APPENDIX 1-A

MEMORANDUM OF UNDERSTANDING (2013)

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AMENDED
Memorandum of Understanding for Integrated Regional Water Management in the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region

1. PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to recognize a mutual understanding among entities in the southern Monterey Bay area regarding their joint efforts toward Integrated Regional Water Management (IRWM) planning. That understanding will continue to increase coordination, collaboration and communication for comprehensive management of water resources in the cities and unincorporated portions of the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region (Region).

A. **Background and Description of Amendments**. The initial MOU to form a Regional Water Management Group (RWMG) was fully executed on July 22, 2008 by the Big Sur Land Trust (BSLT), a 501 (c) 3 organization, the City of Monterey, the Monterey Regional Water Pollution Control Agency (MRWPCA), the Monterey County Water Resources Agency (MCWRA), and the Monterey Peninsula Water Management District (MPWMD). The MOU formed a Regional Water Management Group (RWMG) for the purposes of developing and implementing projects consistent with the guidelines set by the State of California for IRWM.

Subsequently, the Marina Coast Water District (MCWD) requested approval to become part of the RWMG and signed an amended MOU in June 2011 that includes MCWD as a member of the RWMG. In 2012, the Resource Conservation District of Monterey County (RCD) agreed to become a member of the RWMG.

This amended MOU reflects the addition of MCWD and the RCD as members of the RWMG, describes processes and guidelines for changing the membership of the RWMG, and amends the MOU to meet Proposition 84 standards.

2. RECITALS

A. The State of California desires to foster Integrated Regional Water Management (IRWM) planning and encourages local public, non-profit, and private (for profit) entities to define planning regions appropriate for managing water resources and to integrate strategies within these planning regions.

B. Water resources management authority in the Region is currently distributed among various public agencies with a range of legal powers and regulatory responsibilities. These public agencies have definite jurisdictional boundaries, whereas sensible water resources planning and management frequently requires actions in multiple jurisdictions. Non-public entities within the Region have considerable interests in cooperating with public entities to protect, manage, and enhance water resources within the Region.

C. Six public entities and one non-profit entity in the Region with responsibility and interests in the management of water resources have agreed to form a Regional Water Management Group for the purposes of developing and implementing projects consistent with the guidelines set by the State of California for IRWM. These entities are: 1.) the Big Sur Land Trust (BSLT), a 501 (c) 3 organization; 2.) the City of Monterey; 3.) the Monterey Regional Water Pollution Control Agency (MRWPCA); 4.) the Monterey County Water Resources Agency (MCWRA); 5) the Marina Coast Water District (MCWD); 6) the Resource Conservation District of Monterey County; and 7.) the Monterey Peninsula Water Management District (MPWMD).

D. The Regional Water Management Group has defined an appropriate planning Region that takes into consideration jurisdictional limits, powers and responsibilities, and watershed and groundwater basin boundaries. The Regional Water Management Group is taking the lead in overseeing and implementing a detailed IRWM Plan within the planning Region. The Region is generally described as encompassing approximately 347 square miles and consists of groundwater basins and coastal watershed areas contributing to the Carmel Bay and south Monterey Bay. The Region includes coastal watersheds from the southernmost portion of the San Jose Creek watershed north to the northern limit of the Seaside Groundwater Basin. The inland area is bounded by the Seaside Groundwater Basin to the north and by the Carmel River watershed to the south and east. The western limit of the planning Region generally coincides with the land and Pacific Ocean interface, but includes the Pt. Lobos, Carmel Bay, and Pacific Grove Areas of Special Biological Significance (ASBS) adjacent to the coastal portion of the Region.

The principal groundwater basins in the planning Region are the Seaside Groundwater Basin and the Carmel Valley Aquifer. The Region includes about 38 miles of the coast within the Monterey Bay National Marine Sanctuary, three ASBS, the Cities of Carmel-by-the Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, Seaside, and unincorporated portions of Monterey County including the Carmel Valley watershed (255 square miles), Pebble Beach, the Carmel Highlands and portions of the Seaside Groundwater Basin adjacent to Highway 68 (also known as Canyon Del Rey). This description of the planning Region is not intended to be a limitation on projects and resource planning that may be shared between adjacent IRWM planning Regions (e.g., the Greater Monterey County IRWM planning Region to the north and east).

E. The entities signatory to this MOU desire to link and integrate efforts to jointly oversee the development and implementation of a comprehensive Integrated Regional Water Management Plan for the Region.

3. GOALS

The goals of the collaborative effort undertaken pursuant to this MOU are:

3.1 To implement a comprehensive IRWMP for the Region that will consider the strategies that are required by the State under CWC 79562.5 and 79564 and subsequent modifications required under Proposition 84. Eligible projects must yield multiple benefits and include one or more of the following elements (PRC § 75026.(a)):

- **Water supply reliability, water conservation and water use efficiency**
- **Stormwater capture, storage, clean-up, treatment, and management**
- **Removal of invasive non-native species, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands**
- **Non-point source pollution reduction, management and monitoring**
- **Groundwater recharge and management projects**
- **Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users**
- **Water banking, exchange, reclamation and improvement of water quality**
- **Planning and implementation of multipurpose flood management programs**
- **Watershed protection and management**
- **Drinking water treatment and distribution**
- **Ecosystem and fisheries restoration and protection**

3.2 To implement a comprehensive IRWMP for the Region that incorporates water supply, water quality, flood and erosion protection, and environmental protection and enhancement objectives.

3.3 To improve and maximize coordination of individual public, private, and non-profit agency plans, programs and projects for mutual benefit and optimal gain within the Region.

3.4 To help identify, develop, and implement collaborative plans, programs, and projects that may be beyond the scope or capability of individual entities, but which would be of mutual benefit if implemented in a cooperative manner.

3.5 To facilitate regional water management efforts that include multiple water supply, water quality, flood control, and environmental protection and enhancement objectives.

3.6 To foster coordination, collaboration and communication between stakeholders and other interested parties, to achieve greater efficiencies, enhance public services, and build public support for vital projects.

3.7. To realize regional water management objectives at the least cost possible through mutual cooperation, elimination of redundancy, and enhanced regional competitiveness for State and Federal grant funding.

4. DEFINITIONS

4.1 **Integrated Regional Water Management Plan (IRWMP or IRWM Plan).** The plan envisioned by state legislators and state resource agencies that integrates the strategies, objectives, and priorities for projects to manage water resources proposed by public entities, non-profit entities, and stakeholders within a defined Planning Region. The minimum plan standards are as shown in Appendix A of "Integrated Regional Water Management Grant Program Guidelines, November 2004, Department of Water Resources and State Water Resources Control Board, Proposition 50, Chapter 8," as revised. Minimum IRWM Plan standards may be revised from time to time by the State of California.

4.2 **Integration**. The combining of water management strategies and projects to be included in an IRWMP.

4.3.a **Lead Agency for IRWM Plan Development.** The Monterey Peninsula Water Management District is designated by the Regional Water Management Group to lead the development or implementation of an Integrated Regional Water Management Plan for the Region.

4.3.b **Lead Agency for IRWM Grant Applications.** The Regional Water Management Group may designate any entity in the Regional Water Management Group to be the Lead Agency in making application to the State for grant funds.

4.4. **Non-profit Agency.** A 501 (c) (3) corporation, conservancy, group or other organization involved in water resources management in the Region.

4.5 **Private Agency.** A private or publicly held for-profit corporation or property owner involved in water resources management in the Region

4.6. **Project**. A specific project that addresses a service function.

4.7. **Public Agency**. A state-authorized water district, water agency, water management agency or other public entity, be it a special district, city or other governmental entity, responsible for providing one or more services in the areas of water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning and aquatic habitat protection and restoration.

4.8. **Region.** The area defined by the Regional Water Management Group (RWMG) consisting of watersheds, sub-watersheds and groundwater basins under the jurisdiction of one or more entities within the RWMG.

4.9. **Service Function.** A water-related individual service function provided by a private, public, or non-profit entity, i.e. water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood protection, watershed planning, recreational facilities, and habitat protection and restoration.

4.10 **Signatory Entity.** A public, private, or non-profit entity within the Region that is signatory to this MOU.

4.11 **Stakeholder.** A non-signatory public, private, or non-profit agency identified in the IRWM Plan with an interest in water resources management within the Region.

4.12 **Technical Advisory Committee.** The committee organized to advise the Regional Water Management Group and Stakeholders concerning the IRWM Plan. Normally, the group will be comprised of individuals with technical backgrounds in the fields of marine and freshwater biology, ecology, geology, engineering, hydrogeology, planning, resource conservation, riparian systems, water conservation, and water quality. However, stakeholders with interests in a particular aspect of resource or project management, but not necessarily a technical background, may also be considered for inclusion in the TAC.

4.13 **Regional Water Management Group.** The group of entities that takes the lead in overseeing the development and implementation of the Integrated Regional Water Management Plan within the Planning Region. The RWMG consists of the Monterey Regional Water Pollution Control Agency, the Monterey County Water Resources Agency, the Monterey Peninsula Water Management District, the City of Monterey, the Marina Coast Water District, the Resource Conservation District of Monterey County, and the Big Sur Land Trust.

4.14. **Water Management Strategies**. Plans for and activities to be considered in an IRWMP include, but are not limited to, ecosystem restoration, environmental and habitat protection and improvement, water-supply reliability, flood management, groundwater management, recreation and public access, storm water capture and management, water conservation, water quality improvement, water recycling, and wetlands enhancement and creation.

5. IRWMP PARTICIPANTS

5.1 **Adopting Entities.** The entities in the Region that participate in the development, adoption, and implementation of the Integrated Regional Water Management Plan for the Region. Each entity intending to carry out a project proposed in the IRWMP must formally adopt the IRWMP or provide written substantiation of acceptance by the governing authority of the entity. For a public agency, adoption of the IRWMP is by formal resolution of the governing body. For a non-profit or for-profit entity, proof of acceptance of the IRWMP by the equivalent of a public agency governing body is required (e.g., by a board of directors or other management entity).

5.2. **Stakeholders**. Entities, such as other public, private, and non-profit entities, business and environmental groups, that are considered valuable contributors to the understanding and management of the Region's water resources.

5.3. **Regulatory Agencies**. These agencies, including, but not limited to, the Central Coast Regional Water Quality Control Board, California Coastal Commission, U.S. Army Corps of Engineers, California Public Utilities Commission, National Marine Fisheries Service (NOAA Fisheries), U.S. Fish and Wildlife Service, and the California Department of Fish and Game, will be invited to participate in the development and implementation of the IRWMP.

5.4 Regional **Water Management Group.** The group of entities that takes the lead in developing and implementing an Integrated Regional Water Management Plan within the Planning Region.

6. MUTUAL UNDERSTANDING

6.1. **Subject matter scope of the IRWMP**. The IRWMP for the Region will include, but is not limited to, water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning, erosion prevention, and habitat protection and restoration. It is acknowledged that the proposals contained in the IRWMP may be based, in part, on the land-use plans of the member entities local governments such as Cities, Monterey County, and special districts located within the Region. Therefore, the resultant IRWMP will by design have incorporated the land-use plans and assumptions intrinsic to the respective water-related service function.

6.2. **Geographical scope of the IRWMP.** The area for this Memorandum is generally defined as the watersheds and associated groundwater basins contributing to the south Monterey Bay and Carmel Bay as shown in Figure 3-1: Map of Monterey Peninsula Integrated Regional Water Management Planning Region in the IRWM Plan.

The Region includes coastal watersheds from the southernmost portion of the San Jose Creek watershed north to the northern limit of the Seaside Groundwater Basin. The inland area is bounded by the Seaside Groundwater Basin to the north and by the Carmel River watershed to the south and east. The western limit of the planning Region generally coincides with the land and Pacific Ocean interface, but includes the Pt. Lobos, Carmel Bay, and Pacific Grove Areas of Special Biological Significance (ASBS) adjacent to the coastal portion of the Region.

However, it is recognized that the geographic scope represented in the IRWM Plan may be amended to include projects that are implemented cooperatively between IRWM planning regions (e.g., with the Greater Monterey County IRWM planning region) and is not intended to be a rigid boundary.

6.3. **Approach to developing the IRWMP**. It will be the responsibility of each entity signatory to this Memorandum to provide the Lead Agency with information for the IRWMP concerning project proposals or to identify the need for a water management strategy for each service function provided by a signatory entity.

In order to be included in the IRWMP, all proposals for development of water management plans and water development project proposals related to the IRWMP must meet the standards identified in the IRWM Plan for the Region.

A technical advisory committee consisting of staff representatives from the Regional Water Management Group, other Stakeholders and such other organizations as may become contributing entities, will review proposed management plans and project proposals for consistency with the IRWMP and recommend a prioritized list of projects to be carried out within the Region. The Regional Water Management Group and Stakeholders will meet to review the recommendation made by the TAC.

6.4. **Approval of prioritized project list.** Approval of the prioritized project list should occur by consensus of the Regional Water Management Group and Stakeholders and should be based on the prioritization process described in the IRWMP and the recommendations of the Technical Advisory Committee. However, if a consensus cannot be reached among the Stakeholders and Regional Water Management Group, the Regional Water Management Group may make a final determination of the prioritized project list.

6.5. **Adoption of the IRWMP**. Plan adoption will occur by approval of the governing board of each entity. Each member of the RWMG shall adopt the IRWM Plan or an amended IRWM Plan, when the Plan becomes available. Project proponents named in an IRWM grant application shall adopt the IRWM Plan or amended IRWM Plan prior to submittal of the grant application. It should be noted that the adopted Plan and project list may be amended from time to time as described below.

6.6 **Amendment of IRWMP or Prioritized Project list.** The IRWM Plan and prioritized project list may be amended from time to time. Any member of the Regional Water Management Group or Stakeholders may request that the Lead Agency convene a meeting of the Regional Water Management Group and Stakeholders for the purposes of amending the IRWM Plan or the prioritized project list. However, it is anticipated that the IRWMP or prioritized project list will be amended no more frequently than annually, unless more frequent amendments are required to meet State IRWM standards or grant application cycles. An amended IRWM Plan must be consistent with State IRWM standards as described in Definition 4.1 "Integrated Regional Water Management Plan" and any subsequent revisions by the State to IRWM guidelines.

6.7. **Project Implementation.** Project proponents will be responsible for completing proposed projects and providing project reports to the Lead Agency.

6.8 **Project Monitoring.** The Regional Water Management Group will be responsible for monitoring the implementation of the IRWMP. The technical advisory committee will regularly report to the General Managers and Governing Boards of the Regional Water Management Group regarding progress on the development and implementation of the IRWMP. The Lead Agency will be responsible for coordinating data collection and dissemination.

6.9 **Grant Applications.** The Regional Water Management Group will designate a Lead Agency to apply for grant funds. The Lead Agency for each grant application should have a mission and expertise that is consistent with the purpose of the grant being applied for.

6.10 **Grant Awards and Agreement**. The Lead Agency will be the grantee and administer the grant on behalf of the Regional Water Management Group and Stakeholders.

6.11 **Participation in Regional Water Management Group (RWMG)**. Any qualified stakeholder may petition to become a member of the RWMG. A qualified stakeholder must demonstrate the following: a) an interest, responsibility or authority over multiple resources within the region; or b) a unique interest, responsibility, authority, or asset not shared by any other entity within the RWMG. The RWMG shall consider such a request for a change to the RWMG and shall vote by majority to accept or reject the request.

6.12 **Length of Term in Regional Water Management Group**. Members of the RWMG may change from time to time, depending on the level of resources available to each entity. However, there is no required minimum or maximum length of time required as a member of the RWMG. If an entity withdraws from the RWMG, the remaining entities should attempt to replace the interest, responsibility or authority lost by the withdrawal.

6.13 **<u>Rights of the Parties and Constituencies</u>**: This MOU does not provide any added legal rights or regulatory powers to any of the signatory parties, or to the RWMG as a whole. This MOU does not of itself give any party the power to adjudicate water rights, or to regulate or otherwise control the private property of other parties. This

MOU does not contemplate the parties taking any action that would adversely affect the rights of any of the parties, or that would adversely affect the customers or constituencies of any of the parties.

6.14 **Termination**. An entity signatory to this MOU may withdraw from participation upon 30 days advance notice to the other signatory entities, provided it agrees to be financially responsible for any previously committed, but unmet resource commitment.

6.15. **Personnel resources**. It is expected that the General Managers and/or other officials of each entity signatory to this MOU will periodically meet to insure that adequate staff resources are available to implement the IRWM Plan.

6.16. **Other on-going regional efforts**. Development of the IRWMP is separate from efforts of other organizations to develop water-related plans on a regional basis around Monterey Bay and the Central Coast. As the IRWMP is developed and implemented, work products may be shared to provide other entities and groups with current information.

7. INDEMNIFICATION

7.1 Each Party shall indemnify, defend and hold harmless the other parties, to the extent allowed by law and in proportion to fault, against any and all third-party liability for claims, demands, costs or judgments (direct, indirect, incidental or consequential) involving bodily injury, personal injury, death, property damage or other costs and expenses (including reasonable attorneys' fees, costs and expenses) arising or resulting from the acts or omissions of its own officers, agents, employees or representatives carried out pursuant to the obligations of this Agreement.

7.2 These indemnity provisions shall survive the termination or expiration of this Agreement. Further, each Party will be liable to the other Party for attorneys' fees, costs and expenses, and all other costs and expenses whatsoever, which are incurred by the other Party in enforcing these indemnity provisions.

8. RECORD OF AMENDMENTS

8.1 June 2010 – add Marina Coast Water District to RWMG. Revise Goals, Definitions and MOU terms to reflect Proposition 84 requirements.

8.2 March 2012 – add process to change RWMG, define when plan is to be adopted, revise to Proposition 84 standards

8.3 August 2012 – add Resource Conservation District of Monterey County to RWMG

9. SIGNATORIES TO THE MEMORANDUM OF UNDERSTANDING

We, the duly authorized undersigned representatives of our respective entities, acknowledge the above as our understanding of the intent and expected outcome in overseeing the development and implementation of an Integrated Regional Water Management Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region.

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Signature

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Printed Name
Monterey County Water Resources Agency

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Date

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Signature

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Printed Name
Monterey Regional Water Pollution Control Agency

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Date

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Printed Name
Big Sur Land Trust

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Signature

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Printed Name
City of Monterey

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Date

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Signature

_David J. Stoldt_____________________
Printed Name

Monterey Peninsula Water Management District

__7/8/2013___________________________
Date

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Signature

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Printed Name
Marina Coast Water District

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Date

Signature

Printed Name
Board President, Resource Conservation District of Monterey County

Date

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APPENDIX 1-B

AMENDED MEMORANDUM OF UNDERSTANDING (2018)

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AMENDED

Memorandum of Understanding for Integrated Regional Water Management in the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region

1. PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to recognize a mutual understanding among entities in the southern Monterey Bay area regarding their joint efforts toward Integrated Regional Water Management (IRWM) planning. That understanding will continue to increase coordination, collaboration and communication for comprehensive management of water resources in the cities and unincorporated portions of the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region (Region).

A. **Background and Description of Amendments**. The initial MOU to form a Regional Water Management Group (RWMG) was fully executed on July 22, 2008 by the Big Sur Land Trust (BSLT), a 501 (c) 3 organization, the City of Monterey, the Monterey Regional Water Pollution Control Agency (MRPWCA, now known as Monterey One Water or M1W), the Monterey County Water Resources Agency (MCWRA), and the Monterey Peninsula Water Management District (MPWMD). The MOU formed a Regional Water Management Group (RWMG) for the purposes of developing and implementing projects consistent with the guidelines set by the State of California for IRWM.

Subsequently, the Marina Coast Water District (MCWD) requested approval to become part of the RWMG and signed an amended MOU in June 2011 that includes MCWD as a member of the RWMG. In 2012, the MOU was amended to include the Resource Conservation District of Monterey County (RCD) as a member of the RWMG. In 2018, a number of additional organizations requested approval to become part of the MOU, including California State University Monterey Bay, Carmel Area Wastewater District, Carmel River Watershed Conservancy, Carmel Valley Association, City of Carmel-by-the-Sea, City of Del Rey Oaks, City of Sand City, City of Seaside, and Monterey County Resource Management Agency.

In 2014, voters passed Proposition 1, the Water Quality, Supply, and Infrastructure Improvement Act of 2014 the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Act (Public Resources Code, sections 79700 - 79798), which authorizes the Legislature to appropriate funding for competitive grants for Integrated Regional Water Management (IRWM) projects. Funding is administered by the Department of Water Resources (DWR).

In 2015, representatives from the RWMGs representing the Central Coast region, which is coincident with the geographic extent of the funding area, entered into discussions about a funding area agreement for Proposition 1 funds allocated to the Central Coast funding area. In 2016, the Central Coast RWMGs entered into a Memorandum of Agreement for Integrated Regional Water Management Planning and Funding in the

Central Coast Funding Area to share Proposition 1 funding for the IRWM grant program among the six Parties in a fair and equitable manner, and to reduce the need for the Parties to compete against each other for grant funds, which creates unnecessary economic inefficiencies in implementing each Planning Region's IRWM Plan.

(Pending approval by a majority of current RWMG members) This amended MOU reflects the addition of California State University Monterey Bay, Carmel Area Wastewater District, Carmel River Watershed Conservancy, Carmel Valley Association, City of Carmel-by-the-Sea, city of Del Rey Oaks, City of Sand City, City of Seaside, and Monterey County Resource Management Agency as members of the RWMG.

2. RECITALS

A. The State of California desires to foster Integrated Regional Water Management (IRWM) planning and encourages local public, non-profit, and private (for profit) entities to define planning regions appropriate for managing water resources and to integrate strategies within these planning regions.

B. Water resources management authority in the Region is currently distributed among various public agencies with a range of legal powers and regulatory responsibilities. These public agencies have definite jurisdictional boundaries, whereas sensible water resources planning and management frequently requires actions in multiple jurisdictions. Non-public entities within the Region have considerable interests in cooperating with public entities to protect, manage, and enhance water resources within the Region.

C. (Pending approval by current RWMG members) Thirteen public entities and three non-profit entities in the Region with responsibility and interests in the management of water resources have agreed to form a Regional Water Management Group for the purposes of developing and implementing projects consistent with the guidelines set by the State of California for IRWM. These entities are:

- Big Sur Land Trust (BSLT), a 501 (c) 3 organization;
- California State University Monterey Bay
- Carmel Area Wastewater District;
- Carmel River Watershed Conservancy, a 501 (c) 3 organization;
- Carmel Valley Association;
- City of Carmel-by-the-Sea;
- City of Del Rey Oaks
- City of Monterey;
- City of Seaside;
- City of Sand City;
- Monterey One Water (M1W));
- Monterey County Resource Management Agency;
- Monterey County Water Resources Agency (MCWRA);
- Marina Coast Water District (MCWD);

- Resource Conservation District of Monterey County; and
- Monterey Peninsula Water Management District (MPWMD).

D. The RWMG has defined an appropriate planning Region that takes into consideration jurisdictional limits, powers and responsibilities, and watershed and groundwater basin boundaries. The RWMG is taking the lead in overseeing and implementing a detailed IRWM Plan within the planning Region. The Region is generally described as encompassing approximately 347 square miles and consists of groundwater basins and coastal watershed areas contributing to the Carmel Bay and south Monterey Bay. The Region includes coastal watersheds from the southernmost portion of the San Jose Creek watershed north to the northern limit of the Seaside Groundwater Basin. The inland area is bounded by the Seaside Groundwater Basin to the north and by the Carmel River watershed to the south and east. The western limit of the planning Region generally coincides with the land and Pacific Ocean interface, but includes the Pt. Lobos, Carmel Bay, and Pacific Grove Areas of Special Biological Significance (ASBS) adjacent to the coastal portion of the Region.

   The principal groundwater basins in the planning Region are the Seaside Groundwater Basin and the Carmel Valley Aquifer. The Region includes about 38 miles of the coast within the Monterey Bay National Marine Sanctuary, three ASBS, the Cities of Carmel-by-the Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, Seaside, and unincorporated portions of Monterey County including the Carmel Valley watershed (255 square miles), Pebble Beach, the Carmel Highlands and portions of the Seaside Groundwater Basin adjacent to Highway 68 (also known as Canyon Del Rey). This description of the planning Region is not intended to be a limitation on projects and resource planning that may be shared between adjacent IRWM planning Regions (e.g., the Greater Monterey County IRWM planning Region to the north and east).

E. The entities signatory to this MOU desire to link and integrate efforts to jointly oversee the development and implementation of a comprehensive Integrated Regional Water Management Plan for the Region and to allocate IRWM funding within the planning Region.

3. GOALS

The goals of the collaborative effort undertaken pursuant to this MOU are:

3.1 To implement a comprehensive IRWMP for the Region that will consider the strategies that are required by the State under CWC 79562.5 and 79564 and subsequent modifications required under Proposition 1. Eligible projects must yield multiple benefits and include one or more of the following elements

(Water Code §79743 (a - j)):

- ✓ **Water reuse and recycling for non-potable reuse and direct and indirect potable reuse**
- ✓ **Water-use efficiency and water conservation**

- ✓ **Local and regional surface and underground water storage, including groundwater aquifer cleanup or recharge projects**
- ✓ **Regional water conveyance facilities that improve integration of separate water systems**
- ✓ **Watershed protection, restoration, and management projects, including projects that reduce the risk of wildfire or improve water supply reliability**
- ✓ **Stormwater resource management, including, but not limited to, the following:**
  - **Projects to reduce, manage, treat, or capture rainwater or stormwater**
  - **Projects that provide multiple benefits such as water quality, water supply, flood control, or open space**
  - **Decision support tools that evaluate the benefits and costs of multi-benefit stormwater projects**
  - **Projects to implement a stormwater resource plan developed in accordance with Part 2.3 (commencing with Section 10560) of Division 6 including Water Code § 10562 (b)(7)**
- ✓ **Conjunctive use of surface and groundwater storage facilities**
- ✓ **Water desalination projects**
- ✓ **Decision support tools to model regional water management strategies to account for climate change and other changes in regional demand and supply projections**
- ✓ **Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff**
- ✓ **Regional projects or programs as defined by the IRWM Planning Act (Water Code §10537)**

3.2 To implement a comprehensive IRWMP for the Region that incorporates water supply, water quality, flood and erosion protection, and environmental protection and enhancement objectives.

3.3 To improve and maximize coordination of individual public, private, and non-profit agency plans, programs and projects for mutual benefit and optimal gain within the Region.

3.4 To help identify, develop, and implement collaborative plans, programs, and projects that may be beyond the scope or capability of individual entities, but which would be of mutual benefit if implemented in a cooperative manner.

3.5 To facilitate regional water management efforts that include multiple water supply, water quality, flood control, and environmental protection and enhancement objectives.

3.6 To foster coordination, collaboration and communication between stakeholders and other interested parties, to achieve greater efficiencies, enhance public services, and build public support for vital projects.

3.7. To realize regional water management objectives at the least cost possible through mutual cooperation, elimination of redundancy, and enhanced regional competitiveness for State and Federal grant funding.

3.8 To satisfy State requirements for incorporation of a Storm Water Resource plan developed for the Region in accordance with Part 2.3 (commencing with Section 10560) of Division 6 including Water Code § 10562 (b)(7).

4. **DEFINITIONS**

4.1 **Funding Area Agreement.** The agreement entered into between the six regions within the Central Coast funding area to allocate a portion of Proposition 1 IRWM funds to each planning region.

4.2 **Integrated Regional Water Management Plan (IRWMP or IRWM Plan).** The plan envisioned by state legislators and state resource agencies that integrates the strategies, objectives, and priorities for projects to manage water resources proposed by public entities, non-profit entities, and stakeholders within a defined Planning Region. The minimum plan standards are as shown in Appendix A of "Integrated Regional Water Management Grant Program Guidelines, November 2004, Department of Water Resources and State Water Resources Control Board, Proposition 50, Chapter 8," as revised. Minimum IRWM Plan standards may be revised from time to time by the State of California.

4.3 **Integration**. The combining of water management strategies and projects to be included in an IRWMP.

4.4.a **Lead Agency for IRWM Plan Development.** The Monterey Peninsula Water Management District is designated by the Regional Water Management Group to lead the development or implementation of an Integrated Regional Water Management Plan for the Region.

4.4.b **Lead Agency for IRWM Grant Applications.** The Regional Water Management Group may designate any entity in the Regional Water Management Group to be the Lead Agency in making application to the State for grant funds.

4.4.c **Lead Agency for Executing a Central Coast funding area agreement**. The entity the Regional Water Management Group designates to represent the Monterey Peninsula Region to execute a Funding Area Agreement.

4.5 **Non-profit Agency.** A 501 (c) (3) corporation, conservancy, group or other organization involved in water resources management in the Region.

4.6 **Private Agency.** A private or publicly held for-profit corporation or property owner involved in water resources management in the Region

4.7 **Project**. A specific project that addresses a service function.

4.8 **Public Agency**. A state-authorized water district, water agency, water management agency or other public entity, be it a special district, city or other governmental entity, responsible for providing one or more services in the areas of water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning and aquatic habitat protection and restoration.

4.9 **Region.** The area defined by the Regional Water Management Group (RWMG) consisting of watersheds, sub-watersheds and groundwater basins under the jurisdiction of one or more entities within the RWMG.

4.10 **Service Function.** A water-related individual service function provided by a private, public, or non-profit entity, i.e. water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood protection, watershed planning, recreational facilities, and habitat protection and restoration.

4.11 **Signatory Entity.** A public, private, or non-profit entity within the Region that is signatory to this MOU.

4.12 **Stakeholder.** A non-signatory public, private, or non-profit agency identified in the IRWM Plan with an interest in water resources management within the Region.

4.13 **Stormwater Resource Plan**. The plan developed for the Region that identifies stormwater capture project opportunities.

4.14 **Technical Advisory Committee.** The committee organized to advise the Regional Water Management Group and Stakeholders concerning the IRWM Plan. Normally, the group will be comprised of individuals with technical backgrounds in the fields of marine and freshwater biology, ecology, geology, engineering, hydrogeology, planning, resource conservation, riparian systems, water conservation, and water quality. However, stakeholders with interests in a particular aspect of resource or project management, but not necessarily a technical background, may also be considered for inclusion in the TAC.

4.15 **Regional Water Management Group.** The group of entities that takes the lead in overseeing the development and implementation of the Integrated Regional Water Management Plan within the Planning Region. (a list of members of the Regional Water Management Group is provided in Recital C)

4.16 **Water Management Strategies**. Plans for and activities to be considered in an IRWMP include, but are not limited to, ecosystem restoration, environmental and habitat protection and improvement, water-supply reliability, flood management, groundwater management, recreation and public access, storm water capture and management, water conservation, water quality improvement, water recycling, and wetlands enhancement and creation.

5. IRWMP PARTICIPANTS

5.1 **Adopting Entities.** The entities in the Region that participate in the development, adoption, and implementation of the Integrated Regional Water Management Plan for the Region. Each entity intending to carry out a project proposed in the IRWMP must formally adopt the IRWMP or provide written substantiation of acceptance by the governing authority of the entity. For a public agency, adoption of the IRWMP is by formal resolution of the governing body. For a non-profit or for-profit entity, proof of acceptance of the IRWMP by the equivalent of a public agency governing body is required (e.g., by a board of directors or other management entity).

5.2. **Stakeholders**. Entities, such as other public, private, and non-profit entities, business and environmental groups, that are considered valuable contributors to the understanding and management of the Region’s water resources.

5.3. **Regulatory Agencies**. These agencies, including, but not limited to, the State Water Resources Control Board, Central Coast Regional Water Quality Control Board, California Coastal Commission, U.S. Army Corps of Engineers, California Public Utilities Commission, National Marine Fisheries Service (NOAA Fisheries), U.S. Fish and Wildlife Service, and the California Department of Fish and Wildlife, will be invited to participate in the development and implementation of the IRWMP.

5.4 **Regional Water Management Group.** The group of entities that takes the lead in developing and implementing an Integrated Regional Water Management Plan within the Planning Region.

6. MUTUAL UNDERSTANDING

6.1. **Subject matter scope of the IRWMP**. The IRWMP for the Region will include, but is not limited to, water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning, erosion prevention, and habitat protection and restoration. It is acknowledged that the proposals contained in the IRWMP may be based, in part, on the land-use plans of the member entities local governments such as Cities, Monterey County, and special districts located within the Region. Therefore, the resultant IRWMP will by design have incorporated the land-use plans and assumptions intrinsic to the respective water-related service function.

6.2. **Geographical scope of the IRWMP.** The area for this Memorandum is generally defined as the watersheds and associated groundwater basins contributing to the south Monterey Bay and Carmel Bay as shown in Figure 3-1: Map of Monterey Peninsula Integrated Regional Water Management Planning Region in the IRWM Plan.

The Region includes coastal watersheds from the southernmost portion of the San Jose Creek watershed north to the northern limit of the Seaside Groundwater Basin. The inland area is bounded by the Seaside Groundwater Basin to the north and by the Carmel River watershed to the south and east. The western limit of the planning Region generally coincides with the land and Pacific Ocean interface, but includes the Pt. Lobos, Carmel Bay, and Pacific Grove Areas of Special Biological Significance (ASBS) adjacent to the coastal portion of the Region.

However, it is recognized that the geographic scope represented in the IRWM Plan may be amended to include projects that are implemented cooperatively between IRWM planning regions (e.g., with the Greater Monterey County IRWM planning region) and is not intended to be a rigid boundary.

6.3. **Approach to developing the IRWMP**. It will be the responsibility of each entity signatory to this Memorandum to provide the Lead Agency with information for the IRWMP concerning project proposals or to identify the need for a water management strategy for each service function provided by a signatory entity.

In order to be included in the IRWMP, all proposals for development of water management plans and water development project proposals related to the IRWMP must meet the standards identified in the IRWM Plan for the Region.

A technical advisory committee consisting of staff representatives from the Regional Water Management Group, other Stakeholders and such other organizations as may become contributing entities, will review proposed management plans and project proposals for consistency with the IRWMP and recommend a prioritized list of projects to be carried out within the Region. The Regional Water Management Group and Stakeholders will meet to review the recommendation made by the TAC.

6.4. **Approval of prioritized project list.** Approval of the prioritized project list should occur by consensus of the Regional Water Management Group and Stakeholders and should be based on the prioritization process described in the IRWMP and the recommendations of the Technical Advisory Committee. However, if a consensus cannot be reached among the Stakeholders and Regional Water Management Group, the Regional Water Management Group may make a final determination of the prioritized project list.

6.5. **Adoption of the IRWMP**. Plan adoption will occur by approval of the governing board of each entity. Each member of the RWMG shall adopt the IRWM Plan or an amended IRWM Plan, when the Plan becomes available. Project proponents named in an IRWM grant application shall adopt the IRWM Plan or amended IRWM Plan prior to submittal of the grant application. It should be noted that the adopted Plan and project list may be amended from time to time as described below.

6.6 **Amendment of IRWMP or Prioritized Project list.** The IRWM Plan and prioritized project list may be amended from time to time. Any member of the Regional Water Management Group or Stakeholders may request that the Lead Agency convene a meeting of the Regional Water Management Group and Stakeholders for the purposes of amending the IRWM Plan or the prioritized project list. However, it is anticipated that the IRWMP or prioritized project list will be amended no more frequently than annually, unless more frequent amendments are required to meet State IRWM standards or grant application cycles. An amended IRWM Plan must be consistent with State IRWM standards as described in Definition 4.1 “Integrated Regional Water Management Plan” and any subsequent revisions by the State to IRWM guidelines.

6.7. **Project Implementation.** Project proponents will be responsible for completing proposed projects and providing project reports to the Lead Agency.

6.8 **Project Monitoring.** The Regional Water Management Group will be responsible for monitoring the implementation of the IRWMP. The technical advisory committee will regularly report to the General Managers and Governing Boards of the Regional Water Management Group regarding progress on the development and implementation of the IRWMP. The Lead Agency will be responsible for coordinating data collection and dissemination.

6.9 **Grant Applications.** The Regional Water Management Group will designate a Lead Agency to apply for grant funds. The Lead Agency for each grant application should have a mission and expertise that is consistent with the purpose of the grant being applied for.

6.10 **Central Coast funding area agreement.** The RWMG designates MPWMD to execute a funding area agreement on behalf of the Monterey Peninsula Planning Region.

6.11 **Grant Awards and Agreement**. The Lead Agency will be the grantee and administer the grant on behalf of the Regional Water Management Group and Stakeholders.

6.12 **Participation in Regional Water Management Group (RWMG)**. Any qualified stakeholder may petition to become a member of the RWMG. A qualified stakeholder must demonstrate an interest, responsibility or authority over one or more resources within the region; The RWMG shall consider such a request for a change to the RWMG and shall vote by majority to accept or reject the request.

6.13 **Length of Term in Regional Water Management Group**. Members of the RWMG may change from time to time, depending on the level of resources available to each entity. However, there is no required minimum or maximum length of time required as a member of the RWMG. If an entity withdraws from the RWMG, the remaining entities should attempt to replace the interest, responsibility or authority lost by the withdrawal.

6.14 **Rights of the Parties and Constituencies**: This MOU does not provide any added legal rights or regulatory powers to any of the signatory parties, or to the RWMG as a whole. This MOU does not of itself give any party the power to adjudicate water rights, or to regulate or otherwise control the private property of other parties. This MOU does not contemplate the parties taking any action that would adversely affect the rights of any of the parties, or that would adversely affect the customers or constituencies of any of the parties.

6.15 **Termination**. An entity signatory to this MOU may withdraw from participation upon 30 days advance notice to the other signatory entities, provided it agrees to be financially responsible for any previously committed, but unmet resource commitment.

6.16. **Personnel resources**. It is expected that the General Managers and/or other officials of each entity signatory to this MOU will periodically meet to insure that adequate staff resources are available to implement the IRWM Plan.

6.17. **Other on-going regional efforts.** Development of the IRWMP is separate from efforts of other organizations to develop water-related plans on a regional basis around Monterey Bay and the Central Coast. As the IRWMP is developed and implemented, work products may be shared to provide other entities and groups with current information.

7. RECORD OF AMENDMENTS

7.1 June 2010 – add Marina Coast Water District to RWMG. Revise Goals, Definitions and MOU terms to reflect Proposition 84 requirements.

7.2 March 2012 – add process to change RWMG, define when plan is to be adopted, revise to Proposition 84 standards

7.3 August 2012 – add Resource Conservation District of Monterey County to RWMG

7.4 DATE (anticipated as by February 2019) – add California State University Monterey Bay, Carmel Area Wastewater District, Carmel River Watershed Conservancy, Carmel Valley Association, City of Carmel-by-the-Sea, City of Del Rey Oaks, City of Sand City, City of Seaside, and Monterey County Resource Management Agency to RWMG

8. SIGNATORIES TO THE MEMORANDUM OF UNDERSTANDING

We, the duly authorized undersigned representatives of our respective entities, acknowledge the above as our understanding of the intent and expected outcome in overseeing the development and implementation of an Integrated Regional Water Management Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region.

Big Sur Land Trust By:________________________________ Date:________________________, 20____	**Monterey County Water Resources Agency** By:________________________________ Date:________________________, 20____
Monterey Regional Water Pollution Control Agency By:________________________________ Date:________________________, 20____	**City of Monterey** By:________________________________ Date:________________________, 20____
Monterey Peninsula Water Management District By:________________________________ Date:________________________, 20____	**Marina Coast Water District** By:________________________________ Date:________________________, 20____
Resource Conservation District of Monterey County By:________________________________ Date:________________________, 20____	**California State University Monterey Bay** By:________________________________ Date:________________________, 20____

Carmel Area Wastewater District **By:** **Date: , 20____**	**Carmel River Watershed Conservancy** **By:** **Date: , 20____**
Carmel Valley Association **By: Priscilla Walton** **Date:May 2 , 2019____**	**City of Carmel-by-the-Sea** **By:** **Date: , 20____**
City of Del Rey Oaks **By:** **Date: , 20____**	**City of Sand City** **By:** **Date: , 20____**
City of Seaside **By:** **Date: , 20____**	**Monterey County Resource Management Agency** **By:** **Date: , 20____**

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APPENDIX 1-C

RESOLUTIONS OF ADOPTION

[PENDING APPROVAL BY RWMG]

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APPENDIX 1-D

CURRENT STAKEHOLDERS LIST

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Monterey Peninsula Integrated Water Management Plan
Stakeholder List

Date: July 22, 2019

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Monterey Peninsula Integrated Water Management Plan
Stakeholder List

Date: July 22, 2019

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Monterey Peninsula Integrated Water Management Plan
Stakeholder List

Date: July 22, 2019

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Monterey Peninsula Integrated Water Management Plan
Stakeholder List

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Shawn Milar	shawn_milar@fws.gov	USFWS Coastal Program

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APPENDIX 1-E

NOTICE OF INTENT

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INVOICE

Monterey County Weekly Classifieds

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INVOICE NUMBER: 10-061302-00000
Public Notice
Intent to Update to the Monterey
Peninsula, Carmel Bay, and South
Monterey Bay Integrated Regional
Water Management Plan

Placed by Sara Reyes
Published July 25, Aug. 1, 2019

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MONTEREY COUNTY

WEEKLY

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Proof of publication

State of California
County of Monterey

I am a citizen of the United States and a resident of the State of California. I am over the age of 18 years and not party to or interested in the above-entitled matter.

I am the principal clerk of *Monterey County Weekly,* a newspaper of general circulation, published weekly by Milestone Communications, Inc. in the City of Seaside, County of Monterey, and which newspaper has been adjudicated a newspaper of general circulation by the Superior Court of the County of Monterey, State of California; that the notice of which the annexed is a printed copy has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates to wit.

July 25, Aug. 1, 2019

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Name....Linda S. Maceira........................

Signature.....Linda S. Maceira

Dated:.Aug. 1, 2019..Monterey, California

PUBLIC NOTICE

Notice of Intent to Update to the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management (IRWM) Plan

NOTICE IS HERBY GIVEN that the Monterey Peninsula Water Management District (MPWMD), on behalf of the Regional Water Management Group (RWMG), has initiated an update to the existing Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM Plan (IRWM Plan or IRWMP), dated June 2014, in accordance with the requirements in the Department of Water Resources Proposition 1 Final IRWM Guidelines and §6066 of the Government Code.

Pending final ratification of a revised Memorandum of Understanding by all members, the RWMG, which oversees the development of the IRWM Plan, is comprised of the following agencies:

- Big Sur Land Trust (BSLT), a 501 (c) 3 organization;
- California State University Monterey Bay
- Carmel Area Wastewater District;
- Carmel River Watershed Conservancy, a 501 (c) 3 organization;
- Carmel Valley Association;
- City of Carmel-by-the-Sea;
- City of Del Rey Oaks
- City of Monterey;
- City of Pacific Grove;
- City of Seaside;
- City of Sand City;
- Monterey One Water (M1W));
- Monterey County Resource Management Agency (RMA);
- Monterey County Water Resources Agency (MCWRA);
- Marina Coast Water District (MCWD);
- Resource Conservation District of Monterey County; and
- Monterey Peninsula Water Management District (MPWMD).

MPWMD is the lead agency in the region.The IRWMP is a document that identifies and plans for the water resource-related needs of the Monterey Peninsula, Carmel Bay, and South Monterey Bay region. The IRWM Plan examines current and future water-related needs, identifies regional objectives for water-related resource management, develops strategies to address identified needs and then presents and evaluates stakeholder proposed projects to meet the regional objectives. The intent of the IRWM Plan is to integrate water management, watershed planning, implementation efforts, and to facilitate regional cooperation with the goal of improving water supply reliability, water recycling, water conservation, recreation and environmental habitat protection. One of the primary objectives of the IRWM Plan is to provide ongoing guidance and prioritization regarding implementation projects and programs for funding consideration under grant programs, including those funded by Proposition 1.

The existing IRWM Plan for the region complies with Proposition 84 IRWM standards. However, these standards have been revised and re-written and the existing IRWM Plan, which was adopted in 2014, must be amended to be in conformance with the new standards specifically, the IRWM Grant Program Guidelines for projects funded by Proposition 1, Chapter 7 Regional Water Security, Climate and Drought Preparedness (Water Code § 79740 ⊠ 79748).

To join the IRWM Plan Update notification list or to comment on the project, please submit requests in writing to:

Monterey Peninsula Water Management District

Maureen Hamilton, Water Resources Engineer

5 Harris Court, [illegible] 0.
Box 85

Monterey, California 93942-0085

Tel: (831) 658-5622

E-mail address: mhamilton@mpwmd.net

Web address: www.mpirwm.org

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

APPENDIX 2-A

SPECIAL STATUS SPECIES

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Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Moss Landing (3612177) OR Prunedale (3612176) OR San Juan Bautista (3612175) OR Natividad (3612165) OR Salinas (3612166) OR Marina (3612167) OR Spreckels (3612156) OR Seaside (3612157) OR Monterey (3612158) OR Soberanes Point (3612148) OR Mt. Carmel (3612147))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Threatened	G2G3	S1S2	SSC
Agrostis lacuna-vernalis vernal pool bent grass	PMPOA041N0	None	None	G1	S1	1B.1
Allium hickmanii Hickman's onion	PMLIL02140	None	None	G2	S2	1B.2
Ambystoma californiense California tiger salamander	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
Ambystoma macrodactylum croceum Santa Cruz long-toed salamander	AAAAA01082	Endangered	Endangered	G5T1T2	S1S2	FP
Anniella pulchra northern California legless lizard	ARACC01020	None	None	G3	S3	SSC
Antrozous pallidus pallid bat	AMACC10010	None	None	G5	S3	SSC
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Arctostaphylos edmundsii Little Sur manzanita	PDERI04260	None	None	G2	S2	1B.2
Arctostaphylos hookeri ssp. hookeri Hooker's manzanita	PDERI040J1	None	None	G3T2	S2	1B.2
Arctostaphylos montereyensis Toro manzanita	PDERI040R0	None	None	G2?	S2?	1B.2
Arctostaphylos pajaroensis Pajaro manzanita	PDERI04100	None	None	G1	S1	1B.1
Arctostaphylos pumila sandmat manzanita	PDERI04180	None	None	G1	S1	1B.2
Asio flammeus short-eared owl	ABNSB13040	None	None	G5	S3	SSC
Astragalus tener var. tener alkali milk-vetch	PDFAB0F8R1	None	None	G2T1	S1	1B.2
Astragalus tener var. titi coastal dunes milk-vetch	PDFAB0F8R2	Endangered	Endangered	G2T1	S1	1B.1
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
Bombus occidentalis western bumble bee	IIHYM24250	None	None	G2G3	S1	
Bryoria spiralifera twisted horsehair lichen	NLTEST5460	None	None	G3	S1S2	1B.1
Buteo regalis ferruginous hawk	ABNKC19120	None	None	G4	S3S4	WL
Castilleja ambigua var. insalutata pink Johnny-nip	PDSCR0D403	None	None	G4T2	S2	1B.1
Central Dune Scrub Central Dune Scrub	CTT21320CA	None	None	G2	S2.2	
Central Maritime Chaparral Central Maritime Chaparral	CTT37C20CA	None	None	G2	S2.2	
Centromadia parryi ssp. congdonii Congdon's tarplant	PDAST4R0P1	None	None	G3T1T2	S1S2	1B.1
Charadrius alexandrinus nivosus western snowy plover	ABNNB03031	Threatened	None	G3T3	S2S3	SSC
Chorizanthe minutiflora Fort Ord spineflower	PDPGN04100	None	None	G1	S1	1B.2
Chorizanthe pungens var. pungens Monterey spineflower	PDPGN040M2	Threatened	None	G2T2	S2	1B.2
Chorizanthe robusta var. robusta robust spineflower	PDPGN040Q2	Endangered	None	G2T1	S1	1B.1
Clarkia jolonensis Jolon clarkia	PDONA050L0	None	None	G2	S2	1B.2
Coastal and Valley Freshwater Marsh Coastal and Valley Freshwater Marsh	CTT52410CA	None	None	G3	S2.1	
Coastal Brackish Marsh Coastal Brackish Marsh	CTT52200CA	None	None	G2	S2.1	
Coelus globosus globose dune beetle	IICOL4A010	None	None	G1G2	S1S2	
Collinsia multicolor San Francisco collinsia	PDSCR0H0B0	None	None	G2	S2	1B.2
Cordylanthus rigidus ssp. littoralis seaside bird's-beak	PDSCR0J0P2	None	Endangered	G5T2	S2	1B.1
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	None	G3G4	S2	SSC
Coturnicops noveboracensis yellow rail	ABNME01010	None	None	G4	S1S2	SSC
Cypseloides niger black swift	ABNUA01010	None	None	G4	S2	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Danaus plexippus pop. 1 monarch - California overwintering population	IILEPP2012	None	None	G4T2T3	S2S3	
Delphinium californicum ssp. interius Hospital Canyon larkspur	PDRAN0B0A2	None	None	G3T3	S3	1B.2
Delphinium hutchinsoniae Hutchinson's larkspur	PDRAN0B0V0	None	None	G2	S2	1B.2
Delphinium umbraculorum umbrella larkspur	PDRAN0B1W0	None	None	G3	S3	1B.3
Dipodomys venustus venustus Santa Cruz kangaroo rat	AMAFD03042	None	None	G4T1	S1	
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Eremophila alpestris actia California horned lark	ABPAT02011	None	None	G5T4Q	S4	WL
Ericameria fasciculata Eastwood's goldenbush	PDAST3L080	None	None	G2	S2	1B.1
Eriogonum nortonii Pinnacles buckwheat	PDPGN08470	None	None	G2	S2	1B.3
Erysimum ammophilum sand-loving wallflower	PDBRA16010	None	None	G2	S2	1B.2
Erysimum menziesii Menzies' wallflower	PDBRA160R0	Endangered	Endangered	G1	S1	1B.1
Eucyclogobius newberryi tidewater goby	AFCQN04010	Endangered	None	G3	S3	SSC
Euphilotes enoptes smithi Smith's blue butterfly	IILEPG2026	Endangered	None	G5T1T2	S1S2	
Falco mexicanus prairie falcon	ABNKD06090	None	None	G5	S4	WL
Falco peregrinus anatum American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
Fritillaria liliacea fragrant fritillary	PMLIL0V0C0	None	None	G2	S2	1B.2
Gilia tenuiflora ssp. arenaria Monterey gilia	PDPLM041P2	Endangered	Threatened	G3G4T2	S2	1B.2
Helminthoglypta sequoicola consors redwood shoulderband	IMGASC2421	None	None	G2T1	S1	
Hesperocyparis goveniana Gowen cypress	PGCUP04031	Threatened	None	G1	S1	1B.2
Hesperocyparis macrocarpa Monterey cypress	PGCUP04060	None	None	G1	S1	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Holocarpha macradenia Santa Cruz tarplant	PDAST4X020	Threatened	Endangered	G1	S1	1B.1
Horkelia cuneata var. sericea Kellogg's horkelia	PDROS0W043	None	None	G4T1?	S1?	1B.1
Horkelia marinensis Point Reyes horkelia	PDROS0W0B0	None	None	G2	S2	1B.2
Lasiurus cinereus hoary bat	AMACC05030	None	None	G5	S4	
Lasthenia conjugens Contra Costa goldfields	PDAST5L040	Endangered	None	G1	S1	1B.1
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
Layia carnosa beach layia	PDAST5N010	Endangered	Endangered	G2	S2	1B.1
Legenere limosa legenere	PDCAM0C010	None	None	G2	S2	1B.1
Linderiella occidentalis California linderiella	ICBRA06010	None	None	G2G3	S2S3	
Lupinus tidestromii Tidestrom's lupine	PDFAB2B3Y0	Endangered	Endangered	G1	S1	1B.1
Malacothamnus palmeri var. involucratus Carmel Valley bush-mallow	PDMAL0Q0B1	None	None	G3T2Q	S2	1B.2
Malacothrix saxatilis var. arachnoidea Carmel Valley malacothrix	PDAST660C2	None	None	G5T2	S2	1B.2
Meconella oregana Oregon meconella	PDPAP0G030	None	None	G2G3	S2	1B.1
Microseris paludosa marsh microseris	PDAST6E0D0	None	None	G2	S2	1B.2
Monardella sinuata ssp. nigrescens northern curly-leaved monardella	PDLAM18162	None	None	G3T2	S2	1B.2
Monolopia gracilens woodland woollythreads	PDAST6G010	None	None	G3	S3	1B.2
Monterey Cypress Forest Monterey Cypress Forest	CTT83150CA	None	None	G1	S1.2	
Monterey Pine Forest Monterey Pine Forest	CTT83130CA	None	None	G1	S1.1	
Monterey Pygmy Cypress Forest Monterey Pygmy Cypress Forest	CTT83162CA	None	None	G1	S1.1	
Northern Bishop Pine Forest Northern Bishop Pine Forest	CTT83121CA	None	None	G2	S2.2	
Northern Coastal Salt Marsh Northern Coastal Salt Marsh	CTT52110CA	None	None	G3	S3.2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Oceanodroma homochroa ashy storm-petrel	ABNDC04030	None	None	G2	S2	SSC
Oncorhynchus mykiss irideus pop. 9 steelhead - south-central California coast DPS	AFCHA0209H	Threatened	None	G5T2Q	S2	
Optioservus canus Pinnacles optioservus riffle beetle	IICOL5E020	None	None	G1	S1	
Pelecanus occidentalis californicus California brown pelican	ABNFC01021	Delisted	Delisted	G4T3T4	S3	FP
Phrynosoma blainvillii coast horned lizard	ARACF12100	None	None	G3G4	S3S4	SSC
Pinus radiata Monterey pine	PGPIN040V0	None	None	G1	S1	1B.1
Piperia yadonii Yadon's rein orchid	PMORC1X070	Endangered	None	G1	S1	1B.1
Plagiobothrys chorisianus var. chorisianus Choris' popcornflower	PDBOR0V061	None	None	G3T1Q	S1	1B.2
Plagiobothrys diffusus San Francisco popcornflower	PDBOR0V080	None	Endangered	G1Q	S1	1B.1
Plagiobothrys uncinatus hooked popcornflower	PDBOR0V170	None	None	G2	S2	1B.2
Potentilla hickmanii Hickman's cinquefoil	PDROS1B0U0	Endangered	Endangered	G1	S1	1B.1
Rallus obsoletus obsoletus California Ridgway's rail	ABNME05011	Endangered	Endangered	G5T1	S1	FP
Ramalina thrausta angel's hair lichen	NLLEC3S340	None	None	G5	S2?	2B.1
Rana boylii foothill yellow-legged frog	AAABH01050	None	Candidate Threatened	G3	S3	SSC
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Reithrodontomys megalotis distichlis Salinas harvest mouse	AMAFF02032	None	None	G5T1	S1	
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S2	
Rosa pinetorum pine rose	PDROS1J0W0	None	None	G2	S2	1B.2
Sidalcea malachroides maple-leaved checkerbloom	PDMAL110E0	None	None	G3	S3	4.2
Sorex ornatus salarius Monterey shrew	AMABA01105	None	None	G5T1T2	S1S2	SSC
Spea hammondii western spadefoot	AAABF02020	None	None	G3	S3	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	
Stebbinsoseris decipiens Santa Cruz microseris	PDAST6E050	None	None	G2	S2	1B.2
Taricha torosa Coast Range newt	AAAAF02032	None	None	G4	S4	SSC
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC
Thamnophis hammondii two-striped gartersnake	ARADB36160	None	None	G4	S3S4	SSC
Tortula californica California screw moss	NBMUS7L090	None	None	G2G3	S2S3	1B.2
Trifolium buckwestiorum Santa Cruz clover	PDFAB402W0	None	None	G2	S2	1B.1
Trifolium hydrophilum saline clover	PDFAB400R5	None	None	G2	S2	1B.2
Trifolium polyodon Pacific Grove clover	PDFAB402H0	None	Rare	G1	S1	1B.1
Trifolium trichocalyx Monterey clover	PDFAB402J0	Endangered	Endangered	G1	S1	1B.1
Tryonia imitator mimic tryonia (=California brackishwater snail)	IMGASJ7040	None	None	G2	S2	
Valley Needlegrass Grassland Valley Needlegrass Grassland	CTT42110CA	None	None	G3	S3.1	
Vireo bellii pusillus least Bell's vireo	ABPBW01114	Endangered	Endangered	G5T2	S2	

Record Count: 115

APPENDIX 2-B

LAND USE DESIGNATIONS

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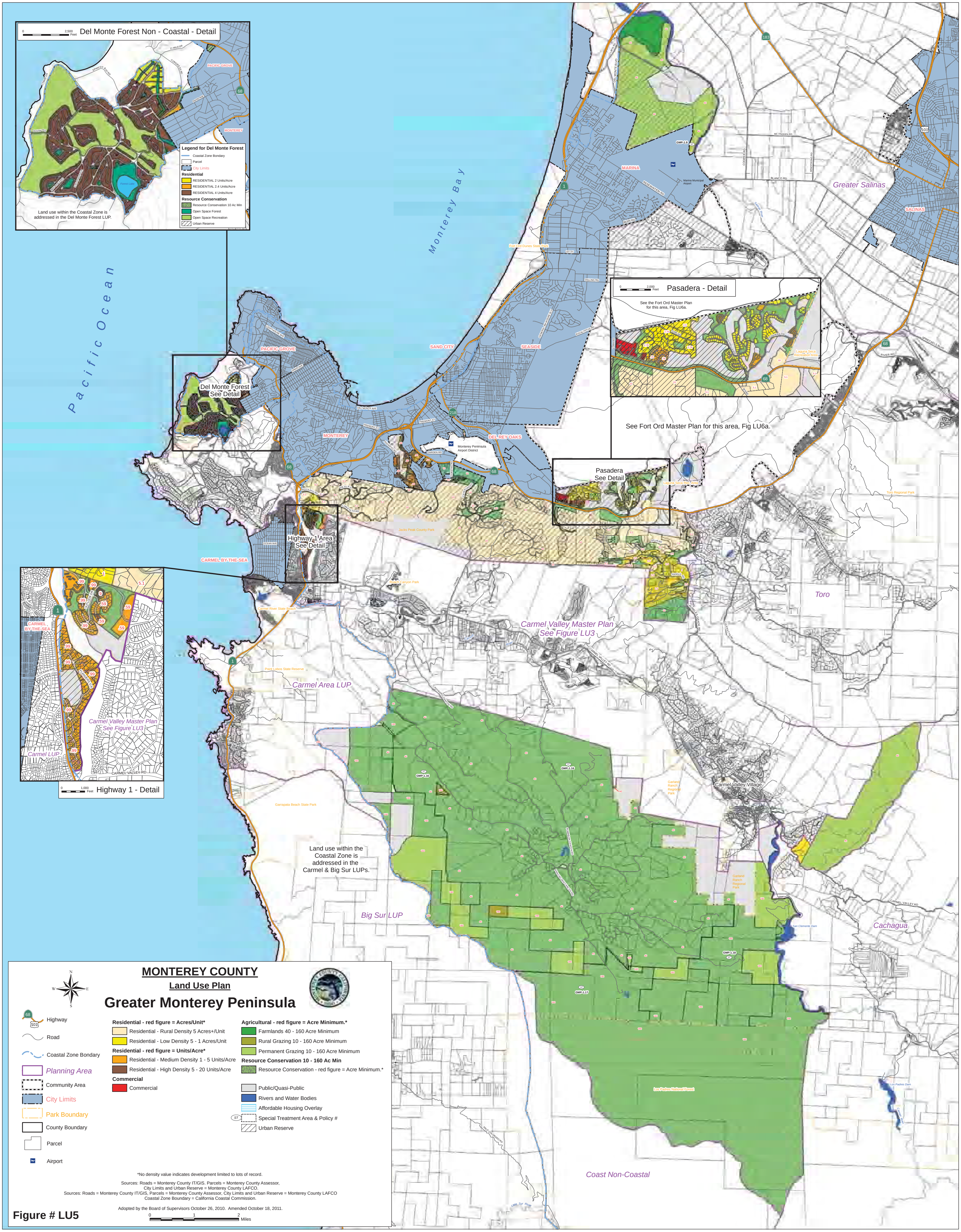
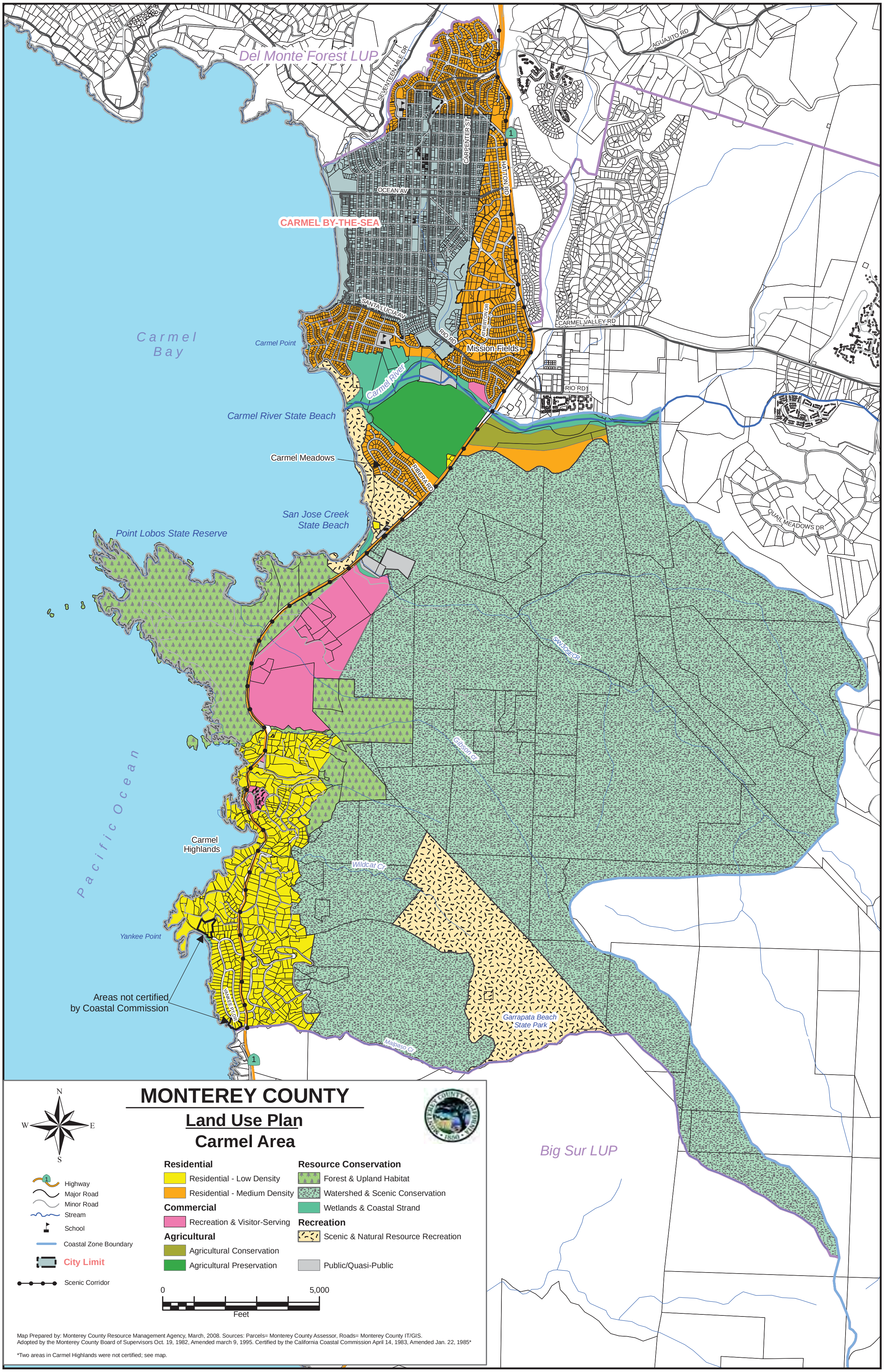
Land Use Designation Maps

I. Monterey County General Plan
   a. Greater Monterey Peninsula Area Plan
   b. Carmel Area Land Use Plan
   c. Del Monte Forest Land Use Plan
   d. Fort Ord Master Plan
   e. Carmel Valley Master Plan
II. Fort Ord Base Reuse Plan
III. City of Seaside General Plan
IV. Sand City General Plan
V. City of Del Rey Oaks General Plan
VI. City of Monterey General Plan
VII. City of Pacific Grove General Plan
VIII. City of Carmel-by-the-Sea General Plan



MONTEREY COUNTY
Land Use Plan
Greater Monterey Peninsula
Figure # LU5
Highway
Road
Coastal Zone Bondary
Planning Area
Community Area
City Limits
Park Boundary
County Boundary
Parcel
Airport
Residential - red figure = Acres/Unit*
Residential - Rural Density 5 Acres+/Unit
Residential - Low Density 5 - 1 Acres/Unit
Residential - red figure = Units/Acre*
Residential - Medium Density 1 - 5 Units/Acre
Residential - High Density 5 - 20 Units/Acre
Commercial
Commercial
Agricultural - red figure = Acre Minimum.*
Farmlands 40 - 160 Acre Minimum
Rural Grazing 10 - 160 Acre Minimum
Permanent Grazing 10 - 160 Acre Minimum
Resource Conservation 10 - 160 Ac Min
Resource Conservation - red figure = Acre Minimum.*
Public/Quasi-Public
Rivers and Water Bodies
Affordable Housing Overlay
Special Treatment Area & Policy #
Urban Reserve
*No density value indicates development limited to lots of record.
Sources: Roads = Monterey County IT/GIS. Parcels = Monterey County Assessor, City Limits and Urban Reserve = Monterey County LAFCO.
Sources: Roads = Monterey County IT/GIS, Parcels = Monterey County Assessor, City Limits and Urban Reserve = Monterey County LAFCO
Coastal Zone Boundary = California Coastal Commission.
Adopted by the Board of Supervisors October 26, 2010. Amended October 18, 2011.
0 1 2 Miles
Del Monte Forest Non - Coastal - Detail
Legend for Del Monte Forest
Coastal Zone Boundary
Parcel
City Limits
Residential
RESIDENTIAL 2 Units/Acre
RESIDENTIAL 2.4 Units/Acre
RESIDENTIAL 4 Units/Acre
Resource Conservation
Resource Conservation 10 Ac Min
Open Space Forest
Open Space Recreation
Urban Reserve
Land use within the Coastal Zone is addressed in the Del Monte Forest LUP.
PACIFIC GROVE
MONTEREY
Pasadera - Detail
See the Fort Ord Master Plan for this area, Fig LU6a.
See Fort Ord Master Plan for this area, Fig LU6a.
Highway 1 - Detail
CARMEL BY-THE-SEA
Carmel Valley Master Plan See Figure LU3
Carmel LUP
CARMEL VALLEY RD
Pacific Ocean
Monterey Bay
MARINA
Marina Municipal Airport
Greater Salinas
SALINAS
SAND CITY
SEASIDE
PACIFIC GROVE
MONTEREY
DEL REY OAKS
Monterey Peninsula Airport District
Del Monte Forest See Detail
Pasadera See Detail
Highway 1 Area See Detail
CARMEL-BY-THE-SEA
Toro
Carmel Valley Master Plan See Figure LU3
Carmel Area LUP
Carmel Valley Village
Land use within the Coastal Zone is addressed in the Carmel & Big Sur LUPs.
Big Sur LUP
Cachagua
Coast Non-Coastal
Los Padres National Forest



Del Monte Forest LUP
SEVENTEEN MILE DR
AGUAJITO RD
CARPENTER ST
HATTON RD
OCEAN AV
CARMEL BY-THE-SEA
SANTA LUCIA AV
RIO RD
Carmel Bay
Carmel Point
Mission Fields
CARMEL VALLEY RD
RIO RD
Carmel River
Carmel River State Beach
Carmel Meadows
RIBERA RD
San Jose Creek
State Beach
Point Lobos State Reserve
QUAIL MEADOWS DR
San Jose Cr
Gibson Cr
Pacific Ocean
Carmel
Highlands
Wildcat Cr
Yankee Point
Areas not certified
by Coastal Commission
Garrapata Beach
State Park
Malpaso Cr
Big Sur LUP
MONTEREY COUNTY
Land Use Plan
Carmel Area
N
W
E
S
Highway
Major Road
Minor Road
Stream
School
Coastal Zone Boundary
City Limit
Scenic Corridor
Residential
Residential - Low Density
Residential - Medium Density
Commercial
Recreation & Visitor-Serving
Agricultural
Agricultural Conservation
Agricultural Preservation
Resource Conservation
Forest & Upland Habitat
Watershed & Scenic Conservation
Wetlands & Coastal Strand
Recreation
Scenic & Natural Resource Recreation
Public/Quasi-Public
0
5,000
Feet
Map Prepared by: Monterey County Resource Management Agency, March, 2008. Sources: Parcels= Monterey County Assessor, Roads= Monterey County IT/GIS.
Adopted by the Monterey County Board of Supervisors Oct. 19, 1982, Amended march 9, 1995. Certified by the California Coastal Commission April 14, 1983, Amended Jan. 22, 1985*
*Two areas in Carmel Highlands were not certified; see map.

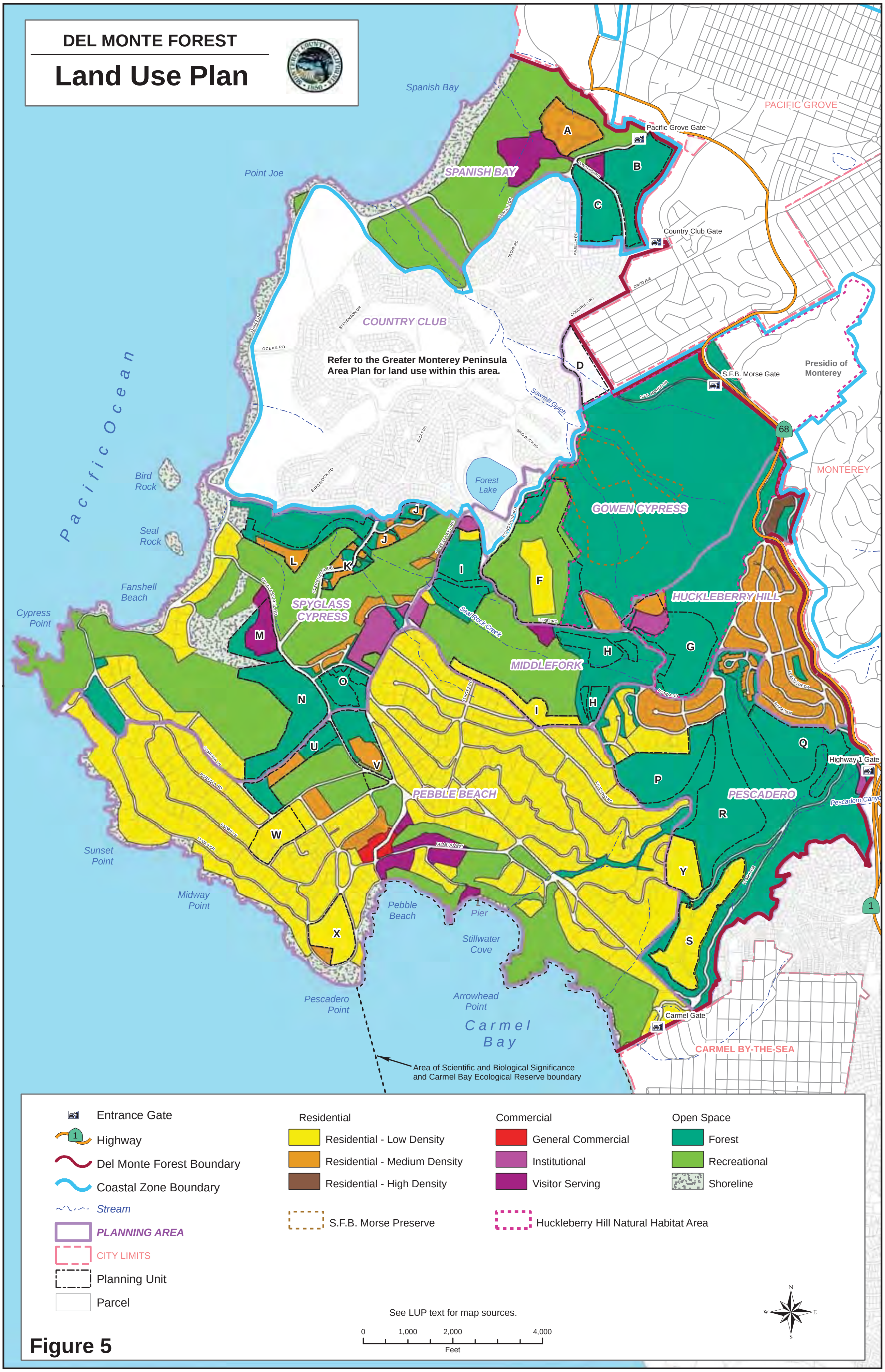

DEL MONTE FOREST
Land Use Plan
Spanish Bay
PACIFIC GROVE
Pacific Grove Gate
Point Joe
SPANISH BAY
Country Club Gate
COUNTRY CLUB
Refer to the Greater Monterey Peninsula Area Plan for land use within this area.
S.F.B. Morse Gate
Presidio of Monterey
Sawmill Gulch
Pacific Ocean
Bird Rock
Seal Rock
Forest Lake
MONTEREY
GOWEN CYPRESS
Fanshell Beach
Cypress Point
SPYGLASS CYPRESS
HUCKLEBERRY HILL
Seal Rock Creek
MIDDLEFORK
PEBBLE BEACH
PESCADERO
Highway 1 Gate
Pescadero Canyon
Sunset Point
Midway Point
Pebble Beach
Pier
Stillwater Cove
Pescadero Point
Arrowhead Point
Carmel Bay
Carmel Gate
CARMEL BY-THE-SEA
Area of Scientific and Biological Significance and Carmel Bay Ecological Reserve boundary
A
B
C
D
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
U
V
W
X
Y
68
1
Entrance Gate
Highway
Del Monte Forest Boundary
Coastal Zone Boundary
Stream
PLANNING AREA
CITY LIMITS
Planning Unit
Parcel
Residential
Residential - Low Density
Residential - Medium Density
Residential - High Density
S.F.B. Morse Preserve
Commercial
General Commercial
Institutional
Visitor Serving
Huckleberry Hill Natural Habitat Area
Open Space
Forest
Recreational
Shoreline
See LUP text for map sources.
0
1,000
2,000
4,000
Feet
N
S
E
W

Figure 5

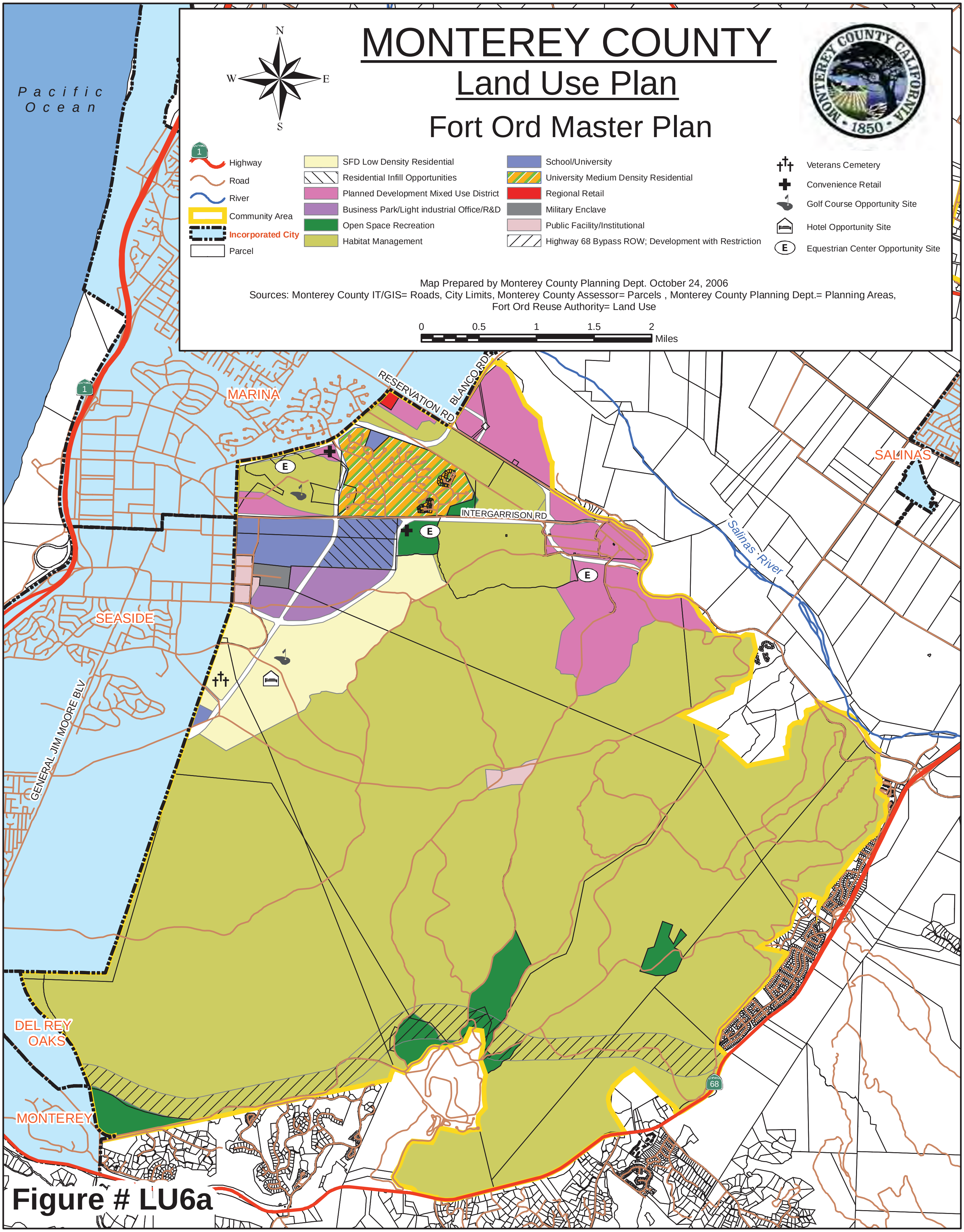
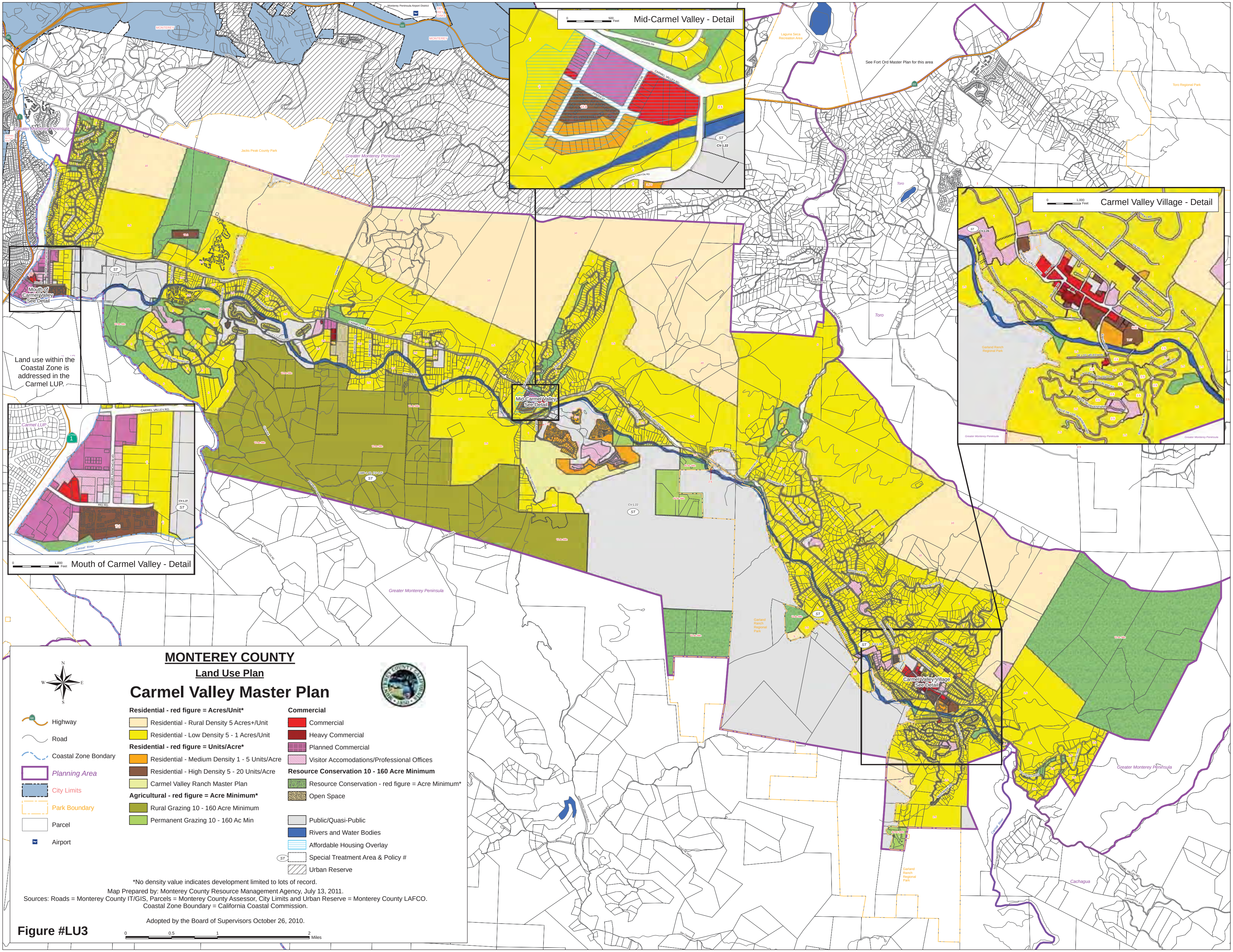
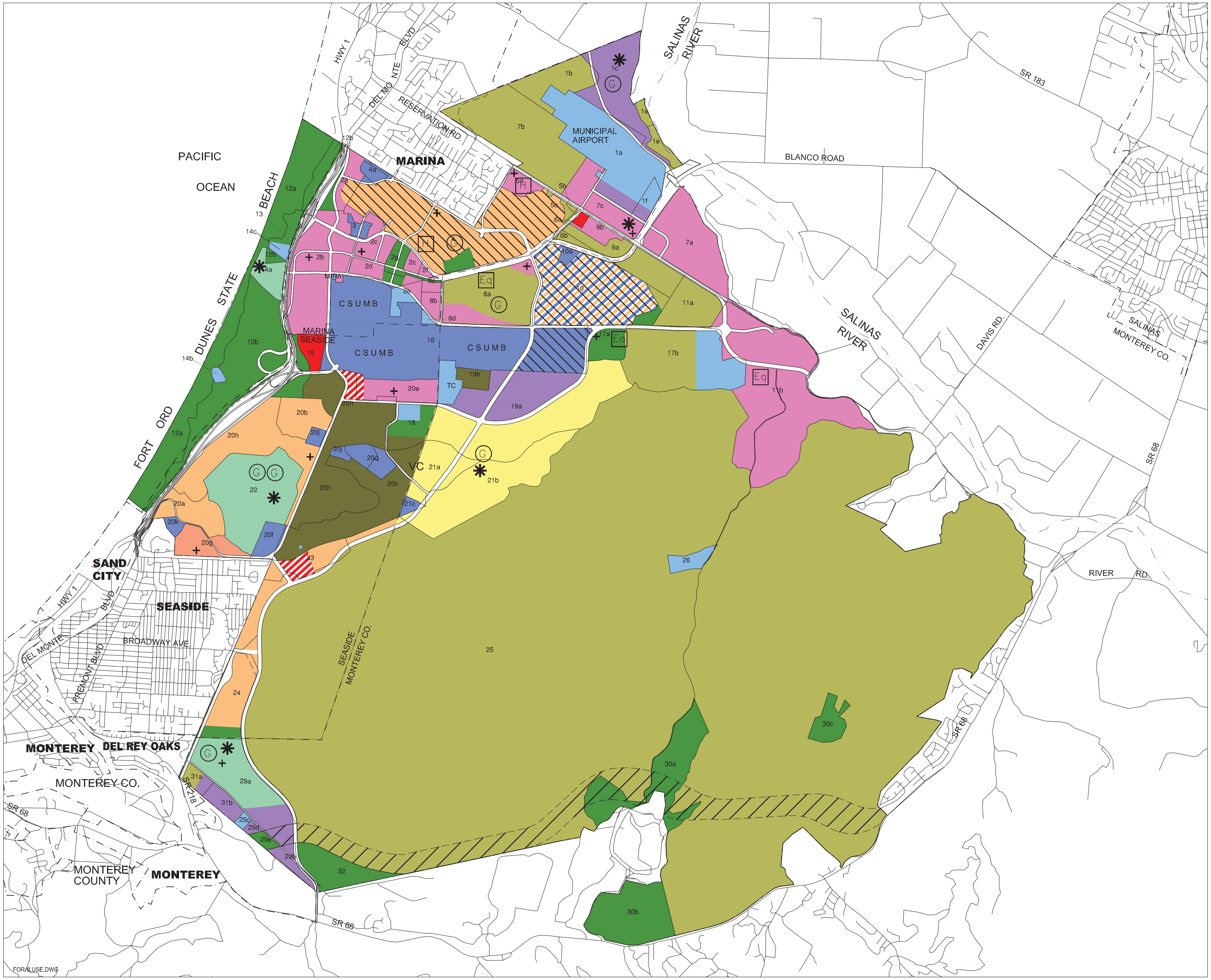

MONTEREY COUNTY
Land Use Plan
Fort Ord Master Plan
N
S
E
W
MONTEREY COUNTY CALIFORNIA
1850
Highway
Road
River
Community Area
Incorporated City
Parcel
SFD Low Density Residential
Residential Infill Opportunities
Planned Development Mixed Use District
Business Park/Light industrial Office/R&D
Open Space Recreation
Habitat Management
School/University
University Medium Density Residential
Regional Retail
Military Enclave
Public Facility/Institutional
Highway 68 Bypass ROW; Development with Restriction
Veterans Cemetery
Convenience Retail
Golf Course Opportunity Site
Hotel Opportunity Site
Equestrian Center Opportunity Site
Map Prepared by Monterey County Planning Dept. October 24, 2006
Sources: Monterey County IT/GIS= Roads, City Limits, Monterey County Assessor= Parcels , Monterey County Planning Dept.= Planning Areas, Fort Ord Reuse Authority= Land Use
0
0.5
1
1.5
2
Miles
Pacific Ocean
MARINA
SEASIDE
SALINAS
DEL REY OAKS
MONTEREY
RESERVATION RD
BLANCO RD
INTERGARRISON RD
GENERAL JIM MOORE BLV
Salinas River
E
1
68

Figure # LU6a


MONTEREY COUNTY
Land Use Plan
Carmel Valley Master Plan
Figure #LU3
Mid-Carmel Valley - Detail
Carmel Valley Village - Detail
Mouth of Carmel Valley - Detail
Mouth of Carmel Valley See Detail
Mid-Carmel Valley See Detail
Carmel Valley Village See Detail
Land use within the Coastal Zone is addressed in the Carmel LUP.
See Fort Ord Master Plan for this area
Greater Monterey Peninsula
Carmel LUP
Toro
Cachagua
CARMEL VALLEY RD
Carmel River
Highway
Road
Coastal Zone Bondary
Planning Area
City Limits
Park Boundary
Parcel
Airport
Residential - red figure = Acres/Unit*
Residential - Rural Density 5 Acres+/Unit
Residential - Low Density 5 - 1 Acres/Unit
Residential - red figure = Units/Acre*
Residential - Medium Density 1 - 5 Units/Acre
Residential - High Density 5 - 20 Units/Acre
Carmel Valley Ranch Master Plan
Agricultural - red figure = Acre Minimum*
Rural Grazing 10 - 160 Acre Minimum
Permanent Grazing 10 - 160 Ac Min
Commercial
Commercial
Heavy Commercial
Planned Commercial
Visitor Accomodations/Professional Offices
Resource Conservation 10 - 160 Acre Minimum
Resource Conservation - red figure = Acre Minimum*
Open Space
Public/Quasi-Public
Rivers and Water Bodies
Affordable Housing Overlay
Special Treatment Area & Policy #
Urban Reserve
*No density value indicates development limited to lots of record.
Map Prepared by: Monterey County Resource Management Agency, July 13, 2011.
Sources: Roads = Monterey County IT/GIS, Parcels = Monterey County Assessor, City Limits and Urban Reserve = Monterey County LAFCO.
Coastal Zone Boundary = California Coastal Commission.
Adopted by the Board of Supervisors October 26, 2010.
0 0.5 1 2 Miles



EMC Planning Group Inc. Rev.: 7/30 /01 5:45PM

FORT ORD REUSE PLAN

Fort Ord Reuse Authority (FORA)

Land Planning	EDAW, Inc.
	EMC Planning Group, Inc.
Market Analysis	Sedway Kotin Mouchly Group
Transportation Engineering	JHK and Associates
Civil Engineering	Reimer Associates
Fiscal Analysis	Angus McDonald Associates
Habitat Planning	Zander Associates
Public Communications	The Ingram Group
Community Development	Resource Corps International

LEGEND:

- SFD Low Density Residential
- SFD Medium Density Residential
- MFD High Density Residential
- Residential Infill Opportunities
- Hwy 68 Bypass ROW: Development with Restrictions
- Planned Development Mixed Use District
- Business Park/Light Industrial Office/R & D
- Convenience Retail
- Neighborhood Retail
- Regional Retail
- Visitor Serving
- G Golf Course Opportunity Site
- Hotel Opportunity Site
- Eq Equestrian Center Opportunity Site
- Open Space/Recreation
- Habitat Management
- School/University
- University Medium Density Residential
- H Alternative High School Sites
- Public Facility/Institutional
- Military Enclave
- VC Veterans Cemetary

SHEET TITLE:

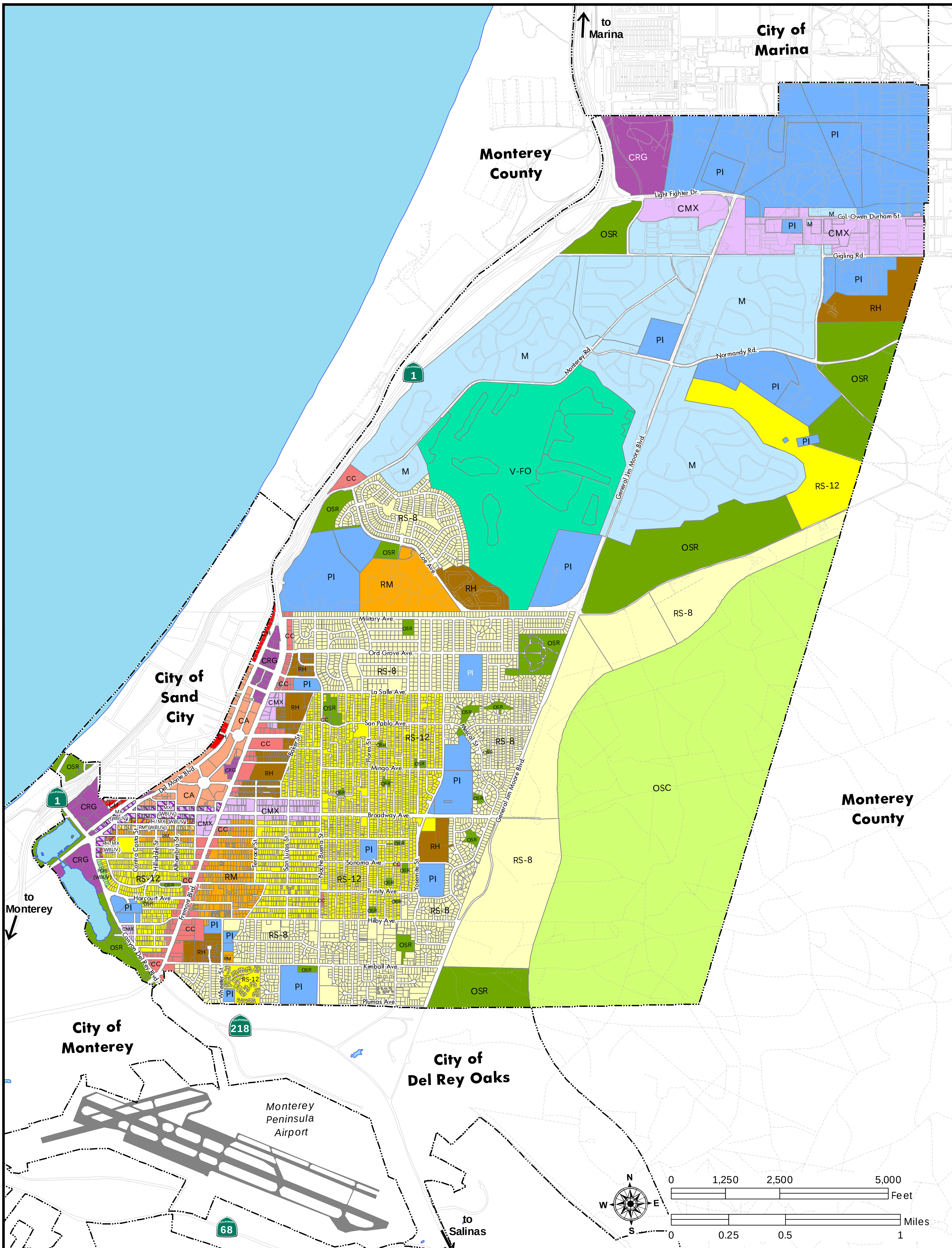
LAND USE CONCEPT ULTIMATE DEVELOPMENT

0 750 1500 3000 4500

NORTH

SOURCE:
Jones & Stokes, 1995
Reimer Associates, (Re-Projected), 1995
Monterey County, 1995
EDAW, Inc., 1996

FIGURE:
3.3-1



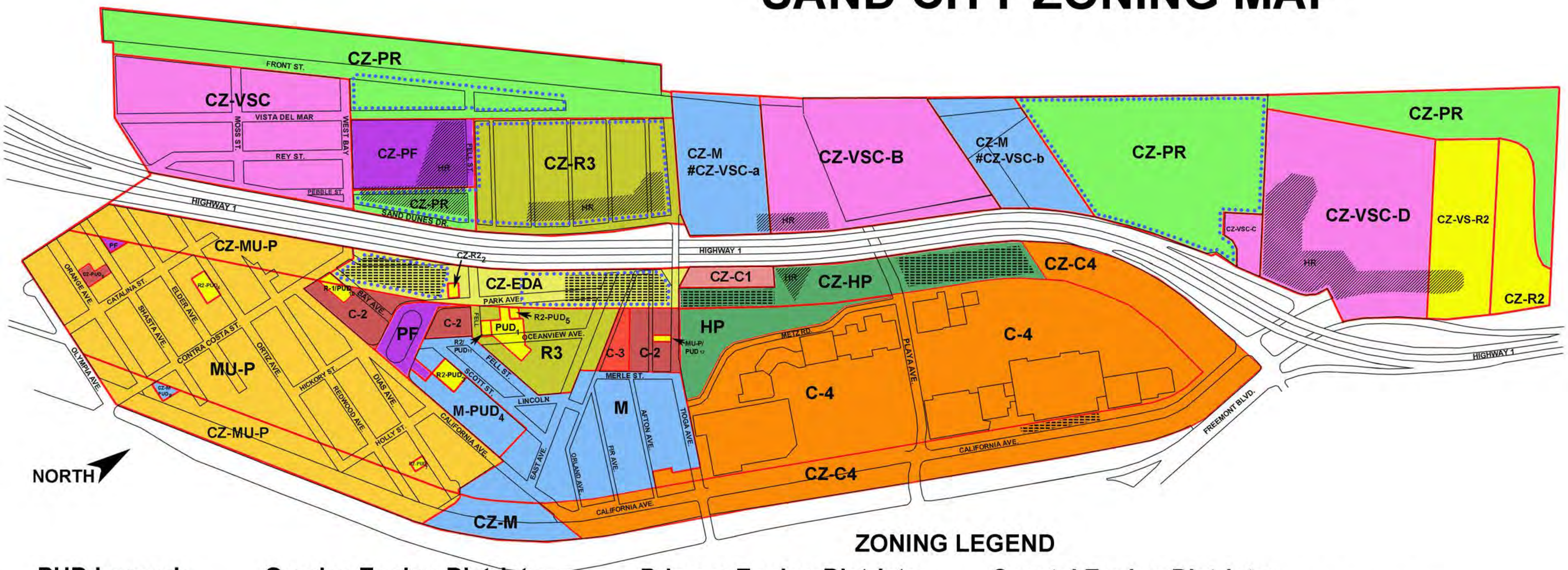
Seaside Zoning Districts

- RS-8 - Single-family Residential
- RS-12 - Single-family Residential
- RM - Medium Density Residential
- RM - Medium Density Residential (WBUV)
- RH - High Density Residential
- RH/MX - High Density Residential/Mixed Use (WBUV)
- CA - Automotive Commercial
- CC - Community Commercial
- CH - Heavy Commercial
- CMX - Commercial Mixed Use
- MX - Mixed Use (WBUV)
- CRG - Regional Commercial
- PI - Public / Institutional
- M - Military
- V-FO - Visitor-Serving Commercial
- OSR - Open Space - Recreation
- OSC - Open Space - Conservation
- POS - Parks and Open Space (WBUV)

Note: WBUV = West Broadway Urban Village Specific Plan

City of Seaside, GIS 2010; last revised 5/11/10

SAND CITY ZONING MAP



ZONING LEGEND

PUD Legend:

PUD ZONING	ORDINANCE NUMBER
PUD 1	95-02
CZ-R2 2	97-02
R2/PUD 3	97-05
M/PUD 4	98-07
R2-PUD 5	99-04
R2-PUD 6	01-02
R2-PUD 7	01-03
CZ-M-PUD 8	01-04
CZ-PUD 9	01-05
R-1/PUD 10	02-05
R2/PUD 11	06-02
MU-P/PUD 12	08-01

Overlay Zoning Districts:

Habitat Treatment Zones:

ST Special Treatment Area

RM Resource Management
Generalized Locations

HR Habitate Restoration
Generalized Locations

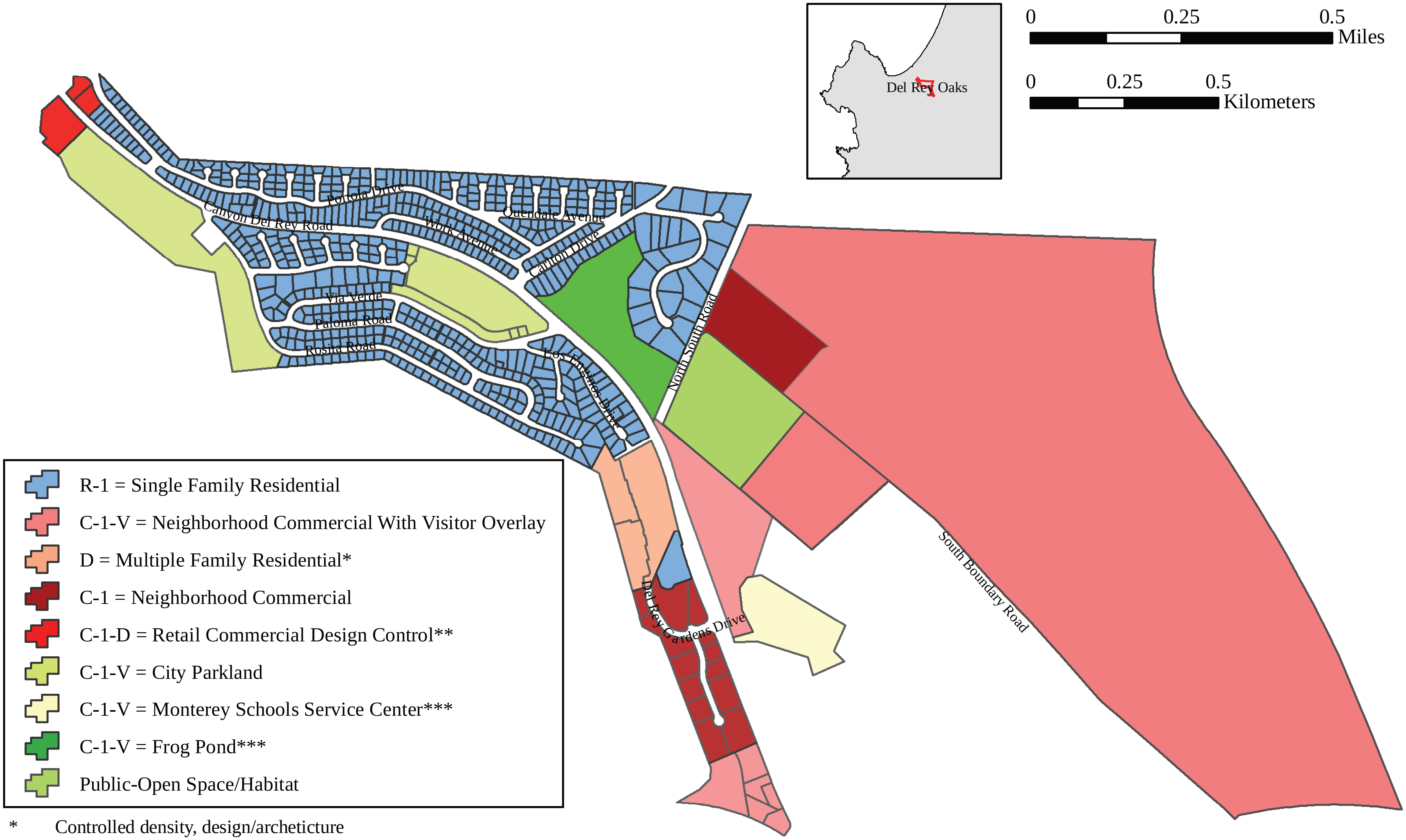
Primary Zoning Districts:

R-1	Single Family Dwelling
R-2	One-Family / Two Family
R-3	Multi-Family Residence
C-1	Light Commercial
C-2	Heavy Commercial
C-3	Neighborhood Commercial
C-4	Regional Commercial
M	Manufacturing
PUD	Planned Unit Development

Coastal Zoning Districts:

CZ-R2	Coastal Residential - Medium Density
CZ-R3	Coastal Residential - High Density
CZ-MU-P	Coastal Planned Mixed Use
CZ-VS-R2	Coastal Visitor Serving Residential Medium Density
CZ-EDA	Coastal East Dunes Area
CZ-C1	Coastal Light Commercial
CZ-C4	Coastal Regional Commercial
CZ-VSC	Coastal Visitor Serving Commercial
#CZ-VSC	Dual Designation (secondary/future use)
CZ-M	Coastal Manufacturing
CZ-PF	Coastal Public Facility
CZ-PR	Coastal Public Recreation
CZ-HP	Coastal Habitat Preserve

a,b,B,C,D - see density standards of LCP



* Controlled density, design/archetiture

** Portion of C-1-D used for restaurant would need a use permit or rezoning for commercial use. The County allowed restaurant on property was never rezoned.

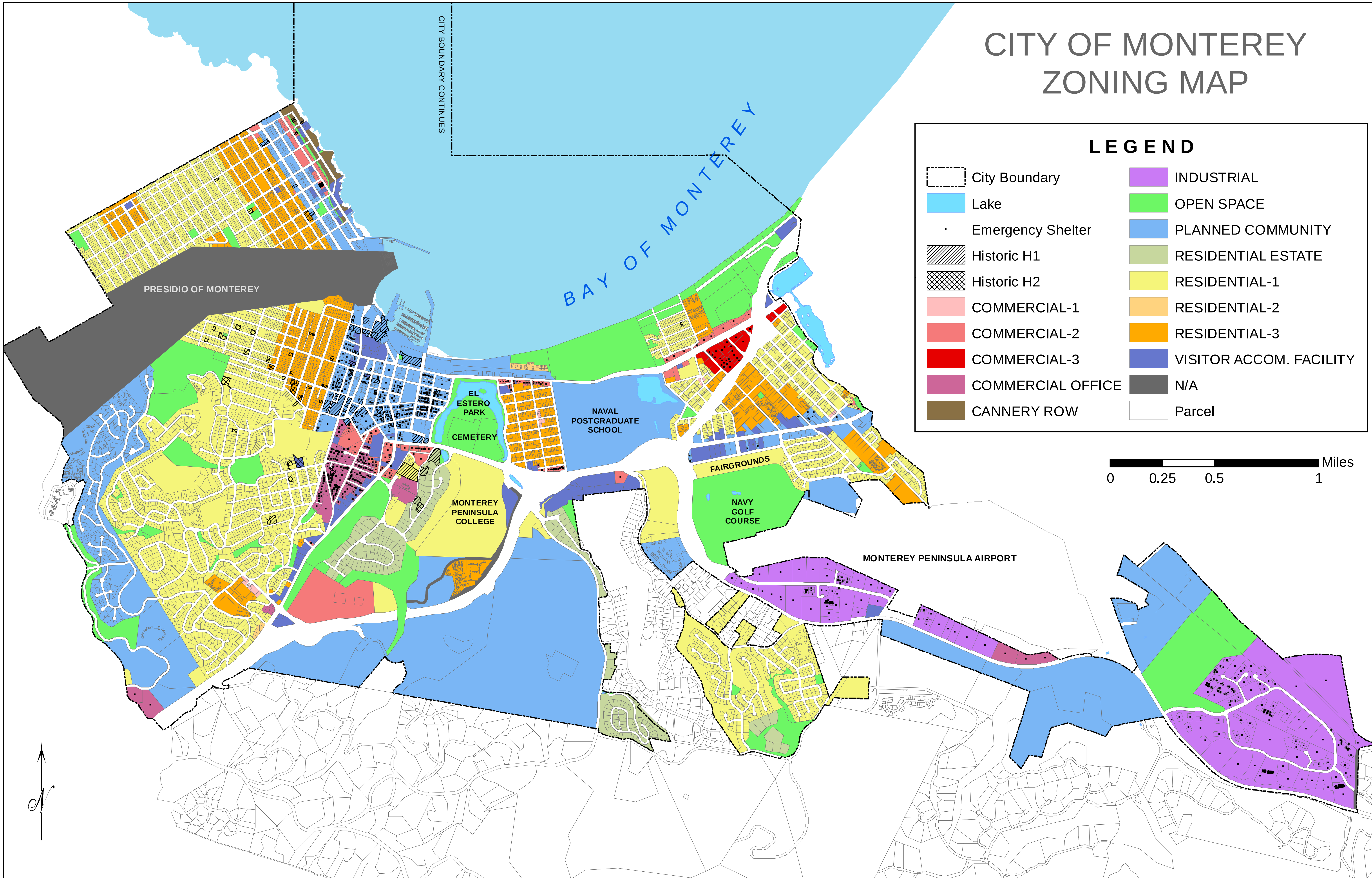
*** County issued a special permit to the School District and Del Rey Oaks did not rezone when parcel was annexed to City.

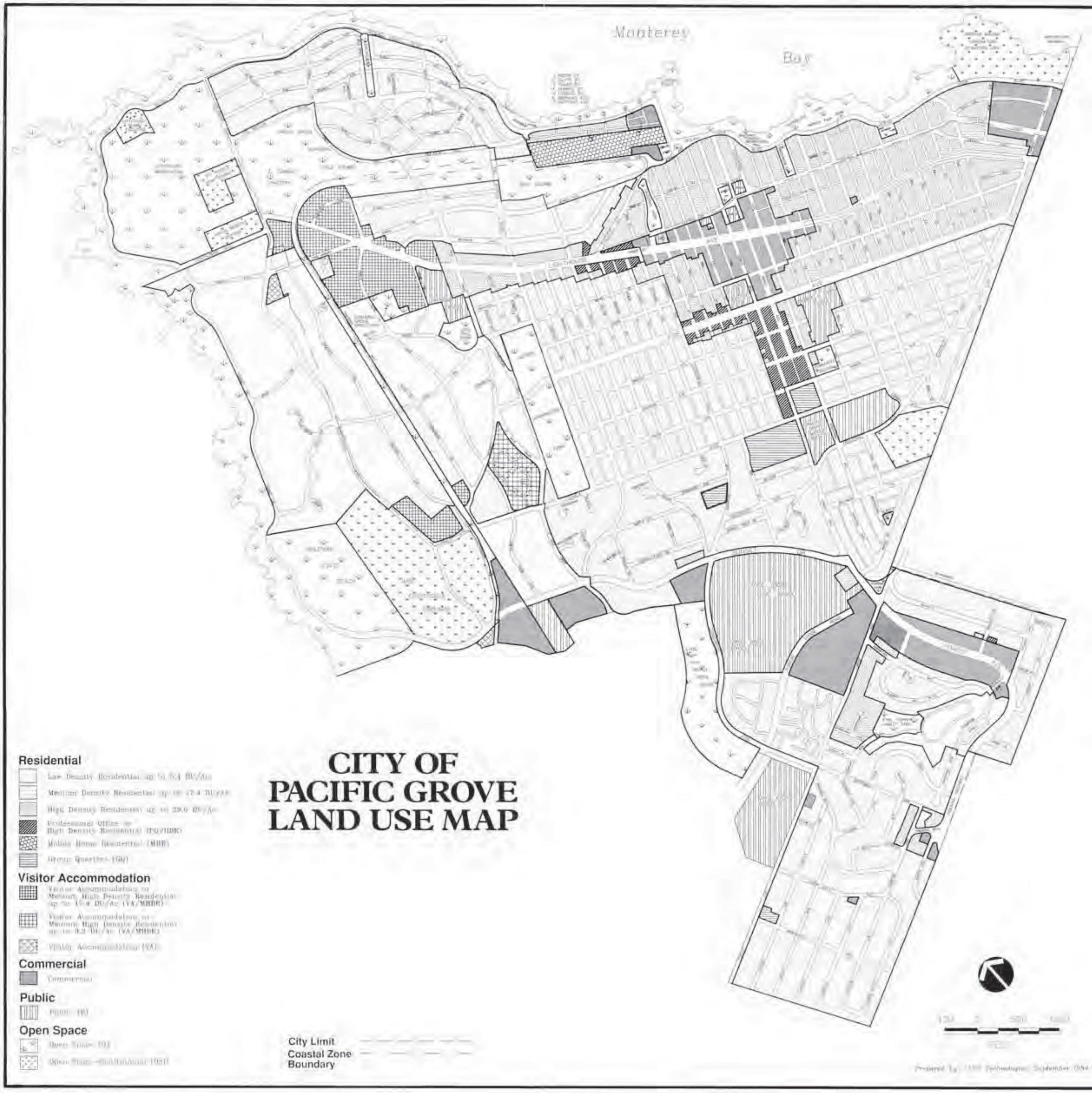
**** Monterey County Regional Park, to remain in natural state.

Current Zoning Map for the City of Del Rey Oaks

Figure 2

DENISE DUFFY & ASSOCIATES, INC.


CITY OF MONTEREY
ZONING MAP
LEGEND
City Boundary
Lake
Emergency Shelter
Historic H1
Historic H2
COMMERCIAL-1
COMMERCIAL-2
COMMERCIAL-3
COMMERCIAL OFFICE
CANNERY ROW
INDUSTRIAL
OPEN SPACE
PLANNED COMMUNITY
RESIDENTIAL ESTATE
RESIDENTIAL-1
RESIDENTIAL-2
RESIDENTIAL-3
VISITOR ACCOM. FACILITY
N/A
Parcel
Miles
0
0.25
0.5
1
CITY BOUNDARY CONTINUES
BAY OF MONTEREY
PRESIDIO OF MONTEREY
EL ESTERO PARK
CEMETERY
NAVAL POSTGRADUATE SCHOOL
FAIRGROUNDS
NAVY GOLF COURSE
MONTEREY PENINSULA COLLEGE
MONTEREY PENINSULA AIRPORT
N


Monterey
Bay
CITY OF
PACIFIC GROVE
LAND USE MAP
Residential
High Density Residential up to 29.0 DU/Ac
Professional Office or High Density Residential (PO/HDR)
Mobile Home Residential (MHR)
Group Quarters (GQ)
Visitor Accommodation
Visitor Accommodation (VA)
Commercial
Commercial
Public
Open Space
City Limit
Coastal Zone Boundary

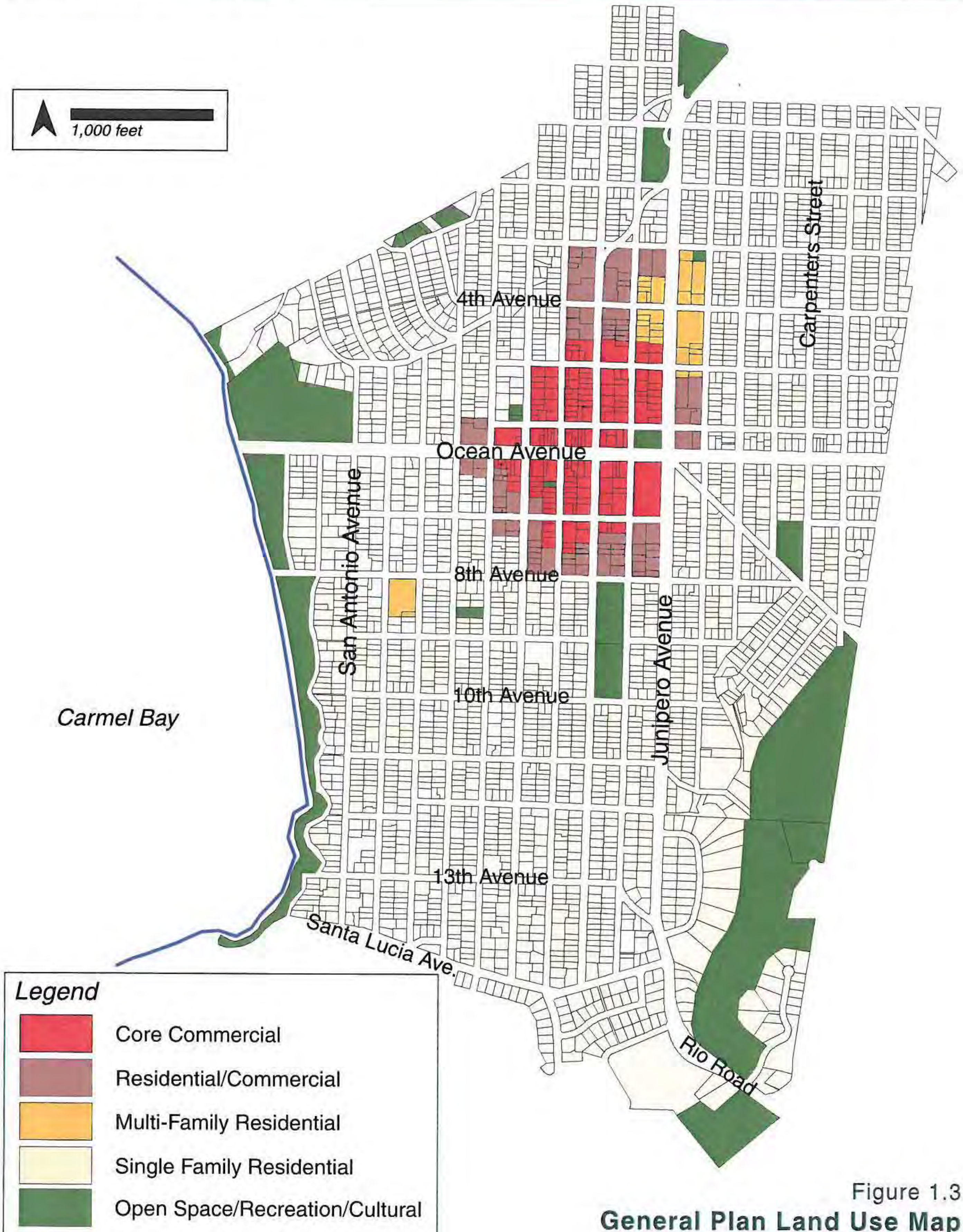


Figure 1.3
General Plan Land Use Map

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Appendix 2-c

2017-2018 Annual Report for the MPWMD Mitigation Program

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MONTEREY PENINSULA
WATER MANAGEMENT DISTRICT

2017-2018 ANNUAL REPORT
(July 1, 2017 - June 30, 2018)

for the

MPWMD MITIGATION PROGRAM

A report in compliance with the

MPWMD WATER ALLOCATION PROGRAM
FINAL ENVIRONMENTAL IMPACT REPORT
(originally certified in November 1990)

Prepared by MPWMD Staff
April 2019

2017-2018 ANNUAL REPORT
MPWMD MITIGATION PROGRAM
WATER ALLOCATION PROGRAM EIR

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Determine Drought Reserve

Augment Water Supply

Mitigation Measures

Program Costs

References

LIST OF FIGURES

LIST OF TABLES

2017-2018 ANNUAL REPORT
(July 1, 2017 - June 30, 2018)

MPWMD MITIGATION PROGRAM
WATER ALLOCATION PROGRAM ENVIRONMENTAL IMPACT REPORT

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT
Prepared April 2019

I. EXECUTIVE SUMMARY

INTRODUCTION AND BACKGROUND:

In April 1990, the Water Allocation Program Final Environmental Impact Report (EIR) was prepared for the Monterey Peninsula Water Management District (MPWMD or District) by J.L. Mintier and Associates. The Final EIR analyzed the effects of five levels of annual California American Water (CAW or Cal-Am) production, ranging from 16,744 acre-feet per year (AFY) to 20,500 AFY. On November 5, 1990, the MPWMD Board certified the Final EIR, adopted findings, and passed a resolution that set Option V as the new water allocation limit. Option V resulted in an annual limit of 16,744 AFY for Cal-Am production, and 3,137 AFY for non-Cal-Am production, with a total allocation of 19,881 AFY for the Monterey Peninsula Water Resource System (MPWRS). The MPWRS is the integrated system of water resources from the Carmel River Alluvial Aquifer and Seaside Groundwater Basin that provide the Monterey Peninsula community's water supply via the Cal-Am water distribution network.

Even though Option V was the least damaging alternative of the five options analyzed in the Water Allocation Program EIR, production at this level still resulted in significant, adverse environmental impacts that must be mitigated. Thus, the findings adopted by the Board included a "Five-Year Mitigation Program for Option V" and associated mitigation measures.

In June 1993, Ordinance No. 70 was passed, which amended the annual Cal-Am production limit from 16,744 AF to 17,619 AF, and the non-Cal-Am limit from 3,137 AF to 3,054 AF; the total production limit was increased from 19,881 AF to 20,673 AF per year due to new supply from the Paralta Well in Seaside. In April 1996, Ordinance No. 83 slightly changed the Cal-Am and non-Cal-Am annual limits to 17,621 AF and 3,046 AF, respectively, resulting in a total limit of 20,667 AFY. In February 1997, Ordinance No. 87 was adopted to provide a special water allocation for the planned expansion of the Community Hospital of the Monterey Peninsula, resulting in a new Cal-Am production limit of 17,641 AFY; the non-Cal-Am limit of 3,046 AFY was not changed. These actions did not affect the implementation of mitigation measures adopted by the Board in 1990.

The Five-Year Mitigation Program formally began in July 1991 with the new fiscal year (FY) and was slated to run until June 30, 1996. Following public hearings in May 1996 and District Board review of draft reports through September 1996, the Five-Year Evaluation Report for the 1991-

1996 comprehensive program, as well as an Implementation Plan for FY 1996-1997 through FY 2000-2001, were finalized in October 1996. In its July 1995 Order WR 95-10, the State Water Resources Control Board (SWRCB) directed Cal-Am to carry out any aspect of the Five-Year Mitigation Program that the District does not continue after June 1996. To date, as part of the annual budget approval process, the District Board has voted to continue the program. The Mitigation Program has accounted for a significant portion of the District's annual budgets in terms of revenue (derived primarily from a portion of the MPWMD user fee on the Cal-Am bill) and expenditures. It should be noted that this fee was removed from Cal-Am's bill in July 2009, resulting from actions subsequent to a California Public Utilities Commission ruling regarding a Cal-Am rate request. Cal-Am continued to pay the Carmel River Mitigation Program fee under a separate agreement with MPWMD through June 2010. The District and Cal-Am have negotiated an annual funding agreement that funded part of the 2016-2017 mitigation program. In April 2017, the MPWMD resumed collection of its user fee from Cal-Am ratepayers. The District's other revenue sources were used to fund the remainder of the program.

The California Environmental Quality Act (CEQA) (Pub. Res. Code 21081.6) requires that the MPWMD adopt a reporting or monitoring program to insure compliance with mitigation measures when implementing the Water Allocation Program. Findings Nos. 387 through 404 adopted by the Board on November 5, 1990 describe mitigation measures associated with the Water Allocation Program; many entail preparation of annual monitoring reports. This 2017-2018 Annual Report for the MPWMD Mitigation Program responds to these requirements. It covers the fiscal year period of July 1 through June 30. It should be noted that hydrologic data and well reporting data in this report are tabulated using the water year, defined as October 1 through September 30, in order to be consistent with the accounting period used by the SWRCB.

This 2017-2018 Annual Report first addresses general mitigation measures relating to water supply and demand (Sections II through XI), followed by monitoring related to compliance with production limits, drought reserve and supply augmentation (Sections XII through XV), followed by mitigations relating to specific environmental resources (Sections XVI through XIX). Section XX provides a summary of costs for the biological mitigation programs as well as related hydrologic monitoring, water augmentation and administrative costs. Section XXI presents selected references.

Table I-1 summarizes the mitigation measures described in this report. In subsequent chapters, for each topic, the mitigation measure adopted as part of the Final EIR is briefly described, followed by a summary of activities relating to the topic in FY 2017-2018 (July 1, 2017 through June 30, 2018, unless otherwise noted). Monitoring results, where applicable, are also presented. Tables and figures that support the text are found at the end of each section in the order they are introduced in the text.

ACCOMPLISHMENTS:

Many activities are carried out as part of the MPWMD Mitigation Program to address the environmental effects that community water use has upon the Carmel River and Seaside

Groundwater Basins. Highlights of the accomplishments in FY 2017-2018 for each major category are shown in **Table I-2**.

OBSERVED TRENDS, CONCLUSIONS AND/OR RECOMMENDATIONS:

The following paragraphs describe observed trends (primarily qualitative), conclusions and/or recommendations for the mitigation program. General conclusions are followed by a summary of selected Mitigation Program categories.

General Overview

Overall, the Carmel River environment with respect to riparian vegetation, river flow, and aquifer levels is in better condition today than it was in 1990 when the Allocation Program EIR was prepared. This improvement is evidenced by increased riparian habitat and higher water tables in the Carmel Valley alluvial aquifer. However, the steelhead fishery was rebounding until the onset of the 2012-2015 drought. During and after the drought, steelhead numbers declined to levels similar to those seen in previous droughts. Then in 2017, with abundant winter rains, adult steelhead were observed in the system and the District did not have to rescue juvenile steelhead in the mainstem of the Carmel River. However, rescues were carried out in the tributaries. Rescues resumed in the summer of 2018.

The comprehensive MPWMD Mitigation Program is an important factor responsible for this improvement. Direct actions such as fish rescues and rearing, and riparian habitat restoration literally enable species to survive and reproduce. Indirect action such as conservation programs, water augmentation, ordinances/regulations and cooperative development of Cal-Am operation strategies result in less environmental impact from human water needs than would occur otherwise. The District's comprehensive monitoring program provides a solid scientific data baseline, and enables better understanding of the relationships between weather, hydrology, human activities and the environment. Better understanding of the MPWRS enables informed decision-making that achieves the District's mission of benefiting the community and the environment.

It is acknowledged that there are other important factors responsible for this improved situation. For example, since Water Year (WY) 1991, the Carmel River has received normal or better runoff in 17 out of 27 years. Actions by federal resource agencies under the Endangered Species Act (ESA) or the SWRCB under its Order WR 95-10 and follow-up orders have provided strong incentive for Cal-Am and other local water producers to examine and amend water production practices to the degree feasible, and for the community to reduce water use. Except for one year in 1997, the community has complied with the production limits imposed on Cal-Am by the SWRCB since Order 95-10 became effective in July 1995.

Despite these improvements, challenges still remain due to human influence on the river. The steelhead and red-legged frog remain listed as threatened species under the ESA. At least several miles of the river still dry up in most years, harming habitat for listed fish and frog species. The presence of the one existing dam, flood-plain development and water diversions to meet community and local user needs continue to alter the natural dynamics of the river. Streambank restoration projects may be significantly damaged in large winter storm events, and some people continue to illegally dump refuse into the river or alter their property without the proper permits. Thus, the Mitigation Program (or a comprehensive effort similar to it) will be needed as long as significant quantities of water are diverted from the Carmel River and people live in close proximity to it.

<u>Water Resources Monitoring Program</u>

Streamflow and precipitation data continue to provide a scientific basis for management of the water resources within the District. These data continue to be useful in Carmel River Basin planning studies, reservoir management operations, water supply forecast and budgeting, and defining the baseline hydrologic conditions of the Carmel River Basin. Also, the District's streamflow monitoring program continues to produce high quality and cost-effective data.

There is limited storage of surface water on the Carmel River. Los Padres Reservoir, completed in 1948, holds 1,667 AF of storage (without flashboard), based on 2017 survey data. In addition, San Clemente Reservoir (SCR), completed in 1921, was removed in the fall of 2015 by order of the Department of Water Resources (DWR) due to seismic safety concerns.

Groundwater levels, and consequently groundwater storage conditions, in the Carmel Valley Alluvial Aquifer have maintained a relatively normal pattern in recent years, in contrast to the dramatic storage declines that were observed during the prolonged 1987-1991 drought period. The relatively stable storage in the Carmel Valley alluvial aquifer in recent years is attributable to a combination of periods of more favorable hydrologic conditions and the adoption of improved water management practices that have tended to preserve higher storage conditions in the aquifer. In WY 2018, Carmel Valley Alluvial Aquifer storage decreased compared with recent years as this year was classified as "below normal."

In contrast, storage conditions in the coastal portion of the Seaside Groundwater Basin have not been stable in recent years, in particular with respect to the deeper Santa Margarita aquifer, from which over 80 percent of the Cal-Am production in the Seaside Basin is derived. This downward trend in water levels reflects the changed production operations in the Seaside Basin stemming primarily from changed practices after SWRCB Order 95-10. The increased annual reliance on production from Cal-Am's major production wells in Seaside, along with significant increases in non-Cal-Am use, have dramatically lowered water levels in this aquifer, and seasonal recoveries have not been sufficient to reverse this trend.

To address this storage depletion trend, the District initiated efforts in the 2000-2001 timeframe to prepare a Seaside Basin Groundwater Management Plan in compliance with protocols set by the State of California (AB 3030, as amended by SB 1938). This process was superseded by litigation filed by Cal-Am in August 2003, requesting a court adjudication of water production and storage rights in the Seaside Basin. The District participated in all litigation proceedings as an intervening "interested party". The Superior Court held hearings in December 2005 and issued a final adjudication decision in March 2006, which was amended through an additional court filing in February 2007. The final decision established a new, lower "natural safe yield" for the Basin of

3,000 AFY, and an initial Basin "operating safe yield" of 5,600 AFY. Under the decision, the operating safe yield would be reduced by 10% every three years until the operating safe yield matches the natural safe yield of the Basin in 2021. The Court also created a nine-member Watermaster Board (of which the District is a member) to implement the Court's decision. With the triennial reductions in operational yield required by the Seaside Basin Adjudication Decision, water levels have not been declining as fast as previously observed.

One of the means that could potentially mitigate this observed storage depletion trend is a program that the District has been actively pursuing since 1996 -- the Seaside Basin groundwater injection program (also known as aquifer storage and recovery, or ASR). ASR entails diverting excess water flows (typically in Winter/Spring) from the Carmel Valley Alluvial Aquifer through existing Cal-Am facilities and injecting the water into the Seaside Groundwater Basin for later recovery in dry periods.

The primary goal of the MPWMD ASR Project is better management of existing water resources and production facilities to help reduce impacts to the Carmel River, especially during the dry season. The projects are viewed as being complementary to other larger, long-term water augmentation projects that are currently being pursued for the Monterey Peninsula. These projects, also known as Phase 1 and 2 ASR projects, entail a maximum diversion of 2,426 AFY, and 2,900 AFY respectively from the Carmel River for injection. The combined average yield for both projects is estimated at about 2,000 AFY. The operation of the Phase 1 and 2 ASR Projects result in reduced unauthorized pumping of the Carmel River in Summer/Fall and increased storage in the Seaside Basin, which are both considered to be environmentally beneficial.

The ASR water supply efforts in 2017-2018 included: (1) continued work with regulatory and land use agencies on expansion of the Phase 1 Santa Margarita ASR site; (2) continued work on the utility water system for the Phase 2 ASR Project at the Seaside Middle School site; (3) coordination with Cal-Am and other parties to construct the necessary infrastructure for the ASR project expansion; and (4) continued implementation of a Memorandum of Understanding (MOU) with Cal-Am on operation and maintenance at the ASR facilities.

Groundwater quality conditions in both the Carmel Valley Alluvial Aquifer and Seaside Basin have remained acceptable in terms of potential indicators of contamination from shallow sources such as septic systems. There have been no identifiable trends indicative of seawater intrusion into the principal supply sources the coastal areas of these two aquifer systems to date.

Steelhead Fishery Program

- **Adult Steelhead**

Previous redd surveys below San Clemente Dam (SCD) confirm that the spawning habitat in the lower river has improved considerably over the last 20 years and many adults now spawn there instead of the upper watershed. In addition, juvenile steelhead rescued by the District from the lower river that survive to adulthood may be more likely to return to the lower river to spawn rather than migrate upstream.

Variability of adult steelhead counts are likely the result of a combination of controlling and limiting factors including:

- ➢ Variable river and flow conditions effects on all steelhead life stages including adult steelhead, as migration may be limited or blocked and spawning reaches may dry early;
- ➢ adverse ocean conditions with increased water temperatures off the coast of California, and degraded ocean water quality likely affecting the abundance of food resources and possibly even the survival of returning steelhead;
- ➢ variable lagoon conditions, caused by artificial manipulation of the sandbar and/or naturally occurring periods of low winter flows; and
- ➢ low densities of juvenile fish affecting subsequent adult populations.

- **Juvenile Steelhead**

Long-term monitoring of the juvenile steelhead population at eleven sites along the mainstem Carmel River below Los Padres Dam (LPD) shows that fish density continues to be quite variable both year to year and site to site from less than 0.10 fish-per-foot (fpf) of stream to levels frequently ranging above 1.00 fpf, values that are typical of well-stocked steelhead streams. In this 2018 reporting period, the average population density remained less than the long-term average of 0.67 fpf for the Carmel River, likely due to the recent drought, poor habitat conditions in the lower river, and low numbers of returning adults.

The variability of the juvenile steelhead population in the Carmel River Basin is directly related to the following factors:

Positive Factors:

- ➢ General improvements in streamflow patterns, due to favorable natural fluctuations, exemplified by relatively high base-flow conditions between 1995 and 2012 and the very wet conditions in 2017;
- ➢ District and SWRCB rules to actively manage the rate and distribution of groundwater extractions and direct surface diversions within the basin, coupled with changes to Cal-Am's operations at LPD, the increased availability of ASR and Sand City desalinated water in the summer, and extensive conservation measures, all help provide increased streamflow;
- ➢ restoration and stabilization of the lower Carmel River's stream banks, providing improved riparian habitat (tree cover/shade along the stream, an increase in woody debris and the associated invertebrate food supply) while preventing erosion of silt/sand from filling gravel beds and pools;
- ➢ extensive juvenile steelhead rescues by the District over the last 29 years, now totaling

437,528 fish through 2018;

- rearing and releases of rescued fish from the Sleepy Hollow Steelhead Rearing Facility (SHSRF) of 97,600 juveniles and smolts back into the river and lagoon over the past 22 years (16 years of operation), at sizes generally larger than the river-reared fish, which in theory should enhance their ocean survival.

<u>Negative Factors</u>:

- variable lagoon conditions, including highly variable water surface elevation changes caused by mechanical breaching, chronic poor water quality (especially in the fall), and predation by birds and striped bass;
- barriers or seasonal impediments to juvenile and smolt emigration, such as intermittent periods of low flow below the Narrows during the normal spring emigration season;
- spring flow variability such as low-flow conditions that could dewater redds prematurely or high flows that could either deposit sediment over redds or completely wash them out;
- occasionally elevated fall temperature and hydrogen sulfide levels below LPD, and the increase in sediment from the SCD removal project;
- the potential for enhanced predation on smolts and YOY migrating through the sediment field above LPD; and
- invasive species: striped bass have recently (2015) started migrating up the river from the lagoon and are likely preying on juvenile steelhead. New Zealand Mud Snails (NZMS) were first discovered during BMI surveys at Red Rock (mid-valley) in 2016 and now comprise up to 62% of the BMI in the lower river. NZMS out compete native invertebrates and are a poor food item themselves for steelhead.

District staff continues to provide technical expertise and scientific data to CAW engineers and environmental consultants, DWR/DSOD, CDFW, NMFS, U.S. Fish and Wildlife Service, and others involved in addressing the resource management issues associated with both LPD and the area influenced by the SCD Removal and Carmel River Reroute Project. District staff also continues to provide technical expertise and scientific data to California Department Parks and Recreation, Monterey County Water Resources Agency, Monterey County Public Works Department, California Coastal Commission, U. S. Army Corps of Engineers, Carmel Area Wastewater District, and other regulatory agencies and stakeholders involved in the management of the Carmel River, the Carmel River Lagoon and the barrier beach.

<u>Riparian Habitat Mitigation</u>

With the exception of the Rancho Cañada to Rancho San Carlos Road Bridge reach, the Carmel River streamside corridor has stabilized in nearly all reaches that were affected by a combination of increased groundwater extraction, extreme drought and flood events that occurred during the

1970s, 1980s and 1990s. Prior to the 2016-17 winter high flows, a complex channel had developed in the lower 16 miles of the river with improved steelhead spawning substrate, diverse habitat, and a richer riparian community. Areas with perennial or near perennial flow (upstream of Schulte Bridge) or a high groundwater table, such as downstream of Highway 1, experienced vigorous natural recruitment in the channel bottom, which has helped to stabilize streambanks and diversify aquatic habitat. Areas that continue to be dewatered annually have less significant growth.

In areas with perennial flow, natural recruitment has led to vegetation encroachment that, in some areas, may constrict high flows and threaten bank stability. MPWMD continues to monitor these areas closely and to develop a management strategy to balance protection of native habitat with the need to reduce erosion potential. Environmental review of proposed projects and the process of securing permits is quite complex and requires an exhaustive review of potential impacts.

The Soberanes fire in the summer of 2016 combined with the removal of San Clemente Dam and high flows in the winter of 2016-17 proved to be a combination of events that significantly changed the river downstream of the former dam site. Quantities of silt, sand, and debris that had not been seen in the alluvial reach since high flows in 1998 were carried down from the fire-scarred upper watershed into the active channel. Past similar events during 1978-1983 and 1993-1998 contributed to substantial destabilization of streambanks in the lower 15.5 miles of the river; however, the 2016-17 event comes after significant reductions in annual diversions have been made and after long reaches of the river have been actively restored or passively recovered. Thus streambank instability was limited to the area downstream of Rancho San Carlos Road. Follow-up channel surveys by CSUMB indicate that the increased sediment load during the winter of 2017 were likely due to material being washed out from the Carmel River Reroute at the former San Clemente Dam site.

The recovery of streamside areas subjected to annual dewatering requires monitoring. Plant stress in the late summer and fall is evident in portions of the river that go dry. In these areas, streambanks can exhibit unstable characteristics during high flows, such as sudden bank collapse, because of the lack of healthy vegetation that would ordinarily provide stability. The drought that began with Water Year 2013 (beginning October 2012) and ended in Water Year 2016 is an ongoing concern because of the past history of channel erosion and bank instability after severe droughts in 1976-77 and 1987-1991. Impacts to streamside vegetation can manifest themselves for several years even after the end of a drought.

Based on annual cross-section work by CSUMB, several areas have experienced a filling in of pools with sand. Absent high flows like those that occurred in 2017, it is likely that the sand will be winnowed out and sent downstream over the next several years. When river flows drop in late spring or early summer of 2019, District staff will investigate the overall scour and deposition of the streambed and report on this in next year's mitigation report. Current results still show many of the pools are still filled with sand.

Restoration project areas sponsored by MPWMD since 1984 continue to mature and exhibit more features of relatively undisturbed reaches, such as plant diversity and vigor, complex floodplain topography, and a variety of in-channel features such as large wood, extensive vegetative cover, pools, riffles, and cut banks.

As cited in previous reports, the most significant trends continue to include the following:

- increased encroachment of vegetation into the active channel bottom that can induce debris blockage, bank erosion and increased risks during floods,
- effects to areas with groundwater extraction downstream of Schulte Road,
- channel changes and erosion due to new supply of sediment from upstream associated with high flows, San Clemente Dam removal, and the Soberanes Fire in Water Year 2017,
- healthy avian species diversity, and
- maturing of previous restoration projects.

Carmel River Erosion Protection and Restoration

With the exception of the channel area between the Via Mallorca Road bridge and the Rancho San Carlos Road bridge, streambanks in the main stem appear to be relatively stable during average water years with "frequent flow" storm events (flows with a return magnitude of less than five years). The program begun by MPWMD in 1984 (and later subsumed into the Mitigation Program) to stabilize streambanks appears to be achieving the goals that were initially set out, i.e., to reduce bank erosion during high flow events up to a 10-year return flow, restore vegetation along the streamside, and improve fisheries habitat.

Consistent with previous reports, it is likely that the following trends will continue:

- Local, State and Federal agencies consider the Carmel River watershed to be a high priority area for restoration, as evidenced by the interest in addressing water supply issues, the removal of San Clemente Dam, proposed projects in the lower Carmel River, and continued oversight with the management of threatened species. Stringent avoidance and mitigation requirements will continue to be placed on activities that could have negative impacts on sensitive aquatic species or their habitats.
- Activities that interrupt or curtail natural stream functions, such as lining streambanks with riprap, have come under increasing scrutiny and now require significant mitigation offsets. Approximately 35% to 40% of the streambanks downstream of Carmel Valley Village have been altered or hardened since the late 1950s. Activities that increase the amount of habitat or restore natural stream functions are more likely to be approved or funded through State and Federal grant programs.
- Additional work to add instream features (such as large logs for steelhead refuge or backwater channel areas for frogs) can restore and diversify aquatic habitat.
- Major restoration projects completed between 1987 and 1999 have had extensive and successful work to diversify plantings. However, maintenance of irrigation systems is ongoing and requires extensive work in water years classified as below normal, dry and critically dry.
- The channel will change due to a new supply of sediment coming from upstream of the old San Clemente Dam and additional sources of sediment associated with the Soberanes Fire of 2016.

Vegetation Restoration and Irrigation

To the maximum extent possible, MPWMD-sponsored river restoration projects incorporate a functional floodplain that is intended to be inundated in relatively frequent storm events (those expected every 1-2 years). For example, low benches at the Red Rock and All Saints Projects have served as natural recruitment areas and are currently being colonized by black cottonwoods, sycamores, and willows. In addition, willow and cottonwood pole plantings in these areas were installed with a backhoe, which allows them to tap into the water table. These techniques have been successful and have reduced the need for supplemental irrigation.

Channel Vegetation Management

Another notable trend relating to the District's vegetation management program was the widening of the channel after floods in 1995 and 1998. With relatively normal years following these floods, the channel has narrowed as vegetation recruits on the channel bottom and gravel bars. Current Federal regulations such as the Endangered Species Act (ESA) "Section 4(d)" rules promulgated by NOAA Fisheries to protect steelhead significantly restrict vegetation management activities. Because of these restrictions, the District can carry out activities only on the most critical channel restrictions and erosion hazards in the lower 15 miles of the river. In the absence of high winter flows capable of scouring vegetation out of the channel bottom, encroaching vegetation may significantly restrict the channel. As vegetation in the river channel matures in the channel bottom, more conflicts are likely to arise between preserving habitat and reducing the potential for property damage during high flows. MPWMD will continue to balance the need to treat erosion hazards in the river yet maintain features that contribute to aquatic habitat quality.

Permits for Channel Restoration and Vegetation Management

In 2018, MPWMD renewed its long-term permits with the U.S. Army Corps of Engineers and the California Regional Water Quality Control Board for routine maintenance and restoration work. In 2014, the District also renewed a long-term Routine Maintenance Agreement (RMA) with the California Department of Fish and Wildlife to conduct regular maintenance and restoration activities in the Carmel River.

Monitoring Program

Vegetative moisture stress fluctuates depending on the rainfall, proximate stream flow, depth to groundwater, and average daily temperatures, and tends to be much lower in above-normal rainfall years. Typical trends for a single season start with little to no vegetative moisture stress in the spring, when the soil is moist and the river is flowing. As the river begins to dry up in lower Carmel Valley (normally around June) and temperatures begin to increase, an overall increase in vegetative moisture stress occurs. For much of the riparian corridor in the lower seven miles of the Carmel River, this stress has been mitigated by supplemental irrigation, thereby preventing the die off of large areas of riparian habitat. However, many recruiting trees experience high levels of stress or mortality in areas difficult to irrigate. Riparian vegetation exposed to rapid or substantial lowering of groundwater levels (i.e., below the root zones of the plants) will continue to require monitoring and irrigation during the dry season.

With respect to riparian songbird diversity, populations dropped after major floods in 1995 and 1998 because of the loss of streamside habitat. Since 1998, species diversity recovered and now fluctuates depending on habitat conditions. Values from 2018 avian point count surveys indicate that the District's mitigation program is preserving and improving riparian habitat.

Strategies for the future

A comprehensive long-term solution to overall environmental degradation requires a significant increase in dry-season water flows in the lower river, a reversal of the incision process, and reestablishment of a natural meander pattern. Of these, MPWMD has made progress on increasing summer low flows and groundwater levels by aggressively pursuing a water conservation program, implementing the first and second phases of the Seaside Groundwater Basin Aquifer Storage and Recovery Project, and recommending an increase in summer releases from Los Padres Reservoir.

Reversal, or at least a slowing, of channel incision may be possible if the supply of sediment is brought into better balance with the sediment transport forces. Additional sediment from the tributary watersheds between San Clemente Dam and Los Padres Dam will pass into the lower river in the foreseeable future now that San Clemente Dam has been removed. District staff are already seeing signs of additional sediment in the Carmel River below Esquiline Road Bridge associated with high flows in Water Year 2017.

Over the long term, an increase in sediment supply could help reduce streambank instability and erosion threats to public and private infrastructure. However, reestablishing a natural supply of sediment and restoring the natural river meander pattern through the lower 15.5 miles of the Carmel Valley presents significant political, environmental, and fiscal challenges, and is not currently being considered as part of the Mitigation Program.

Integrated Regional Water Management (IRWM) Grant Program

The IRWM program promoted by the California DWR encourages planning and management of water resources on a regional scale and promotes projects that incorporate multiple objectives and strategies. In addition, the IRWM process brings stakeholders together and encourages cooperation among agencies in developing mutually beneficial solutions to resource problems.

MPWMD adopted the 2014 Update to the IRWM Plan for a region encompassing Monterey Peninsula areas within the District boundary, the area in the Carmel River watershed outside of the MPWMD boundary, Carmel Bay and the Southern Monterey Bay. The IRWM Plan combines strategies to improve and manage potable water supply, water conservation, stormwater runoff, floodwaters, wastewater, water recycling, habitat for wildlife, and public recreation.

Funding from the IRWM grant program and other programs requiring an adopted IRWM Plan could provide the incentive to undertake a set of projects that would continue to improve the Carmel River environment and engage a larger number of organizations in helping to develop and implement a comprehensive solution to water resource problems in the planning region. The Monterey Peninsula region is expecting to take advantage of about $4.3 million from Prop 1 IRWM funds over the next several; years. In 2018, $252,693 was awarded to the region as a part of the Disadvantaged Community Involvement grant. A grant solicitation package for the first round of implementation projects is expected to be issued in the first half of 2019, and the Monterey Peninsula region will be applying for approximately $2 million in grant funds.

More information about the IRWM Plan and the group of stakeholders in the planning region can be found at the following web site:

http://www.mpirwm.org

Carmel River Lagoon Habitat

The District continues to support and encourage the ongoing habitat restoration efforts in the wetlands and riparian areas surrounding the Carmel River Lagoon. These efforts are consistent with goals that were identified in the Carmel River Lagoon Enhancement Plan, which was partially funded by the District. The District continues to work with various agencies and landowners to implement ongoing restoration of the Odello West property and future restoration of the Odello East property across the highway. Because of the restoration activities on the south side of the lagoon, the District has concentrated its monitoring efforts on the relatively undisturbed north side. Staff also continue to meet and discuss with other agencies the potential use of an existing California Department of Parks and Recreation (CDPR) agricultural well.

The District expanded its long-term monitoring around the lagoon in 1995 in an attempt to determine if the reduction in freshwater flows due to groundwater pumping upstream might change the size or ecological character of the wetlands. Demonstrable changes have not been identified. Because of the complexity of the estuarine system, a variety of parameters are monitored, including vegetative cover in transects and quadrats, water conductivity, and hydrology. It is notable that due to the number of factors affecting this system, it would be premature to attribute any observed changes solely to groundwater pumping. The following illustrates the Water Year (October 1 – September 30) classifications since 1995 in terms of total annual runoff.

Classification	Number of Years	Water Year
Extremely Wet	3	1995, 1998, 2017
Wet	2	2005, 2006
Above Normal	5	1996, 1997, 2000, 2010, 2011
Normal	5	1999, 2001, 2003, 2008, 2009
Below Normal	3	2004, 2016, 2018
Dry	4	2002, 2012, 2013, 2015
Critically Dry	2	2007, 2014

Thus, the hydrology of the watershed has been at least normal or better 63% of the time during that 24 year period. However, monitoring in 2014 occurred during a Critically Dry Water Year that followed two consecutive Dry Water Years, and 2015 was the first time a fourth year of drought was ever monitored. Other natural factors that affect the wetlands include introduction of salt water into the system as waves overtop the sandbar in autumn and winter, tidal fluctuations, and long-term global climatic change. When the District initiated the long-term lagoon monitoring component of the Mitigation Program, it was with the understanding that it would be necessary to gather data for an extended period in order to draw conclusions about well production drawdown effects on wetland dynamics. It is recommended that the current vegetation, conductivity, topographical and wildlife monitoring be continued in order to provide a robust data set for continued analysis of potential changes around the lagoon. During this RY the District budgeted to replace the CDPR lagoon water-quality profiler that has been out of service for five years, with a stock one from a major vendor. However, since the Carmel Area Wastewater District (CAWD) plans to replace and underground their outlet pipe very soon, we delayed spending significant funds on what would be just a temporary installation at this time. The District intends to re-budget in RY 2020-2021 for the placement of a vertical profiler, once the new CAWD pipe is in place, and then restore continuous data collection during a future RY.

Lagoon bathymetric cross sectional surveys, initially conducted in 1988, have been completed annually during the dry season since 1994. These data are useful in assessing changes in the sand supply within the main body of the lagoon and are necessary to answer questions concerning whether or not the lagoon is filling up with sand, thus losing valuable habitat. As indicated in the survey plots, the sandy bed of the lagoon can vary significantly from year to year. Substrate elevations at the cross sections remained relatively stable during WY 2018 compared to August 2017 conditions, likely related to below normal streamflow conditions. Since 1994, an apparent trend of overall loss in sand volume appears to be emerging, as south bank substrate elevations are close to the historic low. The sand loss or down-cutting observed at the cross sections is consistent with the pervasive down-cutting that has occurred along the thalweg of the Lower Carmel River (LCR) upstream of the Highway 1 Bridge (HWY 1) for several miles, a trend believed to have begun in WY 2006. In the recent "Critically Dry" years of WY 2007 and 2014 and "Dry" years of WY 2012 and 2013, no significant changes were documented compared to the respective prior years. Water Year 2018 classified as "Below Normal", resulted in no significant changes at the cross sections, thus it is concluded that substrate elevations at the cross sections generally do not change in these low-flow years, despite the regular occurrence of major lagoon mouth breaches in all of these years, except WY 2014. The "Extremely Wet" WY 2017 caused dramatic changes (scour) at the cross sections indicating that quantity of streamflow (peak flow and total volume) is likely the primary factor that controls significant substrate changes at the key cross sections.

Program Costs

Mitigation Program costs for FY 2017-2018 totaled approximately $2.35 million including direct personnel expenses, operating costs, project expenditures, capital equipment, and fixed asset purchases. The annual cost of mitigation efforts varies because several mitigation measures are weather dependent. Expenditures in FY 2017-2018 were $0.18 million higher than the prior fiscal year due to increases in Mitigation Program costs. However, the overall costs have remained constant (average of $2.30 million per year) for last five years. In the past, expenditures had trended upward due to expenditures for the Aquifer Storage Recovery (ASR) Project. ASR Project costs are no longer captured under Mitigation Program Costs. FY 2015-2016 expenditures were $2.27 million; and FY 2016-2017 expenditures were $2.17 million.

During FY 2017-2018, revenues totaled \$3.73 million including user fees, tax revenues, grant receipts, investment income and miscellaneous revenues. The Mitigation Program Fund Balance as of June 30, 2018 was \$3.43 million.

Table I-1

SUMMARY OF COMPONENTS OF MPWMD MITIGATION PROGRAM
July 1, 2017 - June 30, 2018

WATER MANAGEMENT

- Monitor Water Resources
- Manage Water Production
- Manage Water Demand
- Monitor Water Usage
- Augment Water Supply
- Allocation of New Supply
- Determine Drought Reserve

STEELHEAD FISHERY

- Capture/Transport Emigrating Smolts in Spring
  -- Smolt rescues
  -- Pit tagging study
- Prevent Stranding of Fall/Winter Juvenile Migrants
  -- Juvenile rescues
- Rescue Juveniles Downstream of Robles del Rio in Summer
- Operate Sleepy Hollow holding/rearing facility
- Monitoring Activities for Mitigation Plan
  -- Juvenile population surveys
- Other Activities not required by Mitigation Plan
  -- Spawning habitat restoration
  -- Modify critical riffles

RIPARIAN VEGETATION AND WILDLIFE

- Conservation and Water Distribution Management
- Prepare/Oversee Riparian Corridor Management Plan
- Implement Riparian Corridor Management Program
  -- Cal-Am well irrigation (4 wells)
  -- Channel clearing
  -- Vegetation monitoring
  -- Track and pursue violations
  -- River Care Guide booklet
  -- CRMP Erosion Protection Program

LAGOON VEGETATION AND WILDLIFE

- Assist with Lagoon Enhancement Plan Investigations (See Note 1)
- Expand Long-Term Lagoon Monitoring Program
  -- Water quality/quantity
  -- Vegetation/soils
- Identify Alternatives to Maintain Lagoon Volume

AESTHETICS

- Restore Riparian Vegetation (see above)

Note 1: Mitigation measures are dependent on implementation of the Lagoon Enhancement Plan by the California Department of Parks and Recreation, the land owner and CEQA lead agency. Portions of the Enhancement Plan have been implemented by CalTrans as part of a "mitigation banking" project.

Table I-2
Summary of MPWMD Mitigation Program Accomplishments: 2017-2018 Report

MITIGATION ACTION	MAJOR ACCOMPLISHMENTS
Monitor Water Resources	Regularly tracked precipitation, streamflow, surface and groundwater levels and quality, and lagoon characteristics between Los Padres Dam and the Carmel River Lagoon, using real-time methods at numerous data collection stations. Maintained extensive monitoring network, and continuous streamflow recorders below the former San Clemente Dam and other sites.
Manage Water Production	Developed and implemented multi-agency Memorandum of Agreement and quarterly water supply strategies based on normal-year conditions; worked cooperatively with resource agencies implementing the federal Endangered Species Act. Implemented ordinances that regulate wells and water distribution systems.
Manage Water Demand	A total of 2,444 conservation inspections were conducted in FY 2017-2018. An estimated 13.73 acre-feet (AF) of water were saved by new retrofits verified this year in these two categories. For FY 2017-2018, a total of 1,674 applications for rebates were received, 1,238 applications were approved with the use of the rebate refund, as described in Section VIII. As of June 30, 2018, a total of 89.576AF of water remained available in the areas served by CAW, as described in Section IX. This includes water from pre- and post-Paralta Allocations and water added to a Jurisdiction's Allocation from Water Use Credit transfers and public retrofits.
Monitor Water Usage	Complied with SWRCB Order 95-10 for Water Year 2018.
Augment Water Supply	Long-term efforts to augment supply included: (1) Continued participation in the CPUC rate hearing process to review elements of the Monterey Peninsula Water Supply Project (MPWSP); (2) Participated in meetings intended to resolve concerns about MPWSP construction, operations, financing, management and oversight; (3) Participated on Technical Advisory Committee to the Monterey Peninsula Regional Water Authority; (4) Operated Aquifer Storage and Recovery (ASR) Phase 1 and 2 projects in WY 2018; (5) Held regular coordination meetings with Cal-Am regarding planned infrastructure upgrades to deliver water supply to the ASR project wells at full capacity; (6) Conducted additional work

MITIGATION ACTION	MAJOR ACCOMPLISHMENTS
	related to alternative desalination plant sites; (7) Provided technical support to Monterey One Water for the Pure Water Monterey Project; (8) Participated in CPUC hearing process on Cal-Am related rate requests. Other ongoing activities included: (1) Served as member of both the Seaside Basin Watermaster Board and as the Technical Advisory Committee; (2) Participation in a technical role regarding alternatives for Los Padres Dam and associated sediment management.
Allocate New Supply	Remained within Water Allocation Program limits.
Determine Drought Reserve	Rationing was not required due to maintenance of adequate storage reserve.
Steelhead Fishery Program	The surface flow of the Carmel River dropped below 10 cfs at the Highway 1 Bridge on May 18, 2018. In response to this decline, District staff began monitoring daily river conditions. Mainstem rescues began on June 25th and were conducted until October 3, 2018 between the Highway 1 Bridge (RM 1.0) and Schulte Bridge area (RM 6.7), and at the Trail and Saddle area (RM 13.3). During this period, staff conducted 32 rescue operations over 6.3 miles, yielding a total of 2,794 steelhead, including: 1,396 young-of-the-year (YOY), 1,383 yearlings (1+), 1 kelt and 14 mortalities (0.50%). Since 1989, District staff has rescued 437,528 steelhead from drying reaches of the Carmel River watershed. Compared to previous rescue seasons, total rescued fish in the 2018 dry season was only 34% of the 1989-2018 average of 14,584, as described in Section XVI.
Riparian Habitat Program	Continued revegetation efforts at exposed banks with little or no vegetation located between Via Mallorca and Esquiline Roads; Contracted to collect channel profile data and limited cross section data from the Carmel River for use in maintaining a long-term record and comparing to the past and future data; Made public presentations showing MPWMD-sponsored restoration work over the past 27 years; Continued long-term monitoring of physical and biological processes along the river in order to evaluate the District's river management activities; Continued the annual inspections of the Carmel River from the upstream end of the lagoon to Camp Steffani; Walked the entire river to observe and record erosion damage, conditions that could cause erosion, riparian ordinance infractions, and the overall condition of the riparian corridor; Continued enforcement actions to address serious violations of District

MITIGATION ACTION	MAJOR ACCOMPLISHMENTS
	riparian ordinances; Carried out vegetation management activities; Operated under Routine Maintenance Agreement with CDFW for MPWMD vegetation maintenance activities.
Lagoon Habitat Program	The District continues to support and encourage the ongoing habitat restoration efforts in the wetlands and riparian areas surrounding the Carmel River Lagoon. These efforts are consistent with goals that were identified in the Carmel River Lagoon Enhancement Plan, which was partially funded by the District. The District continues to work with various agencies and landowners to implement ongoing restoration of the Odello West property and future restoration of the Odello East property across the highway. The District also surveyed and analyzed four bathymetric transects, participated in interagency meetings regarding management of lagoon in winter storm events (see also steelhead efforts that benefit lagoon) and monitored lagoon stage.
Aesthetic Measures	See Riparian Habitat Program measures in Section XVII.

II. HYDROLOGIC MONITORING

The Water Allocation Program EIR concluded that Water Supply Option V would have less-than-significant impacts on the water resources in the Monterey Peninsula area, and that no mitigation measures were required. This conclusion was based solely on changes to the hydrologic regime and not on changes to water-dependent resources. Impacts on water-dependent resources (e.g., riparian vegetation and wildlife and steelhead fishery) due to changes in the hydrologic regime were identified as significant in the EIR. Implementation of the mitigation measures proposed for the impacts on these water-dependent resources are described in subsequent sections. It was suggested in the EIR that the District continue and expand its current monitoring programs to establish baseline conditions for assessment of long-term changes (Finding No. 381). Accordingly, the District currently maintains ongoing precipitation, streamflow, storage, water-level and water-quality monitoring programs. These programs and the activities to implement them for Water Year 2018 (October 1, 2017 through September 30, 2018), are summarized below.

A. Precipitation Monitoring

<u>Description and Purpose</u>

During the period from October 1, 2017 through September 30, 2018, the District continued to process long-term precipitation records at Los Padres Dam (LPD) and at the former San Clemente Dam Site (SCDS) collected by California American Water (CAW). District staff also records precipitation at its Monterey office located at Ryan Ranch, and receives daily rainfall reports from the National Weather Service climate station at Monterey. In addition, real-time and historical rainfall data for the Monterey Peninsula area can be accessed via the Internet. These data support a variety of District programs, including erosion control, riparian vegetation management and identifying long-term precipitation trends and hydrologic-year conditions.

<u>Implementation and Activities During 2017-2018</u>

Work during this period involved continuing maintenance of the existing precipitation monitoring network. A summary of daily precipitation at SCDS during Water Year (WY) 2018 is shown in **<u>Figure II-1</u>**. The average annual recorded precipitation at this site for the period from 1922 through 2018 is 21.17 inches. In WY 2018, 13.52 inches of precipitation were recorded at SCDS, which is 64 percent of average.

<u>Figure II-2</u> shows a comparison of WY 2018 rainfall at SCDS and the average monthly rainfall at this site. As indicated in **<u>Figure II-2,</u>** monthly rainfall was below average in all months except for March 2018 at 5.99 inches of precipitation, which accounted for 44 percent of the WY 2018 total.

B. Streamflow Monitoring

Description and Purpose

Since its inception, the District has historically collected streamflow measurements at approximately 15 mainstem sites on the Carmel River and on 16 tributaries to the Carmel River. The District's current principal streamflow measuring sites within the Carmel River Basin (CRB) are shown in **Figure II-3**. Prior to 1991, the streamflow measurements were instantaneous measurements made by the current-meter method. In 1991, a concerted effort was made to upgrade the streamflow monitoring network as staff installed continuous recorders at six selected tributary sites. Since that time, the District has continued to expand its streamflow monitoring network, which currently consists of 18 continuous-recording gaging stations.

Data collected at the District streamflow monitoring sites are analyzed for use in water-supply planning, fishery, riparian and erosion control programs. More specific uses of streamflow data include, but are not limited, to the items listed below:

- Defining the general hydrologic conditions in the basin
- Setting flow requirements for meeting aquatic life goals
- Monitoring compliance with minimum-flow requirements
- Forecasting water-supply availability
- Assessing and scheduling fish rescue activities
- Assessing effectiveness of riparian mitigations
- Evaluating surface and groundwater interaction
- Developing and calibrating hydrologic models
- Delineating and managing flood plains
- Evaluating and designing water-supply projects
- Providing data for forecasting floods and defining flood-recurrence intervals
- Assessing hydrologic impacts from water-development projects
- Supporting Aquifer Storage and Recovery (ASR) operations

Implementation and Activities During 2017-2018

During the 2017-2018 period, the District operated and maintained (O&M) 16 streamflow gaging stations within the CRB / District Boundary, and collected continuous water-level data at both Los Padres Reservoir and at the Carmel River Lagoon. In addition, instantaneous measurements of discharge were collected at the Carmel River above Los Padres Reservoir and Danish Creek sites on a monthly basis during the “dry season” which runs approximately from June through November. The District continuous recording gaging stations are listed below:

Tributary/other	**Mainstem**
Finch Creek	Carmel River below Los Padres Reservoir
Cachagua Creek	Carmel River at Sleepy Hollow Weir
Pine Creek	Carmel River at Don Juan Bridge
San Clemente Creek	Carmel River at Highway 1 Bridge
Tularcitos Creek	Carmel River above Los Padres Reservoir
Hitchcock Creek	(non-recording)
Garzas Creek near Lower Garzas Canyon	**Continuous Water Level**
Garzas Creek at Garzas Road	Los Padres Reservoir
Potrero Creek	Carmel River Lagoon
Robinson Canyon Creek	
San Jose Creek	
Arroyo del Rey at Del Rey Oaks	

Streamflow gaging station O&M at each of the above sites involves obtaining monthly discharge measurements, maintaining recording equipment, obtaining staff gage readings and occasional surveying. Subsequently, river/creek stage and discharge data are processed in-house utilizing Hydstra Time-Series Software (Kisters North America, Inc.), to produce continuous streamflow records for the sites. **Table II-1** summarizes the computed annual flows in acre-feet (AF) for the District sites for the WY 1992-2018 period. In addition, **Table II-1** includes annual flow values for the two mainstem sites operated by the U.S. Geological Survey (USGS) for the 1992-2018 period.

During the 2017-2018 period, District staff continued to maintain the existing streamflow monitoring network (network). Streamflow within the Carmel River Basin during WY 2018 was classified as "below normal", as further described below. Work within this period involved collecting numerous, routine streamflow measurements by the current meter method, in order to refine the stage/discharge relation at the gaging stations. In addition, several low-flow measurements were obtained at the sites utilizing a three-inch modified Parshall Flume.

Upgrade of Continuous Recording Hardware at Gaging Stations

During WY 2018, staff completed hardware upgrades at the six sites listed below as technical support is no longer available for the older equipment.

Cachagua Creek
Pine Creek
San Clemente Creek
Garzas Creek
Robinson Creek
San Jose Creek

Equipment upgrades at these sites involved replacement of older Campbell Scientific Inc. (CSI) CR510 dataloggers and Druck pressure transducers (water level sensors) with current CSI CR300 dataloggers and CS451 pressure transducers. In addition, 20 watt solar panels were added to each of the sites to eliminate (in most cases) the need for periodic, manual battery replacement at the sites.

Automation of Streamflow Data on District Website

During the 2017-2018 period, District staff continued to maintain automated daily posting of real-time streamflow data to the District website for the following locations:

CR below Los Padres Reservoir
CR at Sleepy Hollow Weir
CR at Don Juan Bridge
CR at Highway 1 Bridge
Finch Creek at Hastings Reservation
Carmel River Lagoon

This automated process facilitates data dissemination which reduces the volume of data inquiries.

● **Summary of Streamflow Conditions --** Streamflow during WY 2018 within the CRB was classified as "below normal", defined as a year exceeded in terms of runoff 75 percent of the time. The highest peak streamflow event of the year occurred on March 22, 2018 at 3,070 cfs, and 2,570 cfs at the District's Carmel River (CR) at Don Juan Bridge, and CR at Highway 1 Bridge gaging stations, respectively.

During WY 2018, 30,600 acre-feet (AF) of unimpaired runoff were estimated at the San Clemente Dam Site (SCDS). This total represents 45% of the average annual runoff (68,000 AF) expected at the SCDS.

C. Carmel River Lagoon Water-Level Monitoring

Description and Purpose

Since 1987, the District has monitored the level of surface water in the CR Lagoon. The water level is monitored with a continuous recorder located in the South Arm of the Lagoon that utilizes pressure transducer technology. The water-level data have been used, in part, to support technical studies for use by the Carmel River Steelhead Association, California Department of Parks and Recreation, California Coastal Conservancy, California Department of Fish and Wildlife, Monterey County Water Resources Agency (MCWRA), Monterey County Public Works Department (MCPWD) and MPWMD. In addition, the water-level data are monitored by the MCWRA via their ALERT system to enhance flood warning for residents located along the northern margin of the Lagoon and wetland.

Implementation and Activities During 2017-2018

During the 2017-2018 period, District staff continued to maintain the continuous water-level recorder located in the South Arm of the Lagoon, and a complete record of water-level readings (i.e., 15-minute intervals) was obtained. Staff continued to utilize the telecommunications capability established at the Lagoon gage in September 2007 to post Lagoon water-level data on to the District's website. These continuous water-level data are automatically plotted and posted daily on the District website under the "Carmel River Lagoon Water Levels" as an 8-day plot that shows the past week's levels. Staff continued to maintain the monthly lagoon level plots that are available on the District website from WY 2006 to the present. This allows interested parties to access the data to view historical and recent water-level trends.

The first Lagoon mouth opening of WY 2018 occurred on January 9, 2018 **(Figure II-4)** as the Resource Management Agency of Monterey County directed action to lower the sandbar elevation two feet by construction of a pilot channel to the ocean on January 8 and 9. This action was necessary to alleviate immediate flood conditions at the lagoon. With a lagoon inflow of approximately 40 cfs at this time, the lagoon level continued to rise during and after the sandbar management activity, flowed through the pilot channel and caused the January 9 lagoon mouth breach. Following this initial breach, the sandbar at the mouth immediately redeveloped and the lagoon mouth became closed to the ocean until the next breach on January 21. Overall, data indicates the lagoon mouth was closed most of January 2018 except for about seven days as evidenced by tidal cycles seen in **Figure II-4** which are indicative of an open lagoon mouth. This pattern of a predominantly closed lagoon is typical in wintertime with low river inflow conditions less than 20 cfs (averaged 17 cfs in January 2018) as high wave energy at the beach face dominates on weak river forces associated with low flows.

U:\mpwmd\Allocation\Annual Mit. Report RY 2018\RY 2018-Place your files here\II Precipitation, Streamflow, Lagoon Water Level Monitoring\GJSection II hydrologic monitoring_GJ_WY1718.docx

Figure II-1
San Clemente Reservoir Site Daily Rainfall: Water Year 2018

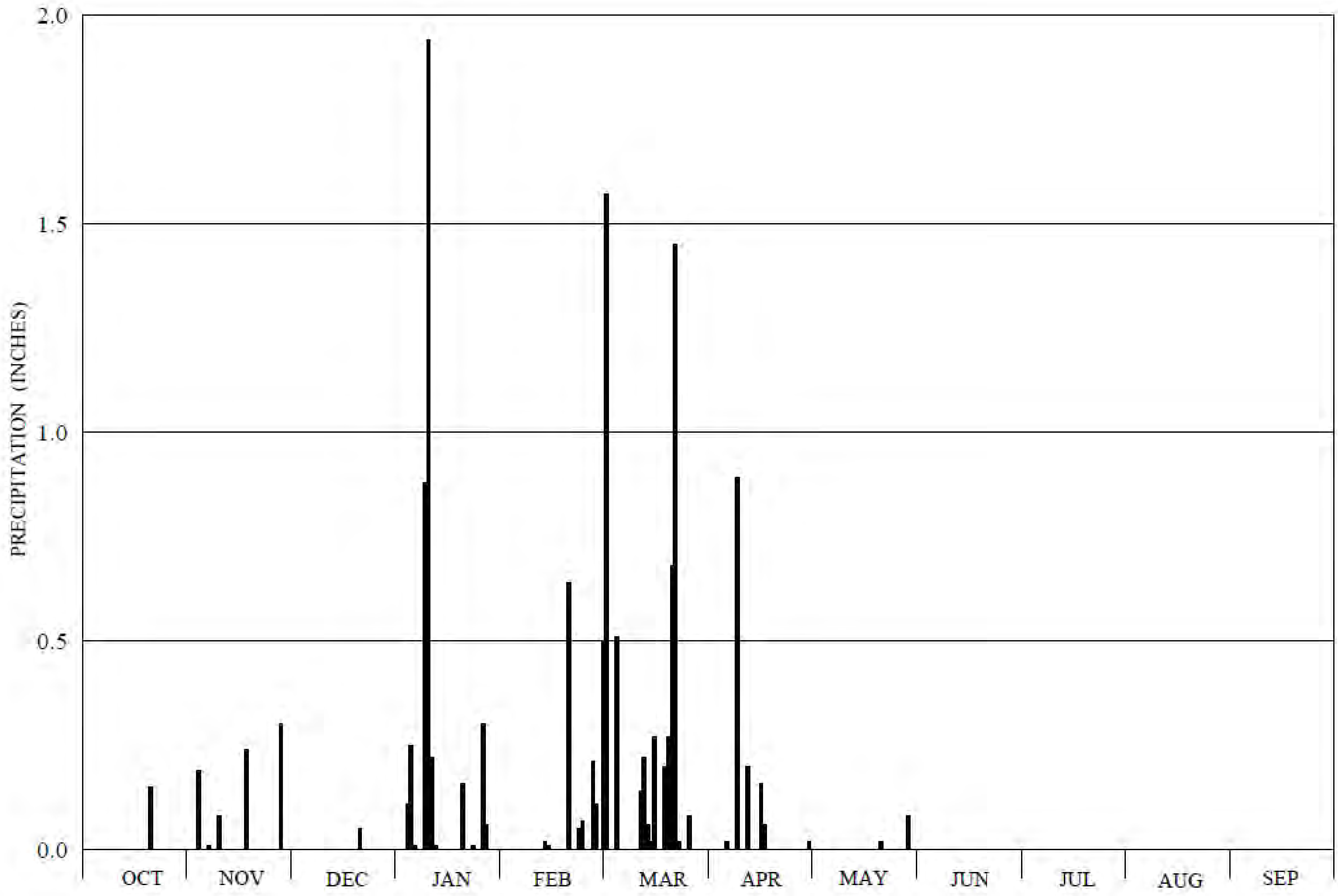


Figure II-2
Monthly Distribution of Rainfall at San Clemente Reservoir Site
Water Year 2018 Compared to 1922-2018 Long-Term Average

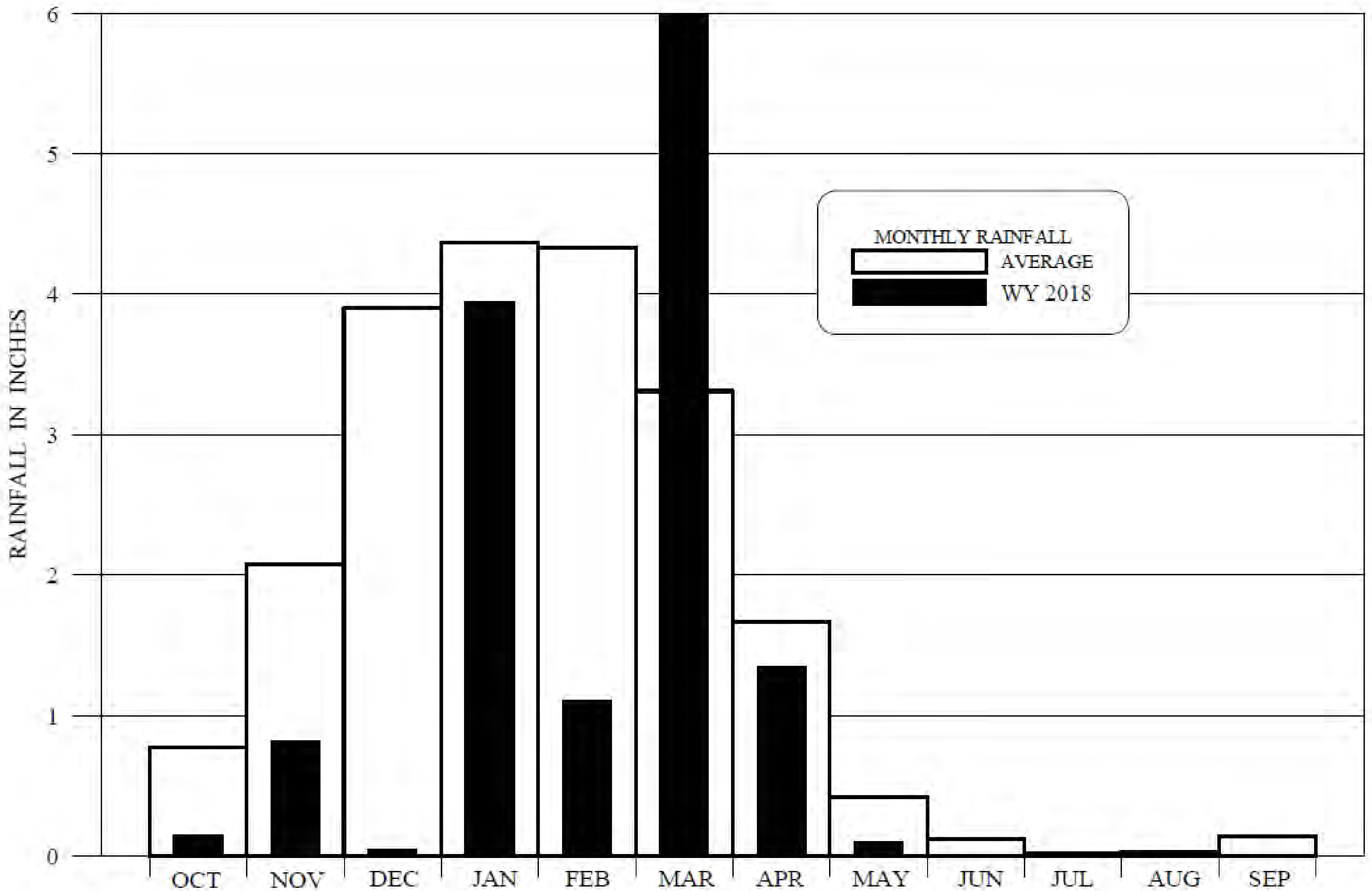


Figure II-3
Carmel River Basin Principal Streamflow Gaging Stations

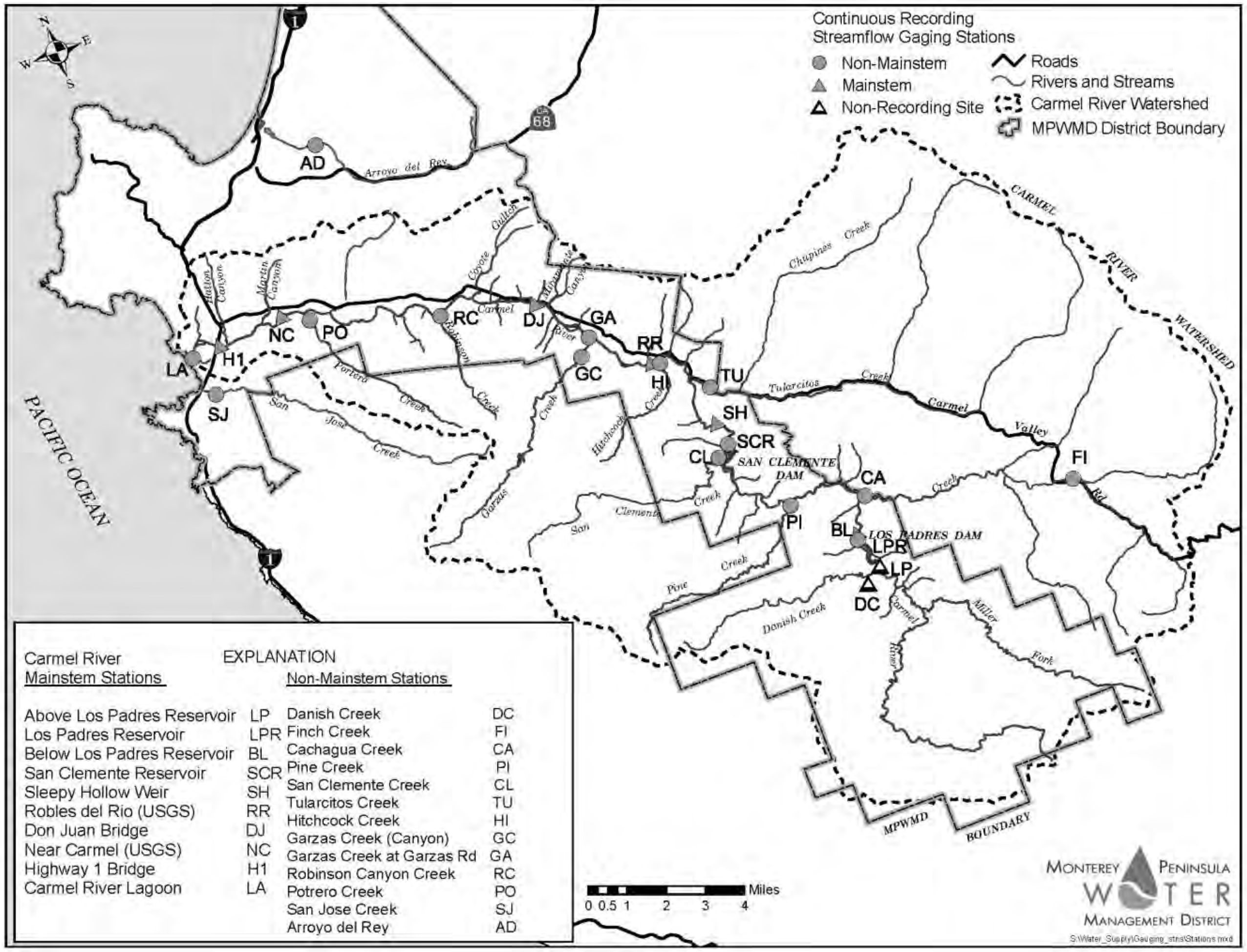


Figure II-4
Carmel River Lagoon Water Level

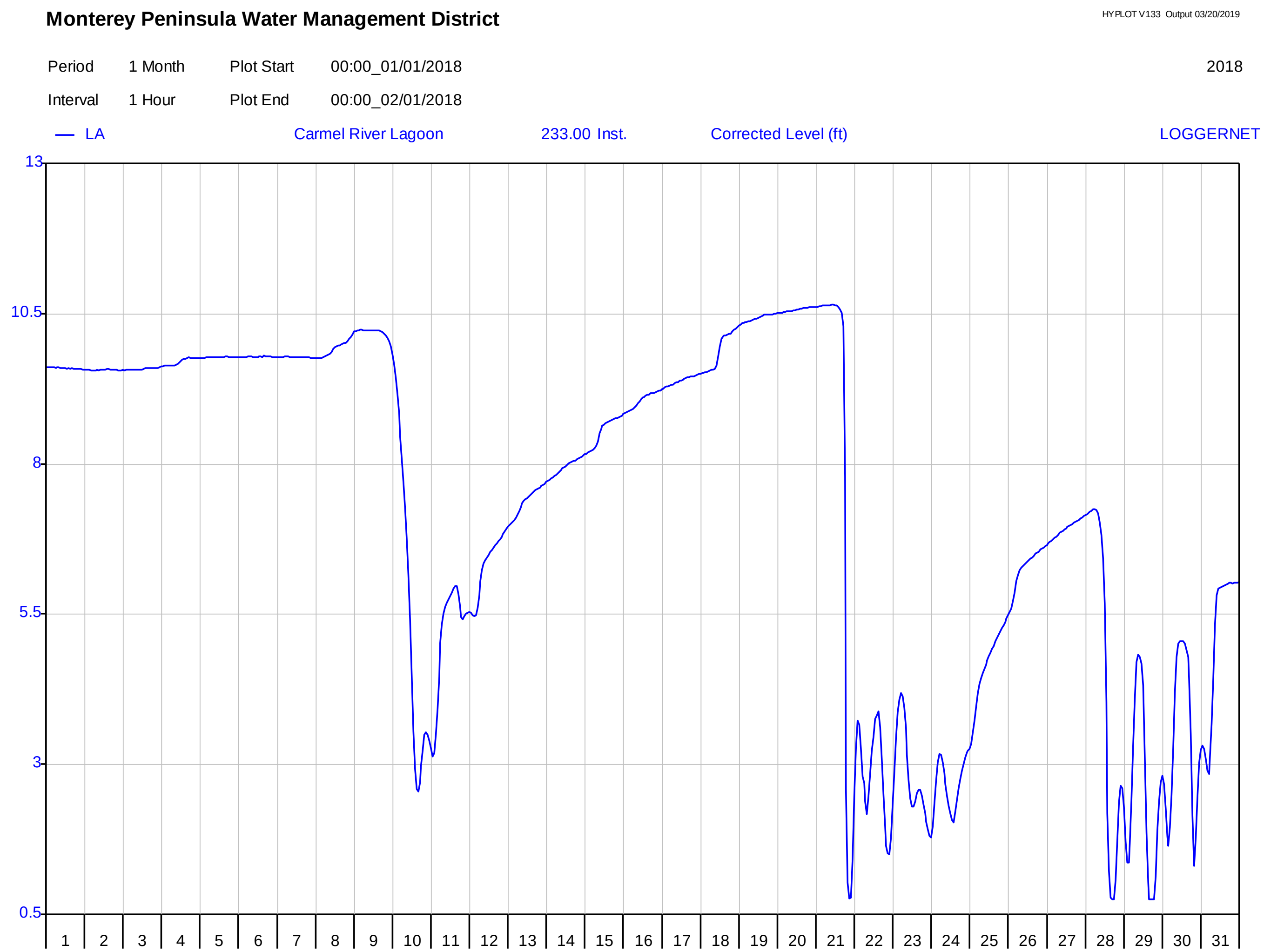


Table II-1
Carmel River Basin Annual Streamflow Summary Water Years 1992 – 2018
(Values in Acre-Feet)

TRIBUTARY SITES	Drainage Area (Sq.Mi.)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
FINCH CREEK	22.1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2860	3420	558	290	28	170	458	3,560	424
CACHAGUA CREEK	46.3	1,780	7,340	560	16,320	3,840	4,990	23,800	2,590	1,730	1,500	245	1,270	1,250	4,340	5,210	261	2,200	1,020	5,030	5,320	695	237	0	234	777	7,120	416
PINE CREEK	7.8	3,750	9,800	1,230	11,110	6,550	8,300	15,610	4,540	5,300	3,270	2,300	4,250	2,350	8,910	8,020	849	3,840	2,830	6,140	6,950	1,310	1,870	406	1,200	3,910	17,240	n/a
SAN CLEMENTE CREEK	15.6	5,450	17,070	1,820	20,580	9,310	14,100	33,380	7,130	9,830	5,340	3,270	5,850	3,720	16,330	13,720	1,360	5,520	4,270	9,950	12,950	1,970	2,570	469	1,670	7,300	n/a	n/a
TULARCITOS CREEK	56.3	635	3,220	444	5,100	1,650	2,450	22,610	3,810	2,450	1,490	630	552	503	1,000	2,480	503	917	405	1,140	1,430	451	327	94	n/a	n/a	n/a	n/a
HITCHCOCK CREEK	4.6	*	*	52	1,820	451	716	2,970	169	482	214	18	274	234	863	691	2	383	152	550	629	7	56	0	18	275	n/a	n/a
GARZAS CREEK	13.2	3,700	11,170	746	12,140	4,890	8,570	24,610	5,050	4,980	3,070	1,200	2,760	1,810	8,590	7,420	381	3,010	2,500	5,720	7,620	641	1,320	44	619	n/a	n/a	n/a
ROBINSON CANYON CR.	5.4	619	2,360	89	2,230	619	1,450	6,890	545	823	433	82	448	354	1,710	1,010	25	455	450	1,120	1,150	40	152	14	n/a	n/a	n/a	n/a
POTRERO CREEK	5.2	*	*	30	1,790	506	1,210	5,970	855	1,020	310	43	210	164	1,470	1,050	13	308	356	985	1,170	14	50	0	n/a	n/a	n/a	n/a
SAN JOSE CREEK	14.2	*	*	*	*	*	*	*	6,400	6,260	2,890	1,100	1,880	1,480	7,640	6,870	862	1,740	2,330	5,220	5,760	1,200	1,540	252	1,040	4,480	n/a	n/a
ARROYO DEL REY	13.8	*	*	*	*	*	*	*	*	*	*	*	392	376	1150	843	213	572	449	772	726	252	255	142	410	969	n/a	n/a
MAINSTEM SITES																												
CR AT ROBLES DEL RIO	193	38,240	109,000	11,800	155,000	75,210	99,340	250,300	54,640	76,750	47,180	31,850	60,560	38,060	114,400	110,100	12,220	49,080	45,950	104,500	108,900	20,750	31,970	6,410	23,360	48,690	200,300	33,100
CR AT DON JUAN BRIDGE	216	*	122,000	12,760	173,600	83,090	111,800	252,200	53,570	73,960	49,360	31,330	60,420	38,330	121,800	118,300	12,150	52,510	47,710	107,000	114,400	20,920	28,530	5,600	21,550	49,060	198,300	31,530
CR NEAR CARMEL	246	35,570	123,400	8,200	177,400	74,500	104,100	261,100	55,000	76,190	47,790	28,340	55,400	35,220	119,200	119,200	7,440	43,960	41,390	105,800	115,700	17,120	24,390	517	14,970	45,740	208,100	28,680
CR AT HIGHWAY 1 BRIDGE	252	*	123,000	7,410	179,500	83,430	112,000	280,900	50,810	72,660	42,860	24,860	52,000	30,300	115,200	115,000	6,470	42,520	39,170	102,700	111,300	16,300	23,410	26	13,420	44,730	201,300	27,180

III. Carmel River Surface-Water Quality Monitoring

Description and Purpose

This monitoring is used to help assess whether or not water-quality criteria for aquatic life are being met in various reaches of the Carmel River, and whether habitats for resources such as Carmel River steelhead (*Oncorhynchus mykiss*) and red-legged frogs (*Rana aurora draytonii*) are being sustained or impaired. Monitoring also provides District staff with a way of measuring trends over extended time periods. These data are used as an indicator of habitat quality, supports staff in recommending appropriate reservoir release schedules, and assists in determining timing of fish rescues.

Since 1991, surface-water quality data have been collected at three sampling stations along the Carmel River on a semi-monthly basis. In 2017, staff added a monitoring site lower in the river, at Garland Park. The locations of the current four sampling stations are as follows: (1) below Los Padres Reservoir (BLP) at River Mile (RM) 25.4, (2) Sleepy Hollow Weir (SHW) at RM 17.1, (3) Don Juan Bridge at Garland Park (GAR) at RM 10.8, and (4) Carmel River Lagoon (CRL) at RM 0.1. River miles are measured from the mouth of the Carmel River where it meets the Pacific Ocean. District staff also continued its vertical profile sampling of the Carmel River Lagoon on a monthly basis. Monitoring at these specific stations gives District staff information on the quality of water released from the reservoir, quality conditions in the main-stem river, and the quality conditions in the lagoon.

District staff also monitors river temperatures continuously at five locations within the Carmel River Basin (**Figure III-1**). Previously, a sixth location was monitored at the South Arm Lagoon; this station has been discontinued due to continuous problems with erroneous readings and vandalism. The objective is to document the temperature regime in different stream reaches and to determine whether water-quality criteria for maximum stream temperatures are exceeded. In addition, these data allow District staff to monitor changes in the thermal regime of the river over time.

Implementation and Activities During 2017-2018

District staff carried out a semi-monthly surface water quality sampling program for the Reporting Year (RY) 2018 (July 1, 2017 to June 30, 2018); data were collected for the following chemical and physical parameters (units in parentheses): temperature (°F), dissolved oxygen (mg/L), carbon dioxide (mg/L), pH, specific conductance (uS/cm), salinity (ppt), and turbidity (NTU). The emphasis for this suite of parameters is on the suitability for rearing juvenile steelhead. In addition, continuous recording temperature data loggers (Optic StowAway temperature data loggers from the Onset Computer Corporation) were deployed at five locations on the Carmel River (**Figure III-1**), as follows:

1. ALP Above Los Padres Reservoir (RM 27.0)
2. BLP Below Los Padres Reservoir (RM 25.4)

3.	ASC	Above San Clemente Reservoir	(RM 18.5)
4.	SHW	Sleepy Hollow Weir	(RM 17.1)
5.	GAR	Garland Park	(RM 10.8)

The District continued its vertical profiling program on the Carmel River Lagoon, on a monthly basis during RY 2018. The suite of parameters that were measured is depth, temperature, dissolved oxygen, and salinity. Vertical profiling helps better understand seasonal changes in the limnological cycles, such as stratification, internal mixing, community respiration, and how that relates to available habitat for steelhead.

The following paragraphs describe the results of the water quality monitoring efforts:

- **Carmel River Lagoon--** Surface water-quality data collected at the CRL station, which is located on the south side of the main body of the lagoon, are listed in **Table III-1**. The minimum dissolved-oxygen measurement recorded during surface water quality sampling was 6.8 mg/L. The pH measurements ranged from 7.5 to 8.5. Carbon dioxide measurements ranged from 5 to 15 mg/L. The conductivity measurements ranged from 315 to 11,832 uS/cm. The surface salinity ranged from 0.2 to 8.2 ppt. The conductivity and salinity are highly variable at the lagoon due to tidal influences and river inflows. The turbidity measurements ranged from 0.3 to 7.7 NTU during the sampling period.

- **Carmel River Lagoon Vertical Profile -** Vertical profiling helps staff understand the seasonal changes in water quality that occurs in the lagoon throughout the water column over time. In the beginning of the sampling period, July 2017, the lagoon was open to the ocean, with surface inflow rapidly declining. The lagoon closed off to the ocean for the season on July 14, 2017 and did not breach again until January 9, 2018. River inflow remained during the entire monitoring period. Inflow during this period was reduced to as low as a mean daily measurement of 4 cubic-feet-second (cfs) in September as measured by the District's Highway One gage. Graphics with observed measurements of the profiles are listed in **Appendix III-1.** A narrative of the results for the reporting period is found in the conclusions/recommendations section.

- **Garland Park--** Water temperature for the Garland Park (GAR) station is shown in **Figure III-2**. High flows observed in the Carmel River during the winter of 2017, displaced the water temperature sensor located at this site, resulting in lost data. For the purpose of this reporting period, only July 2017 data was lost. The sensor was replaced on July 31, 2017. The sampling period with reliable data for this station was July 31, 2017 to June 30, 2018. During this period, maximum annual water temperature was 69.2°F, occurring on September 5, 2017. The overall average water temperature during this period was 57.4°F. Maximum daily average water temperature was 66.9°F, occurring on September 5, 2017. Daily average water temperatures were within adequate range for steelhead rearing during the sampling period. The Water-quality data collected at this station are listed in **Table III-2.**

The dissolved-oxygen measurements recorded ranged from 8 to 15.3 mg/L. Carbon-dioxide measurements ranged from 0 to 10 mg/L. The pH measurements ranged from 7.0 to 8.0. The conductivity measurements ranged from 144 to 299 uS/cm and the turbidity measurements recorded were between 0.1 to 5.5 NTU.

- **Sleepy Hollow Weir--** Water temperature for the Sleepy Hollow Weir (SHW) station is shown in **Figure III-3**. The data recorders sampling period was July 1, 2017 to June 30, 2018. The maximum annual water temperature was 77.4°F, occurring on September 2, 2017. The overall average water temperature during the sampling period at this station was 57.6°F. The maximum daily average water temperature was 71.7°F, occurring on September 5, 2017. Constant water temperatures over 68°F are considered stressful for steelhead (Brungs and Jones, 1977). Average daily water temperatures over 68°F occurred 27 times or 7% of the sampling record. The Water-quality data collected at this station are listed in **Table III-3.** The dissolved-oxygen measurements recorded ranged from 8.4 to 14.7 mg/L. Carbon-dioxide measurements ranged from 0 to 5 mg/L. The pH measurements ranged from 7.5 to 8.0. The conductivity measurements ranged from 126 to 293 uS/cm and the turbidity measurements recorded were between 0.1 to 2.0 NTU.

- **Above San Clemente Reservoir--** Water temperature for the Above San Clemente (ASC) station is shown in **Figure III-4**. After high flows during the winter of 2017 blew out this recorder, it was replaced in July 2017, the new recorder malfunctioned and it was not discovered until February 2018 and could not be replaced until April. The sampling period with reliable data for this station was April 23, 2018 to June 30, 2018. During this period, maximum annual water temperature was 67.8°F, occurring on June 30, 2018. The overall average water temperature during this period was 60.0°F. Maximum daily average water temperature was 65.7°F, occurring on June 25, 2018. Daily average water temperatures were within adequate range for steelhead rearing during the sampling period.

- **Below Los Padres Reservoir--** Water temperature for the Below Los Padres (BLP) station is shown in **Figure III-5**. The data recorders sampling period was July 1, 2017 to June 30, 2018. The maximum annual water temperature observed was 74.2°F, occurring on July 14, 2017. The overall average water temperature observed at this station during the sampling period was 58.2°F. The maximum daily average water temperature at this station was 71°F, occurring on July 8, 2017. Constant water temperatures over 68°F are considered stressful for steelhead (Brungs and Jones, 1977). Average daily water temperatures over 68°F occurred 38 times, representing 10% of the time during the sampling period and is directly related to reservoir water levels and releases. Water quality data collected at this station are listed in **Table III-4**. Water quality at this station is highly influenced by reservoir water quality and release location. The dissolved oxygen measurements recorded ranged from 7.7 to 12.2 mg/L. Carbon dioxide measurements ranged from 0 to 10 mg/L. The pH measurements ranged from 6.5 to 8.0. The conductivity measurements ranged from 111 to 285 uS/cm and the turbidity measured at this station ranged from 0.5 to 9.3 NTU.

- **Above Los Padres Reservoir--** Water temperature for the Above Los Padres (ALP) station is shown in **Figure III-6**. High flows observed in the Carmel River during the winter of 2017, displaced the water temperature sensor located at this site, resulting in lost data. For the purpose of this reporting period, only July and most of August 2017 data was lost. The sensor was replaced on August 23, 2017. The sampling period with reliable data for this station was August 23, 2017 to June 30, 2018. During this period, maximum annual water temperature was 71.6°F, occurring on September 5, 2017. The overall average water temperature during this period was 53.4°F. Maximum daily average water temperature was 69.8°F, occurring on September 5, 2018. Constant water temperatures over 68°F are considered stressful for steelhead (Brungs and Jones, 1977). Average daily water temperatures over 68°F occurred 4 times or 1% of the sampling record.

CONCLUSIONS AND/OR RECOMMENDATIONS:

During the winter the Carmel River basin accumulated 13.52 inches of rain, as measured by the San Clemente Dam rain gage. The reporting year period includes the summer months of Water Year (WY) 2017 and the fall, winter, spring of WY 2018. The WY 2017 and WY 2018 were characterized as "Extremely Wet" and "Below Normal". Continuous temperature loggers observed water temperatures that were within stressful ranges to steelhead in the summer months. Even in the unimpaired wilderness area above Los Padres Reservoir, water temperatures reached stressful ranges for a few days in September. The farthest downstream logger, located in Garland Park had adequate rearing temperatures the entire period. Water released and passing from Los Padres Reservoir during the reporting year was adequate for steelhead from fall to spring, but water temperatures reached stressful range during the summer months. This potentially reduced growth rates or displaced fish to other sections of river that had more favorable conditions. Water quality conditions other than water temperature, at the sampling sites around the former San Clemente Reservoir and down in the lower river were adequate for steelhead rearing during most of the sampling period.

Water quality conditions in the lagoon during summer were enhanced this reporting year, because river inflow into the lagoon was continuous for the entire reporting period. The upper Carmel River watershed burned in 2016 and had an "Extremely Wet" WY type in 2017, thus increasing the duration of inflows into the Los Padres Reservoir and allowing storage releases to be delayed, resulting in the ability to keep the river flowing downstream longer during the summer of 2017. The lowest mean daily inflow measurement at the District's Highway One gage during the reporting year was 4 cfs, occurring in September 2017. Although conditions for rearing steelhead were improved from the inflow, suboptimal temperatures and dissolved oxygen measurements were still observed, but in fewer frequency. Once the lagoon closed in mid-July, water quality conditions were adequate until mid-September in the top 1.5 meters. By late September water temperatures started to enter into the stressful range of 70 degrees. Fall typically is the time of year that tidal wave over-wash from large swells starts to enter the lagoon and change the water quality dynamics. This was observed in early November, where these over-wash events created a stratified layer of freshwater and salt water, but by late November the continuous inflow kept refreshing all but the deepest parts of the lagoon. Water quality conditions were adequate up to 2.5 meters until January. In January the first breach occurred, reducing the volume of the lagoon. The reduced volume coupled with the winter tidal wave over-wash created a defined stratified layer of freshwater on top and salty water on the bottom. At this time water quality conditions are adequate only in the top meter or so for rearing juveniles, but is adequate for outgoing smolts and incoming adults at all depths because of their ability to deal with high salt concentrations. This scenario continued until June, when the lagoon closed off and river inflow refreshed all but the deepest parts of the lagoon. In June, water quality conditions were adequate for steelhead rearing down to about 1.75 meters.

Figure III-1
Temperature and Semi-Monthly Water Quality Monitoring Locations in the Carmel River Basin During RY 2018

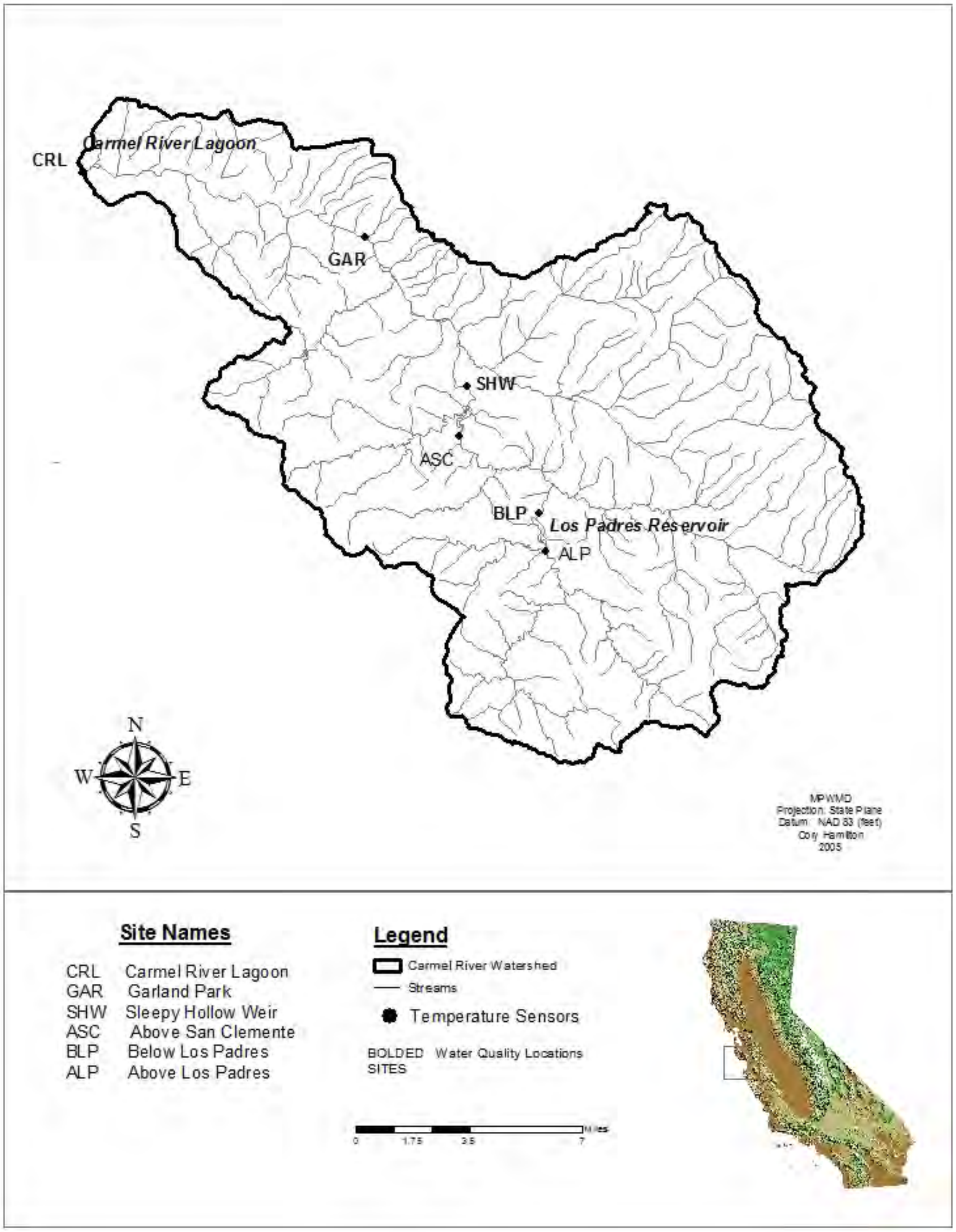


Figure III-2
Daily temperatures recorded from a continuous temperature data logger at the Garland Park (GAR) station during RY 2018

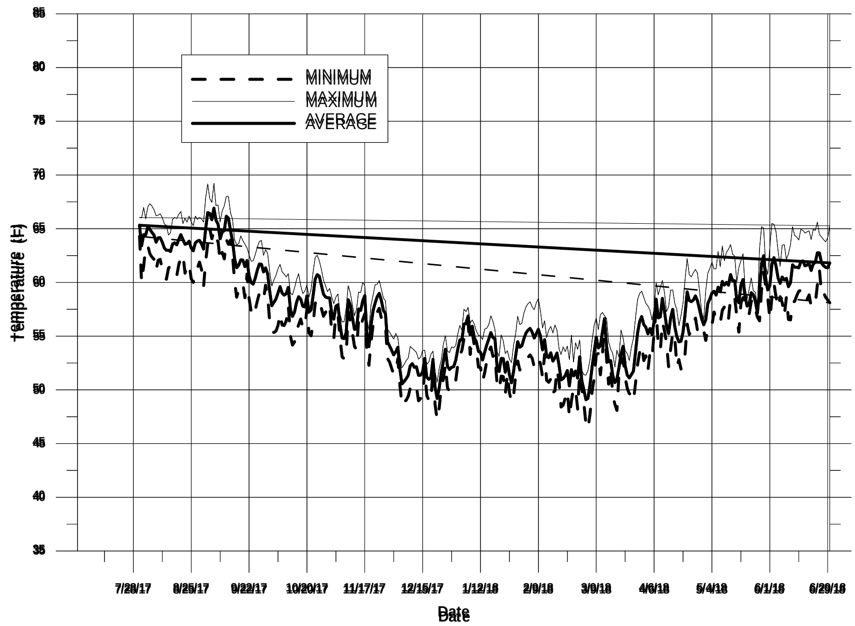


Figure III-3
Daily temperatures recorded from a continuous temperature data logger at the Sleepy Hollow Weir (SHW) station during RY 2018

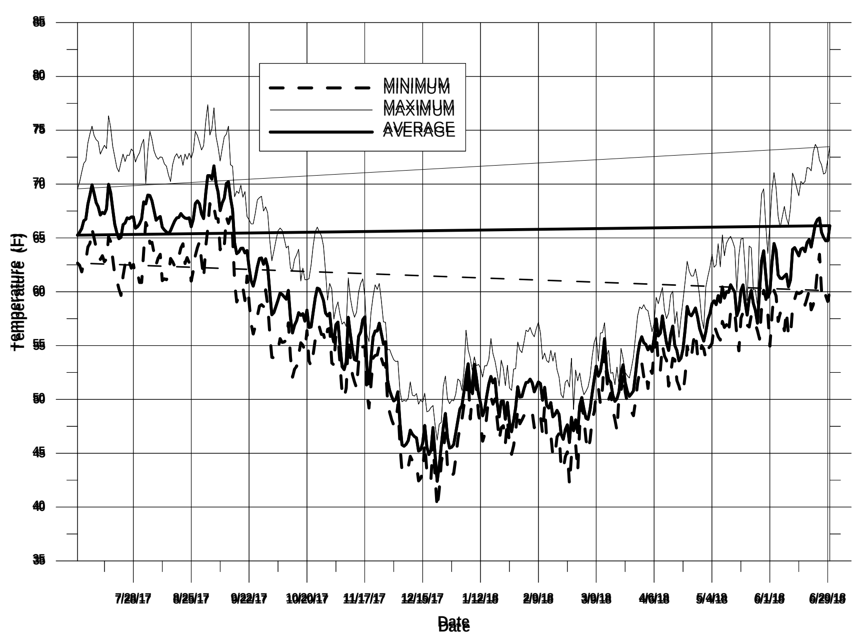


Figure III-4
Daily temperatures recorded from a continuous temperature data logger at the above San Clemente (ASC) station during RY 2018

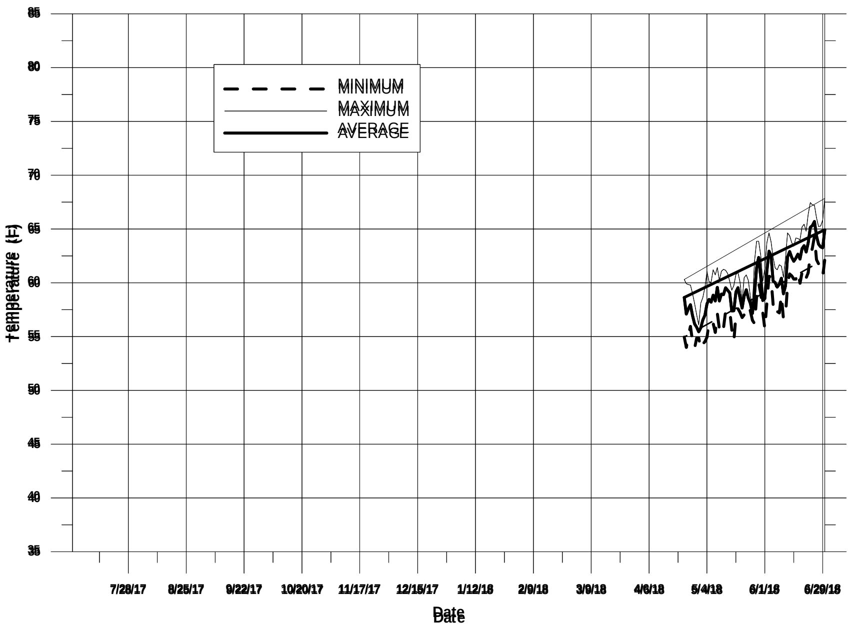


Figure III-5
Daily temperatures recorded from a continuous temperature data logger at the Below Los Padres (BLP) station during RY 2018

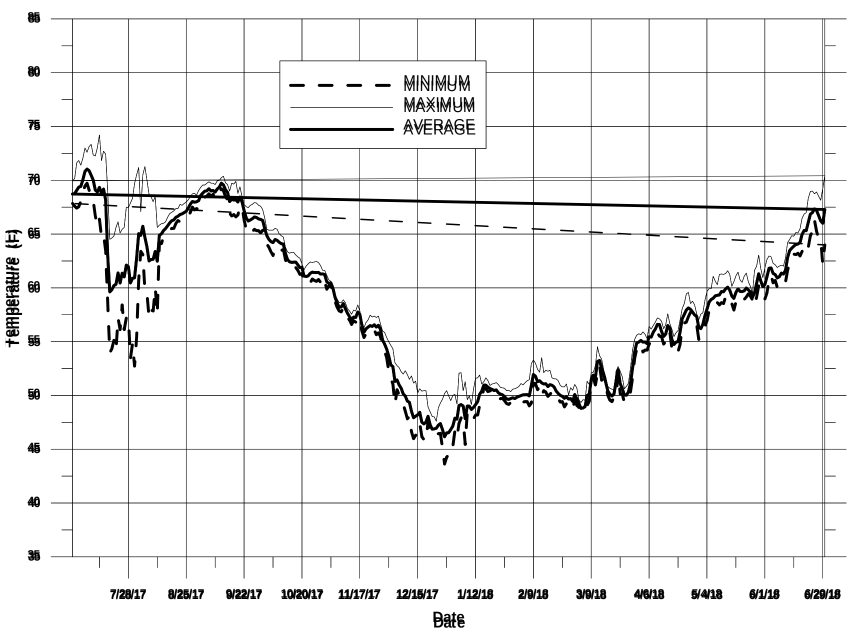


Figure III-6
Daily temperatures recorded from a continuous temperature data logger at the Above Los Padres (ALP) station during RY 2018

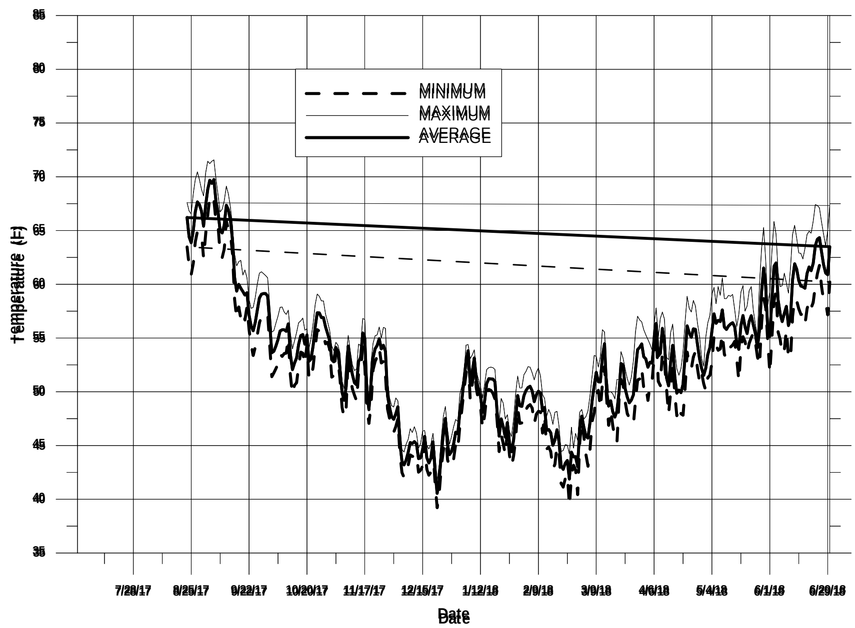


Table III-1
Water quality data collected by MPWMD during RY 2018 at Carmel River Lagoon (CRL) site.

Date	Time 24 Hr	Temperature (F)	Dissolved Oxygen (mg/L)	Carbon Dioxide (mg/L)	pH	Conductivity (uS/cm)	Nacl (ppt)	Turbidity (NTU)
03-Jul-17	1352	62.6	10.2	5	7.5	6,013	3.8	n/a
25-Jul-17	1226	68.1	9.5	5	8.0	1,033	0.6	1.6
11-Aug-17	1235	67.2	8.7	5	8.0	500	0.3	0.5
25-Aug-17	845	65.6	7.7	5	8.0	480	0.3	0.8
01-Sep-17	1335	70.8	8.3	10	8.0	627	0.3	0.6
15-Sep-17	1245	69.4	8.2	10	7.5	1,259	0.7	0.8
04-Oct-17	1533	63.7	9.5	10	8.0	735	0.4	0.9
20-Oct-17	1430	62.5	7.8	15	8.0	11,832	8.2	3.4
07-Nov-17	1457	57.4	8.5	10	7.5	2,107	1.4	1.5
20-Nov-17	1438	56.8	6.8	10	7.5	954	0.6	0.8
30-Nov-17	953	53.0	8.2	10	7.5	834	0.6	0.6
14-Dec-17	950	46.4	9.9	15	8.0	495	0.3	0.4
22-Dec-17	1305	48.0	10.4	10	7.5	595	0.4	0.5
18-Jan-18	1224	55.7	7.2	15	7.5	7,716	5.6	7.7
01-Feb-18	1117	53.5	11.3	5	8.0	4,143	3	1.2
14-Feb-18	1416	54.3	11.4	10	8.5	655	0.4	0.5
12-Mar-18	1255	57.3	10.1	10	8.0	8,967	6.5	3.1
27-Mar-18	1551	55.0	n/a	5	8.0	315	0.2	5.9
17-Apr-18	1435	59.2	n/a	5	8.0	1,226	0.8	0.6
25-Apr-18	1015	57.3	10.0	5	8.0	1,952	1.3	0.5
11-May-18	1210	62.0	9.8	5	8.0	576	0.3	0.5
25-May-18	1315	62.2	10.4	5	8.0	651	0.4	0.5
05-Jun-18	1150	66.1	9.1	5	8.0	617	0.3	0.3
19-Jun-18	945	65.3	7.6	10	7.5	584	0.3	0.4
Minimum		46.4	6.8	5.0	7.5	315	0.2	0.3
Maximum		70.8	11.4	15.0	8.5	11,832	8.2	7.7
Average		60.0	9.1	8.3	7.9	2,286	1.5	1.4

Table III-2
Water quality data collected by MPWMD during RY 2018 at Garland Park (GAR) station.

Date	Time 24 hr	Temperature (F)	Dissolved Oxygen (mg/L)	Carbon Dioxide (mg/L)	pH	Conductivity (uS/cm)	Turbidity (NTU)
03-Jul-17	1301	63.0	10.4	0	7.0	250	n/a
25-Jul-17	1135	63.4	9.5	0	7.5	274	5.5
11-Aug-17	1114	62.4	9.8	5	8.0	276	0.2
25-Aug-17	1048	61.4	9.2	5	8.0	281	0.3
01-Sep-17	1252	65.7	9.0	5	7.0	299	0.3
15-Sep-17	1330	63.0	9.3	0	7.5	293	0.2
04-Oct-17	1457	60.0	9.8	5	7.5	291	0.3
20-Oct-17	1340	59.4	9.4	0	7.5	250	0.2
07-Nov-17	1400	56.0	9.8	5	7.5	274	0.3
20-Nov-17	1400	57.3	8.0	5	8.0	286	0.2
30-Nov-17	1155	53.5	10.4	5	7.5	269	0.2
14-Dec-17	1150	51.6	12.6	5	8.0	274	0.1
22-Dec-17	1113	48.3	11.7	0	8.0	254	0.2
18-Jan-18	1312	55.4	10.7	5	8.0	270	0.3
01-Feb-18	1232	55.2	15.3	0	8.0	292	0.4
14-Feb-18	1336	55.1	11.7	0	8.0	268	0.2
12-Mar-18	1330	55.9	11.2	5	8.0	222	1.0
27-Mar-18	1457	53.4	n/a	0	7.5	144	2.4
17-Apr-18	1335	56.2	n/a	5	8.0	191	0.4
25-Apr-18	1113	57.0	10.2	0	8.0	202	0.2
11-May-18	1307	60.4	10.7	10	8.0	226	0.2
25-May-18	1400	58.7	10.8	5	8.0	228	0.2
05-Jun-18	1230	60.8	9.6	5	8.0	247	0.2
19-Jun-18	1510	64.2	9.3	5	8.0	266	0.3
MINIMUM		48.3	8.0	0.0	7.0	144	0.1
MAXIMUM		65.7	15.3	10.0	8.0	299	5.5
AVERAGE		58.2	10.4	3.3	7.8	255	

Table III-3
Water quality data collected by MPWMD during RY 2018 at Sleepy Hollow Weir (SHW) station.

Date	Time 24 hr	Temperature (F)	Dissolved Oxygen (mg/L)	Carbon Dioxide (mg/L)	pH	Conductivity (uS/cm)	Turbidity (NTU)
03-Jul-17	1111	64.6	10.1	5	7.5	233	n/a
25-Jul-17	1017	63.5	10.3	0	7.5	243	2.0
11-Aug-17	1037	62.1	10.0	5	8.0	246	0.4
25-Aug-17	1237	66.5	9.5	0	8.0	168	0.6
01-Sep-17	1209	68.7	9.4	0	7.5	284	0.6
14-Sep-17	1527	71.2	8.4	0	7.5	293	0.8
04-Oct-17	1423	61.3	10.0	0	8.0	272	0.8
20-Oct-17	1308	58.6	9.6	5	8.0	272	0.9
07-Nov-17	930	50.3	11.5	0	8.0	246	0.7
20-Nov-17	1130	54.1	8.6	5	8.0	255	1.0
30-Nov-17	1255	50.9	11.6	0	8.0	240	0.7
14-Dec-17	1300	45.7	13.6	5	8.0	226	0.8
22-Dec-17	1042	40.5	14.7	0	8.0	208	0.6
18-Jan-18	1400	53.5	11.2	5	8.0	226	0.8
01-Feb-18	1319	52.2	12.3	0	8.0	197	n/a
14-Feb-18	1302	50.8	12.3	5	8.0	197	0.5
12-Mar-18	1420	55.5	11.6	0	8.0	184	0.9
27-Mar-18	1400	52.9	n/a	0	8.0	126	1.8
17-Apr-18	1245	56.4	n/a	0	8.0	164	0.5
25-Apr-18	1210	59.1	11.1	0	8.0	174	0.1
11-May-18	1406	63.9	9.9	5	8.0	195	0.3
25-May-18	1445	60.1	11.1	0	8.0	192	0.1
05-Jun-18	1415	66.3	9.3	5	8.0	217	0.3
19-Jun-18	1415	70.0	9.0	5	8.0	236	0.4
MINIMUM		40.5	8.4	0.0	7.5	126	0.1
MAXIMUM		71.2	14.7	5.0	8.0	293	2.0
AVERAGE		58.3	10.7	2.1	7.9	220	

Table III-4
Water quality data collected by MPWMD during RY 2018 at Below Los Padres (BLP) station.

Date	Time 24 hr	Temperature (F)	Dissolved Oxygen (mg/L)	Carbon Dioxide (mg/L)	pH	Conductivity (uS/cm)	Turbidity (NTU)
03-Jul-17	1000	68.3	8.4	5.0	7.5	240	n/a
11-Aug-17	937	64.4	8.8	5.0	8.0	240	1.0
25-Aug-17	1329	67.9	8.5	5.0	8.0	262	0.6
01-Sep-17	1130	69.0	8.3	5.0	7.5	272	1.1
14-Sep-17	1439	69.9	7.7	5.0	6.5	275	1.1
04-Oct-17	1337	65.3	8.1	5.0	7.5	285	2.7
20-Oct-17	1156	62.3	8.2	0.0	7.5	282	3.5
07-Nov-17	1045	58.4	8.8	10.0	7.5	276	5.5
20-Nov-17	1020	56.4	9.4	10.0	7.5	270	8.4
30-Nov-17	1352	55.0	9.5	10.0	8.0	261	8.6
14-Dec-17	1445	49.6	11.2	5.0	7.5	243	9.3
22-Dec-17	929	47.1	11.4	0.0	8.0	234	8.2
18-Jan-18	1510	51.0	10.4	10.0	7.5	202	4.9
01-Feb-18	1435	50.1	12.2	5.0	8.0	176	3.0
14-Feb-18	1125	51.8	11.2	5.0	7.5	181	2.7
12-Mar-18	1540	54.2	11.1	0.0	8.0	154	0.7
27-Mar-18	1200	50.2	n/a	5.0	7.5	111	2.1
17-Apr-18	1058	55.5	n/a	0.0	7.5	148	0.6
25-Apr-18	1408	59.0	10.4	5.0	8.0	160	0.5
11-May-18	1505	60.9	9.3	5.0	8.0	174	0.6
25-May-18	1555	59.9	10.5	10.0	8.0	181	1.5
05-Jun-18	1530	62.1	9.4	5.0	8.0	191	1.4
19-Jun-18	1115	65.9	8.6	5.0	8.0	212	1.7
MINIMUM		47.1	7.7	0.0	6.5	111	0.5
MAXIMUM		69.9	12.2	10.0	8.0	285	9.3
AVERAGE		58.9	9.6	5.2	7.7	219	

IV. GROUNDWATER MONITORING

A. Groundwater-Level Monitoring

Description and Purpose

The District maintains a groundwater-level monitoring program in the Carmel Valley Aquifer and the Seaside Groundwater Basin. The data collected as part of this program are used to support a variety of programs including: (a) storage monitoring, (b) compilation of annual and long-term well hydrographs, (c) water-table contour mapping, (d) Carmel River Management Program, (e) Seaside Basin Watermaster Program, and (f) other special projects. The monitor-well measurements are stored in a database developed by the District to facilitate data entry, access and manipulation of the water-level data. In addition, groundwater-level measurements are collected on a regular basis by California American Water (Cal-Am) from each of their production wells, and these measurements are also utilized in the District's program. The District also participates in the cooperative California Statewide Groundwater Elevation Monitoring (CASGEM) program administered by the California Department of Water Resources (http://www.water.ca.gov/groundwater/casgem/).

Implementation and Activities During 2017-2018

- **Carmel Valley Aquifer --** The District's monitor well network in the Carmel Valley Aquifer consists of dedicated monitor wells and producer production wells, and currently totals approximately 50 water-level monitoring wells. During this period, the wells were measured on a monthly basis, and these measurements were used to compute end-of-month storage volume estimates for the aquifer. In addition, more frequent monitoring of selected wells was conducted during winter storm events to more closely monitor aquifer recharge.

During the October 2017-September 2018 period, monitoring data indicated that overall groundwater storage in the Carmel Valley Aquifer showed very little fluctuation in WY 2018. Groundwater storage decreased slightly in WY 2018, characterized as “Dry”, following an “Extremely Wet” WY 2017. In the river reach between Sleepy Hollow Weir and the Narrows (i.e., aquifer subunits 1 and 2), the maximum storage estimate was 95% in October 2017, decreasing to the minimum storage estimate of 94% of capacity at the end of September 2018. Similarly, in the river reach from the Narrows to the Carmel River Lagoon (i.e., aquifer subunits 3 and 4), the maximum storage estimate was 92% in October 2017, decreasing to the minimum storage estimate of 87% of capacity at the end of the WY in September 2018.

Figure IV-1 is a typical hydrograph from the lower Carmel Valley, showing groundwater-level fluctuations at the Rancho Cañada West monitor well (River Mile [RM] 2.13) and the Rio North monitoring well (RM 1.65) compared with mean daily streamflow in the Carmel River at Highway 1 (RM 1.09). The Rancho Cañada West monitor well is located about one mile downstream (i.e., westerly) of the farthest downstream Cal-Am production well in Carmel Valley, the Cañada well, and approximately 1,350 feet from the river channel. As shown on this figure, the groundwater elevation began around 20 feet above sea level in September 2017, remained fairly stable throughout WY 2018. WY2018 was characterized as "Dry", and Cal-Am did not pump from their Cañada well during this period and Rancho Cañada Golf Course ceased operations that included irrigating two golf courses from private wells in the vicinity. Only a minor rise in water level was seen at this site in response to rainfall and runoff in March 2018, then the water level slowly declined to closer to 19 feet by the end of September 2018.

The Rio North well is approximately 790 feet from the river channel. The magnitude of seasonal water-level fluctuation at this site was also minor. In WY 2018, groundwater elevation in the Rio North well rose about one foot in response to runoff and returned to about one foot lower that where it started the WY.

- **Seaside Groundwater Basin --** In the Seaside Basin, monthly water-level measurements were collected from 20 monitor wells in the Seaside Coastal Subareas, and four were monitored in the Seaside Inland Subareas. An additional 29 wells in the Seaside Inland and Laguna Seca Subareas were monitored on a quarterly schedule during the year. These additional wells are a combination of active or inactive production wells, and dedicated monitor wells.

Figure IV-2 shows water-level data available from representative wells in the coastal portion of the Seaside Basin monitor well network. This graph shows the water-level elevations in the two principal aquifer zones, the shallower Paso Robles Formation and the deeper Santa Margarita Sandstone, at both upgradient (Site FO-07) and downgradient (Site PCA East) locations from the Paralta production well, the largest capacity Cal-Am well in the coastal area. The graph illustrates the more dominant effect that production from the coastal Seaside Basin wells has had on water levels in the Santa Margarita Sandstone. The graph also illustrates the effect of changed water-supply practices resulting from SWRCB Order WR 95-10. Under the Order, Cal-Am was directed to maximize production from its Seaside Basin sources as a means to reduce production and associated impacts from the Carmel River system. This increased pumping resulted in a declining trend in Santa Margarita aquifer water levels, which are currently below sea level over a large area in the coastal portion of the basin. Seasonal recoveries associated with short-term reduced wintertime production and District aquifer storage and recovery (ASR) injection operations have not been sufficient to reverse the observed long-term downward water-level trend. However, the water-level responses in the Santa Margarita Aquifer at these locations indicate a lessening of the seasonal decline during WY 2017. The modest recovery of groundwater elevations in the deeper (Santa Margarita) wells seen in the graph is attributable to the District Aquifer Storage and Recovery (ASR) program. Additional information on the ASR program is available on the District website. Discussion of the Seaside Basin ASR Projects is included in Section XV.

B. Groundwater-Quality Monitoring

Description and Purpose

The District maintains an ongoing groundwater-quality monitoring program for the two principal groundwater sources within the District: (a) the Carmel Valley alluvial aquifer, and (b) the coastal subareas of the Seaside Groundwater Basin. The purpose of the program is threefold:

(1) to characterize the quality of water in the aquifers,
(2) to detect groundwater contamination from septic systems or other sources in the shallow zones of the Carmel Valley aquifer, and
(3) to monitor sea-water intrusion potential in the coastal portions of the Carmel Valley aquifer and Seaside Basin.

The District has maintained a groundwater-quality monitoring program for the Carmel Valley aquifer since 1981, and for the Seaside Basin since 1990. The District's program is in addition to the extensive water-quality monitoring that is conducted by Cal-Am at its production wells. The District manages all well construction, maintenance, and field-sampling activities associated with the program. Water samples are analyzed at Monterey Bay Analytical Services. The Monterey County Health Department, Cal-Am, and the Monterey County Water Resources Agency have also provided assistance with this program in the past. Collection of the water-quality data is intended to detect problems before they can affect the community's water supply.

Implementation and Activities During 2017-2018

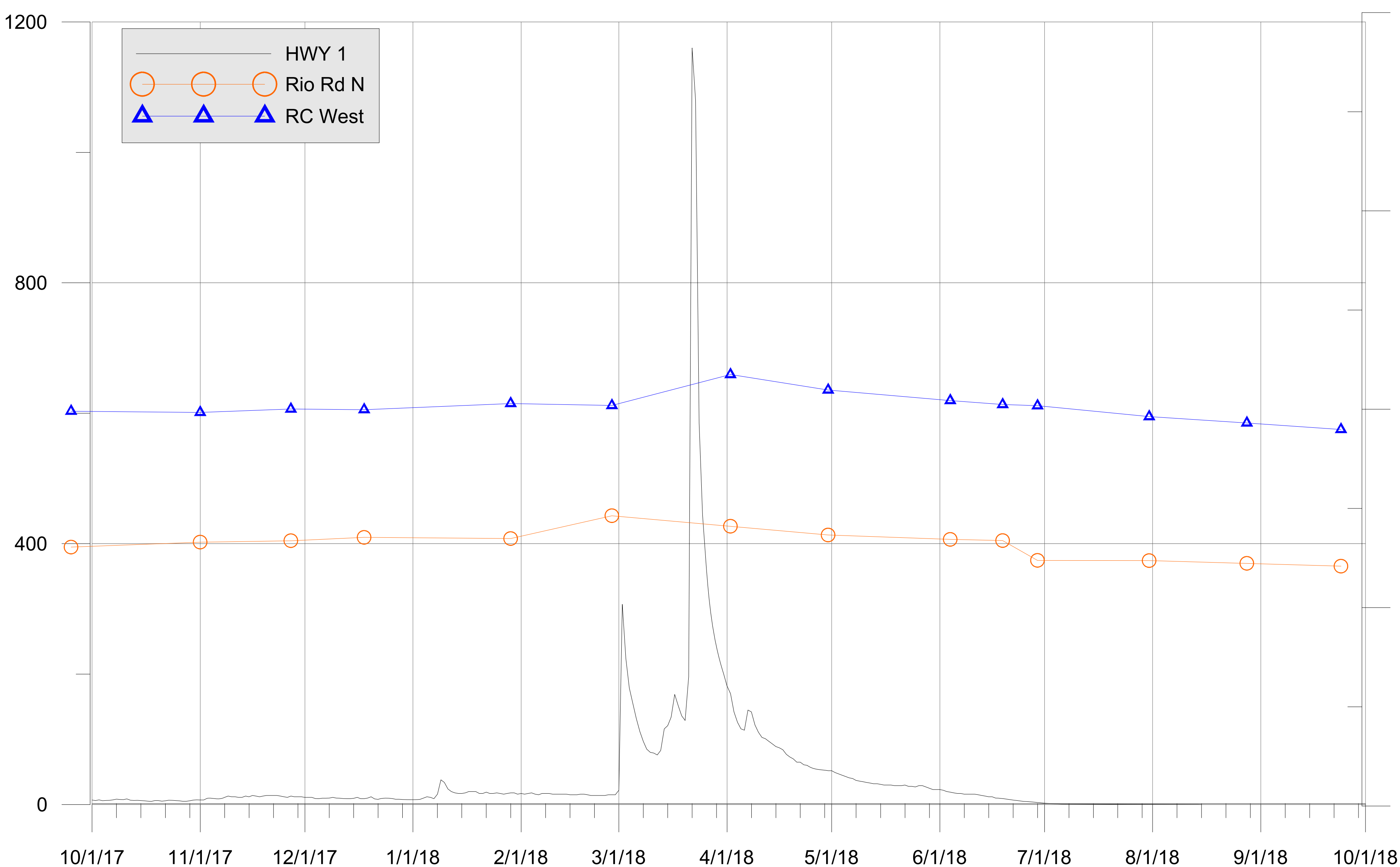
The sampling schedule for Carmel Valley is normally staggered, with Upper Valley wells (i.e., upgradient of the Narrows) sampled in Spring and Lower Valley wells (i.e., downgradient of the Narrows) in Fall, to coincide with the historically higher nitrate concentrations in these respective areas. Collection of samples from the Seaside Basin monitor wells is conducted once per year in Fall, coinciding with the historically low water levels in the basin at that time of the year. Additionally, since 2014, samples were collected quarterly from six wells closest to the coast in the Seaside Basin monitoring network by District staff in cooperation with the Seaside Groundwater Basin Watermaster.

● **Carmel Valley Aquifer –** Groundwater-quality data were collected from six of the network of seven monitor wells in the Carmel Valley aquifer in November 2018. One of the seven wells in lower Carmel Valley was not sampled earlier because it was submerged under high water in the Carmel River Lagoon during the sampling period. Another well that had historically been sampled during this period was destroyed by flooding in March 2011 when the river scoured away the south end of the Carmel River State Beach parking lot. The locations of these sampling points are shown in **Figure IV-3** and **Figure IV-4**. The results indicated that, in general, there were only minor changes in overall water quality compared to samples collected in 2017. Staff is particularly interested in tracking indicators of potential seawater intrusion in the coastal portion of Carmel Valley. Accordingly, three clustered sets of wells were established west of Highway 1, with each set being made up of three wells completed at different depths. Review of historical data indicated that the shallower and intermediate wells at the two well clusters closest to the coast are subject to the mixing of fresh water and saline water as high tides and surf overtop the sand berm between the lagoon and the ocean. This contributes to episodic mixing within the shallower and intermediate zones of the aquifer, but is not necessarily representative of larger-scale seawater intrusion into the aquifer. As described above, the three wells in the cluster closest to the ocean were destroyed by river erosion in March 2011, and the wells in the next closest cluster to the ocean were inaccessible due to high water during the sampling period, so during this Mitigation Report period, only the deeper well at the farthest well cluster from the coast (Well 16S/1W-13Lc) was sampled.

Well 16S/1W-13Lc is the deepest in the array of three wells located on State Parks property near the Carmel Area Wastewater District treatment plant at River Mile (RM) 0.65, currently the most proximate well to the ocean in Carmel Valley that was available for sampling. Although Specific Electrical Conductance (SEC) and Chloride concentration fluctuate slightly from year to year (**Figure IV-5**), both were higher in this well in 2018 relative to 2017, and overall slight increases in SEC and Chloride concentrations are seen at this monitor well over the period of record. Additional background on historical water-quality at the coastal monitor well sites can be found in District Technical Memorandum 90-04*, Summary of Carmel Valley Groundwater-quality from Coastal Monitor Wells*, which is available at the District office. Staff will continue to track future results for trends that might indicate significant changes in concentrations of these or other constituents in the coastal area of the aquifer.

Water quality in well 16S/1E-23La, located 6.72 miles upstream from the river mouth, remained generally unchanged in 2018 relative to 2017, as shown on the graph of SEC and Chloride that is included to track long-term trends (**Figure IV-6**). Staff will continue to track changes in all of the monitor wells in the basin to determine if they are indicative of long-term trends, or anomalous short-term events.

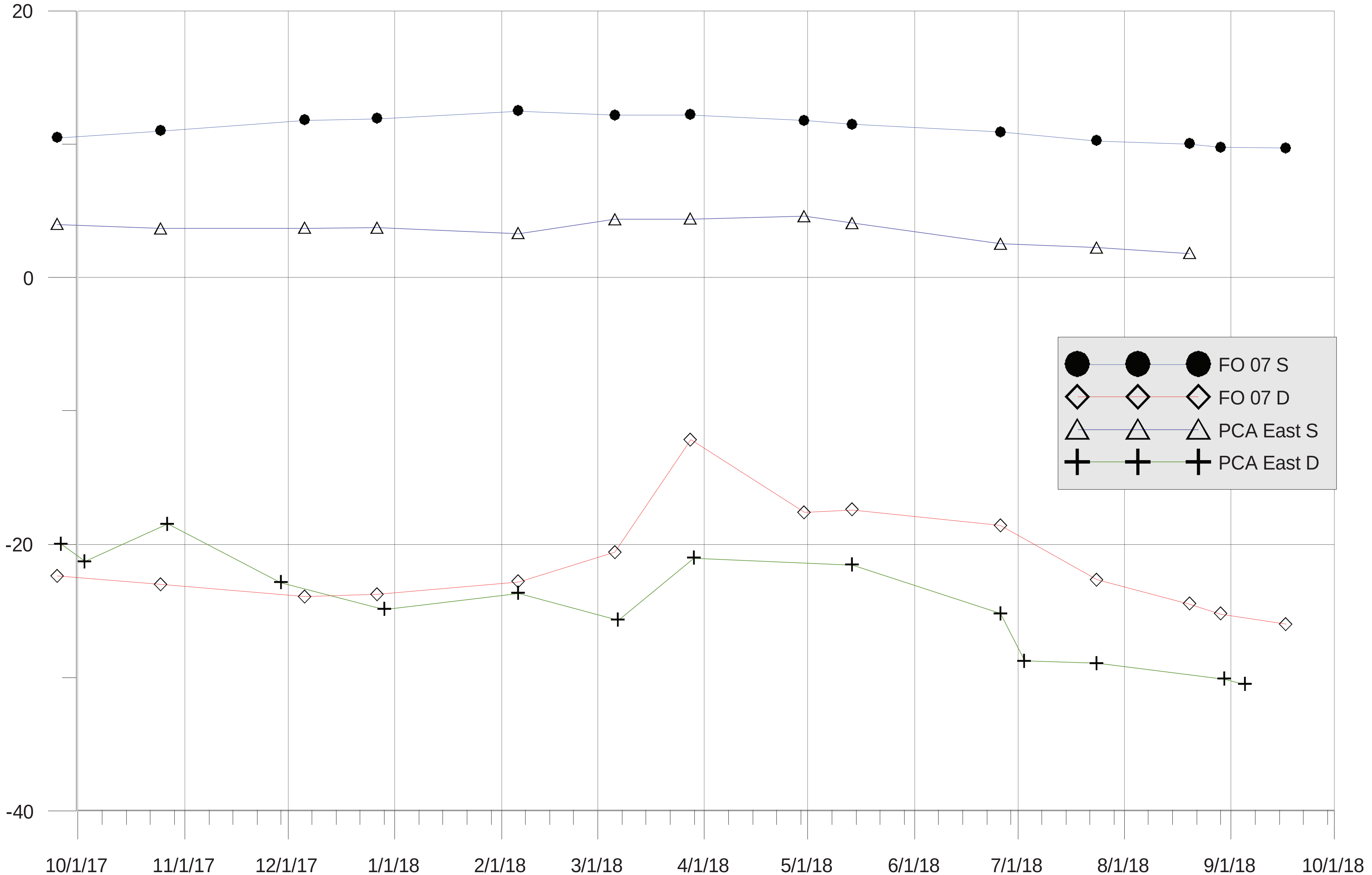
● **Seaside Groundwater Basin --** Eleven monitor wells in the coastal subareas of the Seaside Basin were sampled in August, October and December 2018. The locations of the Seaside monitor wells are shown in **Figure IV-7**. One function of the District's monitor-well network in the Seaside Basin is to serve as an early warning of potential sea-water intrusion into the two principal aquifer zones, the Paso Robles Formation and the Santa Margarita Sandstone. The water-quality results from the Seaside Basin indicate that very little water-quality changes have occurred over the period of record since monitoring began in 1990, and that there is no indication of sea-water intrusion in this area of the basin at this time. **Figure IV-8** shows SEC and Chloride concentrations in two coastal wells, one in the shallower Paso Robles Formation aquifer, and one in the deeper Santa Margarita Sandstone aquifer, for the historical period of record beginning in April 1991. Results from the District's monitoring program indicate that SEC averages approximately 350 and 825 microSiemens/centimeter (µS/cm), for the Paso Robles and Santa Margarita aquifer zones, respectively.



MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

Figure IV-1 Hydrographs of Monitor Well Levels and Carmel River Streamflow

Well levels measured at Rancho Canada West and Rio Road North Monitor Wells.
Carmel River Streamflow measured at Highway 1 Bridge.



MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

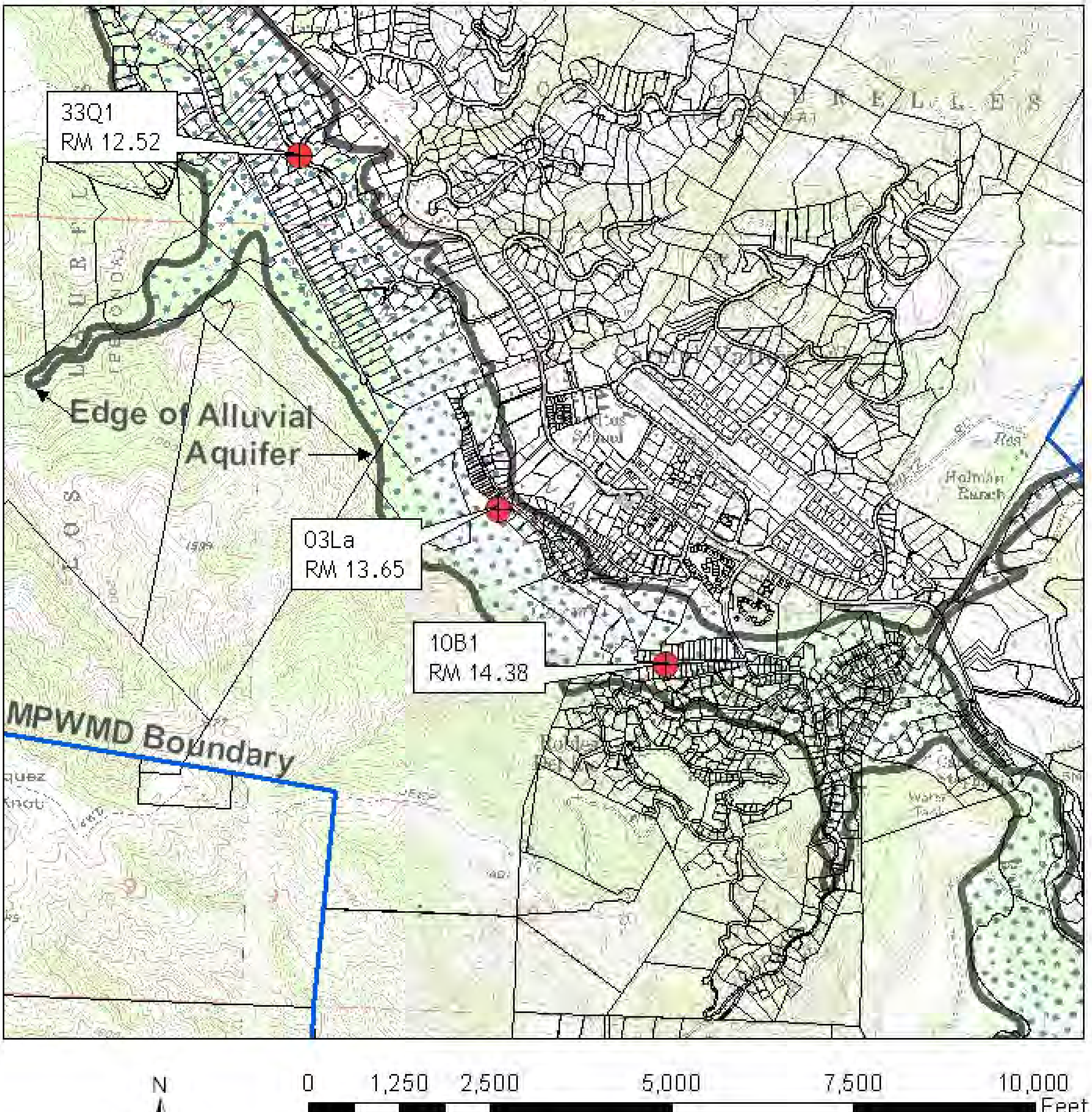
Figure IV-2 Hydrographs of PCA East and FO 07 for WY 2018

Figure IV-3


LOCATION OF MPWMD LOWER CARMEL VALLEY
WATER QUALITY MONITORING WELLS
(River Mile 0.0 to 9.0)
16S/1W-13Lc
State Parks Near CAWD - Deep
16S/1E-17R2
Valley Greens Dr.
16S/1E-17J4
Brookdale Dr.
16S/1E-23E4
Schulte Rd.
16S/1W-14Jg
State Parks Beach - Deep
16S/1E-23La
Reimers #1
16S/1E-24 N5
Center St.
16S/1W-13Md
State Parks Wetlands - Deep
Extent of Carmel Valley
Alluvial Aquifer
MPWMD
MPWMD
68
1
N
W
E
S
0
6,250
12,500
25,000
37,500
50,000
Feet
Scale
Monterey Peninsula
Water Management District
u/tom/pdf12/wellmaps/lvwq.jpg

Figure IV-4

LOCATION OF MPWMD CARMEL VALLEY WATER QUALITY MONITORING WELLS
(River Mile 11.75 to 15.50)



River Mile (RM)	Well Common Name	State Well Number
12.52	Boronda Rd.	T16S/R2E-33Q1
13.65	Little League #1	T17S/R2E-03La
14.28	De Los Helechos	T17S/R2E-10B1

Monterey Peninsula Water Management District

u/tom/pdf2007/WQmapCVU

Figure IV-5

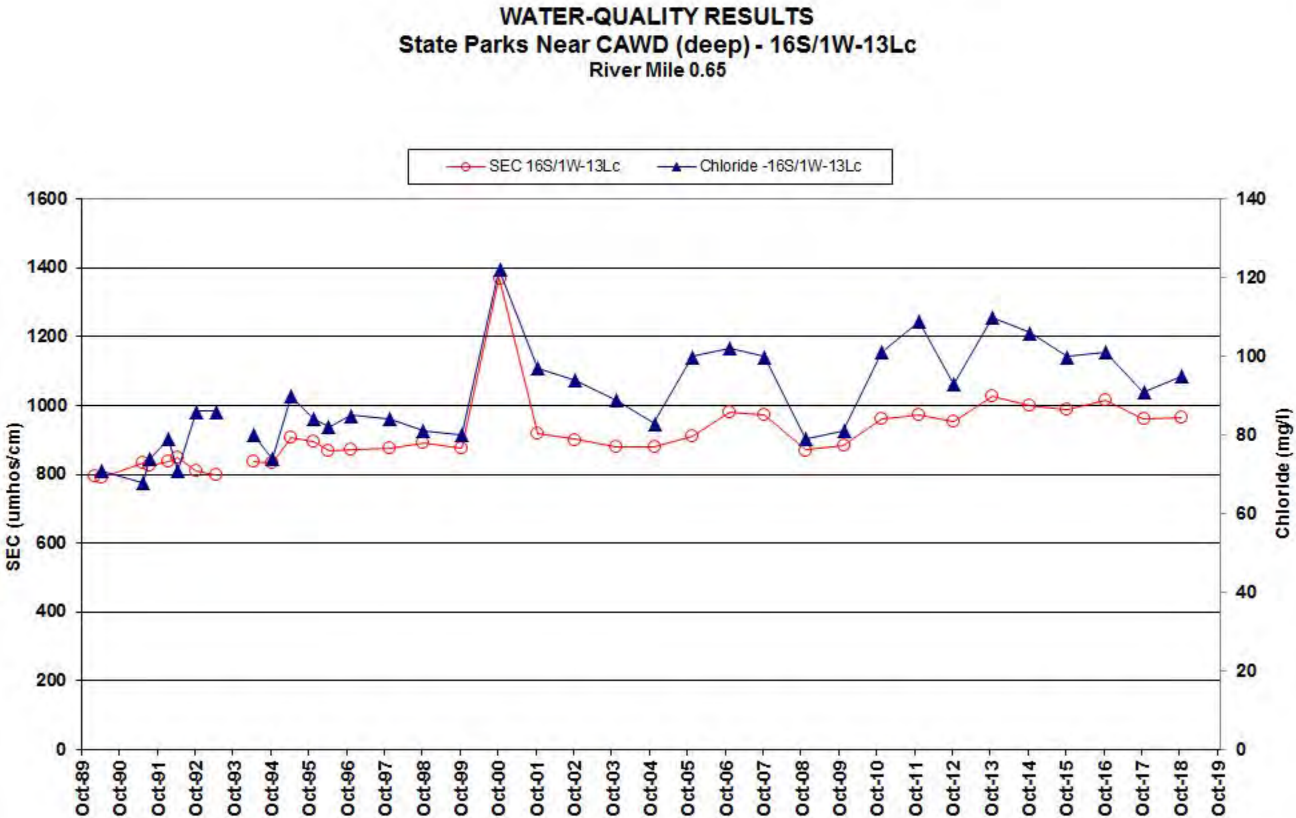

WATER-QUALITY RESULTS
State Parks Near CAWD (deep) - 16S/1W-13Lc
River Mile 0.65
SEC 16S/1W-13Lc
Chloride -16S/1W-13Lc
SEC (umhos/cm)
Chloride (mg/l)
0
200
400
600
800
1000
1200
1400
1600
0
20
40
60
80
100
120
140
Oct-89
Oct-90
Oct-91
Oct-92
Oct-93
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Oct-18
Oct-19

Figure IV-6

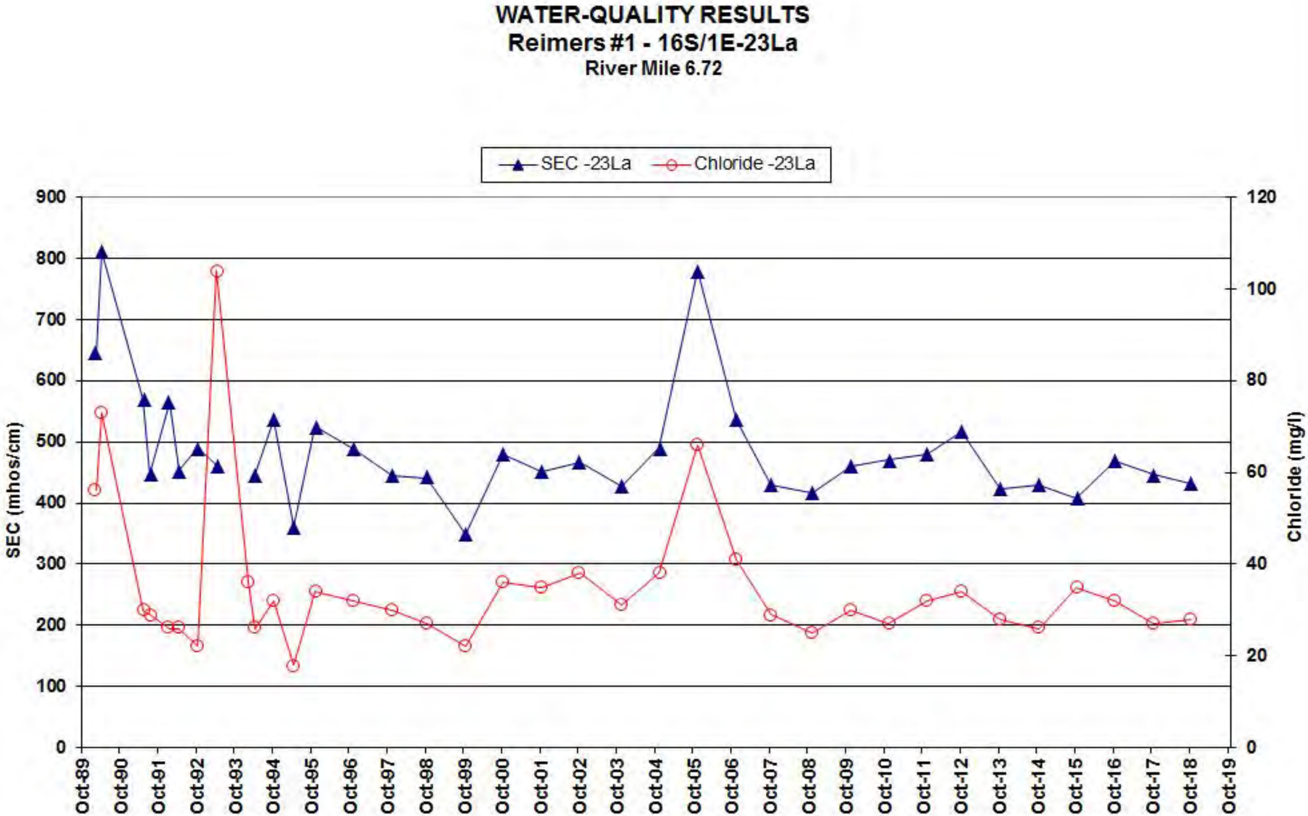
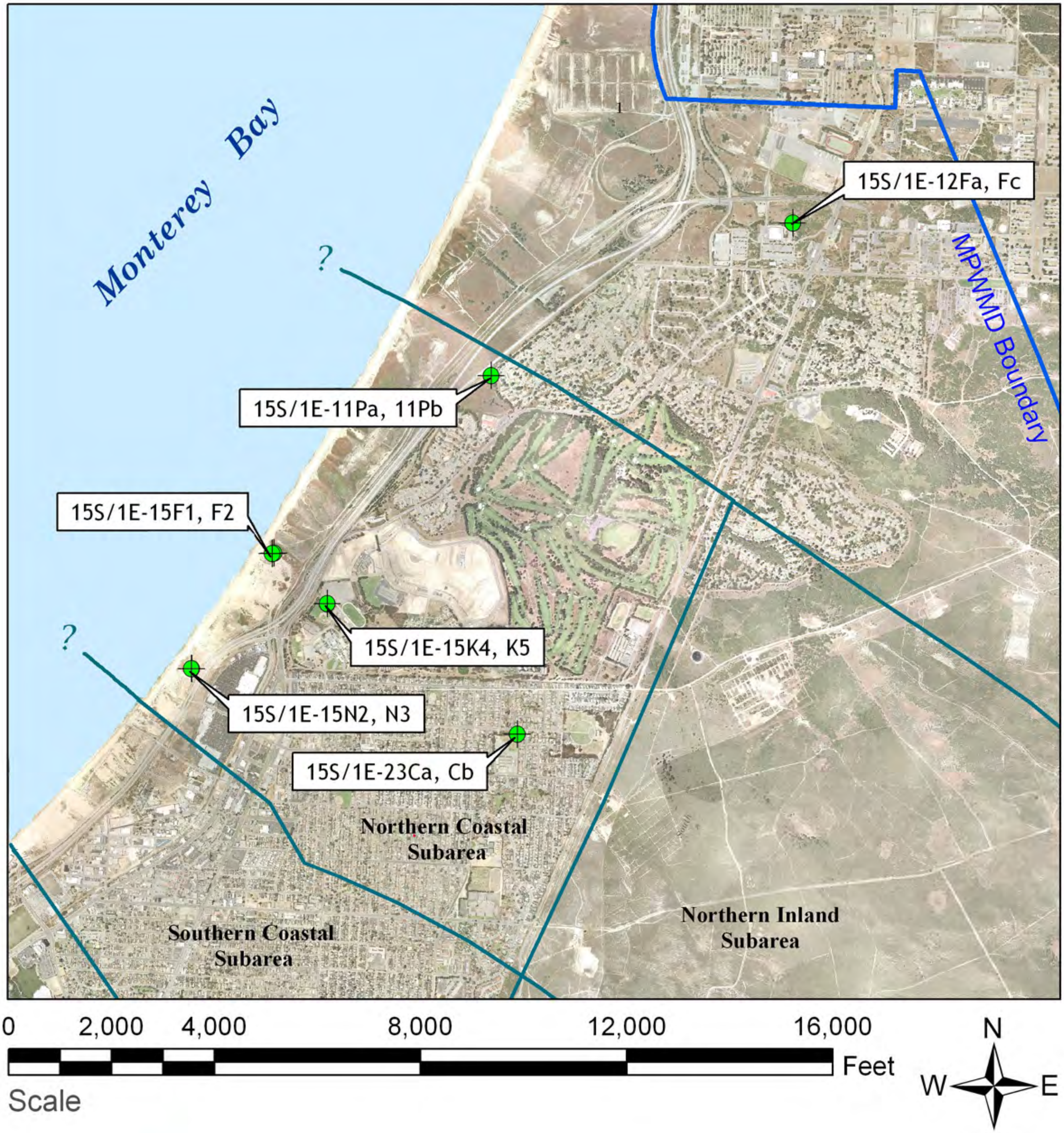

WATER-QUALITY RESULTS
Reimers #1 - 16S/1E-23La
River Mile 6.72
SEC -23La
Chloride -23La
SEC (mhos/cm)
Chloride (mg/l)
900
800
700
600
500
400
300
200
100
0
120
100
80
60
40
20
0
Oct-89
Oct-90
Oct-91
Oct-92
Oct-93
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Oct-18
Oct-19

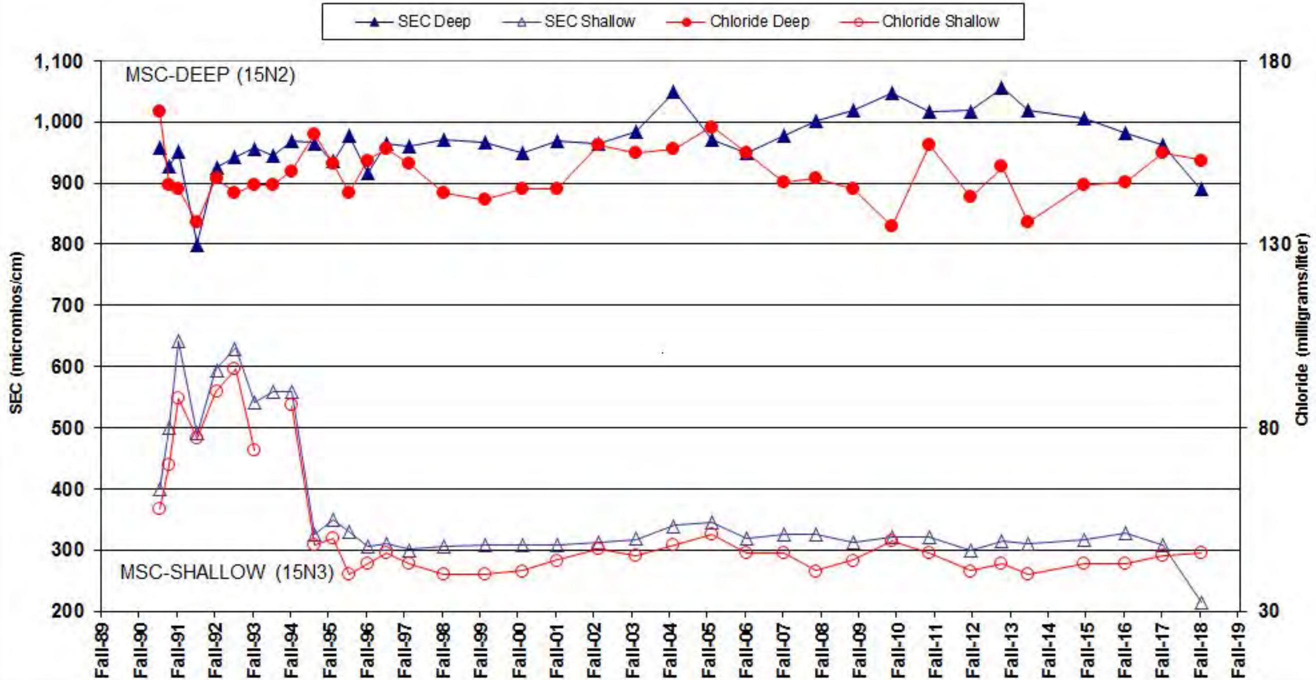
Figure IV-7

SEASIDE BASIN COASTAL GROUND WATER QUALITY MONITOR WELL LOCATIONS



u/tom/pdf19/wqmaps/WQseaside

Figure IV - 8 WATER-QUALITY RESULTS
MSC (Montery Sand Company)
15S/1E-15N2 (deep) and 15S/1E-15N3 (shallow)



V. ANNUAL LOW-FLOW MEMORANDUM OF AGREEMENT

Description and Purpose

The original Memorandum of Agreement (MOA) between the California Department of Fish and Game (now California Department of Fish and Wildlife, CDFW), Cal-Am, and the District was developed in July 1983 to balance CDFW's requirement to conserve and protect the fish and wildlife resources of the state and Cal-Am's responsibility to supply water to the citizens of the communities of the Monterey Peninsula. This MOA is modified each year to reflect specific storage conditions and inflow projections at Los Padres Reservoir (San Clemente Dam was removed in 2015) in the Upper Carmel River watershed. Historically, the MOA addressed the release of water into the Carmel River from San Clemente Dam and was originally designed to maximize surface flow to the Narrows during the low-flow season. In addition to specifying minimum flow releases from San Clemente Dam, the past MOAs limited Cal-Am diversions from San Clemente Dam to the Carmel Valley Filter Plant (CVFP) and directed how Cal-Am was to produce water from the Lower Valley Wells. Currently, the MOA focuses on Los Padres Reservoir, and is formulated in May and remains in force until the end of December. The agreement may be modified or extended by mutual consent of all the parties.

Implementation and Activities During 2017-2018

- **2018 MOA** – The 2018 MOA was developed on June 21, 2018 and approved by the District Board on August 21, 2017. The final document was signed by the District and forwarded to Cal-Am for their concurrence, but was not signed by CDFW due to the same unresolved language that was proposed in 2009 by CDFW. Based on storage conditions and expected reservoir inflows, it was agreed that Cal-Am would maintain minimum flows in the Carmel River below Los Padres at 10.0 cfs for July and 8.5 cfs August through October, then potentially returning to estimated natural river flows of as much as 8.5 cfs in December 2018. The 2018 MOA included terms to: (a) limit operation of Cal-Am wells in the Carmel Valley above Robinson Canyon Road Bridge during low-flow periods; and (b) require Cal-Am to make reasonable efforts to operate the lower Carmel Valley wells in sequence from the most downstream well, progressing upstream as wells are needed and available for production.

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VI. QUARTERLY WATER SUPPLY STRATEGY AND BUDGET

Description and Purpose

Under Ordinance No. 19, which was adopted in December 1984, the District was required to develop an annual water-supply strategy. This strategy included estimates of projected demands and proposed production targets for the Cal-Am system. The strategy was designed to limit Cal-Am surface-water diversions from the Carmel River to no more than 35 percent of total Cal-Am production. Based on the District strategy, Cal-Am developed a water-supply budget specifying monthly production targets.

Under Ordinance No. 41, which was adopted in March 1989, development of the water-supply strategy and budget was changed from an annual to a quarterly process, and Cal-Am's annual surface-water diversions were reduced to a goal of no more than 29 percent of total production. Currently, the quarterly strategy and budget values are developed jointly by Cal-Am, the District, CDFW and NMFS, in conformance with the annual low-flow Memorandum of Agreement (MOA). The strategy is designed to maximize the long-term production potential and protect the environmental quality of the Carmel Valley and Seaside basins. The budget includes monthly production targets for each of Cal-Am's major production sources -- Upper Carmel Valley (UCV) Aquifer, Lower Carmel Valley (LCV) Aquifer, and the Coastal Subareas of the Seaside Basin -- which reflect current and expected system conditions. The quarterly strategies and budgets are normally developed in December, March, June, and September of each year.

Starting in April 2002, the Quarterly Water Supply Strategy and Budgets were fundamentally changed by the State Water Resources Control Board (SWRCB), which adopted Order WRO 2002-0002 on March 21, 2002, and by NMFS and Cal-Am, who signed a Conservation Agreement on September 18, 2001. This order and agreement changed the way that Cal-Am operates its diversions and wells upstream of Robinson Canyon Road Bridge. Specifically, Cal-Am was ordered to:

1. Immediately upon issuance of SWRCB Order WRO 2002-0002, cease withdrawal of water from the San Clemente Dam (removed in 2015) during low-flow periods except during an emergency. For the purpose of the Order, "low-flow periods" are defined as times when stream flow in the Carmel River at the Don Juan Bridge gage (RM 10.8) is less than 20 cfs for five consecutive days.

2. Reduce diversions during low-flow periods from the Scarlett No. 8 Well, Los Laureles Wells Nos. 5 and 6, Panetta Wells, Garzas Wells Nos. 3 and 4, and the Robles Well. Current diversions are 1-7 days per month at each well. Diversions at these wells shall be reduced to a maximum of two eight-hour days per month, except that those wells that currently operate only one eight-hour day per month shall continue to operate at not more than one eight-hour day per month. To the maximum degree practicable, Cal-Am shall operate these wells at night. In consultation with NMFS, USFWS, CDFW and the District, Cal-Am can operate the Scarlett 8 well incrementally to meet maximum daily demand after using all other available downstream sources at maximum capacity.

3. Install, not later than March 31, 2002, a pump that delivers water from the Begonia Zone to the Carmel Valley Village Zone. The "Begonia Zone" is defined to include water well production facilities in AQ3, AQ4 and the Seaside Groundwater Basin. The "Carmel Valley Village Zone" is defined to include all Cal-Am users upstream from the Del Monte Regulating Station.

4. The Russell Wells shall be limited to a combined total instantaneous diversion rate of not more than 0.5 cfs during low-flow periods (these wells are no longer used and deemed under the influence of surface water).

5. During the low-flow periods, except for 0.5 cfs, all water diverted to Carmel Valley Village Zone shall be water that originates from the Begonia Zone (as defined in Paragraph 3 above).

In addition, the production goals for the quarterly budget process have changed over time. Beginning in 1998, the quarterly budgets were formulated with an annual production goal of 11,285 AF during each Water Year from the Carmel River Basin, in conformance with goals and requirements established by SWRCB Orders WR 95-10, WR 98-04, and subsequently in conformance with WRO 2002-0002, CDO 2009-0060, and WRO 2016-0016. Releases from San Clemente Reservoir were maximized throughout the year and groundwater production in the UCV was limited to periods when sufficient streamflow was available to recharge the aquifer.

Starting in March 2006, the annual limit for Cal-Am's production from its wells in the Coastal Subareas of the Seaside Groundwater Basin for customers in its main system used in the quarterly budgets was reduced from 4,000 AF per year to 3,504 AF per year based on the final judgment in the basin adjudication. Accordingly, the total annual limit for Cal-Am from the Carmel River and Seaside Groundwater Basins for its main system was set at 14,789 AF. It should be noted that the March 2006 Seaside Basin adjudication decision was amended in February 2007. The decision was amended in part to allow Cal-Am to combine its production allocation from the Coastal Subareas with its production allocation from the Laguna Seca Subarea.

On January 15, 2008, the SWRCB issued a draft Cease and Desist Order (CDO) against Cal-Am. The Draft CDO refers to the 1995 SWRCB Order 95-10, and notes that compliance with Order 95-10 had not been achieved after 12 years. The CDO institutes a series of cutbacks to Cal-Am production from the Carmel River and prohibits new or intensified connections in the Cal-Am main system. MPWMD and several other parties participated in formal hearings before the SWRCB in the summer of 2008. After several draft versions, the final SWRCB determination on the CDO was issued on October 20, 2009. The District subsequently filed a suit to challenge this ruling, and the Monterey County Superior Court issued a stay on November 3, 2009. In response to a challenge by SWRCB, the court ruled on November 23, 2009 that the stay will remain in effect until the hearing that was held in Santa Clara in April 22, 2010. At that hearing, the Court lifted the stay and the CDO was reinstated. The CDO reduced the Cal-Am annual upper limit of diversion from the Carmel River previously set by Order 95-10 at 11,285 AF to 10,429 AF in WY 2010.

In WY 2015, the CDO (Order 2009-0060) set Cal-Am Carmel River production to 9,945 AF. In WY 2016, the CDO (Order 2016-0016) set the Cal-Am River production to 8,310 AF. The Seaside adjudication decision limited Cal-Am production in the Coastal and Laguna Seca Subareas of the Seaside Basin to 2,251 AF and 48 AF, respectively. This brought the total production limit from all sources to 10,609 AF (not including any adjustments for supplemental supplies or carryover storage).

Implementation and Activities During 2017-2018

During 2017 and 2018, the quarterly strategies and budgets were structured to optimize production from the Coastal Subareas of the Seaside Basin and minimize impacts from production in the Upper Carmel Valley (UCV). Activities in Water Year 2018 are described below.

- **Cal-Am Main System Production in Water Year 2018**[1] – During WY 2018, Cal-Am produced 9,956 acre-feet (AF) of water for customer service from all sources in its Carmel River, Seaside Coastal and Laguna Seca Subarea systems. This production consisted of 6,111 AF from Carmel River source wells, 2,229 AF of native water from Seaside Coastal wells, 303 AF from Laguna Seca Subarea wells, 190 AF from the Sand City desalination plant, 153 AF from Table 13, 1,210 AF from ASR Recovery, and 64 AF produced from the MalPaso well and delivered to the Cal-Am system. Of the system total, no water was diverted at San Clemente Dam because it was removed in the summer of 2015.

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[1] Beginning with the 2002-2003 Mitigation Report, Cal-Am production is reported on a Water Year basis, from October 1 of one Calendar Year through September 30 of the following Calendar Year. This is a change from previous annual reports in which the reporting period was July of one year through June of the following year. This change makes the mitigation report consistent with reporting requirements under SWRCB Order No. WR 95-10.

VII. WELL REGISTRATION AND REPORTING PROGRAM

Description and Purpose

All owners of wells within the District are required to register and report their annual water production. The purpose of the program is to provide annual aggregate estimates of water production from both Cal-Am and non-Cal-Am wells in the various groundwater production zones in the District. The information provided is used to make decisions regarding management of the limited water resources of the Monterey Peninsula area.

The District began its Well Registration and Reporting Program in 1980. From 1981 through 1990, well owners were allowed to report water production by one of three methods: Water Meter, Land Use, or Power Consumption Correlation. In March 1990, the District adopted Ordinance No. 48 requiring installation of water meters on all large production wells (i.e., those producing 20 or more AFY). In November 1991, District rules were further amended with the adoption of Ordinance No. 56, which extended the metering requirement to all existing medium production wells, defined as those producing between 5 and 20 AFY, and all new wells within the District. Ordinance No. 56 also eliminated the Power Consumption Correlation reporting method.

Implementation and Activities During 2017-2018

Figure VII-1 shows summaries of reported production from Cal-Am and non-Cal-Am wells in WY 2018, and **Figure VII-2** shows the WY 2017 data for comparison.

With respect to the District's Water Allocation Program limits, Cal-Am production from the MPWRS in WY 2018 was 9,036 AF, or 8,605 AF (48.0%) less than the Cal-Am production limit of 17,641 AF that was established with the adoption of Ordinance No. 87 in 1997. Non Cal-Am production within the MPWRS in WY 2018 was 2,623 AF, or 423 AF (13.9%) less than the non Cal-Am production limit of 3,046 AF established by Ordinance No. 87. Combined production from Cal-Am and non Cal-Am sources within the MPWRS was 11,658 AF in WY 2018, which is 9,029 acre-feet (43.6%) less than the 20,687 acre-feet production limit set for the MPWRS as part of the District's Water Allocation Program. Therefore, no action is necessary at this time, although staff will continue to monitor production trends within the MPWRS and District-wide. A comparison of reported water production from the MPWRS in Reporting Year 1997, WY 2007, and WY 2018 relative to the District's Water Allocation limits is presented in **Figure VII-3**. 1997 was the last time the production limits were adjusted. Prior to 2008, the LSS was not included in the MPWRS, but was added with the adoption of Ordinance 135 on September 22, 2008. However, the production limits in the District's Allocation Program did not change. Production from the MPWRS in RY 1997 and WY 2007 presented in **Figure VII-3** was adjusted to include production from the LSS. Production from non-Cal-Am sources has not fluctuated a great deal, and since production from LSS is included, non-Cal-Am production has been over the production limit several years. Historical Cal-Am production presented in **Figure VII-3** was also adjusted to include production from the LSS. Cal-Am production from the MPWRS has greatly decreased, and since Cal-Am represents such a large portion of total production, combined production from Cal-Am and non-Cal-Am sources has also decreased over the last several years.

During WY 2018, District staff inspected 19 new water meter installations and eight replacement meters to ensure compliance with the District's water meter installation standards and guidelines. In addition, staff reviewed copies of 16 applications for permits for construction of new wells within the District from the Monterey County Environmental Health Bureau, three applications for well destruction and four applications for new monitor wells. Staff also advised recipients of County well construction permits that MPWMD requires permits or written exemptions for wells within the District's boundary.

Lastly, it should be noted that 99% of the groundwater production within the District was reported by the water meter method in WY 2018. In addition, 99% of registered well owners in the District reported annual production for their wells in WY 2018.

Figure VII-1

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT
DRAFT WATER PRODUCTION SUMMARY FOR WATER YEAR 2018

SOURCE AREAS [1,2]	NON CAW (NON CAL-AM) WELLS						CAW (CAL-AM) WELLS		AQUIFER SUBUNIT TOTALS	
	WATER METER		LAND USE		SUB-TOTAL		WATER METER			
	NO. OF WELLS	PRODUCTION [3] (AF)	NO. OF WELLS	PRODUCTION (AF)	NO. OF WELLS	PRODUCTION (AF)	NO. OF WELLS	PRODUCTION (AF)	NO. OF WELLS	PRODUCTION (AF)
AS1	9	72.6	1	0.1	10	72.6	0	0.0	10	72.6
AS2	60	194.0	30	30.3	90	224.3	4	336.8	94	561.1
AS3	140	1,003.0	42	32.2	182	1,035.2	8	[5] 5,503.0	190	6,538.2
AS4	30	192.3	5	2.4	35	194.7	2	964.2	37	1,158.9
SCS	14	669.5	2	1.8	16	671.4	6	1,928.2	22	2,599.6
LSS	10	413.1	1	2.5	11	415.5	4	303.3	15	718.8
CAC	8	11.5	5	10.5	13	22.0	0	0.0	13	22.0
CVU	315	548.5	41	35.9	356	584.4	0	0.0	356	584.4
MIS	141	331.7	10	5.5	151	337.2	0	0.0	151	337.2
ACTIVE	726	3,436.1	137	121.1	863	3,557.3	24	9,035.5	887	12,592.7
INACTIVE	357		34		391		10		401	
NOT REPORTING	4		7		11		0		11	
SAND CITY DESAL							0	188.6	adjusted for SC desal	
METHOD TOTALS:	1,087	3,436.1	178	121.1	1,265	3,557.3	34	9,224.0	1,299	12,781.3

NOTES:
1. Shaded areas indicate production within the Monterey Peninsula Water Resources System. The LSS was added to the Monterey Peninsula Water Resources System in September 2008.
2. CAW - California American Water
3. Source areas are as follows:
   AS1 - UPPER CARMEL VALLEY - San Clemente Dam to Esquiline Bridge
   AS2 - MID CARMEL VALLEY - Esquiline Bridge to Narrows
   AS3 - LOWER CARMEL VALLEY - Narrows to Via Mallorca Bridge
   AS4 - LOWER CARMEL VALLEY - Via Mallorca Bridge to Lagoon
   SCS - SEASIDE COASTAL SUBAREAS
   LSS - LAGUNA SECA SUBAREA (Ryan Ranch Area is within LSS)
   CAC - CACHAGUA CREEK and UPPER WATERSHED AREAS
   CVU - CARMEL VALLEY UPLAND - Hillsides and Tularcitos Creek Area
   MIS - PENINSULA, CARMEL HIGHLANDS AND SAN JOSE CREEK AREAS
4. Any minor numerical discrepancies in addition are due to rounding.
5. 530.49 AF is included in CAW production from AS3 to account for water delivered to ASR in WY 2018.
6. This total includes water produced in both SCS and LSS, and does not include 1,209.72 AF of ASR water that was recovered for Customer Service in WY 2018.
7. Production includes 3.80 AF to Ryan Ranch from CAW Main System in WY 2018. No water was delivered to Seaside Municipal System in WY 2018.

DISTRICT-WIDE PRODUCTION	
SURFACE WATER DIVERSIONS:	
CAW Diversions (San Clemente Dam):	0.0
Non Cal-Am Diversions Within MPWRS:	8.8
CAW WELLS:	
[6] SEASIDE:	2,231.4
CARMEL VALLEY:	6,804.1
Within the Water Resources System:	9,035.5
Outside the Water Resources System:	0.0
Sand City Desal	189.6
[7] *CAW TOTAL, Wells and Diversion:*	9,225.0
NON CAW WELLS:	
Within the Water Resources System:	2,613.8
Outside the Water Resources System:	943.5
Non Cal-Am Diversions Outside the MPWRS:	67.8
NON CAW TOTAL, Wells and Diversion:	3,633.9
GRAND TOTAL:	12,858.9

Figure VII-2

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT
DRAFT WATER PRODUCTION SUMMARY FOR WATER YEAR 2017

SOURCE AREAS [1, 2]	NON CAW (NON CAL-AM) WELLS						CAW (CAL-AM) WELLS		AQUIFER SUBUNIT TOTALS	
	WATER METER		LAND USE		SUB-TOTAL		WATER METER			
	NO. OF WELLS	PRODUCTION [3] (AF)	NO. OF WELLS	PRODUCTION (AF)	NO. OF WELLS	PRODUCTION (AF)	NO. OF WELLS	PRODUCTION (AF)	NO. OF WELLS	PRODUCTION (AF)
AS1	9	78.5	1	0.1	10	78.6	0	0.0	10	78.6
AS2	57	139.4	31	30.9	88	170.3	4	475.2	92	645.5
AS3	136	991.0	42	32.2	178	1,023.2	8	[5]6,811.8	186	7,835.1
AS4	32	148.5	4	3.1	36	151.6	2	914.2	38	1,065.8
SCS	12	923.8	2	1.8	14	925.7	6	1,730.4	20	2,656.1
LSS	9	372.8	2	2.9	11	375.8	4	299.1	15	674.9
CAC	8	28.9	5	10.5	13	39.4	0	0.0	13	39.4
CVU	305	547.5	40	35.7	345	583.2	0	0.0	345	583.2
MIS	137	313.4	8	5.5	145	318.9	0	0.0	145	318.9
ACTIVE	705	3,543.9	135	122.8	840	3,666.7	24	10,230.7	864	13,897.4
INACTIVE	349		35		384		10		394	
NOT REPORTING	4		12		16		0		16	
SAND CITY DESAL							0	249.0		adjusted for SC desal
METHOD TOTALS:	1,058	3,543.9	182	122.8	1,240	3,666.7	34	10,479.7	1,274	14,146.4

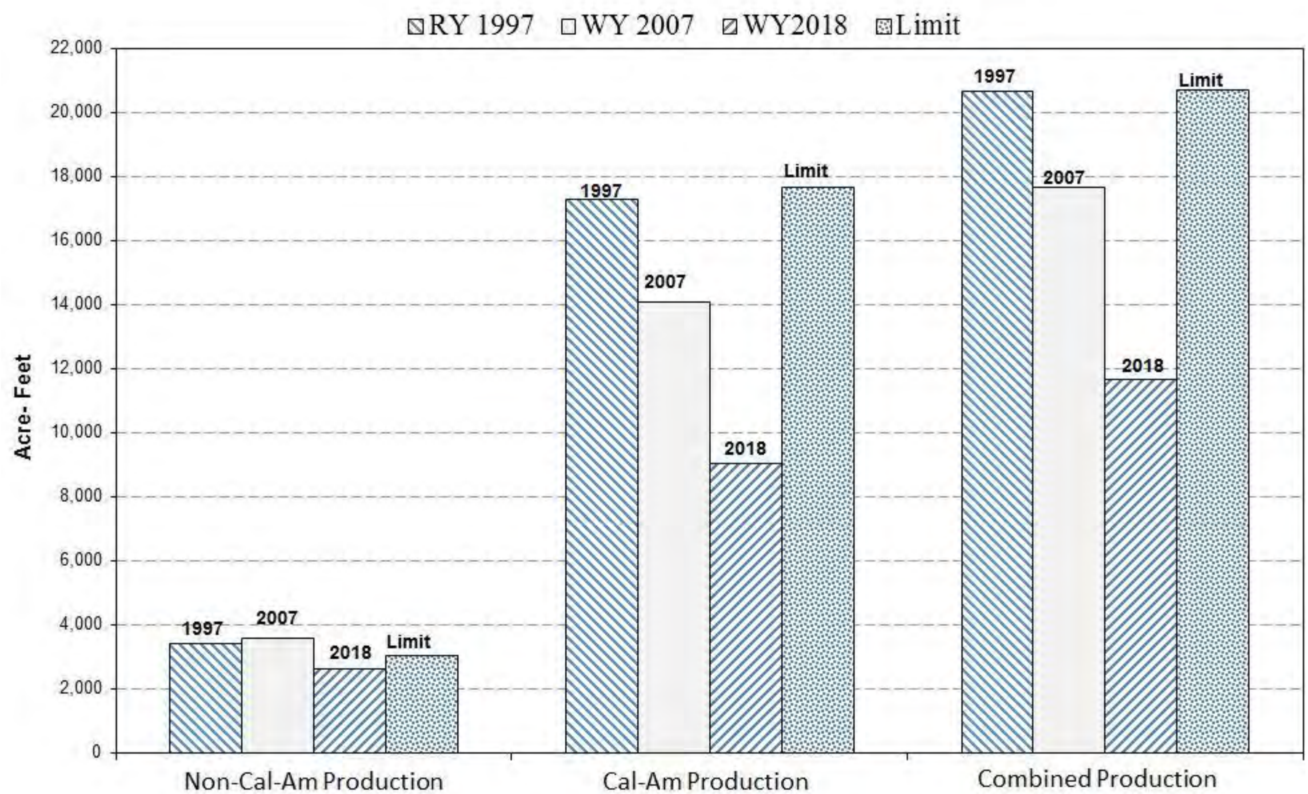
NOTES:

1. Shaded areas indicate production within the Monterey Peninsula Water Resources System. The LSS was added to the Monterey Peninsula Water Resources System in Septembter 2008.
2. CAW - California American Water
3. Source areas are as follows:
   AS1 - UPPER CARMEL VALLEY - San Clemente Dam to Esquiline Bridge
   AS2 - MID CARMEL VALLEY - Esquiline Bridge to Narrows
   AS3 - LOWER CARMEL VALLEY - Narrows to Via Mallorca Bridge
   AS4 - LOWER CARMEL VALLEY - Via Mallorca Bridge to Lagoon
   SCS - SEASIDE COASTAL SUBAREAS
   LSS - LAGUNA SECA SUBAREA (Ryan Ranch Area is within LSS)
   CAC - CACHAGUA CREEK and UPPER WATERSHED AREAS
   CVU - CARMEL VALLEY UPLAND - Hillsides and Tularcitos Creek Area
   MIS - PENINSULA, CARMEL HIGHLANDS AND SAN JOSE CREEK AREAS
4. Any minor numerical discrepancies in addition are due to rounding.
5. 2,345.19 AF is included in CAW production from AS3 to account for water delivered to ASR in WY 2017.
6. This total includes water produced in both SCS and LSS, and does not 1,501.33 AF of ASR water that was recovered for Customer Service in WY 2017.
7. Production includes 1.80 AF to Ryan Ranch from CAW Main System in WY 2017. No water was delivered to Seaside Municipal System in WY 2017.

DISTRICT-WIDE PRODUCTION	
SURFACE WATER DIVERSIONS:	
CAW Diversions (San Clemente Dam):	0.0
Non Cal-Am Diversions Within MPWRS:	21.0
CAW WELLS:	
[6] SEASIDE:	2,029.5
CARMEL VALLEY:	8,201.2
Within the Water Resources System:	10,230.7
Outside the Water Resources System:	0.0
Sand City Desal	249.0
[7] *CAW TOTAL, Wells and Diversion:*	10,479.7
NON CAW WELLS:	
Within the Water Resources System:	2,725.2
Outside the Water Resources System:	941.5
Non Cal-Am Diversions Outside the MPWRS:	27.8
NON CAW TOTAL, Wells and Diversion:	3,715.5
GRAND TOTAL:	14,195.2

Figure VII-3

Comparison of Reported Production to Allocation Limits within the Monterey Peninsula Water Resources System Reporting Year 1997, Water Year 2007 and Water Year 2018



VIII. WATER EFFICIENCY AND CONSERVATION

Description and Purpose

As a legislated function of the Monterey Peninsula Water Management District ("MPWMD" or "District"), a comprehensive water Conservation Program was implemented in October 1979. The Conservation Program expanded in 1983 when the District facilitated development of *The Water Conservation Plan for Monterey County*. The Conservation Plan, adopted by the MPWMD Board in 1986, included a goal to reduce demand by 15 percent of the then-estimated year 2020 demand through implementation of a number of water saving measures including retrofits, use of recycled water, education and other means. At the time the plan was adopted, 2020 demand was expected to be 24,000 AFY for the Peninsula, making the conservation goal 3,600 AF.

Ordinance No. 30, adopted in 1987, was the cornerstone conservation ordinance for the Monterey Peninsula. This ordinance required retrofit to Ultra-Low Flush 1.6 gallons per flush toilets upon resale and in new construction, remodels/additions and changes in use. The ordinance was adopted in July 1987 and codified as MPWMD Regulation XIV, Water Conservation. Regulation XIV also implemented other mandatory water saving measures and a verification process. MPWMD's Regulation XIV has been regarded as a model for other agencies.

In 2009, MPWMD undertook an extensive overhaul of Regulation XIV. Revisions incorporated new technology and Best Management Practices and made the regulation easier to understand. Substantial amendments to the program included significantly expanded indoor and outdoor water efficiency requirements for New Construction, Visitor-Serving Facilities and Non-Residential customers. For example, all Non-Residential Users that did not have 1.6 gallons-per-flush toilets by January 1, 2010, were required to install High Efficiency Toilets ("HET") by December 31, 2013. Another example is a requirement for Rain Sensors to be installed on all automatic Irrigation Systems upon Change of Ownership or Use and Expansion of Use (i.e., remodels).

Another legislated function of the MPWMD is the authority to implement and enforce water rationing. A water rationing plan developed by the Monterey Peninsula Water Management Agency (the predecessor to the MPWMD) was available when the MPWMD was established. Amendments to the plan were made in 1981 (Ordinance No. 7) and in 1988 (Ordinance Nos. 35 and 37) during drought-related rationing administered by MPWMD that continued through 1991. Water-use reductions of approximately 30 percent were achieved during the 1988-91 rationing.

In 1997, in response to SWRCB Order 95-10[1], the MPWMD Board of Directors tasked its staff with preparing a plan to address compliance with the Order (i.e., regulatory supply shortage) as well as with physical water shortages. MPWMD worked with a variety of community interests including California American Water ("Cal-Am"), to conceive and develop the Expanded Water Conservation and Standby Rationing Plan ("Plan"), which was adopted as Ordinance No. 92 in 1998 (codified as Regulation XV). The Plan consisted of seven stages. The first four stages provided Cal-Am and the District with conservation "tools" to keep community water use within

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1 SWRCB Order No. WR 95-10 concluded that Cal-Am does not have a legal right for about 10,730 AFA (about 69% of the water supplied to Cal-Am customers) which was being diverted from the Carmel River and that diversions were having an adverse effect on the public trust resources of the river.

regulatory limits. Stages 5-7 of the Plan were ever-more stringent actions including per-capita rationing that would be triggered by a drought-induced water supply shortages and/or non-compliance with regulatory restrictions.

In February 2017, the MPWMD Board of Directors adopted Ordinance No. 169 which repealed the existing Regulation XV, The Expanded Water Conservation and Standby Rationing Plan of the Monterey Peninsula Water Management District and replaced it with a streamlined conservation and rationing plan known as "The 2016 Monterey Peninsula Water Conservation and Rationing Plan."

A key element of the Conservation Program was also added in 1997 when the District began issuing rebates for voluntary toilet replacements with Ultra-Low Flush ("ULF") 1.6 gallons-per-flush toilets. Initially, the District shared funding with Cal-Am. Today, the rebate funds for Cal-Am customers are supported by the ratepayers through a conservation surcharge on the Cal-Am bill, with the District administering the program.

Implementation and Activities During 2017-2018

Conservation Inspections -- District staff continued an intensive inspection program to ensure compliance with the Conservation and Permit Regulations. Change of Ownership inspections make up the bulk of the District's inspection program. Most of the **1,572** properties that changed ownership in FY 2017-2018 were inspected prior to the close of escrow. **Fifty** percent (**50%**) of the inspected properties were found to be in compliance during the first inspection. An additional 1 percent (**1%**) passed during the second inspection, typically after replacing older toilets identified during the initial inspection. Subsequent enforcement is through non-compliance notice on the title of the property.

District staff inspected **952** properties for compliance with Water Permit conditions during FY 2017-2018.

A total of about **2,444** inspections were conducted in FY 2017-2018. An estimated **13.730** acre-feet ("AF") of water were saved by new retrofits verified this year in these two categories.

Other Conservation Incentives -- The District continued to offer incentives for property owners who agree to install water efficient appliances to offset new water fixtures as a condition of a Water Permit. Credit, in the form of water fixture units, remained available to offset new water fixtures in Remodels and Additions when an older model appliance is replaced with a High Efficiency Dishwasher, High Efficiency Clothes Washer, or HET, or when an Instant-Access Hot Water System is installed. This incentive program is one way to allow limited Remodeling and Additions without increasing water use.

Rebate Program -- The Rebate Program is available for a wide array of water saving devices and offers significantly generous rebates (e.g., up to $500 for a High Efficiency Clothes Washer). Rebates become unavailable when a Qualifying Device is globally mandated, such as when all Clothes Washers had to be High Efficiency Clothes Washers in all Non-Residential uses by 2014, or when the device is required by the District due to a permit condition or Change of Ownership.

From July 1, 2017, through June 30, 2018, a total of **1,674** applications for rebates were received, **1,238** applications were approved with the use of the rebate refund. **Table VIII-1** summarizes the Rebate Program for FY 2017-2018.

At the conclusion of WY 2018, the following items qualified for a rebate[2]:

Residential Indoor Rebates
High Efficiency Toilet

Ultra High Efficiency Toilet

High Efficiency Residential Dishwasher

High Efficiency Residential Clothes Washer

Instant-Access Hot Water System

On-demand pump or point-of source water heater as part of an Instant-Access Hot Water System

Non-Residential Indoor Rebates
High Efficiency Toilet

Ultra High Efficiency Toilet

Pint Urinal

Zero Water Consumption Urinal

Water Broom

Cooling Tower Conductivity Controller

CEE Tier II Water Efficient Ice Machine

X-ray film processor recirculation system

Cooling Tower pH/Conductivity Controller

Dry Vacuum Pumps

High Efficiency Connectionless Steamer

Water Efficient Commercial Dishwashers

Medical equipment steam sterilizer retrofit with a water tempering device

Water Efficient Commercial Steam or "Combi' Oven

Commercial Ozone Laundry System

Commercial Waterless Wok Stove

2 Rebates are issued when funding is available.

Outdoor Water Efficiency Rebates
Smart (Weather-Based) Irrigation System Controller

Soil Moisture Sensor

Rainwater Harvesting (water storage capacity)

Lawn removal and replacement with low water use plants or permeable surfaces

Rotating Sprinkler Nozzles (minimum purchase and installation of ten)

Graywater Irrigation System supplied by one Clothes Washer for irrigation and/or one or more Bathrooms that have a Bathtub/Shower connected to a Graywater Irrigation System

Non-Residential Graywater Irrigation Systems considered on a case-by-case basis

The Water Conservation Rebate Program is available on a first-come, first-served basis. District staff continues to meet with local community organizations to advertise the program.

Conservation Education and Outreach -- District activities remained focused on public education and encouraging Peninsula residents and businesses to implement new water conservation and efficiency practices and to maintain existing equipment and behaviors. Individualized Water Waste education took place as necessary to remind water users not to wash sidewalks, leave hoses running or ignore leaks. Efforts again successfully kept community water use below regulatory limits.

- The District continued supporting water conservation education through the Water Awareness Committee of Monterey County ("WAC"). WAC is a nonprofit water-education organization serving Monterey County. The District, as a founding member, holds a seat on the WAC Board of Directors and contributes annual financial and staff support to its efforts. WAC provides books on water-efficient landscaping, Drip Irrigation, and other water related subjects to libraries in Monterey County, sponsors a school water education program and provides outreach opportunities for the public to learn about local water issues.

- District staff participated in several events during FY 2017-2018. Outreach events included: Pebble Beach Community Services District Open House, Monterey Peninsula College Earth Day, City of Monterey's Cutting Day, City of Pacific Grove's Good Old Days, and Water Awareness Day at the Monterey County Fair. The events provided the public with an opportunity to learn about the District's extensive activities and programs.

- Entered a drought tolerant landscape display in the Monterey County Fair and was awarded second place in the Water-Wise Landscape category.

- The District participated in educating the Hospitality Industry at the Monterey County Hospitality Association Nick Lombardo Golf Tournament.

- The District hosted *Convert Thirsty Lawn to a Drought Tolerant Garden* class.

- Water Demand staff attended the leading-edge WaterSmart Innovations Conference and Exposition. The conference offered four sessions with choices of eight different water efficiency tracks per session.

- Hosted a hands-on sheet-mulching workshop at Martin Luther King Elementary School.

- Water Demand staff gave a presentation to the Multi-Family Dwelling property owners and property management companies to discuss upcoming water efficiency requirements.

- The District planted an organic garden at the office, irrigation supplied by the Rainwater cistern on Site.

- Offered two Specialized Landscaping classes focusing on drought tolerant landscape and native plants selections.

- Hosted rainwater harvesting, and water efficient irrigation workshops.

- Presented "*Conservation is a Culture: The Story of the Monterey Peninsula*" at the Sustainability Conference in Seattle.

Regulatory Changes -- Several ordinances were approved in recent years that have resulted in additional water savings:

- Ordinance No. 172, adopted August 15, 2016, implemented regional water efficient landscape requirements for new and refurbished landscapes throughout the District. The ordinance added water efficient landscape requirements to the District's Rules in keeping with the District's role as the Monterey Peninsula's regional water manager. The District now issues Landscape Water Permits, enforces the conditions, and reports annually to the state.

- Ordinance No. 175, adopted on November 14, 2016, amended rules related to the setting of Production Limits for Water Distribution Systems in the Carmel Valley Alluvial Aquifer.

- Ordinance No. 178, adopted November 13, 2017, added water efficiency requirements for Multi-Family Residential Sites with more than three units and common areas at Common Interest Developments (i.e., condominiums) and allowed permanent sub-metering of Accessory Dwelling Units.

- Ordinance No. 179, adopted August 20, 2018, expanded the Rebate Program to allow rebates for a grant-supported retrofit project (Highly Efficient Applied Retrofit Targets or HEART) in the disadvantaged communities.

Table VIII-1
Summary of Rebate Program

Type of Devices Rebated	Number of devices	Rebate Paid	Estimated AF	Gallons Saved
High Efficiency Toilet (HET)	154	$13,862.97	6.429192	2,094,958.64
Ultra-Low Flush to HET	326	$27,942.98	3.260000	1,062,274.26
Ultra HET	20	$2,693.00	0.200000	65,170.20
Toilet Flapper	4	$49.81	0.000000	0
High Efficiency Dishwasher	201	$27,875.00	0.603000	196,488.15
High Efficiency Clothes Washer	571	$285,400.35	9.193100	2,995,580.83
Instant-Access Hot Water System	18	$3,598.99	0.000000	0
On Demand Systems	4	400.00	0.000000	0
Zero Use Urinals	0	0.00	0.000000	0
High Efficiency Urinals	0	0.00	0.000000	0
Pint Urinals	0	0.00	0.000000	0
Cisterns	30	$45,052.00	0.000000	0
Smart Controllers	10	$1,559.00	0.000000	0
Rotating Sprinkler Nozzles	0	0.00	0.000000	0
Moisture Sensors	0	0.00	0.000000	0
Lawn Removal & Replacement	6	$10,035.00	1.043614	340,062.67
Graywater	0	0.00	0.000000	0
Ice Machines	0	0.00	0.000000	0
TOTALS	1,344	$418,469.10	20.728906	6,754,534.75

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IX. ALLOCATION OF NEW WATER SUPPLY

The MPWMD Water Allocation Program requires that each new water Connection or Expansion of Use be accounted for so that System Limits are not exceeded. Ordinance No. 70, adopted by the District Board on June 21, 1993, ended the moratorium on the issuance of new water Connections that was imposed in January 1991 as a result of the Water Allocation Program EIR. The ordinance established a consumption Allocation of water that could be used by each Jurisdiction from a total of 358 Acre-Feet Annually (AFA). This amount was calculated from a formula based on the production capacity of the Paralta well, an interim water supply project development by the District in cooperation with California American Water ("Cal-Am") (see also **Section X**).

Of the 358 AFA available from the Paralta well, a 50 AFA District Reserve Allocation was established in 1993 for community benefit projects. In February 1995, Ordinance No. 73 rescinded the District Reserve and allocated the remaining water equally among the eight Jurisdictions. Of the original 50 AFA, 34.720 AFA remained and was distributed equally (4.34 AFA each) among the Jurisdictions.

As described in Section XI of this report, specific water "Entitlements" associated with funding of the Pebble Beach Reclamation Project are available for areas within the Del Monte Forest pursuant to Ordinance No. 109. These Entitlements are not water "Allocations", and are therefore tracked separately. In addition, there are several other Entitlements of water available to specific areas of the Cal-Am service area.

Implementation and Activities During 2017-2018

Between August 1993 and July 2018, a total of **253.144** AFA of the 342.720 AFA Paralta Well Allocation had been permitted for use by Jurisdictions, leaving **89.576** AFA remaining, or **26.1** percent of the Jurisdictions' Paralta well Allocations. Credits from expired or canceled Water Permits ("Pre-Paralta Credits") are tracked by Jurisdiction and may be used for Expansions of Use and New Connections similar to the Paralta Allocation. Finally, credits that were received for public retrofit projects from March 1995 to July 1998 (pursuant to Ordinance Nos. 75 and 91) and Water Use Credits that were transferred to a Jurisdiction are tracked as "Public Credits". **Table IX-1** provides the status of water Allocations for each Jurisdiction as of June 30, 2018.

Table IX-2 summarizes the Entitlements of water available to specific areas of the Cal-Am service area.

In April 2005, the first Water Use Permits were issued to property owners in the Del Monte Forest who purchased water from the Pebble Beach Company (PBC). Property owners taking advantage of this program pay PBC for the Entitlement and receive documentation of their purchase. The District processes and records a Water Use Permit on the title of the property that provides notice of the amount of Water Entitlement available. Water Permits are required when the property owner desires to use the water available from a Water Use Permit. As of June 30, 2018, **587** Water Use Permits and Water Permits had been issued for a total of **47.470 AFA** new and expanded uses.

<u>Ordinance No. 132</u>. In January 2008, the Board adopted Ordinance No. 132 (adding Rule 23.6) to allow the expansion and extension of the Cal-Am system to provide Connections to, and Potable water service for the use on and benefit of property located within Sand City. This rule enables the issuance of Sand City Water Use Permits for new and expanded water uses on Sand City Sites, in a cumulative amount of no more than 206 AFA. As of June 30, 2018, **23** Water Use Permits and Water Permits had been issued for a total of **4.353 AFA**.

<u>Ordinance No. 165</u>. In August 2015, the Board adopted Ordinance No. 165 (adding Rule 23.8) to allow the expansion and extension of the Cal-Am system to provide Connections to, and Potable water service for the use on and benefit of property located within the Carmel River watershed and the City of Carmel-by-the-Sea. This rule enables the issuance of Malpaso Water Use Permits for new and expanded water uses on Carmel River watershed and the City of Carmel-by-the-Sea Sites, in a cumulative amount of no more than 80 AFA. As of June 30, 2018, **147** Water Use Permits and Water Permits had been issued for a total of **9.315 AFA**.

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Table IX-1

ALLOCATION REPORT
Reported in Acre-Feet
Water Year 2017-2018

Jurisdiction	Paralta	Pre-Paralta Credits	Public	Total Water Available
Airport District	5.197	0.000	0.000	5.197
Carmel-by-the-Sea	1.398	1.081	0.182	2.661
Del Rey Oaks	0.000	0.000	0.000	0.000
Monterey	0.263	0.030	2.325	2.618
Monterey County	10.717	0.352	1.775	12.844
Pacific Grove	0.000	0.022	0.133	0.155
Sand City	0.000	0.000	23.373	23.373
Seaside	7.146	34.438	1.144	42.728
TOTALS	**24.721**	**35.923**	**28.932**	**89.576**

Allocation Holder	Water Available	Total Demand from Water Permits Issued	Remaining Water Available
Quail Meadows	33.000	32.320	0.680
Water West	12.760	9.372	3.388

* Does not include 15.280 AFA from the District Reserve prior to adoption of Ordinance No. 73.

Table IX-2

ENTITLEMENT REPORT
Reported in Acre-Feet
Water Year 2017-2018

Entitlement Holder	Entitlement	Total Demand from Water Permits Issued	Remaining Entitlement/and Water Use Permits Available
Pebble Beach Co. [1]	228.260	31.431	196.829
Del Monte Forest Benefited Properties [2] **(Pursuant to Ord No. 109)**	136.740	50.539	86.201
Macomber Estates	10.000	9.595	0.405
Griffin Trust	5.000	4.829	0.171
CAWD/PBCSD Project Totals	**380.000**	**96.394**	**283.606**

Entitlement Holder	Entitlement	Total Demand from Water Permits Issued	Remaining Entitlement/and Water Use Permits Available
City of Sand City	206.000	4.353	201.647
Malpaso Water Company	80.000	9.315	70.685

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Increases in the Del Monte Forest Benefited Properties Entitlement will result in reductions in the Pebble Beach Co. Entitlement.

X. WATER-USE TRENDS

Description and Purpose

Based on data provided by California American Water (Cal-Am), Monterey Peninsula Water Management District staff tracks water use (Cal-Am metered consumption) over time to assess community water-use trends. These data are used in water-supply planning (augmentation) as well as development of conservation programs (e.g., assess the degree of conservation savings needed and the effectiveness of conservation programs).

Implementation and Activities During 2017-2018

Water-use trends may be tracked by using production data at the well head, as described above, or by considering Cal-Am metered consumption information, as described below. **Figure X-1** provides water-use trends from 1980 through 2018, as represented by consumption in Acre-Feet per Cal-Am Connection (AF/Connection) for customers[1] in the Main Cal-Am System. This is based on an annual report titled "Customers & Consumption by Political Jurisdiction & Classification" that provides metered use information for each political jurisdiction and for the Cal-Am system subunits, as well as several user classifications. For WY 2018, the use per Connection is based on Cal-Am's total metered consumption[2] (8,740 AF) divided by Cal-Am's total customers (38,738) and equaled 0.226 AF/Connection.

Water consumption in WY 2018 increased slightly from an all-time low of 8,576 in WY 2017. Review of **Figure X-1** indicates that water use per Connection for the last 29 years (1989-2018) is significantly less than in the preceding nine years (1980-1988). The sharp decline in WYs 1989, 1990, and 1991 is attributable to mandatory water rationing in response to the 1987-1991 drought period. From 1992-2004, annual water consumption remained relatively stable, with a range from approximately 0.33 to 0.40 AF/connection, and average of 0.359 AF/connection, compared to the average of 0.500 AF/connection for the 1980-1988 period. Since WY 2004, a general annual declining trend has occurred. Notably, water consumption per Connection in WY 2018 (0.226 AF/Connection) was 55% less than the pre-drought consumption per Connection in RY 1987 (0.503 AF/connection).

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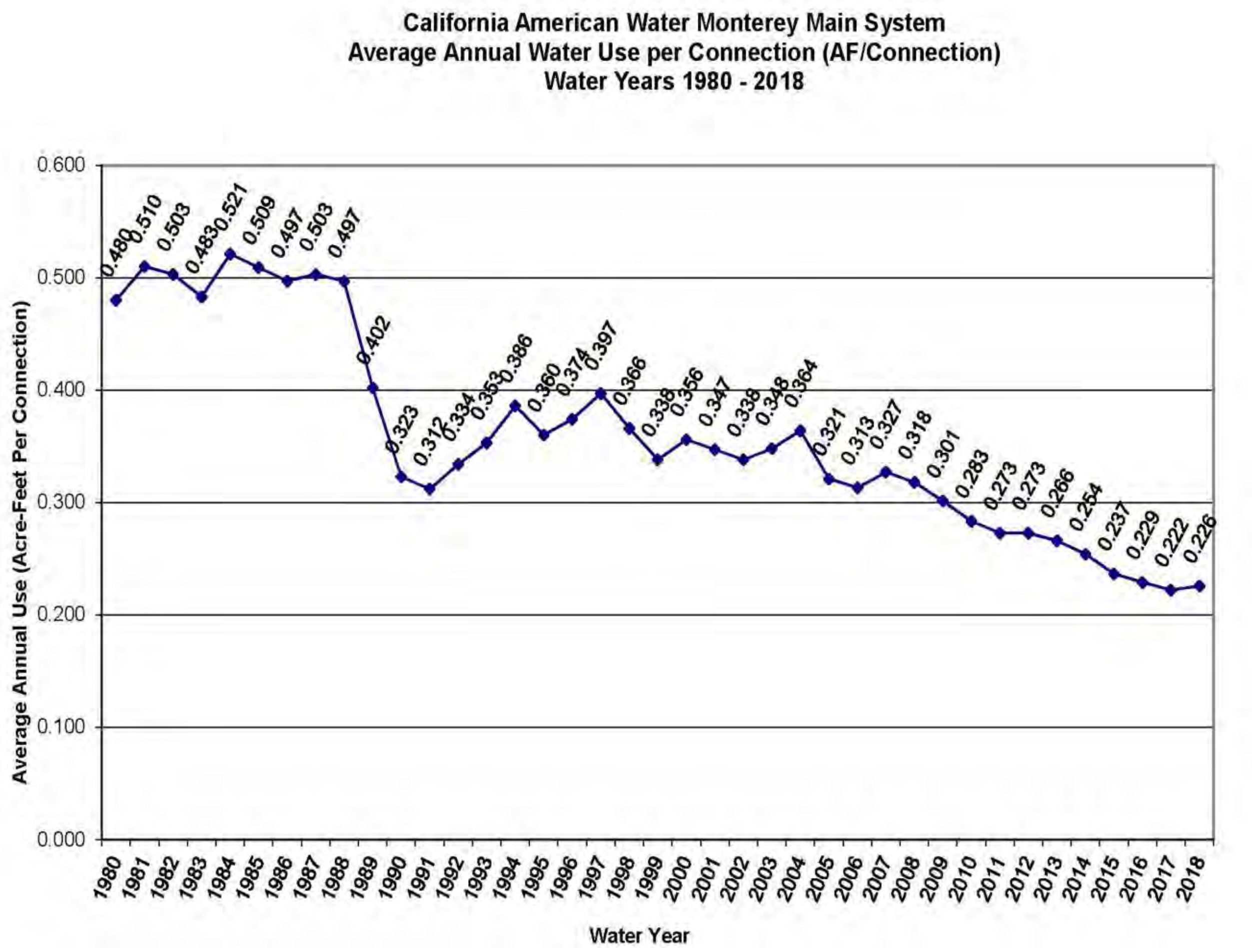
[1] Includes residential, multi-residential, commercial, industrial, golf course, public authority, other and non-revenue metered connections.

[2] Excludes Cal-Am satellite systems with separate well sources (i.e., Ryan Ranch, Hidden Hills, Bishop, Ralph Lane, Chualar and Ambler). Also excludes water supplied to MPWMD by Cal-Am wells to irrigate Carmel River riparian vegetation as part of the Allocation EIR Mitigation Program.

Figure X-1



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XI. WATER DISTRIBUTION SYSTEM MANAGEMENT (WATER PERMITS)

Description and Purpose

The Monterey Peninsula Water Management District (MPWMD or District) balances water supply and demand by carefully tracking the amount of allotted water used by the eight Jurisdictions within the MPWMD boundaries. The Monthly Water Allocation Program Report, found in the District's regular meeting Board packet, summarizes the amount of water available to each Jurisdiction. The current Allocation system, implemented after adoption of the Water Allocation Program EIR, replaced a system based on each Jurisdiction receiving a percentage of the total available production. The current process makes only newly developed water supplies available for new and expanding uses through an Allocation by Jurisdiction system, which is tracked every time a Water Permit is issued. In mid-1993, water from the Paralta Well project resulted in an Allocation of water to the Jurisdictions, ending a moratorium that was established in 1989.

In addition to Allocations for each of the Jurisdictions, there are several separate Water Entitlements: Water West, a water company purchased by California American Water (CAW) in the early 1990's, has an independent Entitlement of water for properties within the boundaries of the former system. Properties located in the Quail Meadows subdivision, Pebble Beach Company (PBC) properties, Hester Hyde, Griffin Trust, and J. Lohr properties also have an independent Entitlement of water. Water from the PBC's Entitlement can be assigned to other properties located within the Del Monte Forest (Pebble Beach).

Implementation and Activities During 2017-2018

- **Permit Activity** -- From July 1, 2017, through June 30, 2018, a total of **1,063** Water Permits were issued in the CAW System (**86** new residences and **893** residential Remodels/additions were permitted). There were **119** Non-Residential Water Permits issued for Remodels/Additions and Changes of Use in the CAW system. Separate Water Entitlements are shown on **Table X1-1.** As of June 30, 2018, a total of **89.576 AF** of water remained available in the areas served by CAW, as shown in **Section IX**. This includes water from pre- and post-Paralta Allocations and water added to a Jurisdiction's Allocation from Water Use Credit transfers and public retrofits.

- **Reclamation** – The Carmel Area Wastewater District/Pebble Beach Community Services District (CAWD/PBSCD) Recycled Water Project began operation in 1994, producing Reclaimed Water to replace Potable water previously used to irrigate golf courses and recreational open space in the Del Monte Forest (Pebble Beach area). At the start of operation, the District released Water Entitlements to the project sponsors for their fiscal participation. The PBC received 365 AF, Macomber Estates received 10 AF, and the Griffin Trust received 5 AF. The District retains 420 AF of the project's estimated savings of 800 AFA; none of the District share has been allocated.

Ordinance No. 109. In May 2004, the Board adopted Ordinance No. 109 (amending Rule 23.5) to enable financing of upgrades to the CAWD/ PBCSD Recycled Water Project. This ordinance enabled Water Entitlements held by the PBC to be made available to properties throughout the Del

Monte Forest in order to finance the Project Expansion. Ordinance No. 109 also provided a framework for several ancillary agreements for financing, construction and operation, and sale of Recycled Water.

In April 2005, the first Water Use Permits were issued to property owners in the Del Monte Forest who purchased water from the PBC. Property owners taking advantage of this program pay PBC for the Entitlement and receive documentation of their purchase. The District processes and records a Water Use Permit on the title of the property that provides notice of the amount of Water Entitlement available. Regular Water Permits are required when the property owner desires to use the water available from a Water Use Permit. As of June 30, 2018, **587** Water Use Permits and Water Permits had been issued for a total of **47.470** AF to permit new and expanded uses (see **Section IX**).

Ordinance No. 132. In January 2008, the Board adopted Ordinance No. 132 (adding Rule 23.6) to allow the expansion and extension of the CAW System to provide Connections to, and Potable water service for the use on and benefit of property located within Sand City. This rule enables the issuance of Sand City Water Use Permits for new and expanded water uses on Sand City sites, in a cumulative amount of no more than 206 AFA. For FY 2017-2018 **23** Water Use Permits and Water Permits had been issued for a total of **4.353 AF**.

Ordinance No. 165. In August 2016, the Board adopted Ordinance No. 165 (adding Rule 23.8) to allow the expansion and extension of the CAW System to provide Connections to, and Potable water service for the use on and benefit of property located within the Carmel River watershed and the City of Carmel-by-the-Sea. This rule enables the issuance of Malpaso Water Use Permits for new and expanded water uses on Carmel River watershed and the City of Carmel-by-the-Sea Sites, in a cumulative amount of no more than 80 AFA. For FY 2017-2018 **147** Water Use Permits and Water Permits had been issued for a total of **9.315 AFA**.

- **Interagency Coordination** -- District staff continues extensive coordination with community development personnel from the local Jurisdictions to facilitate communication regarding the Water Permit process. Presentations on the local water-supply situation are given regularly, and meetings are held to discuss permit procedures and to answer questions about Allocation management. Through these meetings, rapport has been developed with the local agencies, making the management of water supplies more productive and accurate.

Table XI-1
Summary of Water Permits Issued

CALIFORNIA AMERICAN WATER Main System (July 2017-June 2018)			
Type of Water Permit	**No. of Permits**	**Capacity (Acre-Feet)**	**Average Use Per Permit (Acre-Feet)**
New Residential			
• *Pebble Beach Entitlements**	30	12.465	0.416
• *Sand City Entitlement**	2	0.341	0.171
• *Malpaso Water Entitlement**	13	7.983	0.614
Residential Remodels/Additions			
• *Pebble Beach Entitlements**	52	10.772	0.207
• *Sand City Entitlement**	6	0.034	0.006
• *Malpaso Water Entitlement**	40	8.347	0.209
New Non-Residential			
• *Pebble Beach Entitlements**	1	1.013	1.013
• *Sand City Entitlement**	0	0.000	0.000
• *Malpaso Water Entitlement**	0	0.000	0.000
Non-Residential Remodels/Additions			
• *Pebble Beach Entitlements**	3	1.383	0.461
• *Sand City Entitlement**	0	0.000	0.000
• *Malpaso Water Entitlement**	4	4.181	1.045

**Pebble Beach and Sand City Entitlements are tracked separately from Main California American Water System permits.*

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XII. MONITOR PRODUCTION AND COMPLIANCE WITH SWRCB ORDER WR 2009-0060 AND WR 2016-0016

Implementation and Activities During 2017-2018

Regarding compliance with State Water Resources Control Board (SWRCB) Order WR 2016-0016 (i.e, the "Cease and Desist Order" or CDO), California American Water (Cal-Am) target production from the Carmel River Basin in Water Year (WY) 2018 for the SWRCB tally was based on the initial regulatory limit of 8,310 acre-feet (AF). This number was then reduced by Sand City Desalination Project production of 190 AF and ASR Recovery of 610 AF over the 600 AF cap on ASR diversion counted in river pumping, resulting in an adjusted base amount of 7,510 AF. Actual Cal-Am Carmel River Basin diversions (after adjustments) for WY 2018 were 6,865 AF. Thus, Cal-Am reported diversions were below the adjusted diversion limit from the Carmel River Basin imposed by the SWRCB. WY 2018 was the 21th straight year in which compliance with Order WR 95-10 was achieved, the 9th year for compliance with Order WR 2009-0060, and the second year of compliance with SWRCB 2016-0016. A major purpose of the District's *Expanded Conservation Plan and Standby Rationing Program* is to ensure continued compliance with the SWRCB Orders. The community was in Stage 1 of the conservation program throughout the 2017-2018 reporting period.

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XIII. MONITOR PRODUCTION AND COMPLIANCE WITH MPWMD ALLOCATION LIMITS

Description and Purpose

The adoption of Ordinance No. 70 in June 1993 revised the Monterey Peninsula Water Resource System (MPWRS) supply limit from an annual production limit of 19,881 acre-feet per year (AFY) to 20,673 AFY. The California American Water (Cal-Am) annual production limit of 16,744 AFY (Option V from Finding No. 403 of the Final Water Allocation Program EIR; Ordinance No. 53) was revised to 17,619 AFY, and the non-Cal-Am production limit of 3,137 AFY was revised to 3,054 AFY. This new water supply limit reflected the 385 AFY of new water production allocation from the Paralta Well project and minor adjustments to reflect the integration of the Water West system into the Cal-Am system, the annexation of Quail Meadows Subdivision into Cal-Am, and the refinement of the non-Cal-Am production estimate.

Ordinance No. 83, adopted in April 1996, set Cal-Am's annual production limit at 17,621 AFY and the non-Cal-Am annual production limit at 3,046 AFY, based on permanent reductions in water use by non-Cal-Am water users in exchange for water service from Cal-Am. As part of the agreement, 15% of the historical non-Cal-Am production was set aside to meet the Monterey Peninsula Water Management District (District) long-term water conservation goal. Based on these changes, a new limit for the MPWRS as a whole was set at 20,667 AFY.

The Cal-Am production limit was again amended in February 1997, when Ordinance No. 87 was adopted as an urgency ordinance to provide a special community benefit reserve allocation of 19.6 AFY of production to the Community Hospital of the Monterey Peninsula. Ordinance No. 87 increased the total annual Cal-Am production limit to 17,641 AFY, but did not change the non-Cal-Am limit. Thus, the new limit for the MPWRS as a whole is 20,687 AFY.

In addition to District-imposed production limits as part of its Water Allocation Program, Cal-Am must also comply with limits set by the State Water Resources Control Board (SWRCB) in 1995 as part of Order WR 95-10. The Order includes a provision that Cal-Am water diversions (surface and groundwater production) from the Carmel River basin should not exceed 11,990 AF in Water Year (WY) 1996, and not exceed 11,285 AF in WY 1997 and subsequent years. In 2009, the SWRCB issued Order 2009-0060 (i.e., the "Cease and Desist Order" or CDO), which further modified the Cal-Am production limits and imposed a production ramp-down schedule by water year (see **Section XII**). The water year begins on October 1 and ends on September 30 of the following year. The District program to monitor water use includes tracking Cal-Am compliance with the SWRCB goals.

Implementation and Activities During 2017-2018

District staff continued to manage the overall supply budget, sending periodic reports to the cities and/or county and providing updates and general information as needed. The monitoring programs initiated by Ordinance Nos. 52 and 53 continue to be implemented. Beginning with the 2001-2002 Annual Report, the District changed the reporting period for the Well Registration and Reporting Program from a Reporting Year (July 1-June 30) to a Water Year (October 1-September 30) to be consistent with the SWRCB Order reporting requirements, and other hydrological reporting programs. The 2000-2001 Annual Mitigation Report was the last report in which groundwater production within the District was presented in a Reporting Year format. Water production tables for the current year in this report use WY 2018 data (October 1, 2017 through September 30, 2018). Compliance with production limits imposed by MPWMD as part of the Water Allocation Program are shown in **Table XIII-1**.

Production vs. CDO and Adjudication to Date: WY 2018

(All values in Acre-Feet)

	MPWRS					Water Projects and Rights			
Year-to-Date Values	Carmel River Basin [2, 6]	Seaside Groundwater Basin: Coastal	Seaside Groundwater Basin: Laguna Seca	Seaside Groundwater Basin: Ajudication Compliance	**MPWRS Total**	ASR Recovery	Table 13 [7]	Sand City [3]	Water Projects and Rights Total
Target	7,518	1,820	0	1,820	**9,338**	1,320	227	300	**1,847**
Actual [4]	6,865	1,926	303	2,229	**9,094**	1,210	153	190	**1,552**
Difference	653	-106	-303	-409	**244**	110	74	110	**295**
WY 2017 Actual	6,396	1,724	300	2,024	**8,420**	1,487	491	241	**2,219**

1. This table is current through the date of this report.
2. For CDO compliance, ASR, Mal Paso, and Table 13 diversions are included in River production per State Board.
3. Sand City Desal, Table 13, and ASR recovery are also tracked as water resources projects.
4. To date, 530 AF and 153 AF have been produced from the River for ASR and Table 13 respectively.
5. All values are rounded to the nearest Acre-Foot.
6. For CDO Tracking Purposes, ASR production for injection is capped at 600 AFY.
7. Table 13 diversions are reported under water rights but counted as production from the River for CDO tracking.

Monthly Production from all Sources for Customer Service: WY 2018

(All values in Acre-Feet)

	Carmel River Basin	Seaside Basin	ASR Recovery	Table 13	Sand City	Mal Paso	Total
Oct-17	532	392	0	0	14	3	940
Nov-17	421	326	0	0	3	3	753
Dec-17	399	339	0	0	26	1	765
Jan-18	400	265	0	0	25	7	697
Feb-18	413	264	0	0	21	7	704
Mar-18	374	189	0	98	0	7	667
Apr-18	579	91	0	55	3	7	735
May-18	740	113	0	0	25	0	878
Jun-18	692	154	43	0	23	8	919
Jul-18	567	34	360	0	26	7	993
Aug-18	518	34	414	0	10	7	983
Sep-18	475	31	392	0	14	8	921
Total	**6,111**	**2,229**	**1,210**	**153**	**190**	**64**	**9,956**
WY 2017	**5,306**	**2,024**	**1,487**	**491**	**241**	**93**	**9,641**

1. This table is produced as a proxy for customer demand.
2. Numbers are provisional and are subject to correction.

Rationing Trigger: WY 2018

12 Month Moving Average [1]	9,952	10,130	Rule 160 Production Limit

1. Average includes production from Carmel River, Seaside Basin, Sand City Desal, and ASR recovery produced for Customer Service.

XIV. DETERMINE DROUGHT RESERVE

Description and Purpose

In conceptual terms, drought reserve can be defined as the balance between water supply and water demand that is necessary to insure a specified level of drought protection. The question that remains is how much protection is "adequate". There is no universally accepted standard for quantifying "adequate" levels of drought protection for municipal water supply systems. Moreover, drought protection can be measured in a number of ways including safe or firm yield, annual shortfalls, frequency or severity of water rationing, carryover storage, or some indicator of environmental stress.

For the Monterey Peninsula Water Management District (MPWMD), the level of desired drought protection has been specified by the Board of Directors in terms of water rationing. Adequate drought protection exists as long as the frequency of mandatory water rationing is less than predetermined standards. The determination of whether or not mandatory water rationing would be imposed during a reoccurrence of particular drought periods is based on simulated system operations for the 1958-2002 period of record.

In more specific terms, drought reserve can be expressed as the total usable storage in the Monterey Peninsula Water Resources System that is required on May 1 to limit mandatory water rationing to the predetermined frequency. The total storage that is required includes carryover storage for use during the following water year and the storage necessary to satisfy the demand that is expected to occur during the remainder of the current water year. In August 1993, the Board adopted a drought protection goal that allows no more than 20 percent mandatory water rationing two percent of the time, or two out of 100 years, on average.

Implementation and Activities During 2017-2018

In 2018, District staff determined that approximately **23,091 acre-feet (AF)** of usable storage were required on May 1, 2018 to avoid requesting a District-wide voluntary 15 percent reduction in water demand. Given that actual, usable storage on May 1 was estimated at **29,170 AF**, no demand reductions beyond existing Stage 1 restrictions were necessary for 2018 based on physical water availability. The 2018 trigger values are based on the maximum California American Water (CAW) production limit set by the State Water Resources Control Board in Order No. WR 2009-0060 (8,310 AF) for CAW's diversions from the Carmel River, the maximum production limit for CAW's diversions from the Coastal Subareas of the Seaside Groundwater Basin set by the Court as a result of the Seaside Groundwater Basin adjudication (2,251 AF), and the non CAW water production limit that was specified in the District's Water Allocation Program (3,046 AF).

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XV. AUGMENT WATER SUPPLY

The Findings for Adoption of the Water Allocation Program EIR in 1990 identified a set of general mitigation measures that relate to increasing the water supply. Finding No. 403-A stated that the Monterey Peninsula Water Management District (MPWMD or District) shall pursue construction of a major, long-term water supply project to provide water for restoration of the environment and for public water supply. Finding No. 403-B stated that the District should pursue a series of smaller "near-term" water supply projects to provide additional water for drought protection and some new growth until the long-term project is completed.

In 1996, District efforts related to both long-term and near-term projects were consolidated into the MPWMD Water Augmentation Plan (WAP). Specific goals and objectives were adopted in January 1997, and revised in January 1998, April 2000, and March 2001. Since 2001, the MPWMD Board has held Strategic Planning Workshops to set strategic planning initiatives, set goals and objectives to guide District activities, receive progress reports and provide policy guidance. Augmenting the water supply remains a major focus. Activities for the July 2017 through June 2018 reporting period were primarily guided by goals and objectives in the Strategic Plan adopted by the Board on April 20, 2015.

To maintain consistency with the Water Allocation Program EIR, the following sections describe MPWMD efforts for long-term and near-term projects separately. In practice, District water augmentation efforts are integrated. For aquifer storage and recovery (ASR), the long-term MPWMD ASR Phase 1 and Phase 2 Projects and associated water rights are described under **Section XV-A**; the annual ASR operation activities are discussed under **Section XV-B**.

A. Long-Term Water Supply Project

Description and Purpose

The mission of the District is to promote or provide for a long-term sustainable water supply, and to manage and protect water resources for the benefit of the community and the environment. The following paragraphs provide background information followed by a review of actions in the July 2017 through June 2018 period. Additional information is provided by the General Manager at most monthly regular board meetings, available on the District website at: www.mpwmd.net.

Background: In the early 1990s, the electorate did not approve public funding for two major water supply projects – a small 3,000 acre-foot per year desalination project in 1993 and the proposed 24,000 acre-foot (AF) New Los Padres Dam and Reservoir (NLP) Project in 1995. Since then, the District has focused its efforts on non-dam alternatives. The District participated extensively in the 1999-2002 California Public Utilities Commission (CPUC) "Plan B" process to identify a non-dam alternative to the NLP. Since 2012, the District has worked with Cal Am on the Monterey Peninsula Water Supply Project (MPWSP), a portfolio comprised of (i) a 6,200 AFA desalination plant owned by Cal-Am, (ii) a 3,500 AFA Advanced Water Purification Facility known as "Pure Water Monterey", a joint project of Monterey One Water (M1W) and the District, and (iii) additional ASR by the District and Cal-Am.

The State Water Resources Control Board (SWRCB) decisions on Carmel River issues in July 1995 and subsequent orders continue to influence water augmentation efforts to the present. The SWRCB Order WR 95-10 identified an estimated 10,730 acre-feet per year (AFY) of historical unauthorized Cal-Am diversions from the Carmel River that must be replaced by another water project or projects. With few exceptions, SWRCB orders have a "one-for-one replacement" requirement, whereby any new water supply that is developed for Cal-Am use must offset the unauthorized diversions from the Carmel River before new water supply can be used for new construction or remodels that intensify water use in the Cal-Am system. Thus, water for existing legal lots of record and other future needs will be available only when Order 95-10 and its subsequent requirements have been fully satisfied.

Because of a lack of progress toward completion of a replacement water supply and despite strong objections from the Monterey Peninsula, the SWRCB issued a Final Cease and Desist Order on October 20, 2009 (CDO 2009-0060). This Order set mandatory reductions in Carmel River diversions that that were to culminate in reducing Cal-Am Carmel River diversions to an authorized amount of 3,376 AFY by December 31, 2016.

Cal-Am, in conjunction with the District, Monterey Peninsula Regional Water Authority, the City of Pacific Grove and the Pebble Beach Company, submitted an application to amend the CDO on April 28, 2016. On July 19, 2016, the SWRCB adopted Order 2016-0016 extending the CDO period to December 31, 2021. The effective diversion limit (EDL) for the Carmel River was lowered to no more than 8,310 AFY and additional mitigation measures to offset impacts to public trust resources were ordered by the SWRCB[1].

Seaside Basin Setting: Management of the Seaside Groundwater Basin also has important ramifications for long-term community water supply. SWRCB Order 95-10 directed Cal-Am to maximize pumping in the Seaside Basin to the extent practicable in order to reduce diversions from the Carmel River. Thus, since 1995, the Seaside Basin became an increasingly important source of water supply. Unfortunately, it also began to exhibit signs of stress from over-pumping due to Order 95-10, as well as significant increases in non-Cal-Am use. As a result, to protect its rights, Cal-Am brought a complaint to the courts in 2003, where the defendants were 9 other pumpers and 4 cities.

The Superior Court rendered a Final Decision on adjudication of basin water rights on March 27, 2006 (as amended). The Decision determined that the Seaside Basin is in overdraft; quantified water rights for parties with overlying water rights ("Alternative Producers"); and set a reduced "natural safe yield" and a near-term "operating yield" allowed to be produced by certain parties with appropriative rights ("Standard Producers") as they work toward a "physical solution" to eliminate the overdraft. The Decision set a timetable that included triennial reductions in basin production to 3,000 AFA. Thus, by 2021, Cal-Am's legal share of water rights in the basin will be reduced to 1,474 AFY – down from production of nearly 4,000 AFY prior to adjudication. A nine-member Watermaster Board was created to implement the Decision with continued oversight by the Court. The MPWMD holds one seat on the Watermaster Board with two out of 13 votes; a MPWMD Board member serves as the MPWMD representative. The Watermaster has generally

1 Additional detailed background information can be found in previous years Mitigation Program Annual reports and in SWRCB Orders 95-10 and 2009-0060.

held monthly meetings since its formal commencement on April 5, 2006. The Watermaster website is at: http://www.seasidebasinwatermaster.org/.

District staff sits on the Watermaster Technical Advisory Committee and contributes data and analysis for several technical reports required by the Court. MPWMD staff and consultants, along with other partners, have been retained by the Watermaster to provide contract technical services, including project management, data collection, and preparation of documents required by the Court as part of the Seaside Basin Monitoring and Management Program.

Water Supply Needs: Community water-augmentation efforts have focused on compliance with SWRCB Orders and the Seaside Basin Adjudication. In addition, the MPWSP includes water supply for existing lots of record. As presently envisioned, 6,252 AFA of new supply will be added as a result of the MPWSP and 3,500 AFA from Pure Water Monterey. Because of continuing water conservation outreach and incentives, the SWRCB CDO, and the enactment of a steeply-tiered rate structure, water use on the Monterey Peninsula has trended down and is currently hovering at levels not seen since 1959.

Monterey Peninsula Regional Water Authority (MPRWA or Water Authority): In early 2012, the mayors of six Peninsula cities -- Carmel-by-the-Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City and Seaside -- created a Joint Powers Authority (JPA) called the Monterey Peninsula Regional Water Authority. The Water Authority's goal is to find a solution to the pending Peninsula water shortage due to the SWRCB's Cease and Desist Order and the Seaside Basin Adjudication. The Water Authority is concerned that the community has been unable to reach a consensus on a water supply solution, and if a project is not in place by the CDO deadlines, the community will face severe rationing and an economic crisis. The Water Authority believes in a portfolio approach to achieve an adequate and cost-effective water supply for the Peninsula while addressing public concerns about the transparency of the project development process, and about the projected increased cost of water. The Water Authority website is: www.mprwa.org.

Since 2012, the MPWMD General Manager has served on the Authority's Technical Advisory Committee (TAC).

Monterey Peninsula Water Supply Project Governance Committee (Governance Committee): In order to enhance coordination between the public and private sector, provide oversight on behalf of the public, and help reduce the cost of future regional water supply projects, the Governance Committee was formed under an Agreement dated November 5, 2013 (revised April 30, 2014). The Governance Committee is comprised of the Water Authority, MPWMD, County of Monterey, and Cal-Am.

Through 2018, the Governance Committee continued to monitor progress on the desalination plant, Pure Water Monterey, and construction of the Monterey pipeline. MPWMD facilitates meetings of the Governance Committee. Additional information including agenda packages and meeting minutes are at: http://www.mpwmd.net/GovernanceCommittee/GovernanceCmte.htm

MPWMD Water Supply Project Priorities: On April 20, 2015, the District Board adopted its Strategic Plan, which included One-Year and Three-Year goals and objectives related to water supply projects, as follows[2]:

Desalination: Further develop the "Ratepayer Relief Bonds" proposal for a public contribution for the Cal-Am regional desalination project. (Note: Though not enumerated as a specific goal, the Board also supported evaluation of an alternative non-Cal-Am project as a "back-up" measure, given the delays and uncertainties associated with the Cal-Am desalination project).

Groundwater Replenishment (GWR): Enter into a cost-sharing agreement for GWR and advance CEQA and feasibility work. This project is also known as "Pure Water Monterey" with Monterey One Water as the lead.

Aquifer Storage and Recovery: Complete Water Project 1 (ASR Phase 1), including an enhanced back-flush pond; redefine easement and enter into agreements with City of Seaside and Fort Ord Reuse Authority (FORA); complete construction of water treatment facilities.

Local Projects: Work with jurisdictions to advance planning and development of local supplies. Examples include: Pacific Grove golf course irrigation with recycled water, well development for Del Monte Golf Course irrigation, and other projects. The District has provided seed-level matching funding to advance local planning.

Odello Property: Regulate and provide oversight of the "Malpaso Water Company water entitlement."

The Three-Year Strategic Goals adopted in 2015 included:

Develop Comprehensive Strategy for SWRCB Permits 20808A, 20808B, and 20808C: The District has successfully reassigned portions of the original New Los Padres Reservoir water right Permit #20808 to Phases 1 and 2 of ASR (20808A, 20808C) and retains the remainder under Permit 20808B. However, permit conditions for each are not consistent. In addition, a condition of all the permits requires licensing by 2020 (a process to demonstrate beneficial use of water and make the right permanent). While the District continues to make clear progress toward perfecting rights under Permits 20808A and C with the ASR project, efforts on a project that would use rights under Permit 20808B are still in a preliminary study stage.

A strategy for these water rights may include:

- Identify potential sites in Carmel Valley for diversion and storage and sites in the Seaside Basin that could be used for injection and recovery;
- Evaluate possible source well rehabilitation and/or expansion in Carmel Valley, which could entail potential treatment capacity expansion;

2 The staff note and proposed Strategic Plan are at Item 24 in the following link: http://www.mpwmd.net/asd/board/boardpacket/2015/PDF/April%2020%20Pkt.pdf

- Consider developing a strategy for a direct diversion component of water right;
- Petitioning the SWRCB to amend existing permits and consider conforming all permits to the same standards; attempt to create greater operating flexibility such that any injection well can inject any diverted water and wells can be used for both recovery and production;
- Petition the SWRCB to grant a time extension for licensing the permits;
- Consider completing a water availability analysis and an IFIM study to develop new permit conditions.

Prepare for Allocation of "New Water": The District will need to develop fair and equitable mechanisms to allocate water from new water projects to the jurisdictions. Policies need to be considered for:

- Allocation of water for legal lots of record;
- Local projects that may free-up potable supplies within jurisdictions;
- Additional water supplies that could be created by future ASR, Table 13 water rights, and changes in water right permit conditions;
- Use of any "excess" supplies in the early years of the MPWSP, before allocation to full build-out of Pebble Beach or legal lots of record;
- Update and evaluation of the jurisdictions' general plan needs.

The One-Year Strategic Goals adopted in 2015 included:

Establish a Long-Term Strategy for Los Padres Dam: In 2011, the District proposed increasing water supply capacity at Los Padres Dam through either a rubber dam on the existing spillway, or dredging, or both. Cal-Am expressed little or no interest in these projects in the past, due in part to the high cost and logistical challenges associated with replacing or enhancing fish transport over the dam and through the reservoir, dredging the reservoir, and because the National Marine Fisheries Service (NMFS) has indicated that permanent removal of Los Padres Dam should be considered for restoration of the Central Coast Steelhead. However, many fisheries experts believe that a regulated river with reservoir storage that can be used to augment dry season flows would be a better long-term solution for the steelhead as well as property owners along the river. In 2015, the District entered into an agreement with Cal-Am to develop an alternatives study that addresses the following:

- Dam ownership;
- Dam removal and steelhead recovery;
- Property owners and rights;
- Additional water supply;
- Fish passage over Los Padres Dam and through the reservoir;

As of mid-2018, several consultants the District retained for the study had begun or continued to work on fish passage, a sediment transport model for the river, a linked surface water-groundwater model for the Carmel River Basin, and a steelhead habitat model of the Carmel River main stem from the ocean to Los Padres Dam.

The District continued to make progress on the following One-Year Goals:

- Pursue Proposition 1 and federal funding opportunities.
- Local Projects including Monterey Regional Airport, Monterey County Fairgrounds, and Pebble Beach Company Del Monte Golf Course as possible projects.
- Develop ordinance and allocation frameworks for locally developed water supplies. This includes regulation and oversight for water right transfers in the Carmel River Basin (e.g., Odello) and Seaside Groundwater Basin (e.g., Cypress, DBO) as well as reallocation of potable water saved by conversion to non-potable irrigation sources (Pacific Grove).

In 2014, the State Legislature signed sweeping legislation (Sustainable Groundwater Management Act [SGMA]), which could potentially have a substantive effect on water supply planning and development of water projects. The District Board has accomplished the following with respect to SGMA:

- Adopted a resolution designating the District as the Groundwater Sustainability Agency for the Carmel Valley Alluvial Aquifer.
- Worked with SWRCB and the Department of Water Resources to resolve issues regarding the categorization of the Carmel Valley Alluvial Aquifer, and succeeded in obtaining an exemption from the requirements of SGMA.
- Worked with the Watermaster to ensure reporting requirements for the adjudicated Seaside Groundwater Basin are met.
- Coordinated with Marina Coast Water District and MCWRA to address interaction between the Salinas Valley and Seaside Groundwater Basins.

The 2015 Adopted Strategic Goals document is also available on the District website at:
http://www.mpwmd.net/who-we-are/mission-vision-goals/bod-goals/

Implementation and Activities During 2017-2018

The following paragraphs describe action on the water augmentation goals identified above in the July 1, 2017 through June 30, 2018 period. A brief summary of accomplishments is provided. Please refer to the 2018 Annual Report for additional information.

Monterey Peninsula Water Supply Project – The District worked jointly with Cal-Am, the Water Authority, and other parties to further the MPWSP. The District continued to actively participate in CPUC hearings and settlement agreements regarding Cal-Am's Application A.12-04-019 for the MPWSP.

Groundwater Replenishment/Pure Water Monterey Project – The District provided the majority of pre-construction funding and provided services for work on this innovative water recycling plant, working in partnership with Monterey One Water which will own and operate the system.

In the period July 2017 to June 2018, the project partners completed environmental compliance documents for an expansion of the Pure Water Monterey treatment facility capacity to 5.0 million gallons per day (mgd) from 4.0 mgd. The expansion will allow for the delivery of up to 600 AFA of purified recycled water to the Marina Coast Water District. The team also successfully obtained water rights for the project, secured State Revolving Fund loan monies from the State Water Resources Control Board (SWRCB) to build the project, and certified an Addendum to the Environmental Impact Report to add the Monterey Pipeline and Hilby Pump Station. Construction on the Monterey Pipeline began in late 2016 with the District acting as Project Manager for environmental compliance assurance. When completed, the pipeline will allow Pure Water Monterey water to be supplied to Pebble Beach, Carmel and Carmel Valley and also allow excess Carmel River water to be delivered to the ASR wells in the winter. Construction on all components of Pure Water Monterey began in 2017. Completion was expected in late-2018, but construction was delayed into 2019.

Aquifer Storage and Recovery (ASR) - The District continued to work with FORA and the City of Seaside on expanding property at the Santa Margarita site to install permanent pipelines connecting the Phase 1 and 2 sites and an expanded back-flush pit. A design to expand the backflush pit was completed and a preliminary plan for construction of treatment facilities was circulated for review.

Local Water Projects– For a fourth year, the District continued to provide grants to local public entities to help them pursue small water projects, including: (1) the City of Monterey for evaluating capture and reuse of urban stormwater, (2) The Pebble Beach Company for a non-potable supply well for irrigation of its Del Monte Golf Course, and (3) the City of Seaside for drilling a new well. Previously funded local projects are making progress: Pacific Grove began operations of its "Water Factory" in January 2018. The City of Monterey partnered with M1W to develop a stormwater resource plan for the Monterey Peninsula and Carmel Valley with additional grant funds from Prop. 1. The City of Seaside has not yet moved forward with a new well.

Odello Property/Water Rights Transfer –The District passed Ordinance No. 165 to establish a Water Entitlement to Malpaso LLC, based on its existing license from the SWRCB for the old Odello property south of the Carmel River and east of Highway One. This became the model for similar ordinances for other water right transfers. Several home remodels and business expansions have been accomplished with water from the Malpaso entitlement.

Water Rights/SWRCB Permit 20808-B – The District continued work on an integrated ground water – surface water GSFLOW/MODFLOW model to update instream flow needs for steelhead in the Carmel River, with a focus on model calibration, data review and input. The model was operable in late-2017 and was fully calibrated using the parameter estimation (PEST) process on a USGS super computer. The model will allow the District to model different water supply scenarios and their impacts on the Carmel River and will be an important tool to assess water availability under a wide range of scenarios for water use under Permit 20808-B.

Proposition 1 Integrated Regional Water Management Program – The District took the lead for the Monterey Peninsula region in negotiating an agreement for sharing Proposition 1 Disadvantaged Community funds in the Central Coast funding area. The Monterey Peninsula region received $435,000 for planning and implementation of projects. In related action, the District continued work with the federal Bureau of Reclamation on the Salinas and Carmel Rivers Basin Study, which will facilitate integrated resources management in light of future climate change.

Los Padres Dam – The District continued to monitor improvements to upstream passage at the dam and held workshop meetings with technical staff from Cal-Am, MPWMD and regulatory agencies concerning future management alternatives. Areas of study include sediment management, future water availability, evaluating downstream habitat impacts, and an evaluation of alternatives ranging from complete dam removal to increasing storage at the reservoir.

Sustainable Groundwater Management Act (SGMA) – The District continued to participate in technical meetings focused on management of the Salinas Valley Groundwater Basin (SVGB). Because there is no hydrogeologic divide[3] between the Seaside and Salinas basins, pumping in either basin can affect aquifers near the basin boundaries.

B. Near-Term Water Supply Projects

Description and Purpose

Section XV-A above describes long-term water supply alternatives, including the MPWMD ASR Phase 1 and Phase 2 Projects. This section focuses on annual ASR operations. Since 1996, the District has evaluated the feasibility of ASR at greater levels of detail. As of June 2017, the District had constructed five ASR wells in the Seaside Basin: (1) a shallower ASR pilot test well into the Paso Robles Formation (located at Mission Memorial Park in Seaside) in 1998; (2) a 720-foot deep, full-scale test well into the Santa Margarita Formation in 2002 (now ASR-1); (3) another full-scale ASR well at the Santa Margarita site (ASR-2) in 2007; a full-scale ASR well at the Seaside Middle School site (ASR-3) in 2012; and a second full-scale well at the Middle School site (ASR-4) in 2014. To comply with the SWRCB water rights permit conditions, MPWMD submits detailed annual reports to the SWRCB after each operational season, which also confirms that diversions for the ASR projects have complied with regulatory requirements. A similar report is provided to the Central Coast Regional Water Quality Control Board as part of its ongoing oversight of the ASR program in the Seaside Basin.

3 The basins are separated by a flow divide running northwest to southeast from approximately the north end of Sand City through the Laguna Seca Raceway (currently the WeatherTech Raceway at Laguna Seca). Water in the aquifers to the southwest of the divide is deemed to be in the Seaside Basin.

Implementation and Activities During 2017-2018

The District operated the ASR facilities in coordination with Cal-Am while diverting 530 acre-feet (AF) of Carmel River Basin water for injection and storage in the Seaside Basin during the 2018 water year (WY). Since inception of the ASR program, a total of 8,561 AF has been diverted from the Carmel River for storage and subsequent recovery through the end of WY 2018. In Water Year 2018, 1,218 AF of ASR-stored water was extracted (recovered), for delivery to Cal-Am system customers.

XVI. STEELHEAD FISHERY MITIGATION MEASURES

The Findings for Certification of the Water Allocation Program Final EIR (Findings Nos. 388-A through D) identified mitigation measures to reduce impacts to the Carmel River steelhead population, including: (a) expansion of the program to capture and transport smolts during spring, (b) prevent stranding of early fall and winter migrants, (c) rescue juveniles downstream of Robles del Rio during summer, and (d) implement an experimental smolt transport program at Los Padres Dam (LPD). Monitoring of adult returns and juvenile populations provides an indication of the overall success of the steelhead mitigation measures. The following sections briefly describe the purpose of each mitigation measure and activities during the current reporting period.

A. Capture and Transport Emigrating Smolts during Spring

Description and Purpose

The goal of this program is to reduce disruption of the steelhead life cycle due to streamflow diversions. During spring months, when steelhead smolts are actively emigrating from freshwater to the ocean, the diversion of surface and groundwater from the river and alluvial aquifer sometimes interferes, and in some cases, blocks migration into the ocean. This threatens individual fish, reduces the number of smolts that successfully reach the ocean, and indirectly affects the number of adults that eventually return to freshwater. When streamflow is too low for natural emigration, or when smolts are at risk of being stranded, the Monterey Peninsula Water Management District (MPWMD or District) monitors streamflow, captures emigrating smolts, and transports them to the lagoon or ocean.

Implementation and Activities During 2018

During the primary three-month smolt migration period, March-May 2018, flows in the lower river at the Highway 1 Gage were adequate for smolt migration with flows ranging from 1,160 to 22 cubic feet per second (cfs) **(Figure XVI-1)** and no smolt trapping was needed **(Figure XVI-2)**.

B. Prevent Stranding of Fall/Winter Juvenile Migrants

Description and Purpose

As in other central California streams, juvenile steelhead in the Carmel River move downstream into lower reaches of the river well ahead of the peak emigration of smolts. Depending on river conditions and diversions during the previous dry season, there is some risk that pre-smolts and other juvenile steelhead will be stranded following early fall and winter storms, which increase flows and stimulate the fish to move downstream into habitats that are subsequently dewatered after the storm peak passes. This risk occurs primarily from October through February, although during severe droughts, the risk period may extend into March. The District mitigates this problem by capturing and transporting juveniles when necessary during the high-risk period. Currently, juveniles trapped during fall/winter months are transported upstream to viable habitats above the Narrows or held at the District's Sleepy Hollow Steelhead Rearing Facility (SHSRF).

Implementation and Activities During 2018

District staff monitored river conditions during the fall and winter months of 2018. Flow at the District's Highway 1 Gage dropped to zero cfs on August 16, 2018 and the lower river remained dry through early December 19, 2018 (**Figure XVI-1**). Due to the dry conditions, there was a moderate risk of fish stranding and conditions were carefully monitored throughout the fall and winter, but no additional rescues were needed.

C. Rescue Juveniles Downstream of Robles Del Rio during Summer

Description and Purpose

About 1.5 miles of habitat between Boronda Road and Robles del Rio Road, and up to nine miles of habitat below the Narrows, are seasonally subject to dewatering depending on the magnitude of streamflow releases at LPD, seasonal air temperatures, and water demand. Beginning as early as April or May of each dry season, the District rescues juvenile steelhead from the habitat in these reaches. The goal of this program is to help maintain a viable steelhead population by transplanting juveniles to permanent river habitat above the Narrows (if it is available), and/or rearing juvenile steelhead at the SHSRF if existing habitat is not available or is already fully saturated with juvenile steelhead.

Implementation and Activities 2018 Rescue and Rearing Season

- **MPWMD Fish Rescue Totals -** Since 1989, District staff has rescued 437,528 steelhead from drying reaches of the Carmel River watershed. Compared to previous rescue seasons, total rescued fish in the 2018 dry season was only 34% of the 1989-2018 average of 14,584 (**Figure XVI-3**). Rescue and transport mortality for the 2018 dry season was 0.56%. Average rescue transport mortality for the 1991-2018 period is 0.57% (**Figure XVI-4**).

2018 MPWMD Annual Mainstem Rescue Totals – The surface flow of the Carmel River dropped below 10 cfs at the Highway 1 Bridge on May 18, 2018. In response to this decline, District staff began monitoring daily river conditions. Mainstem rescues began on June 25th and were conducted until October 3, 2018 between the Highway 1 Bridge (RM 1.0) and Schulte Bridge area (RM 6.7), and at the Trail and Saddle area (RM 13.3). During this period, staff conducted 32 rescue operations over 6.3 miles, yielding a total of 2,794 steelhead, including: 1,396 young-of-the-year (YOY), 1,383 yearlings (1+), 1 kelt and 14 mortalities (0.50%) (**Table XVI-1a**). Staff tagged 2,268 fish with passive integrated transponder (PIT) tags before release. Fish were transported and released at seven locations upstream of the drying reach; lower Garland Park (112), Don Juan Bridge (22), mid-Garland Park (490), upper Garland Park (440), Cal-Am's West Garzas Well (605), Rosie's Bridge (312), and Hitchcock creek confluence (799) (**Table XVI-1b**).

2018 MPWMD Tributary Rescues Totals – A total of 14 rescue days were conducted on Potrero, Robinson Canyon, Garzas, Hitchcock, and Cachagua Creeks. Rescue operations occurred in early May through late-June, yielding a total of 2,164 steelhead, including: 1,855 young-of-the-year (YOY), 295 yearlings (1+), and 14 mortalities (0.65%) (**Table XVI-1a**). Staff tagged 152 fish of size with PIT tags before release. Fish rescued out of Potrero creek (212) and Robinson canyon creek (8) were transported and released upstream of their confluence in perennial waters of the mainstem, while fish rescued out of Garzas (353) and Cachagua (1,577) were transported and released close to their confluence with the Carmel River (**Table XVI-1b**). No fish were rescued or observed in Hitchcock Creek, even though two rescue days were undertaken**.**

- **Sleepy Hollow Steelhead Rearing Facility (SHSRF)** - Facility Modifications in Reporting Year 2018 – The District is in the process of completing a major intake system upgrade that will improve the reliability and ease of maintenance of the intake pumps during both high and low flow conditions. The main features of the project include installing a new intake structure that can withstand flood and drought conditions as well as the increased bedload from the San Clemente Dam removal project two years ago, and a new Recirculating Aquaculture System (RAS) that can be operated in times of low flow or high turbidity to keep the fish healthy. This project is financed by funds from the California American Water (Cal-Am) Settlement agreement with the National Marine Fisheries Service (NMFS) administered through the State Coastal Conservancy (SCC), and is expected to be completed in 2019.

During this reporting year, District staff and their consultants finalized the project design, permitting, and environmental monitoring requirements. General contractor Mercer-Fraser Company of Eureka, CA, was hired and started construction in September on the $2 million project. By the end of December, the new intake screen, piping and electrical conduits had been installed. The settling basin, building foundation, rearing channel modifications, and new concrete pad for the cooling tower and degasser were completed.

Summary of 2018 SHSRF Fish Stocking and Releases – No fish were held at the Facility in 2018 due to the construction project.

D. Monitoring of Steelhead Population

Description and Purpose

The District uses three primary techniques to monitor the health of the steelhead population: (1) counts of adult steelhead passing LPD, (2) surveys of winter steelhead redds, and (3) surveys of the juvenile steelhead population at the end of the dry season in October.

Implementation and Activities during 2018

- **Winter Steelhead Adult Counts** - The LPD Fish Trap is operated and monitored by Cal-Am. The trap was monitored from January 15, 2018 to June 6, 2018. The number of trapped adult sea-run steelhead reported during the 2018 migration season (Jan. - April) was 29 (**Figure XVI-5**). The average run size for the 1991-2018 period is 95 fish. Additionally, there were 8 resident trout counted in the trap this season.

- **Winter Redd Surveys –** Since 1994, the District has conducted winter steelhead redd (nest) surveys downstream of LPD. The primary purpose of the surveys is to conduct a thorough assessment of steelhead redds and adult fish (including spawning pairs, singles, kelts, and carcasses) in the Carmel River, then use those results to help evaluate the health and abundance of each steelhead life stage.

In addition, the general condition of the spawning habitat as well as the numbers of steelhead smolts, juveniles, and fry are noted in each reach. Also, noted are any areas where low flows might be creating migration barriers to upstream or downstream fish passage.

Thirdly, the surveys are used to track gravel movement and monitor spawning activity in conjunction with the District's Spawning Gravel Enhancement Project below LPD, where in 2014, 1,500 tons of 1.5 - 4" gravel was placed with the goal of increasing the available spawning habitat by 50% above Cachagua Creek.

<u>2018 Redd Survey Summary</u>:
Extremely dry conditions persisted through February 2018 and no sea-run steelhead could enter the watershed. Two large storm systems in March brought in fish but high flows prevented walking the river to look for redds until mid-April. Once flows finally dropped enough to allow safe access and clear viewing, one complete redd survey pass from Highway 1 (RM 1.0) to Los Padres Dam (RM 24.8) was conducted between April 18 and May 3, 2018 by MPWMD fisheries staff. River flows at the time of the surveys ranged from ~70 to 40 cfs at the survey locations.

Overall, 52 redds were observed between Quail Lodge golf course, at Doris Day Pool (RM ~4.5) and a half-mile downstream of LPD in the newly placed spawning gravel (~RM 24.3), along with two pairs of spawning adults, nine single adults and two carcasses, as well as more than 60 smolts and 20+ large/older juveniles. Despite the late migration season and high (redds erasing) spring river flows, 2018 had the greatest number of counted redds since 2013, with 16 more redds than in 2017. Additionally, the hundreds of fry seen throughout the entire river (even where no redds were seen) indicate a successful spawning season.

The lower portions of six tributaries were also surveyed. Three redds, and several fry were seen in Cachagua Creek and several larger fish were observed in Tularcitos, Robinson, and Potrero Creeks indicating that fish were able to survive there since last year.

Gravels from the District's 2014 Spawning Gravel Enhancement Project continued to move downstream, creating new spawning habitat all the way to Syndicate Camp (RM ~22.1). While the spawning gravel grant's monitoring period is over, this downstream movement of gravel and subsequent habitat improvement satisfies the project's goal of >50% increase in spawning habitat between LPD and Cachagua Creek as evidenced by the five redds in fresh gravel seen in the Prince's Camp/Galante area.

<u>Pacific Lamprey</u> – Lamprey numbers appear to be rising in the Carmel River the past few years, and with the removal of SCD they are able to spawn in the upper watershed for the first time since the 1920's. In 2018, staff counted 42 lamprey redds, 14 of which were seen in or above the CRRDR reach.

<u>Striped Bass</u> – Striped bass (SB) have been present in the Carmel River lagoon for approximately 10 years, but they were first observed up in the lower river in 2015. In 2016 and 2017 they extended their range to the CRRDR reach, 18.5 miles upstream of the lagoon. In 2018, several

small groups of SB were observed in the lower river and one large group was seen at the Old Carmel Dam site. To date, no juvenile bass have been found in the river.

● **Juvenile Population Surveys** - Since Fall 1990, the District has surveyed the juvenile steelhead population in the Carmel River below LPD. This information is crucial to assess the success of adult reproduction and to determine whether or not freshwater habitats are adequately seeded with juveniles.

In 2018, 10 survey sites were sampled throughout the 17-mile reach between Mid-Valley and Cachagua. District staff also assisted NMFS on a number of additional surveys throughout the watershed. Fish densities were generally the highest they have been since 2012 (before the drought) at all sites below the CRRDR reach, ranging from 0.23 – 0.50 fish per foot (fpf) **(Table XVI-2)**. The overall average improved slightly this year to 0.39 fpf, but was still below the long-term average of 0.67 fpf (3,552 fish per mile) **(Figure XVI-6)**.

● **Constraints to Cal-Am Diversions from the Lower Aquifer** - During the 1992 SWRCB hearings on complaints against Cal-Am's diversions from the Carmel River, testimony was presented that outlined the potential benefits of a modified way of managing the sequence of pumping from Cal-Am well fields in the Carmel Valley Alluvial Aquifer. Pursuant to Condition No. 5 of SWRCB Order WR 95-10, Cal-Am is required to operate its Carmel Valley production wells beginning with the most downstream well, and moving upstream to other wells as needed to meet demand. The goal of this order is to maximize the length of viable stream and aquatic habitats in the lower Carmel Valley.

During the 2018 dry season, it was estimated that this mode of operation and flow releases from Los Padres Reservoir resulted in 2.0 miles of additional viable aquatic habitat down to Schulte Bridge (RM 6.7). Juvenile population estimates show fish densities at 0.36 fish-per-foot (fpf) below the narrows **(Table XVI-2)**. This additional habitat supported approximately 3,800 juveniles.

E. Other Activities Related to the Steelhead Resource

The District continues to carry out several activities that were not specifically identified as part of the original Allocation EIR Mitigation Program, but will improve habitat conditions, help restore the steelhead resource, or provide additional key data on the steelhead resource. These include: (a) rescue and transportation of kelts, (b) spawning habitat restoration and monitoring, (c) assessment of steelhead migration barriers, (d) PIT tagging operations, (e) assessment of the benthic macro-invertebrate (BMI) communities, and (f) Carmel River habitat mapping.

Implementation and Activities in 2018

● **Passive Integrated Transponder (PIT) Tagging** – The District has been collaborating with National Marine Fisheries Service (NMFS) Southwest Fisheries Science Center since 2013 on establishing a steelhead tagging and monitoring network in the Carmel River in order to provide data to assist in management decisions, recovery efforts, and ongoing mitigation evaluations. To date, the collaboration has tagged over 8,000 steelhead using passive integrated transponder (PIT) tags. In 2018, the District operated two of four PIT tag antenna arrays in the mainstem Carmel River. An array is a wired antenna that is put into the river and reads the PIT tags. As fish pass by the antenna the tag sends a signal to a data logger. Each tagged fish has a different identification number, which allows us to identify individual fish, including where they were tagged, their size and length at tagging and which direction they are traveling. A data base is currently under construction in order to analyze the copious amount of data that is collected by the arrays.

- **Rescue and Transportation of Kelts** – "Kelts" are adult steelhead that have already spawned, typically from January through April, and begin to migrate back to the ocean in late spring and early summer. Under existing conditions, these fish are threatened by receding flows in many years, especially when the upstream migration of adults is delayed due to lack of early-season storms. District staff rescue and transport these fish to more stable waters, when needed.

In 2018, the lower river remained wet until June so no trapping was necessary and no kelts were captured during summer rescues.

- **Bioassessment Program** – The California State Water Resources Control Board's Reach Wide Benthic (RWB) protocol's Surface Water Ambient Monitoring Program (SWAMP) procedures are used to sample benthic macroinvertebrates (BMI) and assess their physical habitats. Sampling was completed in November 2018 at five sites from the control site in the Los Padres Wilderness above Los Padres Reservoir (CRLP) to the mid-valley site at Red Rock (CRRR). Sites are given an Index of Biotic Integrity (IBI) score between 0 (poor) and 100 (excellent). At most sites, IBI scores from the past four years show a significant improvement in habitat conditions with values above the historic (2004-2010) average score due primarily to recovery from the severe drought and the removal of San Clemente Dam (**Figure XVI-7**) (See the 2017 Mitigation Report for additional information on this program).

OBSERVED TRENDS, CONCLUSIONS AND/OR RECOMMENDATIONS:

- **Adult Steelhead**

Previous redd surveys below SCD confirm that the spawning habitat in the lower river has improved considerably over the last 20 years and many adults now spawn there instead of the upper watershed. In addition, juvenile steelhead rescued by the District from the lower river that survive to adulthood may be more likely to return to the lower river to spawn rather than migrate upstream.

Variability of adult steelhead counts are likely the result of a combination of controlling and limiting factors including:

- Variable river and flow conditions effects on all steelhead life stages including adult steelhead, as migration may be limited or blocked and spawning reaches may dry early;
- adverse ocean conditions with increased water temperatures off the coast of California, and degraded ocean water quality likely affecting the abundance of food resources and possibly

even the survival of returning steelhead;

- ➢ variable lagoon conditions, caused by artificial manipulation of the sandbar and/or naturally occurring periods of low winter flows; and

- ➢ low densities of juvenile fish affecting subsequent adult populations.

- **Juvenile Steelhead**

Long-term monitoring of the juvenile steelhead population at eleven sites along the mainstem Carmel River below LPD shows that fish density continues to be quite variable both year to year and site to site from less than 0.10 fish-per-foot (fpf) of stream to levels frequently ranging above 1.00 fpf, values that are typical of well-stocked steelhead streams. In this 2018 reporting period, the average population density remained less than the long-term average of 0.67 fpf for the Carmel River, likely due to the recent drought, poor habitat conditions in the lower river, and low numbers of returning adults.

The variability of the juvenile steelhead population in the Carmel River Basin is directly related to the following factors:

<u>Positive Factors</u>:

- ➢ General improvements in streamflow patterns, due to favorable natural fluctuations, exemplified by relatively high base-flow conditions between 1995 and 2012 and the very wet conditions in 2017;

- ➢ District and SWRCB rules to actively manage the rate and distribution of groundwater extractions and direct surface diversions within the basin, coupled with changes to Cal-Am's operations at LPD, the increased availability of ASR and Sand City desalinated water in the summer, and extensive conservation measures, all help provide increased streamflow;

- ➢ restoration and stabilization of the lower Carmel River's stream banks, providing improved riparian habitat (tree cover/shade along the stream, an increase in woody debris and the associated invertebrate food supply) while preventing erosion of silt/sand from filling gravel beds and pools;

- ➢ extensive juvenile steelhead rescues by the District over the last 29 years, now totaling 437,528 fish through 2018;

- ➢ rearing and releases of rescued fish from the SHSRF of 97,600 juveniles and smolts back into the river and lagoon over the past 22 years (16 years of operation), at sizes generally larger than the river-reared fish, which in theory should enhance their ocean survival.

<u>Negative Factors</u>:

- ➢ variable lagoon conditions, including highly variable water surface elevation changes caused by mechanical breaching, chronic poor water quality (especially in the fall), and predation by birds and striped bass;

- barriers or seasonal impediments to juvenile and smolt emigration, such as intermittent periods of low flow below the Narrows during the normal spring emigration season;
- spring flow variability such as low-flow conditions that could dewater redds prematurely or high flows that could either deposit sediment over redds or completely wash them out;
- occasionally elevated fall temperature and hydrogen sulfide levels below LPD, and the increase in sediment from the SCD removal project;
- the potential for enhanced predation on smolts and YOY migrating through the sediment field above LPD; and
- invasive species: striped bass have recently (2015) started migrating up the river from the lagoon and are likely preying on juvenile steelhead. New Zealand Mud Snails (NZMS) were first discovered during BMI surveys at Red Rock (mid-valley) in 2016 and now comprise up to 62% of the BMI in the lower river. NZMS out compete native invertebrates and are a poor food item themselves for steelhead.

District staff continues to provide technical expertise and scientific data to CAW engineers and environmental consultants, DWR/DSOD, CDFW, NMFS, U.S. Fish and Wildlife Service, and others involved in addressing the resource management issues associated with both LPD and the area influenced by the SCD Removal and Carmel River Reroute Project. District staff also continues to provide technical expertise and scientific data to California Department Parks and Recreation, Monterey County Water Resources Agency, Monterey County Public Works Department, California Coastal Commission, U. S. Army Corps of Engineers, Carmel Area Wastewater District, and other regulatory agencies and stakeholders involved in the management of the Carmel River, the Carmel River Lagoon and the barrier beach.

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Figure XVI-1

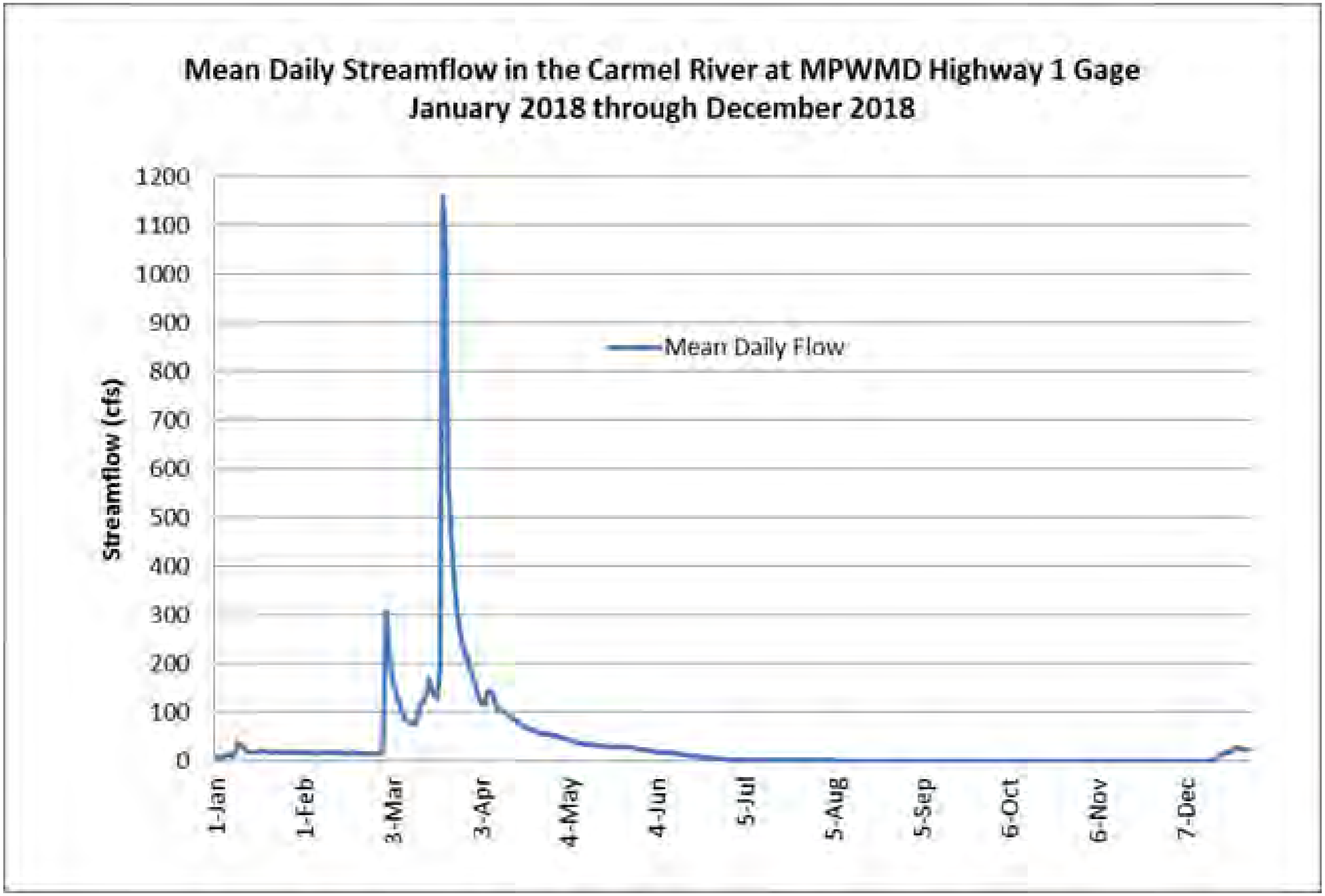
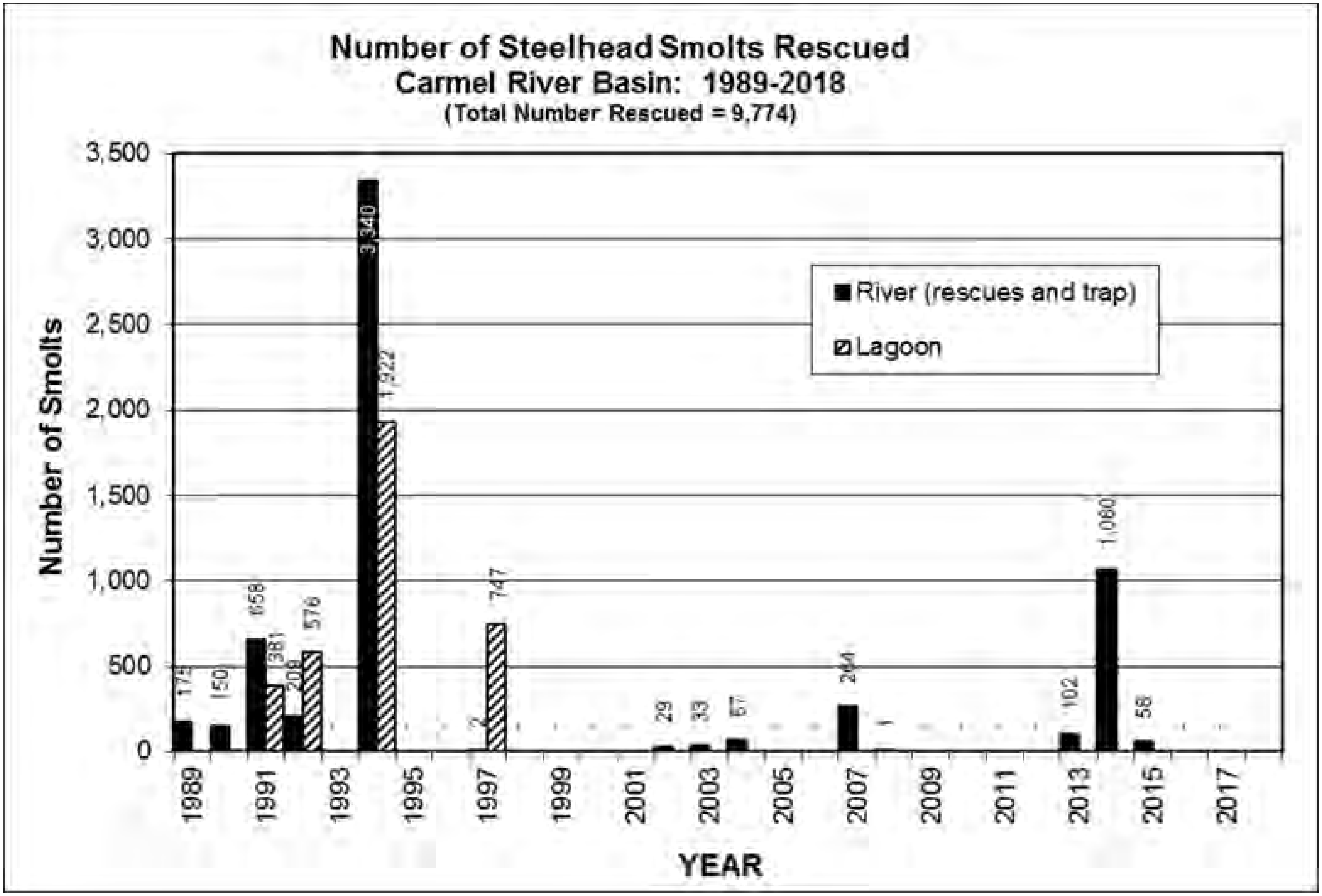

Mean Daily Streamflow in the Carmel River at MPWMD Highway 1 Gage
January 2018 through December 2018
Streamflow (cfs)
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Mean Daily Flow
1-Jan
1-Feb
3-Mar
3-Apr
4-May
4-Jun
5-Jul
5-Aug
5-Sep
6-Oct
6-Nov
7-Dec

Figure XVI-2



Number of Steelhead Smolts Rescued
Carmel River Basin: 1989-2018
(Total Number Rescued = 9,774)
Number of Smolts
YEAR
River (rescues and trap)
Lagoon
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
175
150
658
381
208
576
3,340
1,922
2
747
29
33
67
264
102
1,080
58

Figure XVI-3

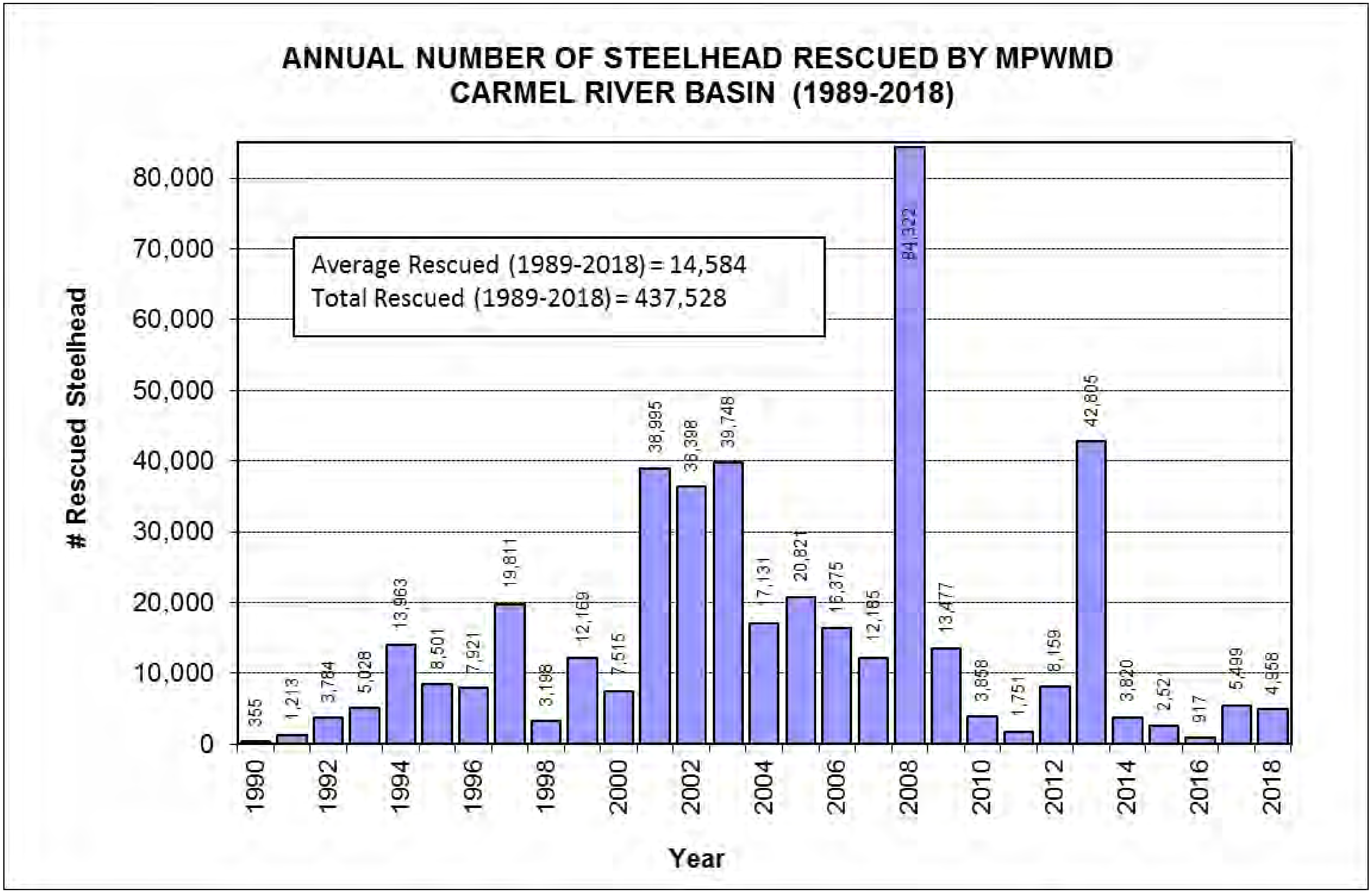

ANNUAL NUMBER OF STEELHEAD RESCUED BY MPWMD
CARMEL RIVER BASIN (1989-2018)
Average Rescued (1989-2018) = 14,584
Total Rescued (1989-2018) = 437,528
Rescued Steelhead
Year
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
355
1,213
3,784
5,028
13,963
8,501
7,921
19,811
3,198
12,169
7,515
38,995
36,398
39,748
17,131
20,821
16,375
12,185
84,322
13,477
3,858
1,751
8,159
42,805
3,820
2,52
917
5,499
4,958

Figure XVI-4

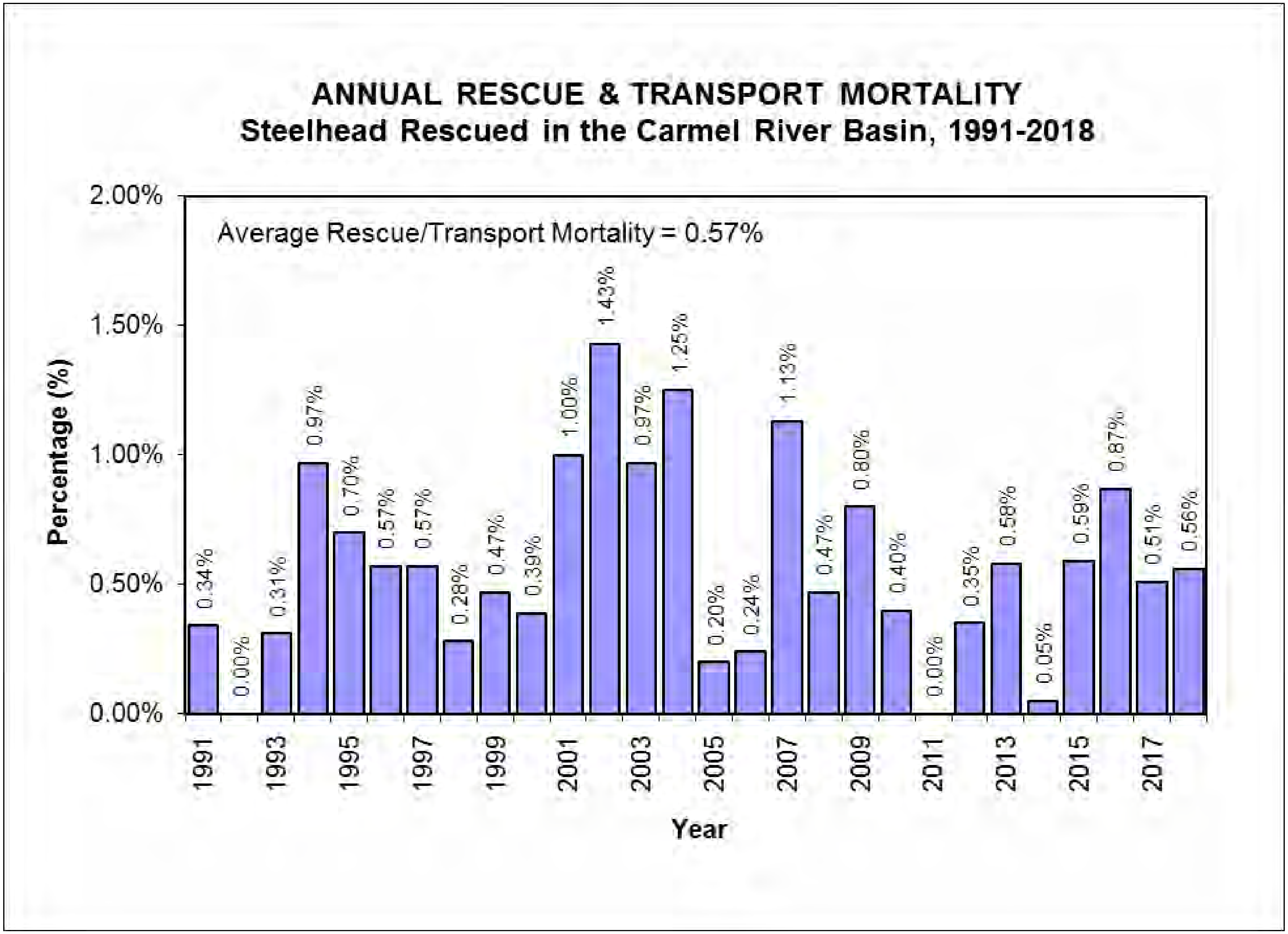

ANNUAL RESCUE & TRANSPORT MORTALITY
Steelhead Rescued in the Carmel River Basin, 1991-2018
Average Rescue/Transport Mortality = 0.57%
Percentage (%)
2.00%
1.50%
1.00%
0.50%
0.00%
0.34%
0.00%
0.31%
0.97%
0.70%
0.57%
0.57%
0.28%
0.47%
0.39%
1.00%
1.43%
0.97%
1.25%
0.20%
0.24%
1.13%
0.47%
0.80%
0.40%
0.00%
0.35%
0.58%
0.05%
0.59%
0.87%
0.51%
0.56%
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
Year

Figure XVI-5

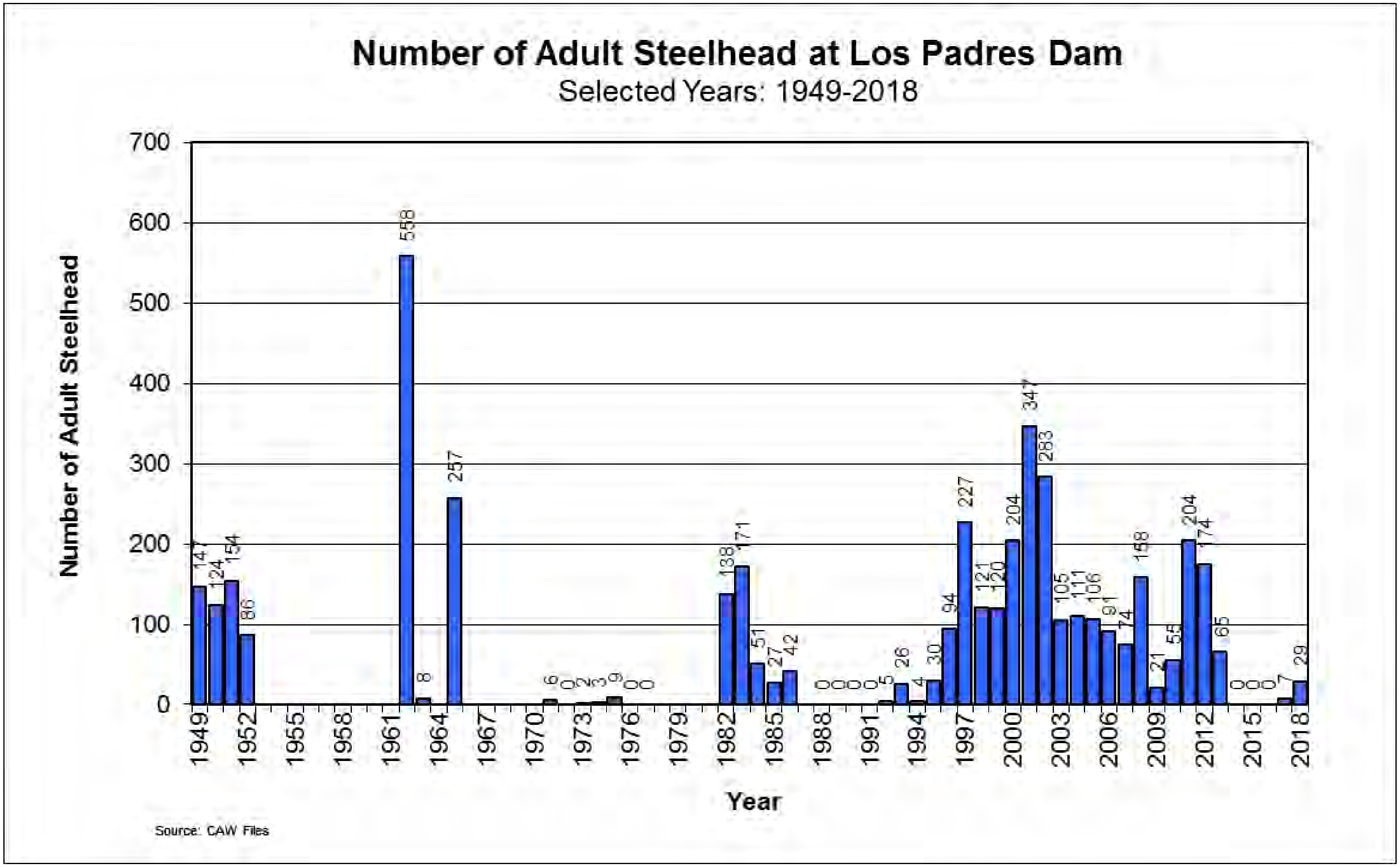

Number of Adult Steelhead at Los Padres Dam
Selected Years: 1949-2018
Number of Adult Steelhead
700
600
500
400
300
200
100
0
147
124
154
86
558
8
257
6
0
2
3
9
0
0
138
171
51
27
42
0
0
0
0
5
26
4
30
94
227
121
120
204
347
283
105
111
106
91
74
158
21
55
204
174
65
0
0
0
7
29
1949
1952
1955
1958
1961
1964
1967
1970
1973
1976
1979
1982
1985
1988
1991
1994
1997
2000
2003
2006
2009
2012
2015
2018
Year
Source: CAW Files

Figure XVI-6

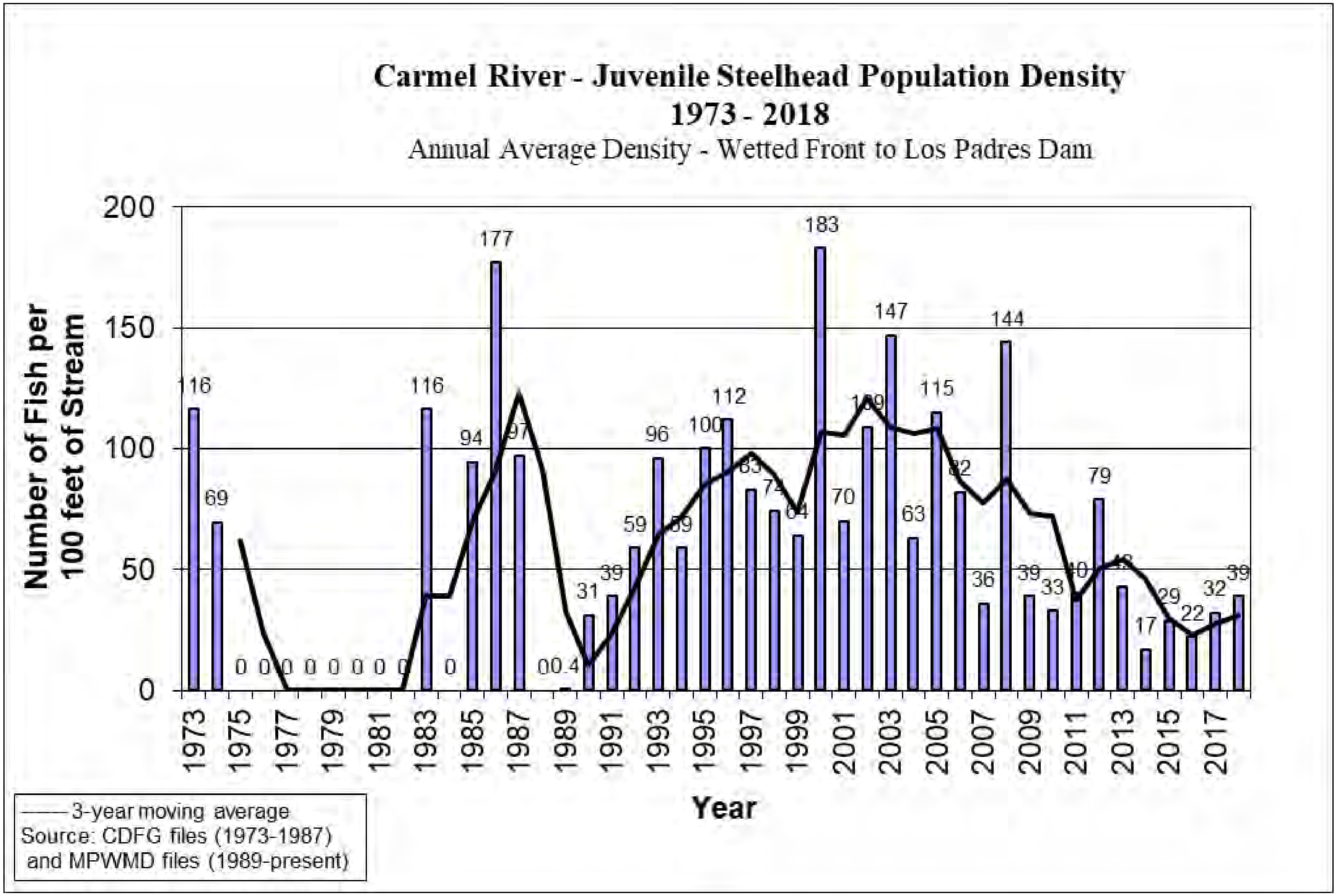

Carmel River - Juvenile Steelhead Population Density
1973 - 2018
Annual Average Density - Wetted Front to Los Padres Dam
Number of Fish per 100 feet of Stream
200
150
100
50
0
Year
3-year moving average
Source: CDFG files (1973-1987)
and MPWMD files (1989-present)

Figure XVI-7

Index of Biotic Integrity scores for Carmel River in 2014 through 2018 at sites where samples were collected using the reach-wide benthic procedure. Scores range from 0 (poor) to 100 (very good). Site mean values incorporate historic data from years 2000 to 2010.
CRLP – Above LPR; CRCA – Cachagua (below LPD); CRSH – Sleepy Hollow; CRSP –Stonepine, CRRR – Red Rock; CRVG – Valley Greens, CRCR – Cross Roads.

Table XVI-1a

Number of Steelhead Rescued in the Carmel River Watershed by Age Group and General Location, Rescue Yeas 2018.

Age Group	MPWMD 2018 Mainstem	MPWMD 2018 Tributaries
YOY	1,396	1,855
1+	1,383	295
Smolts	0	0
Kelt	1	0
Mortality	14	14
Totals	**2,794**	**2,164**

Table XVI-1b

Transplant Locations of (non-smolt) Steelhead Rescued in the Carmel River Watershed, Rescue Year 2018.

Rescue location	Release Location	RiverMile	Number Released
Mainstem Carmel River	Lower Garland Park	10.4	112
Mainstem Carmel River	Don Juan Bridge	10.8	22
Mainstem Carmel River	Mid Garland Park	11.1	490
Mainstem Carmel River	upper Garland Park	11.6	440
Mainstem Carmel River	W. Garzas Well	12.1	605
Mainstem Carmel River	Rosie Bridge	14.5	312
Mainstem Carmel River	Hitchcock Crk Confluence	14.6	799
Potrero Creek	Mid Garland Park	11.1	212
Robinson Canyon Creek	Don Juan Bridge	10.8	8
Garzas Creek	W. Garzas Well	12.1	353
Hitchcock Creek	Hitchcock Crk Confluence	14.6	0
Cachagua Creek	Cachagua Community Center	23	1577

NOTE: River miles are approximate.

Table XVI-2

Carmel River Juvenile Steelhead Annual Population Survey [1]

Lineal Population Density at Survey Stations (numbers per foot of stream) [2, 3]

	Valley Greens Br.	Red Rock (Mid Valley)	Scarlett Narrows	Garland Park	Boronda	DeDamp Park	Stonepine Resort	Sleepy Hollow	SCR Lower Delta	SCR Upper Delta	Los Compadres	Cachagua	**Overall Annual Average**	
YEAR	RM 4.8	RM 7.7	RM 8.7	RM 10.8	RM 12.7	RM 13.7	RM 15.8	RM 17.5	RM 19.0	RM 19.6	RM 20.7	RM 24.7	**(nos./ft)**	**(nos./mi)**
1990					ND		0.50	0.27			0.26	0.22	**0.31**	**1,650**
1991					0.12		0.74	0.39			0.09	0.62	**0.39**	**2,070**
1992				0.67	0.36		0.96	0.30			0.40	0.83	**0.59**	**3,098**
1993			0.62	0.91	0.92	0.82	0.84	0.52			1.22	1.84	**0.96**	**5,075**
1994		ND	0.44	0.23	0.43	ND	0.50	0.29			1.51	0.71	**0.59**	**3,100**
1995		0.49	0.65	1.01	1.61	ND	1.42	0.69			0.50	1.63	**1.00**	**5,281**
1996		0.24	1.52	0.82	1.05	**2.03**	1.22	0.29			0.95	1.92	**1.12**	**5,890**
1997		0.02	0.22	1.02	1.74	1.15	0.50	0.22			1.15	1.41	**0.83**	**4,359**
1998		0.19	0.30	0.67	0.34	1.50	0.27	0.60			0.54	**2.24**	**0.74**	**3,901**
1999		0.17	0.26	0.50	0.32	0.62	1.67	0.45			0.46	1.35	**0.64**	**3,403**
2000		0.91	1.03	0.64	1.38	**5.66**	1.71	1.46			1.41	**2.30**	**1.83**	**9,680**
2001		ND	0.48	0.35	0.63	0.68	1.08	0.32			0.47	1.62	**0.70**	**3,716**
2002		ND	0.68	0.85	1.67	0.83	1.07	0.50	0.33	0.68	1.52	**2.73**	**1.09**	**5,734**
2003		1.53	0.82	**2.16**	1.86	1.45	1.55	1.23	0.58	1.09	1.69	**2.16**	**1.47**	**7,738**
2004		0.25	0.46	0.78	1.21	0.43	1.24	0.55	0.21	0.41	0.45	0.89	**0.63**	**3,302**
2005		1.23	0.60	1.34	1.16	0.91	1.62	1.63	0.21	0.85	0.98	**2.10**	**1.15**	**6,062**
2006		1.13	0.64	0.86	0.87	0.47	0.37	0.95	1.65	0.28	0.82	1.00	**0.82**	**4,339**
2007		ND	0.15	0.50	0.77	0.06	0.33	0.16	0.36	0.25	0.49	0.50	**0.36**	**1,885**
2008		ND	0.90	**2.61**	**3.64**	1.11	1.19	1.38	0.17	0.71	1.13	1.56	**1.44**	**7,603**
2009		0.24	ND	0.25	ND	0.27	ND	0.48	ND	ND	ND	0.72	**0.39**	**2,070**
2010	0.19	0.06	ND	0.30	0.38	0.17	0.31	0.32	0.26	0.11	0.60	0.78	**0.33**	**1,737**
2011	0.11	0.17	ND	0.36	ND	ND	ND	1.07	ND	ND	ND	0.27	**0.40**	**2,091**
2012	ND	0.67	0.47	1.01	1.58	0.35	0.59	0.37	**1.31**	0.74	0.82	0.83	**0.79**	**4,195**
2013	ND	ND	0.41	ND	ND	ND	ND	ND	ND	ND	0.40	0.48	**0.43**	**2,270**
2014	ND	ND	0.07	0.14	ND	ND	0.18	0.12	ND	0.24	0.30	0.17	**0.17**	**920**
2015	ND	ND	ND	0.10	ND	ND	0.19	0.30	ND	0.30	0.38	0.46	**0.29**	**1,522**
2016	ND	ND	0.07	0.15	0.14	0.19	0.13	0.24	site removed	0.34	0.40	0.31	**0.22**	**1,156**
2017	0.01	0.07	0.41	0.17	0.36	0.20	0.35	0.25		0.24	0.71	0.74	**0.32**	**1,690**
2018	ND	0.23	0.50	0.46	0.41	0.47	0.36	0.28		0.32	0.44	0.45	**0.39**	**2,070**
Station Ave (#/ft)	**0.10**	**0.48**	**0.53**	**0.73**	**1.00**	**0.97**	**0.80**	**0.56**	**0.56**	**0.47**	**0.74**	**1.13**	**0.70**	**3,711**
Station Ave (#/mile)	**546**	**2,508**	**2,808**	**3,830**	**5,269**	**5,114**	**4,242**	**2,947**	**2,980**	**2,474**	**3,929**	**5,979**		
Overall Station Averages:													**0.67**	**3,552**

[1] Surveys completed in October and results based on repetitive 3-pass removal method using an electrofisher.

[2] RM; indicates miles from rivermouth

[3] ND indicates stream was dry at sampling station or that site was not sampled that year. Blanks = site not added yet. 2009 - huge storm mid-Oct and river got too high to sample. 2013 - much of river dry. SCR under construction.

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XVII. RIPARIAN HABITAT MITIGATION MEASURES

The Findings of Adoption of the 1990 Water Allocation Program Final EIR identified four mitigation measures to reduce impacts to the Carmel River riparian corridor, which includes wildlife that is dependent on streamside habitat (Finding Nos. 389-A through D, and 391). The measures are: (a) conservation and water-distribution management to retain water in the river; (b) prepare and oversee a Riparian Corridor Management Plan; (c) implement the Riparian Corridor Management Program; and (d) expand the existing monitoring program for soil moisture and vegetative stress.

Since 2007, the Monterey Peninsula Water Management District (MPWMD or District) has been the lead agency in developing and implementing the Integrated Regional Water Management Plan (IRWM Plan) for the Monterey Peninsula region. In 2017, the District reached out for assistance with this effort to the Regional Water Management Group. The Big Sur Land Trust agreed to take the lead in updating the IRWM Plan to 2016 standards and will also facilitate a project solicitation. MPWMD continued to maintain the IRWM web site and also facilitated a grant agreement with the Department of Water Resources for Prop 1 funds for Disadvantaged Communities

The IRWM region consists of coastal watershed areas in Carmel Bay and south Monterey Bay between Pt. Lobos on the south and the Fort Ord Dunes State Park on the north – a 38.3-mile stretch of the Pacific coast. The area encompasses the six Monterey Peninsula cities of Carmel-by-the Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, Seaside, and extends into portions of the unincorporated area of Monterey County in the Carmel Highlands, Pebble Beach and the inland areas of Carmel Valley and the Laguna Seca area.

A funds sharing agreement for the Central Coast funding area consisting of coastal watersheds from Santa Cruz County to Santa Barbara County was executed in 2016 that will allow the Monterey Peninsula region to plan for receiving $4.6 million in IRWM grant funding over the next several years. Additional information is contained at the end of this chapter.

A. Conservation and Water Distribution Management to Retain Water in the Carmel River

The purpose of this measure is to reduce pumping impacts on riparian vegetation, particularly in the region of Aquifer Subunit 2 (Scarlett Narrows to Carmel Valley Village). Activities to further this goal during 2017-2018 are summarized above in **Section II** (Hydrologic Monitoring), **Section V** (Annual Low Flow MOA), **Section VI** (Quarterly Budget), and **Section VIII** (Water Efficiency and Conservation).

B. Oversee Riparian Corridor Management Program

Riparian habitat mitigation measures proposed in the Water Allocation Program Final EIR have formed the basis for riparian corridor management activities undertaken since the Board of Directors certified the EIR in November 1990. The Riparian Corridor Management Program (RCMP) integrates the District's many riparian mitigation and management activities into one program. Components of the RCMP include the Carmel River Erosion Protection and Restoration Program; continued irrigation around Cal-Am production wells in the lower Carmel Valley and around existing District restoration projects; in-channel vegetation management; public education; enforcement of District rules and regulations; and monitoring of wildlife, vegetation and soil.

C. Implement Riparian Corridor Management Program

The goal of the Riparian Corridor Management Program is the rehabilitation, restoration, enhancement and preservation of the streamside corridor along the Carmel River. As described below, several major sub-programs are carried out to achieve this goal.

Implementation and Activities During 2017-2018

During FY 2017-2018, MPWMD accomplished the following:

- continued revegetation efforts at exposed banks with little or no vegetation located in Aquifer Subunits 2 and 3 (Via Mallorca Rd. to Esquiline Rd.);
- operated under a Routine Maintenance Agreement with California Department of Fish and Wildlife and a Regional General Permit with the U.S. Army Corps of Engineers for maintenance activities associated with vegetation encroachment and restoration projects;
- made public presentations showing MPWMD-sponsored restoration work since 1984 and presented recent documentation of Carmel River State Beach, lagoon, and Scenic Road concerns;
- diversified restoration projects and experimented with planting techniques that allow trees to mature more quickly and depend less on irrigation;
- continued long-term monitoring of physical and biological processes along the river in order to evaluate the District's river management activities;
- continued the annual inspections of the Carmel River from the upstream end of the lagoon at River Mile (RM) 0.5 to Camp Steffani at RM 15.5 (staff members responsible for vegetation management and erosion prevention annually walk the entire river to observe and record erosion damage, conditions that could cause erosion [e.g., in-channel vegetation or debris], riparian ordinance infractions, presence of deleterious material, and the overall condition of the riparian corridor);
- carried out vegetation management activities at thirteen sites (Highway One Bridge, Rancho Canada Golf Course, Via Mallorca Bridge, Rancho San Carlos Bridge, Valley Greens Bridge, Schulte Bridge, Robinson Canyon Bridge, Randazzo's Bridge, Garland Park, West Garzas, Boronda Bridge, Trail and Saddle, DeDampierre, Esquiline Bridge, and Ward Bridge);

The following sections describe MPWMD's work in more detail.

- **Carmel River Erosion Protection and Restoration**

Lower San Carlos Restoration Project: The two-mile reach between the lower end of the Rancho Cañada golf course and Rancho San Carlos Road Bridge has historically been unstable and has eroded at various locations during high flows in 1969, 1978-1983, 1995, 1998, 2006, 2007, 2011, and 2017. Floodplain development and frequent seasonal Carmel River dewatering are the primary causes of this periodic instability, with continued channel degradation also a factor.

During the spring of 2011, additional erosion of the north streambank occurred immediately downstream of the Rancho San Carlos Road Bridge. MPWMD have subsequently inspected the site annually. High flows in January and February 2017 removed up 50 feet of the left streambank and resulted in the loss of several large cottonwoods and a portion of Santa Barbara sedge, which is used by Native Americans for making basketry. The District retained Balance Hydrologics, Inc. to develop a restoration plan. Construction of a cribwall for approximately 160 lineal feet was carried out on the left bank and some root wads combined with boulders for the right bank took place in the summer of 2018.

<u>Riparian Ordinance Enforcement Action</u>: MPWMD continues to work with private property owners on how to protect the riparian corridor. Typical actions included helping property owners plant native streamside vegetation on their property to prevent erosion.

<u>Monitoring San Clemente Dam Removal and Carmel River Reroute</u>: MPWMD engaged in efforts with state, local, and federal scientists interested in pre- and post-construction monitoring of the Carmel River. This included providing funding to the School of Natural Sciences at California State University Monterey Bay to carry out topographic, sediment, and large wood survey work.

- **Vegetation Restoration --** Various techniques for vegetation installation were employed at District restoration projects in FY 2017-2018. Planting techniques involved either rooted seedlings or cuttings sustained by irrigation, or deeper plantings set to tap summer groundwater without supplemental water applications. The District continued to diversify streambanks by planting with willows, black cottonwoods, and sycamores.

The primary objectives of the District's restoration planting effort are to stabilize eroded stream banks with native vegetation and to enhance habitat values near the stream, on adjacent floodplains, and terrace areas. One of the goals of the habitat enhancement program is to diversify restoration plantings by identifying microhabitat areas and revegetating them with species typical of those riparian habitat sites. District staff provided riparian plants to several private property owners. Rooted seedlings are obtained from cuttings and seeds collected from along the Carmel River and propagated by a local nursery.

- **Irrigation Program --** Established riparian vegetation has proven to be an effective deterrent to stream erosion; the mat-like roots of most riparian species bind together loose channel banks and foliage tends to slow the velocity of high river flows. The District selectively irrigates mature streamside vegetation and newly established restoration plantings in order to maintain a healthy, vigorous riparian corridor both for erosion protection and habitat enhancement.

<u>**Table XVII-1**</u> and <u>**Figure XVII-1**</u> shows water use at various restoration and riparian mitigation sites for calendar year 2018. A total of 11.91 acre-feet (AF) of water were applied in 2018. In calendar year 2017, 8.21 AF were used to irrigate riparian vegetation. The irrigation season

typically begins in April and continues through the end of November.

● **Vegetation Management --** Since Fall 1990, the District has carried out annual vegetation management projects along portions of the Carmel River to reduce potential obstructions to river flow and to reduce the potential for bank erosion. In the past, the District has removed downed trees and vegetation that could deflect high water onto adjacent stream banks, thereby inducing erosion and degrading streamside habitat.

Carmel River Inspection - Annually, staff assesses the lower 15.5 miles from the lagoon to Camp Stephani in order to determine if and where clearing should occur. At sites where debris and/or live vegetation is judged to be a potential hazard, staff balances the goals of conserving aquatic and streamside habitat with reducing the potential for erosion of private and public property and infrastructure. Only woody plant material representing a bank erosion threat is treated by notching or partially cutting through the trunk and large limbs.

During the fall of 2017, fourteen areas with vegetation encroachment, debris piles, and downed trees in the channel bottom were selected for vegetation management:

1. Highway One Bridge Area (encroaching vegetation area approximately 500 ft^2): at River Mile (RM) 1 upstream and downstream of Highway One Bridge willows encroaching into the active channel were trimmed back.

2. Via Mallorca Bridge Area (encroaching vegetation area approximately 200 ft^2): at RM 3.2 upstream and downstream of Via Mallorca Bridge willows encroaching into the active channel were trimmed back.

3. Rancho San Carlos Bridge Area (encroaching vegetation area approximately 200 ft^2): at RM 3.9 upstream and downstream of Rancho San Carlos Bridge willows encroaching into the active channel were trimmed back.

4. Valley Greens Bridge Area (downed trees and encroaching vegetation area approximately 200 ft^2): at RM 4.8 upstream and downstream of Valley Greens Bridge willows encroaching into the active channel were trimmed back and downed trees were cut into several sections.

5. Schulte Bridge Area (downed trees, debris piles, and encroaching vegetation area approximately 100 ft^2): at RM 6.7 upstream and downstream of Schulte Bridge debris piles have been forced up against vegetation. These debris piles were broken up with hand tools and removed from live vegetation. Some trees were trimmed to allow debris to pass through the constriction. In addition, downed trees in the area had their crown branches removed with the trunks being cut in several places and left in place for large wood habitat.

6. Robinson Canyon Bridge Area (downed trees and encroaching vegetation area approximately 100 ft^2): at RM 8.5 downstream of Robinson Canyon Bridge willows encroaching into the active channel were trimmed back with downed trees being cut into sections.

7. **Randazzo's Bridge Area (downed trees and encroaching vegetation area approximately 100 ft^2):** at a private bridge known as Randazzo's Bridge at RM 10.1 tree branches encroaching into the active channel were trimmed back and several downed trees were cut into smaller sections.

8. Garland Park Area (debris pile and downed trees): at RM 11.0 a debris pile was broken up and a tree lodged on Don Juan Bridge was cut into sections.

9. West Garzas Road Area (downed trees and encroaching vegetation area approximately 200 ft^2): at RM 12.1 willows encroaching into the active channel were trimmed back and a downed tree was cut into sections.

10. Boronda Bridge Area (downed tree and encroaching vegetation area approximately 200 ft^2): at RM 12.6 upstream of Boronda Road Bridge downed trees had their trunks cut into sections while the crown was removed and chipped off-site. Some willows were trimmed.

11. Trail and Saddle Club Area (downed tree, debris piles and encroaching vegetation area approximately 200 ft^2): at RM 13.7 willows encroaching into the active channel were trimmed back and some debris piles were broken apart. In addition, a large downed western sycamore had its trunk cut in serval places and was left in place for large wood habitat.

12. DeDampierre Area (downed trees, debris piles, and encroaching vegetation area approximately 200 ft^2): at RM 13.7 twenty one willows growing in the active channel were cut down. Even though these willows will sprout back, because they were cut at their base, the District has mitigated for these particular trees by planting 12 black cottonwoods and 27 red willows downstream of the work area per specifications in the Revegetation Plan (September 20, 2017). The District will provide an Annual Mitigation Report on the plantings by May 1st of each year. In addition, several downed trees in the active channel were reduced in size to allow debris and high flows to pass.

13. Esquiline Bridge Area (downed trees and encroaching vegetation area approximately 200 ft^2): upstream and downstream of Esquiline Bridge at RM 14.5 downed trees were cut into sections so debris can pass during high flows.

14. Ward Bridge Area (downed trees and encroaching vegetation area approximately 200 ft^2): upstream and downstream of Ward's private bridge at RM 15.0; several large downed trees were hung up in a section with a split channel. These trunks were cut in several places to allow debris to pass.

In general, a width of up to 30 feet of open channel is desired. A total of approximately 2,600 square feet of stream cover encompassing approximately 0.06 acres in the channel bottom may have been affected by the vegetation removal. In addition, a total of approximately five debris piles were altered by the management actions.

In addition to erosion hazard reduction, vegetation management objectives include removing trash and inorganic debris from the river channel. During FY 2017-2018, trash such as plastic, paper, cans, bottles and car parts were removed from the channel and disposed by the District.

In general, the health of the riparian corridor along the lower 15.5 miles of the river appeared to be good with continued development of naturally recruited species, such as black cottonwoods, willows, and sycamores, on some of the engineered floodplains as well as natural gravel bars. While most of the stream channel remained clear of major obstructions, District staff documented increases in vegetation encroachment into the channel bottom that will likely require continued monitoring and may require vegetation management activities in the future. District staff believes that continued selective removal of encroaching vegetation will be necessary during the summer of 2019. Without such a program, it is possible that unauthorized vegetation removal by property owners along the river may increase and lead to a decline in the health and stability of the riparian corridor.

- **Public Information and Partnerships**

MPWMD continued its outreach program with presentations to senior environmental science classes from Carmel High School, and graduate students at California State University Monterey Bay and the Water Committee for the Carmel Valley Association. In addition, staff lead lectures for the Pacific Grove Naturalist Program and gave a presentation at the 9th National Summit on Coastal and Estuarine Restoration and Management. Topics included information on the Monterey Peninsula Water Resource System, proposed water supply projects within the region, MPWMD's Environmental Protection Program, the Carmel River steelhead life cycle, specific issues related to the Carmel River watershed.

D. Expand Monitoring Programs for Soil Moisture and Vegetative Stress

This mitigation measure involves implementing a groundwater and vegetation monitoring program to better assess plant water stress and related irrigation needs in the riparian zone. Data from soil-moisture and plant water-stress tests facilitate the identification and location of impacts resulting from the prolonged depression or rapid drawdown of the water table. Soil and plant monitoring also documents the beneficial results of riparian mitigations, and provides a statistical foundation for determining trends in conditions over time.

In calendar year 2018, staff collected bi-monthly canopy ratings of individual trees at four study sites in mid and lower Carmel Valley (Rancho Cañada, San Carlos, Schulte Restoration Project, and the Valley Hills Restoration Project). Canopy ratings are used to determine the amount of defoliation that is occurring in riparian trees due to moisture stress associated with a falling water table. **Figure XVII-2** shows average canopy ratings for both willows and cottonwoods. Results showed that willows and cottonwoods started showing signs of moisture stress in the fall. It should be noted that many trees are irrigated in the vicinity of large production wells to offset impacts associated with water extraction. Monitoring results help District staff determine irrigation requirements for portions of the riparian corridor that are under the influence of groundwater extraction. Photo documentation and measurements of foliage volume occurs in other areas as well, depending on river flow conditions and depth to groundwater.

In addition to vegetation and groundwater monitoring, avian (bird) species diversity monitoring has been carried out annually from 1992 to the summer of 2010 and then on a periodic basis starting in 2015. Data collected by Dr. David Mullen and the BSOL since 1992 compares habitat values at permanent monitoring stations and provides an indication of changing patterns of avian use in District restoration projects. The information collected on avian species diversity has helped document the response of populations to habitat enhancements implemented by the District. Since 1992, the avian monitoring work has shown healthy avian species diversity along river reaches where the District has implemented restoration projects, while diversity-index readings in control sites with established riparian vegetation seem to fluctuate depending on the presence of flow in the river channel, the quality of the habitat, and off site conditions during migration. The most recent avian point counts were conduction in 2018.

OBSERVED TRENDS, CONCLUSIONS AND/OR RECOMMENDATIONS:

With the exception of the Rancho Cañada to Rancho San Carlos Road Bridge reach, the Carmel River streamside corridor has stabilized in nearly all reaches that were affected by a combination of increased groundwater extraction, extreme drought and flood events that occurred during the 1970s, 1980s and 1990s. Prior to the 2016-17 winter high flows, a complex channel had developed in the lower 16 miles of the river with improved steelhead spawning substrate, diverse habitat, and a richer riparian community. Areas with perennial or near perennial flow (upstream of Schulte Bridge) or a high groundwater table, such as downstream of Highway 1, experienced vigorous natural recruitment in the channel bottom, which has helped to stabilize streambanks and diversify aquatic habitat. Areas that continue to be dewatered annually have less significant growth.

In areas with perennial flow, natural recruitment has led to vegetation encroachment that, in some areas, may constrict high flows and threaten bank stability. MPWMD continues to monitor these areas closely and to develop a management strategy to balance protection of native habitat with the need to reduce erosion potential. Environmental review of proposed projects and the process of securing permits is quite complex and requires an exhaustive review of potential impacts.

The Soberanes fire in the summer of 2016 combined with the removal of San Clemente Dam and high flows in the winter of 2016-17 proved to be a combination of events that significantly changed the river downstream of the former dam site. Quantities of silt, sand, and debris that had not been seen in the alluvial reach since high flows in 1998 were carried down from the fire-scarred upper watershed into the active channel. Past similar events during 1978-1983 and 1993-1998 contributed to substantial destabilization of streambanks in the lower 15.5 miles of the river; however, the 2016-17 event comes after significant reductions in annual diversions have been made and after long reaches of the river have been actively restored or passively recovered. Thus streambank instability was limited to the area downstream of Rancho San Carlos Road. Follow-up channel surveys by CSUMB indicate that the increased sediment load during the winter of 2017 were likely due to material being washed out from the Carmel River Reroute at the former San Clemente Dam site.

The recovery of streamside areas subjected to annual dewatering requires monitoring. Plant stress in the late summer and fall is evident in portions of the river that go dry. In these areas, streambanks can exhibit unstable characteristics during high flows, such as sudden bank collapse, because of the lack of healthy vegetation that would ordinarily provide stability. The drought that began with Water Year 2013 (beginning October 2012) and ended in Water Year 2016 is an ongoing concern because of the past history of channel erosion and bank instability after severe droughts in 1976-77 and 1987-1991. Impacts to streamside vegetation can manifest themselves for several years even after the end of a drought.

Based on annual cross-section work by CSUMB, several areas have experienced a filling in of pools with sand. Absent high flows like those that occurred in 2017, it is likely that the sand will be winnowed out and sent downstream over the next several years. When river flows drop in late spring or early summer of 2019, District staff will investigate the overall scour and deposition of the streambed and report on this in next year's mitigation report. Current results still show many of the pools are still filled with sand.

Restoration project areas sponsored by MPWMD since 1984 continue to mature and exhibit more features of relatively undisturbed reaches, such as plant diversity and vigor, complex floodplain topography, and a variety of in-channel features such as large wood, extensive vegetative cover, pools, riffles, and cut banks.

As cited in previous reports, the most significant trends continue to include the following:

- increased encroachment of vegetation into the active channel bottom that can induce debris blockage, bank erosion and increased risks during floods,
- effects to areas with groundwater extraction downstream of Schulte Road,
- channel changes and erosion due to new supply of sediment from upstream associated with high flows, San Clemente Dam removal, and the Soberanes Fire in Water Year 2017,
- healthy avian species diversity, and
- maturing of previous restoration projects.

Carmel River Erosion Protection and Restoration

With the exception of the channel area between the Via Mallorca Road bridge and the Rancho San Carlos Road bridge, streambanks in the main stem appear to be relatively stable during average water years with "frequent flow" storm events (flows with a return magnitude of less than five years). The program begun by MPWMD in 1984 (and later subsumed into the Mitigation Program) to stabilize streambanks appears to be achieving the goals that were initially set out, i.e., to reduce bank erosion during high flow events up to a 10-year return flow, restore vegetation along the streamside, and improve fisheries habitat.

Consistent with previous reports, it is likely that the following trends will continue:

- Local, State and Federal agencies consider the Carmel River watershed to be a high priority area for restoration, as evidenced by the interest in addressing water supply issues, the removal of San Clemente Dam, proposed projects in the lower Carmel River, and continued oversight with the management of threatened species. Stringent avoidance and mitigation requirements will continue to be placed on activities that could have negative impacts on sensitive aquatic species or their habitats.

- ➢ Activities that interrupt or curtail natural stream functions, such as lining streambanks with riprap, have come under increasing scrutiny and now require significant mitigation offsets. Approximately 35% to 40% of the streambanks downstream of Carmel Valley Village have been altered or hardened since the late 1950s. Activities that increase the amount of habitat or restore natural stream functions are more likely to be approved or funded through State and Federal grant programs.
- ➢ Additional work to add instream features (such as large logs for steelhead refuge or backwater channel areas for frogs) can restore and diversify aquatic habitat.
- ➢ Major restoration projects completed between 1987 and 1999 have had extensive and successful work to diversify plantings. However, maintenance of irrigation systems is ongoing and requires extensive work in water years classified as below normal, dry and critically dry.
- ➢ The channel will change due to a new supply of sediment coming from upstream of the old San Clemente Dam and additional sources of sediment associated with the Soberanes Fire of 2016.

In the spring of 2011, the river migrated into the north streambank downstream of the Rancho San Carlos Road Bridge (see **<u>Figure XVII-3</u>**). In the winter of 2017, during a series of high flows, erosion started taking place on the south side of the river. This reach became unstable and the District began construction on a restoration project that stabilized the streambanks in the summer of 2018. It is likely that additional erosion would occur if these streambanks were left alone.

Eventually, without corrective measures to balance the sediment load with the flow of water or to mitigate for the effect of the downcutting, streambanks will begin to collapse and the integrity of bridges and other infrastructure in the active channel of the river may be threatened.

Vegetation Restoration and Irrigation

To the maximum extent possible, MPWMD-sponsored river restoration projects incorporate a functional floodplain that is intended to be inundated in relatively frequent storm events (those expected every 1-2 years). For example, low benches at the Red Rock and All Saints Projects have served as natural recruitment areas and are currently being colonized by black cottonwoods, sycamores and willows. In addition, willow and cottonwood pole plantings in these areas were installed with a backhoe, which allows them to tap into the water table. These techniques have been successful and have reduced the need for supplemental irrigation.

Channel Vegetation Management

Another notable trend relating to the District's vegetation management program was the widening of the channel after floods in 1995 and 1998. With relatively normal years following these floods, the channel has narrowed as vegetation recruits on the channel bottom and gravel bars. Current

Federal regulations such as the Endangered Species Act (ESA) "Section 4(d)" rules promulgated by NOAA Fisheries to protect steelhead significantly restrict vegetation management activities. Because of these restrictions, the District can carry out activities only on the most critical channel restrictions and erosion hazards in the lower 15 miles of the river. In the absence of high winter flows capable of scouring vegetation out of the channel bottom, encroaching vegetation may significantly restrict the channel. As vegetation in the river channel matures in the channel bottom, more conflicts are likely to arise between preserving habitat and reducing the potential for property damage during high flows. MPWMD will continue to balance the need to treat erosion hazards in the river yet maintain features that contribute to aquatic habitat quality.

Permits for Channel Restoration and Vegetation Management

In 2018, MPWMD renewed its long-term permits with the U.S. Army Corps of Engineers and the California Regional Water Quality Control Board for routine maintenance and restoration work. In 2014, the District also renewed a long-term Routine Maintenance Agreement (RMA) with the California Department of Fish and Wildlife to conduct regular maintenance and restoration activities in the Carmel River.

Monitoring Program

Vegetative moisture stress fluctuates depending on the rainfall, proximate stream flow, depth to groundwater, and average daily temperatures, and tends to be much lower in above-normal rainfall years. Typical trends for a single season start with little to no vegetative moisture stress in the spring, when the soil is moist and the river is flowing. As the river begins to dry up in lower Carmel Valley (normally around June) and temperatures begin to increase, an overall increase in vegetative moisture stress occurs. For much of the riparian corridor in the lower seven miles of the Carmel River, this stress has been mitigated by supplemental irrigation, thereby preventing the die off of large areas of riparian habitat. However, many recruiting trees experience high levels of stress or mortality in areas difficult to irrigate. Riparian vegetation exposed to rapid or substantial lowering of groundwater levels (i.e., below the root zones of the plants) will continue to require monitoring and irrigation during the dry season.

With respect to riparian songbird diversity, populations dropped after major floods in 1995 and 1998 because of the loss of streamside habitat. Since 1998, species diversity recovered and now fluctuates depending on habitat conditions. Values from 2018 avian point count surveys indicate that the District's mitigation program is preserving and improving riparian habitat.

Strategies for the future

A comprehensive long-term solution to overall environmental degradation requires a significant increase in dry-season water flows in the lower river, a reversal of the incision process, and reestablishment of a natural meander pattern. Of these, MPWMD has made progress on increasing summer low flows and groundwater levels by aggressively pursuing a water conservation program, implementing the first and second phases of the Seaside Groundwater Basin Aquifer Storage and Recovery Project, and recommending an increase in summer releases from Los Padres Reservoir.

Reversal, or at least a slowing, of channel incision may be possible if the supply of sediment is brought into better balance with the sediment transport forces. Additional sediment from the tributary watersheds between San Clemente Dam and Los Padres Dam will pass into the lower river in the foreseeable future now that San Clemente Dam has been removed. District staff are already seeing signs of additional sediment in the Carmel River below Esquiline Road Bridge associated with high flows in Water Year 2017.

Over the long term, an increase in sediment supply could help reduce streambank instability and erosion threats to public and private infrastructure. However, reestablishing a natural supply of sediment and restoring the natural river meander pattern through the lower 15.5 miles of the Carmel Valley presents significant political, environmental, and fiscal challenges, and is not currently being considered as part of the Mitigation Program.

Integrated Regional Water Management (IRWM) Grant Program

The IRWM program promoted by the California DWR encourages planning and management of water resources on a regional scale and promotes projects that incorporate multiple objectives and strategies. In addition, the IRWM process brings stakeholders together and encourages cooperation among agencies in developing mutually beneficial solutions to resource problems.

MPWMD adopted the 2014 Update to the IRWM Plan for a region encompassing Monterey Peninsula areas within the District boundary, the area in the Carmel River watershed outside of the MPWMD boundary, Carmel Bay and the Southern Monterey Bay. The IRWM Plan combines strategies to improve and manage potable water supply, water conservation, stormwater runoff, floodwaters, wastewater, water recycling, habitat for wildlife, and public recreation.

Funding from the IRWM grant program and other programs requiring an adopted IRWM Plan could provide the incentive to undertake a set of projects that would continue to improve the Carmel River environment and engage a larger number of organizations in helping to develop and implement a comprehensive solution to water resource problems in the planning region. The Monterey Peninsula region is expecting to take advantage of about $4.3 million from Prop 1 IRWM funds over the next several years. In 2018, $252,693 was awarded to the region as a part of the Disadvantaged Community Involvement grant. A grant solicitation package for the first round of implementation projects is expected to be issued in the first half of 2019, and the Monterey Peninsula region will be applying for approximately $2 million in grant funds.

More information about the IRWM Plan and the group of stakeholders in the planning region can be found at the following web site:

http://www.mpirwm.org

Table XVII-1

Monthly Irrigation Water Use During 2018
(Values in Acre-Feet)

Project Site	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Total
DeDampierre	0.000				0.130	0.222	0.212	0.121	0.073	0.112	0.051		**0.921**
Trail and Saddle	0.230	0.255		0.112	0.716	0.764	0.790	0.468	0.450	0.590	0.273	0.207	**4.855**
Begonia	0.062	0.124		0.085	0.354	0.269	0.308	0.360	0.271	0.161	0.017		**2.011**
Reimers		0.137			0.346	0.414	0.434	0.432	0.189	0.103	0.189		**2.244**
Valley Hills							0.049	0.099	0.488	0.636	0.537		**1.809**
Schulte Bridge		0.013			0.002	0.001	0.013	0.004	0.025	0.005	0.004		**0.067**
TOTAL WATER USE IN ACRE-FEET FOR DISTRICT RESTORATION PROJECTS IN 2018 =													**11.908**

Figure XVII-1

Riparian Irrigation Totals

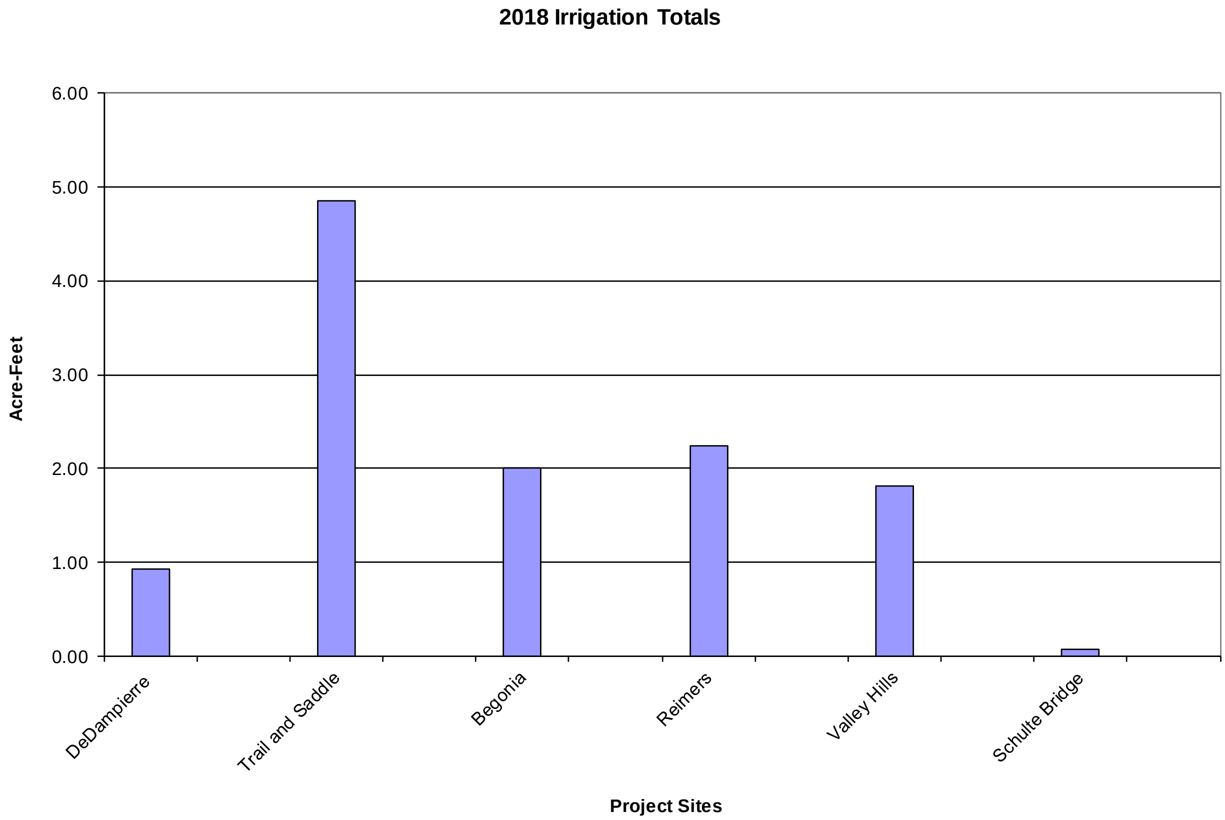
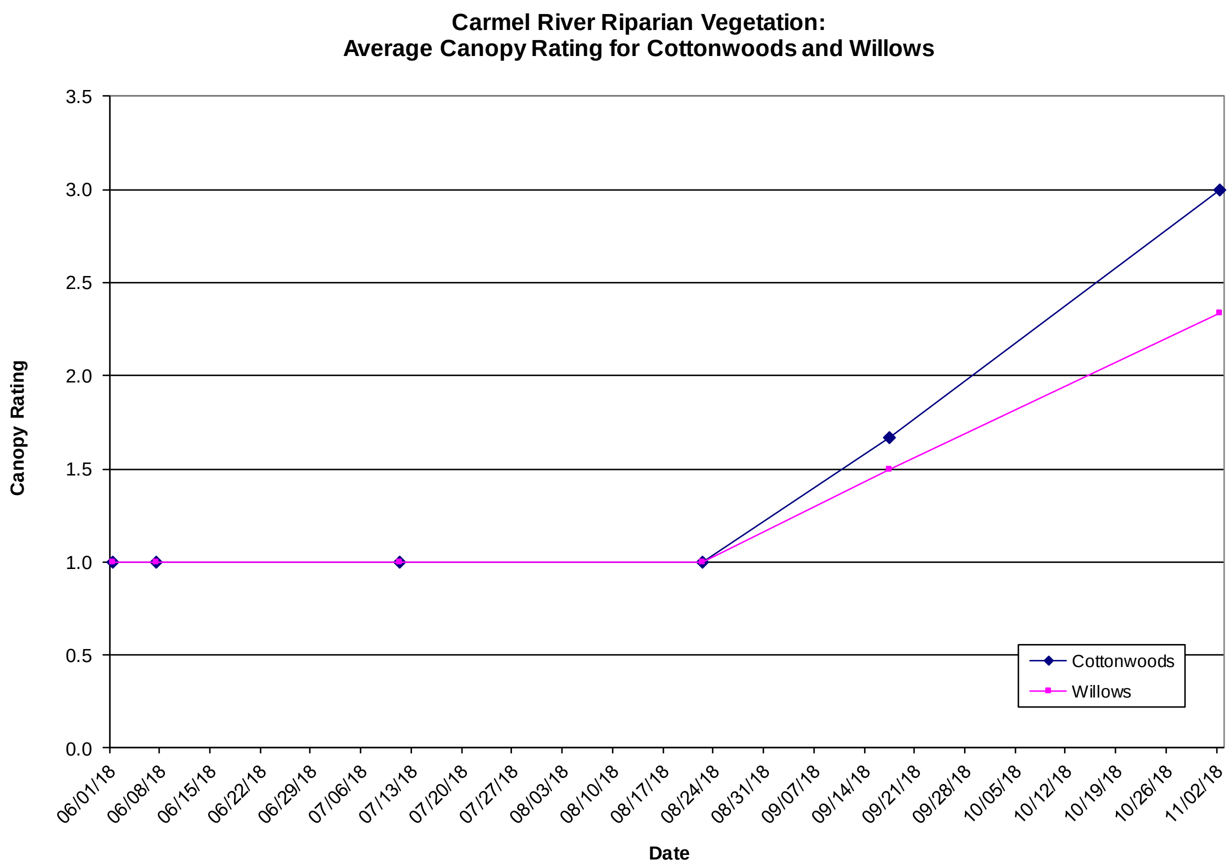


Figure XVII-2

2018 Average Canopy Rating for Cottonwoods and Willows



Canopy Rating Scale		Stress Level
1=	Green, obviously vigorous	none, no irrigation required
2=	Some visible yellowing	low, occasional irrigation required
3=	Leaves mostly yellowing	moderate, regular irrigation required
4=	< 10% Defoliated	moderate, regular irrigation required
5=	Defoliated 10% to 30%	moderate, regular irrigation required
6=	Defoliated 30% to 50%	moderate to high, additional measures required
7=	Defoliated 50% to 70%	high stress, risk of mortality or canopy dieback
8=	Defoliated 70% to 90%	high stress, risk of mortality or canopy dieback
9=	> 90% Defoliated	high stress, risk of mortality or canopy dieback
10=	Dead	consider replanting

Figure XVII-3

Streambank Erosion at Rancho San Carlos Road Bridge, Carmel River

Left Bank Looking Downstream before Bank Stabilization (Spring 2017)

Left Bank Looking Downstream after Bank Stabilization (Fall 2018)

XVIII. LAGOON HABITAT MITIGATION MEASURES

The Findings for Adoption of the Water Allocation Program Final EIR identified three mitigation measures to reduce impacts to the Carmel River Lagoon, including wildlife that is dependent on it (Finding Nos. 390-A through C, and 392). They include: (a) assist with lagoon enhancement plan investigations, (b) expand long-term monitoring program, and (c) identify feasible alternatives to maintain adequate lagoon volume. This section briefly describes the purpose of these three programs and summarizes the mitigation activities from July 1, 2017 through June 30, 2018, referred to as the Reporting Year (RY).

A. Assist with Lagoon Enhancement Plan Investigations

Description and Purpose

The Monterey Peninsula Water Management District (MPWMD or District), Monterey County Water Resources Agency (MCWRA), California Department of Parks and Recreation (CDPR), and the California Coastal Conservancy (Conservancy) co-funded the Carmel River Lagoon Enhancement Plan, which was prepared by Philip Williams & Associates. A key aspect of the Lagoon Enhancement Plan was to identify alternative means to restore and enhance the lagoon environment. District staff participated on a plan review committee, which met on an as-needed basis, and contributed staff expertise for enhancement plan investigations. District staff reviewed and provided comments on the Draft Lagoon Enhancement Plan document. These comments, as well as comments from other reviewing agencies, were incorporated into the Final Plan dated December 1992.

Implementation and Activities during 2017-2018

During this period, the CDPR continued their native riparian plant re-vegetation efforts at a reduced level within the 100-acre portion of the “Odello West” property that is now part of the Carmel River State Beach. The re-vegetation work is ongoing, though the formal monitoring program and its reporting ended after five years in 2009.

District staff monitored receiving water quality and continued to provide expertise to representatives from numerous state, federal and local agencies, as well as members of the public. The lagoon water-quality data for both surface and subsurface profiles are presented in Section III. During many months in the summer and fall, there is usually no natural surface flow to the lagoon, and the lagoon has historically experienced poor water quality and low water levels that could contribute to poor growth or fish mortality. However, there was year round flow in this RY.

For the third RY in a row, no water was pumped from either the CDPR “Cal-Trans” well or the CDPR “Highway 1” well. No water was applied to CDPR riparian restoration areas adjacent to the south arm of the lagoon during this period or the previous two RYs. No water was added into the South arm of the Lagoon during the last three RYs.

During April of RY 2014-2015, the District began to report and graph lagoon levels in both NGVD 1929 and the newer sea level topographic datum, NAVD 1988, that was adopted by the USGS in

1991. Most government agencies are shifting to the use of this newer datum. Lagoon elevation summaries starting last RY will be given in NAVD 1988. The difference between these older and newer sea level datums at this location along the California coast is +2.74 feet.

District staff did not provide any ongoing support to the Carmel River Lagoon Technical Advisory Committee (CRL-TAC) in this RY, regarding Monterey County Resource Management Agency (MC-RMA), Public Works (RMA-PW) management of the sandbar that forms each year between the lagoon and the ocean. The CRL-TAC remains operational in concept, but no further meetings were held during the last seven RYs. Lagoon water levels can fall to less than five feet elevation (NAVD 1988, measured in the south arm) when the beach breaches in the middle. NMFS and CDFW have indicated that an elevation from four to ten feet at NGVD 1929 (equivalent to approximately seven to thirteen feet at NAVD 1988), depending on the time of year and life cycle needs of steelhead, would be an optimal management target to benefit steelhead rearing.

The lagoon was last connected to the ocean on a continuous basis last RY on July 14, 2017, when the lagoon closed on its own. Lagoon elevations remained above the minimum target of 6.74 feet throughout the summer, fall and winter of 2017, until it was breached on January 10, 2018. Wave over-wash events raised lagoon levels very slightly multiple times between September 6, 2017, and October 8, 2017, by less than half a foot each time, followed by an approximately 1.75 foot increase on October 20, 2017. Lagoon elevation climbed from 10.5 to over 12 feet in November, then stayed relatively level in December 2017 and on into early January 2018, until it was breached. A very small initial winter storm on January 8-10, 2018 raised lagoon elevations to 13 feet late on January 8, 2018. RMA-PW took action to manage the lagoon on January 8, 2018 by sculpting an approximately 12,000 square foot outlet channel at 12.75 foot elevation, with a sand plug in the channel at ~13.25 foot elevation. The lagoon began to drain through the outlet channel early on the morning of January 9th, and then flows cut down the outlet channel to ~5.25 foot elevation by the end of the day on January 10, 2018. The lagoon closed on January 12 at ~ 8.75 foot of elevation and continued to rise to ~13.5 feet on January 21, 2019. A second smaller outlet channel of ~4,000 square feet was constructed on January 20, 2019 at an elevation of 12.75 feet, with a sand plug of ~13.55 feet, and the lagoon breached through that channel on January 21, 2019. The lagoon then entered its normal winter pattern of tidally driven cycles of openings and closures, except in February, where it mostly remained closed due to low flows and little rain. During the remainder of RY 2017-2018 until final unaided closure on May 29, 2018, lagoon water elevations varied from approximately 3.0 to as high as approximately 11.5 feet, but usually peaked under 10 feet. The lagoon was open to the sea over 75% of the time on 83 days of the 110-day period, from January 9, through May 29, 2018. Note that the lagoon remained closed at the end of this RY.

The lagoon was closed on 77% of the days in this RY, due to the short and mild winter, followed by an early spring recession that resulted in a Below Normal Water Year Type. While flow past the Highway 1 Gage to the lagoon occurred at greater than 4.0 CFS all through the fall of 2017, it ceased in the following RY on August 16, 2018. The first minimal rains of the year finally opened the lagoon on January 9, 2018 at flows of only 38 cfs at Highway 1 Gage. The rest of January and February were very dry with flows ranging predominantly from 14 – 20 cfs. The first moderate winter storms of the RY occurred in March with three peaks of 307, 169, and 1180 cfs on March 2, 17, and 22, 2018. Flows declined through the next significant storm on April 7, 2018, when they were boosted slightly by a two-day storm on the April 7-8, 2018. River flows steadily declined from there to 2.7 cfs at the end of the RY on June 30, 2018. Thus even though flows during this current RY occurred for a total of 365 consecutive days (100% of the time) past Highway 1 and into the lagoon, 75% of the time they were less than 21 CFS, which is estimated as approximately the critical flow required to keep the lagoon open.

The District continues to seek another participating agency to take over leadership of the CRL-TAC and chair the meetings, but the District will continue to provide the same level of staff support. The CRL-TAC meets as needed concerning management of the Carmel River lagoon and beach. As described above, the CRL-TAC did not meet during the last seven RYs. The District is no longer actively pursuing funding to implement *Final Study Plan for the Long-Term Adaptive Management of the Carmel River State Beach and Lagoon* (April 17, 2007), as no applicable source of funding was secured during the prior three RYs. The District is instead supporting analysis, permitting, and development of the Ecosystem Protective Barrier Project being advocated by the Carmel River Watershed Conservancy (CRWC) and pursued with grant funding acquired by the CRWC and provided to MC-RMA.

During the 2008-2009 RY, CDPR finalized its *Mitigated Negative Declaration for the Carmel River Lagoon Water Elevation Adaptive Management*, and acquired separate State and Federal permits for the closure of the lagoon in the spring to maximize habitat volume. However, due to State budgetary constraints, CDPR is no longer able to implement the permitted actions, and has not for the last eight RYs. CDPR continues to recommend that another agency with appropriate jurisdiction and funding take over the lagoon closure process, and the MC-RMA/RMA-PW have in effect informally done so in some years since 2011.

The MC-RMA is the parent county agency for RMA-PW. MC-RMA is now pursuing separate long-term State and Federal permit applications for lagoon breaching by RMA-PW. This is the seventh RY where MC-RMA and RMA-PW had most or all of the permits necessary for all their actions.

B. Expand Long-Term Monitoring Program

<u>Description and Purpose</u>

Long-term monitoring of the lagoon and its associated plant communities provides data that can be used to evaluate the wetlands' response to groundwater pumping. The purpose of the monitoring is to: (1) determine if changes in hydrology or plant species distribution and coverage are occurring due to the removal of groundwater upstream, and (2) implement additional mitigations if pumping-induced changes to hydrologic characteristics or vegetation are identified. The Mitigation Program calls for extensive studies such as vegetation mapping and soil surveys to occur every five years. In practice, lagoon vegetation has been monitored annually from 1995 through 2005, and nearly every other year thereafter, except 2011 and 2016 when lagoon water levels were too high in summer to do so. This monitoring resumed in 2017. Saturation-paste conductivity of soils in the vicinity of the vegetation-monitoring stations was measured annually from 1995 through 2004. Wildlife surveys have not been conducted since 2015. Bathymetric surveys continue to be conducted each year.

<u>Implementation and Activities during 2017-2018</u>

The District has historically conducted three types of long-term lagoon monitoring activities, only two of which were completed this RY:

- Vegetation Surveys [last completed in 2017]
- Topographic Surveys and hydrology
- Wildlife Surveys [last completed in 2015]

● **Vegetation Monitoring –** The same monitoring stations that were established in 1995 were sampled annually between 1995 and 2005, and then every other year until 2009, as the Allocation EIR only called for this monitoring to occur every two years. In July and August of 2011 the water level in the lagoon were too high to monitor the stations, except for very brief intermittent periods early in July. Therefore, vegetation monitoring did not occur in 2010 or 2011, but resumed in July 2012 and August 2014. In July and August of 2016, water levels were again too high to monitor the stations early in July, and the air quality was so bad the days that the monitoring was scheduled to occur due to the Sobranes wildfire in the Santa Lucia Mountains that staff made a decision to postpone the event till 2017. Vegetation and soil monitoring resumed in July 2017, and was covered in last RY 2016-2017 report, so will not be reiterated here. Any new data will be discussed in the future report for RY 2018-2019.

The report, *Biologic Assessment of the Carmel River Lagoon Wetlands*, prepared for the District by the Habitat Restoration Group in 1995, provides a detailed description of the methodology employed. Ten pairs of quadrats were intentionally located along transects at lower elevations of the wetlands because it is anticipated that changes in the vegetative community would first become apparent in these habitat types. The north side was emphasized because of disturbances on the south side associated with the creation of the Cal-Trans Carmel River Mitigation Bank and subsequent restoration of the former Odello artichoke field.

A more detailed discussion of the results of past vegetation monitoring is presented in the 2005 Mitigation Program Report. Data gathered thus far suggest that factors favoring freshwater species over salt tolerant species may be occurring. Determining whether changes are attributable to water management practices upstream as opposed to the timing of monitoring, beach breaching, variation in hydrologic regimes or global weather dynamics are more complex questions. Review of the available data has not identified significant changes from one monitoring event to the next. Nor have strong relationships between species composition or distribution and water management practices been identified. Staff anticipates continued monitoring of the wetlands every other year in the future to provide evaluation of long-term trends.

● **Topographic Surveys and Hydrologic Monitoring --** During the period covered in this report, District staff surveyed four cross sections to track the movement of sediment in the lagoon, continued to maintain a water-level recorder and support an Automated Local Evaluation in Real Time (ALERT) station at the south arm, and measured groundwater elevations in three wetland piezometers that were installed in May 1996. There is a good correlation between surface-water elevation and water elevation in the piezometers. Staff also continues to track surface discharge into the lagoon at the Highway 1 gaging station, and water production upstream of the lagoon.

- **Wildlife Monitoring –** Birds are often used as indicators of the suitability of an area for wildlife because they tend to be easier to identify and count than other creatures. By tracking the species diversity index at a specific location over time, scientists are able to infer if changes have occurred that may affect the area's dependent wildlife. In the past, District staff contracted with the Ventana Wilderness Society and Big Sur Ornithology Lab (BSOL) to conduct avian point count surveys in the riparian corridor of the Carmel River at sites from Carmel Valley Village to a point just upstream of the lagoon. The District carried out this program from 1992 through 2010 on a regular basis. However, due to budget constraints, the avian point counts are carried out less frequently, with the last two occurring in 2015 and 2018.

Avian monitoring specific to the lagoon was last carried out by the District at sites near the lagoon at the mouth of the Carmel River in the summer of 2004. Sampling in the vicinity of the lagoon was subsequently carried out by the CDPR from 2005-2008, when monitoring ceased due to ongoing budget constraints.

Special Studies During 2017-2018

- **Steelhead Population Monitoring**

MPWMD applied for and acquired ESA Section 7 coverage starting in 2009 to conduct a mark-recapture study as part of its semi-annual renewal of staff Scientific Collecting Permits from CDFW. These have been replaced by the agency's triennial "entity" permit good through 2020. No winter or spring/summer 2017-2018 population censuses were conducted this RY due to high lagoon levels after lagoon closure and throughout the RY, until the lagoon was breached, making it ineffective to seine the lagoon. High lagoon levels and thick shoreline vegetation, all of which are very beneficial to fish and wildlife, are making it difficult to sample the lagoon for steelhead in may RYs.

C. Identify Feasible Alternatives to Maintain Adequate Lagoon Volume

Description and Purpose

The purpose of this mitigation measure is to determine the volume required to keep the lagoon in a stable condition that can adequately support plants and wildlife. It is envisioned that alternative means to achieve and maintain the desired volume will be compared, and the most cost-effective means selected. One alternative that may achieve these goals is the development of a water supply project that can reliably provide more water to the Monterey Peninsula and result in reduced diversions from the Carmel River; however, few other feasible alternatives have materialized in spite of extensive evaluation. MPWMD staff previously estimated that approximately 8 cfs, or about 16 acre feet per day (AFD), can percolate through the barrier beach when the outlet is closed and lagoon water levels are stable at relatively high elevations (8 – 9 feet). This seepage rate was determined utilizing continuous streamflow data from the Carmel River at Highway 1 Bridge gaging station and the 1997 lagoon stage volume relationship over the 1991-2005 period.

However, in May and June 2009, following the manual lagoon mouth closure on May 18, 2009, streamflow and lagoon storage data showed that 12 cfs or 24 AFD percolated through the beach berm and into the surrounding wetlands (based on an updated 2007 lagoon storage table). It is postulated that increased infiltration capacity of the lagoon may be due to a combination of the excavation of an outlet channel to the south, the two South Arm excavations in 2004 and 2007, and that the manual lagoon mouth closure results in a higher water surface elevation than was typical of the 1991-2005 period. A higher water surface elevation likely results in flow through the outlet channel that then percolates into the beach. This volume of water passing through the beach is significant, and is equivalent to about two-thirds of the daily Carmel River diversions historically needed to meet a portion of the municipal demand of the Monterey Peninsula during the summer. No treated water from the CAWD was added to the lagoon in this RY. There were concerns about the effects the recycled CAWD water might have on water quality in the lagoon, which might affect both juvenile steelhead and red-legged frog habitat values, so the action ceased until impact evaluations could be completed. Those studies have been suspended indefinitely (see **Section XVIII-A** above). No water from an existing agricultural well was added to the lagoon in this RY. Determination of desirable lagoon volume will be conducted in conjunction with the monitoring studies noted above and the findings of the Lagoon Enhancement Plan. Development of feasible alternative means to provide adequate volume to sustain healthy lagoon habitat throughout the dry season continues to be sought by the District.

Implementation and Activities During 2017-2018

District staff continued the annual survey of four key lagoon cross sections (**Figure XVIII-1**) to track changes in the volume of sand in the active portion of the lagoon over time. An initial survey of the four cross sections was conducted in January 1988. Subsequent annual surveys have been conducted beginning in September 1994 through the present. Sedimentation in the lagoon is a concern because the Carmel River as a whole has taken on an increased load of sand from Tularcitos Creek and other drainages following the El Niño winter of 1998. Additional sedimentation concerns include the combined effects of the 2015 San Clemente Dam (SCD) removal, 2016 Soberanes Fire, and the extremely wet WY 2017 that moved significant sediment into the Lower Carmel River (LCR). In regards to the El Nino winter 1998, it appears at this time, the majority of the sediment deposited along the Carmel River in 1998 has washed through the Carmel River system and lagoon, and has subsequently reached the ocean. The more recent sedimentation factors described above (beginning with the 2015 SCD removal) so far have resulted in significant sand deposition along the LCR, with no major impact on lagoon sand supply within the cross sections. Existing and future surveys at these four key cross sections provide a quantitative means to evaluate whether or not lagoon volume is changing significantly over time. The dynamic nature of the lagoon substrate is evident in **Figure XVIII-2**, which shows the results of the annual surveys conducted since 1994.

In September 2018, staff completed the annual surveys of cross sections (XS) 1-4. In Water Year 2018, approximately 27,200 acre-feet (AF) of streamflow passed through the lagoon as measured at the District's CR at Highway 1 Bridge (HWY 1) gage, and classified as a "below normal" year. The highest peak streamflow of WY 2018 was 2,570 cfs on March 22, 2018, recorded at the District's HWY 1 gage. Below normal streamflow conditions in WY 2018 resulted in no major changes in lagoon sand supply between September 2017 and September 2018, with the only notable change being moderate sand deposition along the southwest margin of the lagoon (base of bedrock outcrop) at the common left end point of XS1 and XS2 (**Figure XVIII-3**).

Review of the entire cross sectional data set (**Figure XVIII-2**) shows an overall trend of sand loss within the zone of the established cross sections. Left bank (as facing downstream) substrate elevations at XS1 and XS2 appear close to the historic low, with right bank elevations higher than average. The lagoon substrate elevations at XS3 and XS4 reached an historic low elevation in September 2017 with essentially no change in September 2018. The overall sand loss at the cross sections since 1994, particularly XS 4, is consistent with the steady loss of streambed material in the vicinity of Highway 1 Bridge gage (and along reaches for several miles upstream) that has been occurring since 2006, suggesting a limited sand supply in the Lower Carmel River at this time. In addition, it should be noted that at elevation 10-feet (NGVD 1929 datum) the lagoon backwater zone now extends approximately one quarter mile upstream of the Highway 1 Bridge to the eastern margin of the Crossroads Shopping Center as a result of continued down-cutting of the stream channel.

OBSERVED TRENDS, CONCLUSIONS AND/OR RECOMMENDATIONS:

The District continues to support and encourage the ongoing habitat restoration efforts in the wetlands and riparian areas surrounding the Carmel River Lagoon. These efforts are consistent with goals that were identified in the Carmel River Lagoon Enhancement Plan, which was partially funded by the District. The District continues to work with various agencies and landowners to implement ongoing restoration of the Odello West property and future restoration of the Odello East property across the highway. Because of the restoration activities on the south side of the lagoon, the District has concentrated its monitoring efforts on the relatively undisturbed north side. Staff also continue to meet and discuss with other agencies the potential use of an existing CDPR agricultural well.

The District expanded its long-term monitoring around the lagoon in 1995 in an attempt to determine if the reduction in freshwater flows due to groundwater pumping upstream might change the size or ecological character of the wetlands. Demonstrable changes have not been identified. Because of the complexity of the estuarine system, a variety of parameters are monitored, including vegetative cover in transects and quadrats, water conductivity, and hydrology. It is notable that due to the number of factors affecting this system, it would be premature to attribute any observed changes solely to groundwater pumping. During the 24-year period to date, there have been three ***Extremely Wet*** (1995, 1998, and 2017), two ***Wet*** (2005, 2006), five ***Above Normal*** (1996, 1997, 2000, 2010, and 2011), five ***Normal*** (1999, 2001, 2003, 2008 and 2009), three ***Below Normal*** (2004, 2016, and 2018), four ***Dry*** (2002, 2012, 2013, and 2015), and two ***Critically Dry*** (2007 and 2014) Water Year types in terms of total annual runoff. Thus, the hydrology of the watershed has been wetter than average 42% of the time, and at least normal or better 63% of the time during that 24 year period. However, monitoring in 2014 occurred during a Critically Dry Water Year that followed two consecutive Dry Water Years, and 2015 was the first time a fourth year of drought was ever monitored. Other natural factors that affect the wetlands include introduction of salt water into the system as waves overtop the sandbar in autumn and winter, tidal fluctuations, and long-term global climatic change. When the District initiated the long-term lagoon monitoring component of the Mitigation Program, it was with the understanding that it would be necessary to gather data for an extended period in order to draw conclusions about well production drawdown effects on wetland dynamics. It is recommended that the current vegetation, conductivity, topographical and wildlife monitoring be continued in order to provide a robust data set for continued analysis of potential changes around the lagoon. During this RY the District budgeted to replace the CDPR lagoon water-quality profiler that has been out of service for five years, with a stock one from a major vendor. However, since the Carmel Area Wastewater District (CAWD) plans to replace and underground their outlet pipe very soon, we delayed spending significant funds on what would be just a temporary installation at this time. The District intends to re-budget in RY 2020-2021 for the placement of a vertical profiler, once the new CAWD pipe is in place, and then restore continuous data collection during a future RY.

Lagoon bathymetric cross sectional surveys, initially conducted in 1988, have been completed annually during the dry season since 1994. These data are useful in assessing changes in the sand supply within the main body of the lagoon and are necessary to answer questions concerning whether or not the lagoon is filling up with sand, thus losing valuable habitat. As indicated in the survey plots, the sandy bed of the lagoon can vary significantly from year to year. Substrate elevations at the cross sections remained relatively stable during WY 2018 compared to August 2017 conditions, likely related to below normal streamflow conditions. Since 1994, an apparent trend of overall loss in sand volume appears to be emerging, as south bank substrate elevations are close to the historic low. The sand loss or down-cutting observed at the cross sections is consistent with the pervasive down-cutting that has occurred along the thalweg of the Lower Carmel River (LCR) upstream of the Highway 1 Bridge (HWY 1) for several miles, a trend believed to have begun in WY 2006. In the recent “Critically Dry” years of WY 2007 and 2014 and “Dry” years of WY 2012 and 2013, no significant changes were documented compared to the respective prior years. Water Year 2018 classified as “Below Normal”, resulted in no significant changes at the cross sections, thus it is concluded that substrate elevations at the cross sections generally do not change in these low-flow years, despite the regular occurrence of major lagoon mouth breaches in all of these years, except WY 2014. The “Extremely Wet” WY 2017 caused dramatic changes (scour) at the cross sections indicating that quantity of streamflow (peak flow and total volume) is likely the primary factor that controls significant substrate changes at the key cross sections.

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Figure XVIII-1
Map of Monitoring Transects and Stations at Carmel River Lagoon.

Figure XVIII-2
Carmel River Lagoon Cross Sections 1 through 4, based on Annual Surveys 1994-2018

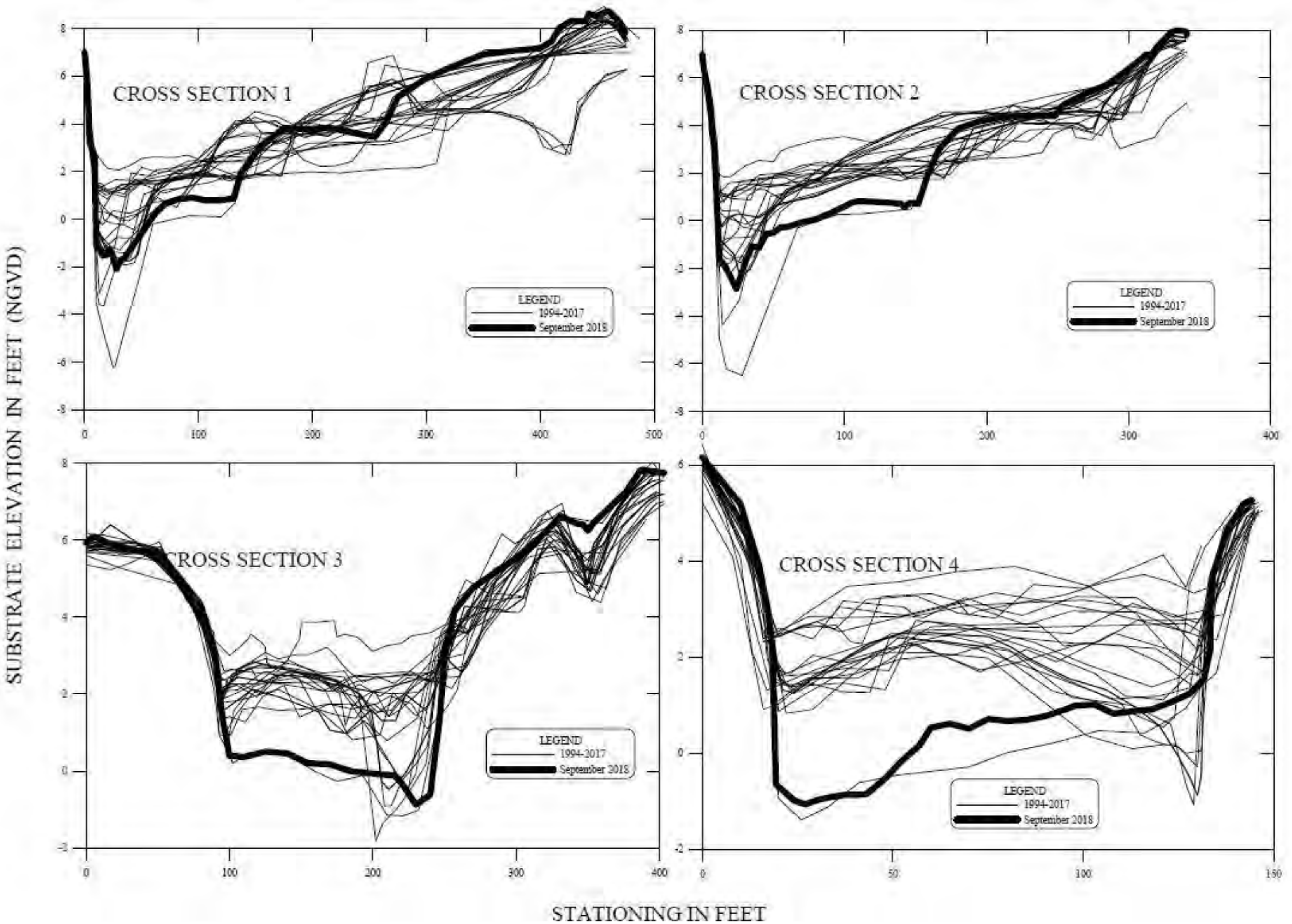
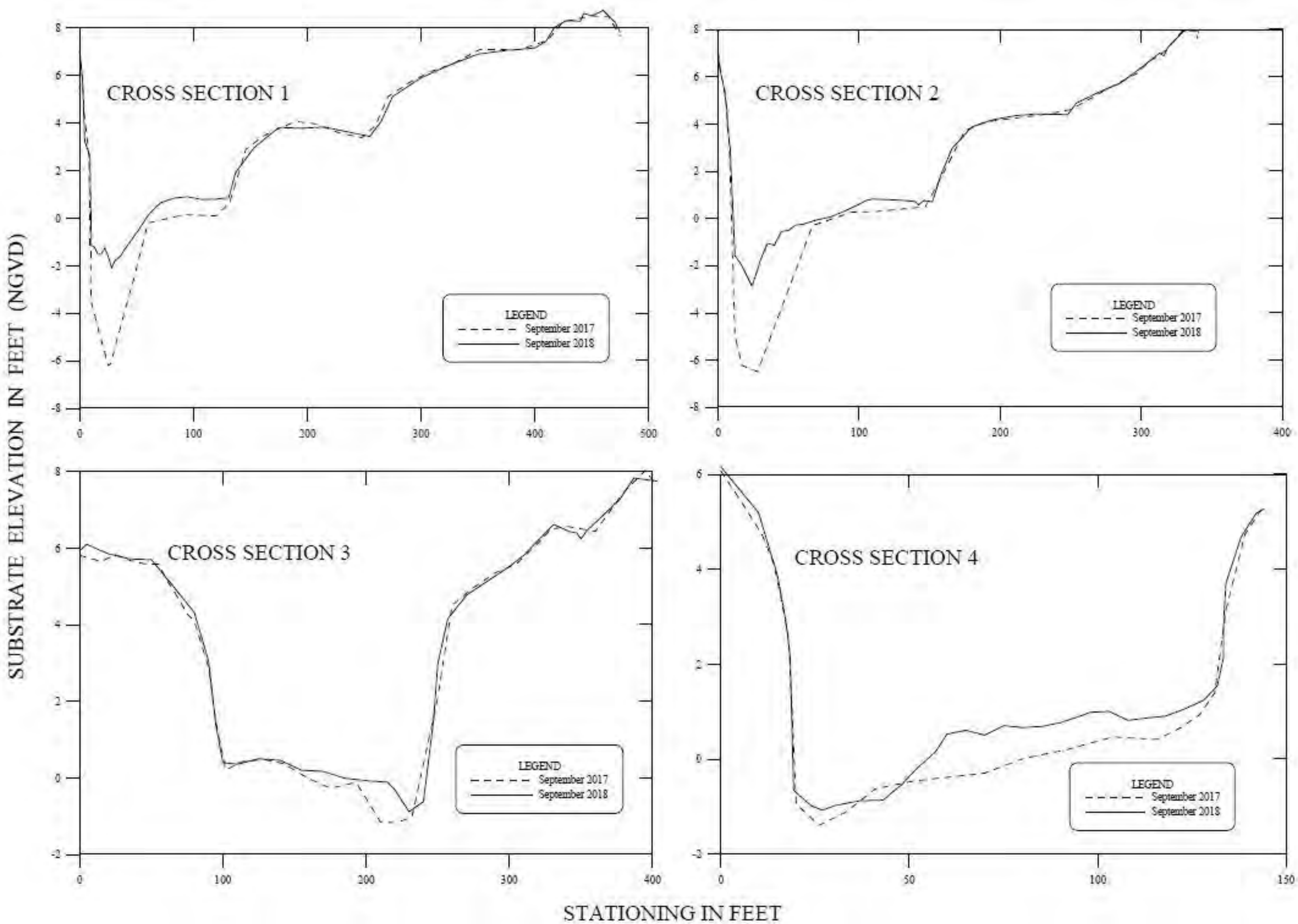


Figure XVIII-3
Carmel River Lagoon Cross Sections 1 through 4, Comparison of 2017 and 2018 Surveys



XIX. AESTHETIC MITIGATION MEASURES

The Findings for Adoption of the Water Allocation Program Final EIR identified one mitigation measure to reduce aesthetic impacts along the Carmel River associated with riparian vegetation – that is, to implement the riparian habitat mitigation measures described above in Finding No. 393. Accordingly, please refer to **Section XVII** for information on riparian mitigation activities during the period from July 2017 through June 2018.

XX. SUMMARY OF COSTS FOR MITIGATION PROGRAM, JULY 1, 2017 THROUGH JUNE 30, 2018

Mitigation Program costs for FY 2017-2018 totaled approximately $2.35 million including direct personnel expenses, operating costs, project expenditures, capital equipment, and fixed asset purchases (**Table XX-1**). The annual cost of mitigation efforts varies because several mitigation measures are weather dependent. Expenditures in FY 2017-2018 were $0.18 million higher than the prior fiscal year due to increases in Mitigation Program costs. However, the overall costs have remained constant (average of $2.30 million per year) for last five years. In the past, expenditures had trended upward due to expenditures for the Aquifer Storage Recovery (ASR) Project. ASR Project costs are no longer captured under Mitigation Program Costs. FY 2015-2016 expenditures were $2.27 million; and FY 2016-2017 expenditures were $2.17 million.

During FY 2017-2018, revenues totaled $3.73 million including user fees, tax revenues, grant receipts, investment income and miscellaneous revenues. The Mitigation Program Fund Balance as of June 30, 2018 was $3.43 million.

Table XX-1

Mitigation Program Cost Breakdown for the Period July 2017 through June 2018

EXPENDITURES	Data Collection	Riparian	Fish	Lagoon	Water Supply	IRGWMP	Admin	Total
Personnel Costs	$200,475	$226,688	$436,599	$84,361	$197,101	$17,378	$277,665	$1,440,266
Operating Expenses	52,171	58,993	113,619	21,954	51,293	4,522	72,259	374,810
Project Expenses	10,091	162,700	279,871	9,032	0	977	0	462,671
Fixed Asset Acquisitions	7,813	21,152	17,015	3,288	7,681	677	10,821	68,446
TOTAL EXPENDITURES	**$270,549**	**$469,533**	**$847,103**	**$118,634**	**$256,075**	**$23,555**	**$360,744**	**$2,346,193**

REVENUES	Total
Permit Fees	$20,810
Mitigation Revenue	0
User Fees	2,972,424
Tax Revenues	549,806
Grant Receipts	135,021
Investment Income	14,049
Miscellaneous	39,027
TOTAL REVENUE	**$3,731,137**
REVENUE OVER EXPENDITURES	**$1,384,944**

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Section XVII. Riparian Habitat Mitigation Measures

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Section XX. Summary of Costs

(Annual Audit Reports on file at District office)

U:\mpwmd\Allocation\Annual Mit. Report RY 2018\RY 2018-Place your files here\XXI References\Sec_XXI_references2018.docx

APPENDIX 2-D

CALIFORNIA AMERICAN WATER COMPANY SERVICE AREA MAP

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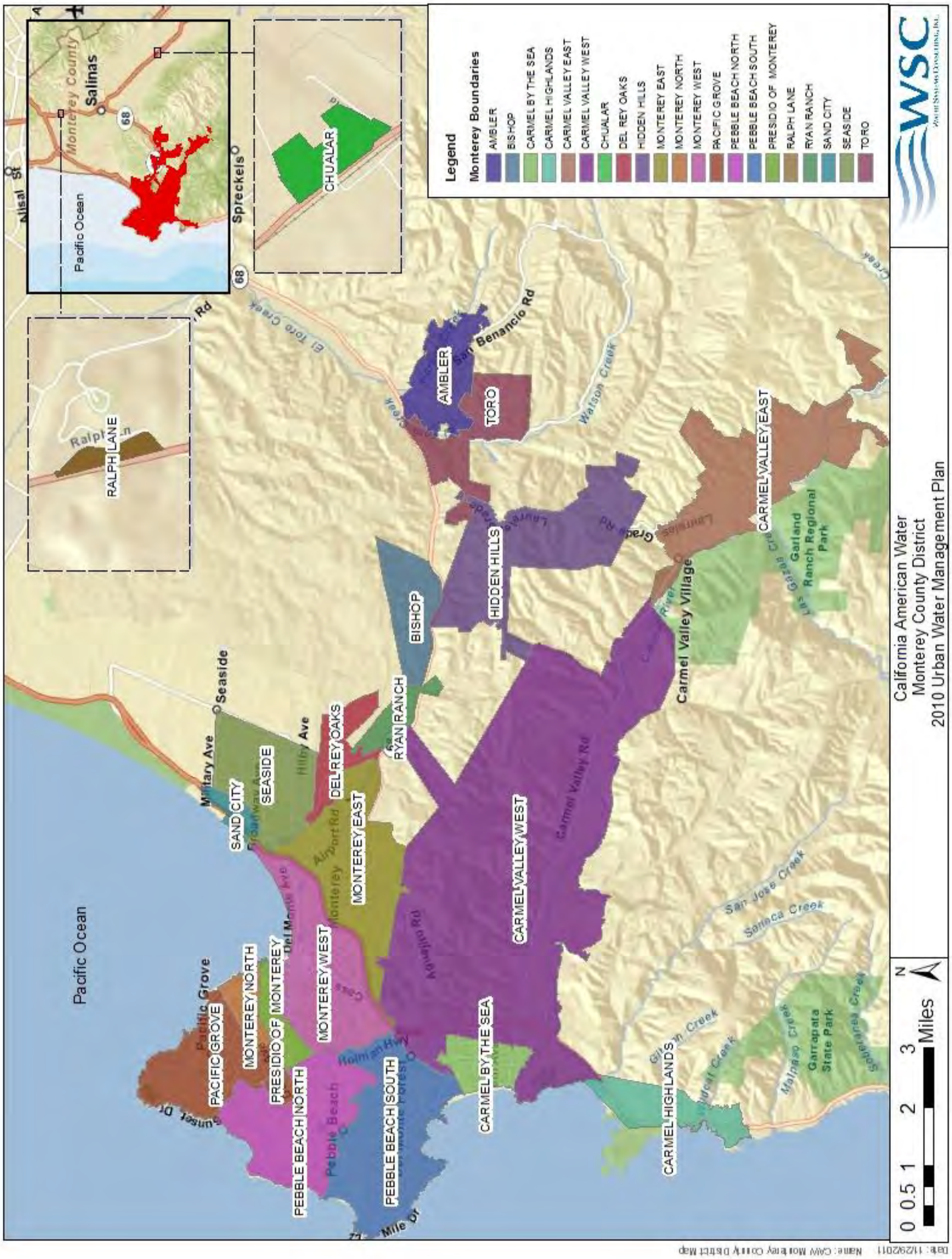

Figure 2-1: Map of California American Water's Central Division - Monterey County District

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APPENDIX 2-E

MONTEREY PENINSULA REGION STORMWATER RESOURCE PLAN

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Prepared for

Monterey One Water
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Monterey, California 93940

FINAL
MONTEREY PENINSULA REGION STORMWATER RESOURCE PLAN

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Project Number: WW2405

July 30, 2019

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LIST OF ACRONYMS AND ABBREVIATIONS

13267 Letter	Water Code Section 13267 Technical Report Order
ac-ft/yr	acre-feet per year
AMBAG	Association of Monterey Bay Area Governments
APN	Assessor Parcel Number
ASBS	Areas of Special Biological Significance
BMPs	best management practices
CalAm	California American Water Company
Caltrans	California Department of Transportation
CASGEM	California Statewide Groundwater Elevation Monitoring
CAWD	Carmel Area Wastewater District
CCC	California Coastal Commission
CCRWQCB	Central Coast Regional Water Quality Control Board
CDO	Cease and Desist Order
CEQA	California Environmental Quality Act
CIP	capital improvement program
CMAC	Continuous Monitoring and Adaptive Control
DACs	Disadvantaged Communities
DD&A	Denise Duffy & Associates, Inc.
DWR	Department of Water Resources
E. coli	Escherichia coli
EIR	Environmental Impact Report
feet msl	feet above mean sea level
ft/yr	feet per year
Geosyntec	Geosyntec Consultants, Inc.
GIS	geographic information systems
HEC-HMS	Hydrologic Modeling System
HSG	hydrologic soil group
HSPF	Hydrological Simulation Program
Impaired Waters Policy	Water Quality Control Policy for Addressing Impaired Waters: Regulatory Structure and Options
IRWM	Integrated Regional Water Management

IRWMP	Integrated Regional Water Management Program
LAFCO	Local Agency Formation Commission
LIDI	Low Impact Development Initiative
MBNMS	Monterey Bay National Marine Sanctuary
Monterey Peninsula	Monterey Peninsula, Carmel Bay, and South Monterey Bay
MPWMD	Monterey Peninsula Water Management District
MRSWMP	Monterey Regional Stormwater Management Program
MS4	Municipal Separate Storm Sewer System
NGOs	nongovernmental organizations
NRCS	Natural Resources Conservation Service
PCBs	polychlorinated biphenyls
PEAIP	Program Effectiveness Assessment and Improvement Plan
Phase II Permit	Phase II Small Municipal Separate Storm Sewer System (MS4) General Permit
Plan	SWRP Stakeholder Outreach, Education, and Engagement Plan
ROW	right-of-way
RWMG	Regional Water Management Group
SBPAT	Structural BMP Prioritization and Analysis Tool
SMCWPPP	San Mateo Countywide Water Pollution Prevention Program
SUSTAIN	System for Urban Stormwater Treatment and Analysis Integration
SWMM	Stormwater Management Model
SWRCB	State Water Resources Control Board
SWRP	Stormwater Resource Plan
TAC	Technical Advisory Committee
TELR	Tool to Estimate Load Reductions
TMDL	Total Maximum Daily Load
ton/ac-yr	ton per acre-year
TR-55	Technical Release 55
TSS	total suspended solids
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
W&WD	Water & Wastes Digest

EXECUTIVE SUMMARY

ES-1. Introduction

Monterey One Water, formerly the Monterey Regional Water Pollution Control Agency (MRWPCA), provides wastewater treatment services to the Monterey Peninsula region and was the lead entity in the development of this Stormwater Resource Plan (SWRP) for the Monterey Peninsula, Carmel Bay, and South Monterey Bay (Monterey Peninsula) Integrated Regional Water Management (IRWM) Planning Area. Monterey One Water has prepared this Monterey Peninsula Region SWRP on behalf of the Monterey Regional Stormwater Management Program (MRSWMP), including the cities of Carmel-by-the-Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, and Seaside, and Monterey County. In addition to the MRSWMP members, the Monterey Peninsula Water Management District is also a cooperating entity for the development of this SWRP. Unincorporated communities of Monterey County in this SWRP include Carmel Valley, Pebble Beach, Carmel Highlands, the Laguna Seca area, and the Ord Community. A Consultant Project Team consisting of Geosyntec Consultants, Inc. (Geosyntec), EOA, Inc. (EOA), and Denise Duffy & Associates, Inc. (DD&A) prepared the SWRP and conducted associated analyses. Preparation of the Monterey Peninsula SWRP was funded by a Proposition 1 Planning Grant and local match funds, including the locally funded Monterey Peninsula Water Recovery Study Report, the results of which are integrated into this SWRP.

Water quantity issues in the Monterey Peninsula region include an impacted water supply due to a Cease and Desist Order (CDO) for diversions from the Carmel River in 2009 (Order WR 2009-0060), amended on July 19, 2016 (Order WR 2016-0016), and adjudication of the Seaside Groundwater Basin by the Superior Court in 2006, which are currently the primary water supply sources in the Planning Area. Surface water quality issues in the Monterey Peninsula region include pollutant loading from urban and rural runoff, contributing to five impaired water bodies and one total maximum daily load (TMDL). The Planning Area is also includes three Areas of Special Biological Significance (ASBS) – the Point Lobos ASBS, which contains the Point Lobos State Marine Reserve; the Carmel Bay ASBS, which borders the City of Carmel and Pebble Beach Golf Course and contains the Carmel Bay State Marine Conservation Area; and the Pacific Grove ASBS, an area adjacent to Pacific Grove near the boundary of the City of Monterey which contains the Pacific Grove State Marine Conservation Area and the Hopkins State Marine Reserve. All three ASBS areas lie within the Monterey Bay National Marine Sanctuary (MBNMS), which was designated in 1992 as a federally-protected marine area.

The purpose of this SWRP is to identify stormwater capture project opportunities that could be utilized as new water supply sources for the Monterey Peninsula and provide additional water quality and environmental benefits.

The purpose of the Monterey Peninsula Water Recovery Study, which was conducted as part of the development of this Monterey Peninsula Region SWRP, was to examine the feasibility of establishing a Peninsula-wide water recovery and reclamation system, including identifying and evaluating potential projects that could capture sources of wet and dry weather runoff within the Monterey Peninsula IRWM Planning Area for water recovery and use.

The water recovery projects were specifically identified based on their potential to reduce the Peninsula's dependence on the Carmel River, Carmel Valley Alluvial Aquifer, and adjudicated Seaside Groundwater Basin. The study considered how to store, treat, and transport potential sources of runoff prior to entering existing water and wastewater infrastructure for use, but did not identify projects that expand existing water distribution and wastewater storage, treatment, and conveyance system capacities, or determine if this will be needed.

ES-2. Coordination

Cooperating entities participating in the Monterey Peninsula Region SWRP include the MRSWMP member agencies, as well as the Monterey Peninsula Water Management District. Additionally, all components of the SWRP were discussed and reviewed by the Monterey Peninsula Region SWRP Technical Advisory Committee (TAC), which included cooperating entities, regulators, and other interested parties.

A comprehensive and wide-reaching Stakeholder Group, consisting of dozens of federal, state, regional, and local agencies; water/wastewater districts and water suppliers; non-governmental organizations and citizen groups; academic and research institutions; and private businesses, was developed to provide input on the SWRP. Multiple opportunities for stakeholder and public participation were provided during SWRP development.

ES-3. Watershed Identification

The USGS and California Department of Water Resources (DWR) watersheds in the Planning Area are briefly described below:

- The Carmel River Basin watershed, the largest watershed within the Planning Area. The watershed is largely located within unincorporated Monterey County lands, and a portion of the city of Carmel-by-the-Sea intersects the watershed. A portion of the Carmel River Basin watershed is underlain by the Carmel Valley Alluvial Aquifer. Water quality priorities within the Carmel River Basin watershed include the sustainment of beneficial uses within the Carmel River, along with addressing water pollutant concerns present in the Clean Water Act Section 303(d) (303[d]) listings for Tularcitos Creek. Additionally, a Fecal Indicator Bacteria TMDL has been adopted for Tularcitos Creek (CCRWQCB, 2011).
- Most of the Canyon Del Rey/Frontal Monterey Bay watershed, the second largest watershed area within the Planning Area, containing almost all the urbanized areas. Most of the watershed is located within the Planning Area. Water quality priorities within the

watershed include addressing water pollutant concerns present in the four 303(d) listed waterbodies within the watershed, along with protection of the MBNMS and the three ASBS that receive drainage from the watershed (Pacific Grove and Carmel Bay). The 303(d) listed waterbodies within the Canyon Del Rey/Frontal Monterey Bay watershed include Monterey Harbor, Pacific Ocean at Stillwater Cove Beach, and Majors Creek.

- A small portion of the Big Sur/Frontal Pacific Ocean watershed, consisting entirely of unincorporated Monterey County land. The portion of the watershed in the Planning Area includes two major creeks that are largely unaffected by development – the ecologically important San Jose Creek, and the smaller Mal Paso Creek.
- A small portion of the El Toro Creek/ Salinas River watershed, entirely within the federally managed Fort Ord National Monument, and land uses consist mostly of open space lands (see Figure 3). The portion of the El Toro Creek/Salinas River watershed that lies within the Planning Area is underlain by the adjudicated Seaside Groundwater Basin.

In 2009, SWRCB issued a Cease-and-Desist Order to CalAm and set January 1, 2016 as a deadline to cease unauthorized diversions from the Carmel River (SWRCB, 2009). The Cease-and-Desist Order was extended in 2016 with a new deadline of January 1, 2022 for compliance (SWRCB, 2016). Currently, over 60% of the potable water (groundwater) used in the Monterey Peninsula region originates from the Carmel Valley Alluvial Aquifer. The Seaside Groundwater Basin (the Basin) underlies an approximately 19- to 24-square-mile area below Sand City, Seaside, Del Rey Oaks, unincorporated Monterey County, and the Fort Ord Community. The action to adjudicate the Seaside Groundwater Basin was filed in 2003 and the Watermaster for the Basin was created in 2006 in response to potential overdraft conditions.

ES-4. Water Quality Compliance

There are several water quality regulatory requirements that some or all the Cooperating Entities must comply with, including the Phase II Small Municipal Separate Storm Sewer System (MS4) General Permit (Phase II Permit) (Order 2013-0001-DWQ)[1], a guidance letter from the CCRWQCB (13267 Letter), Statewide Trash Amendments, and the Tularcitos Creek TMDL. Additionally, the three ASBS in the Planning Area are subject to ASBS Special Protections, and areas that discharge stormwater to the ASBS must develop compliance plans to meet those Protections. Federal development and redevelopment projects taking place on federal lands within the Planning Area are required to reduce stormwater runoff under Section 438 of the Energy Independence and Security Act of 2007.

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[1] http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml. The Phase II Permit requires stormwater agencies to comply with the corresponding TMDL requirements, as specified within the Permit and Attachment G, Region-Specific Requirements for Implementation of TMDLs. However, there are no region-specific requirements affecting the Monterey Peninsula Region.

There have been numerous actions taken in the region to protect water quality. In addition to wastewater control improvements, the cities participating in the MBNMS Water Quality Protection Program have sought to reduce the impacts of urban runoff pollution through a combination of low impact development, stormwater treatment measures (e.g., bioretention and other measures), and source control programs through the implementation of the Sanctuary's Urban Runoff Plan, the prior Model Urban Runoff Program (1996), Monterey Regional Storm Water Pollution Prevention Program (2002), and the MRSWMP (2006 to present).

MRSWMP agencies have also been engaged in the development of TELR and BMP Rapid Assessment Methodology. TELR is intended to be used to prioritize stormwater actions to improve water quality and support water resource objectives, and to track effectiveness of these actions over time.

ES-5. Quantitative Methods for Identification and Prioritization of Stormwater and Dry Weather Projects

All projects identified in the SWRP were evaluated using a metrics-based multi-benefit approach to score projects based on the benefits achieved. The methodology conducted included the following steps:

1. Identify project opportunities – planned and potential project opportunities were identified through three avenues. Planned future projects were provided by SWRP cooperating entities, interested parties, and stakeholders. Additional project opportunity locations were identified and catalogued by the Project Team using a geospatially-based opportunity analysis. Further project opportunities were identified as part of the Monterey Peninsula Water Recovery Study.
2. Screen and classify identified projects – all identified project opportunities were classified by project type, scale, and infiltration feasibility using information provided for planned projects and underlying geospatial characteristics. Project opportunities were then screened for project implementation feasibility and potential performance using geospatial data obtained from the TELR model, publicly available sources, and cooperating entities.
3. Score projects using metrics-based multi-benefit analysis – using the GIS data compiled for each project opportunity as part of Step 2, a quantitative metrics-based multiple benefit evaluation was conducted to score all identified projects.
4. Prioritize and rank projects based on input from cooperating entities, interested parties, stakeholders, and the TAC.
5. Quantification of benefits – the volume of runoff captured was quantified for projects selected for development of concept design.

ES-6. Identification and Prioritization of Projects

The SWRP project identification, analysis, prioritization, and selection process included the following steps:

1. Identify project opportunities and perform a metrics-based evaluation to obtain a preliminary project “score.”
2. Send project opportunities and preliminary scores to project opportunity location organizations to perform project prioritization and rank projects.
3. Send revised master project database with project rankings to Monterey Peninsula Stakeholder Group to obtain feedback.
4. Finalize selection of seven projects for concept designs through the TAC, considering the preliminary project scores, the agency rankings, input from the Monterey Peninsula Stakeholder Group, and other local and institutional knowledge. Select one of the seven projects for preparation of a 30% design and CEQA Checklist.

Using these methods, a total of 84 planned projects were received from 17 entities, 241 Water Recovery Study projects were identified, and 377 parcel-based, 61 regional, and 1,609 right-of-way (ROW) projects were identified through the geospatial analysis in the Planning Area.

Based on Stakeholder Group and TAC input and comments, the primary factor in project selection for concept design was to capture as much usable water as possible to help meet dry weather recycled water demands and augment water supply at other time with prior authorization from Monterey One Water. The seven projects selected for concept design include:

- The Hartnell Gulch Restoration and Runoff Diversion project, a proposed diversion to sanitary sewer and restoration project, is in the City of Monterey. The project is estimated to achieve between 20 to 100 ac-ft/yr of water supply. This project was also developed into a 30% design and a preliminary CEQA checklist was completed.
- The Lake El Estero Diversion to Sanitary Sewer project, in the City of Monterey, would augment water supply via diversion of flows to the sanitary sewer, instead of discharging into Monterey Bay. The project is estimated to achieve over 100 ac-ft/yr of water supply from the approximately 3,670-acre tributary drainage area.
- The Monterey Tunnel stormwater diversion project is in the City of Monterey. The project would divert flows from the downtown Tunnel and Oliver Street storm drain gravity pipe and to the sanitary sewer instead of discharging it into Monterey Bay. The project is estimated to achieve from 10 to 20 ac-ft/yr of water supply from the approximately 150-acre tributary drainage area.

- The Carmel-by-the-Sea Stormwater Diversion project, located in the City of Carmel-by-the-Sea, would divert dry weather runoff and wet weather first flush flows from the inland storm drain network to the sanitary sewer main along San Antonio Avenue for treatment and reuse for golf course irrigation. The project is estimated to achieve between 10 to 20 ac-ft/yr of water supply from its approximately 310-acre tributary drainage area.
- The Pacific Grove-Monterey ASBS Watershed – David Avenue Stormwater Storage and Diversion project in the City of Pacific Grove would store wet and dry weather flows for diversion to the sanitary sewer instead of discharging runoff into Monterey Bay and the Pacific Grove ASBS region. This project is estimated to achieve from 10 to 20 ac-ft/yr of water supply from its approximately 100-acre tributary drainage area.
- The regional Del Monte Manor Park Infiltration Project in the City of Seaside, which would include open space park improvements and flood management to infiltrate runoff from the surrounding ROW. The project is estimated to provide indirect benefits of infiltrating 5 to 10 ac-ft/yr of urban runoff above a potable water supply aquifer from its approximately 25-acre tributary drainage area that contains a DAC.
- The Drywell Aquifer Recharge Program in the City of Seaside, with support from regional partners, would focus on using drywells to recharge urban runoff to a primary water supply aquifer. The project is estimated to achieve between 20 to 100 ac-ft/yr of water supply.

Quantification of project benefits utilized a conceptual-level modeling approach. Both wet and dry weather runoff were considered. Wet weather runoff supply was calculated as a function of catchment hydrology, facility configuration, and drawdown rate using continuous hydrologic simulation with USEPA's Stormwater Management Model (SWMM), and the method included in the Phase II Permit for comparison. Dry weather runoff was estimated for a subset of projects by extrapolating dry weather yield results from previously implemented and evaluated projects.

ES-7. Implementation Strategy and Schedule

It is anticipated that Monterey One Water and MRSWMP will facilitate future SWRP updates and ongoing adaptive management. As part of ongoing management, these regular meetings may include a SWRP meeting agenda item as needed to discuss potential updates to the SWRP and how to prepare and fund the updates.

Funding for implementation of projects included in this SWRP will be obtained by the municipal agency, partnership of agencies, or other stakeholder project sponsors capable of implementing the identified projects. A subset of projects identified in this SWRP were identified for potential implementation by 2040, should projects be found to be feasible through detailed investigation, and project funding be secured. Projects identified in this SWRP may be implemented as funding opportunities become available and funds are awarded or allocated to the project. Sources of project funding may include grants, bond measures, local capital improvement program (CIP) budgets, local revenue streams such as utility rates or fees, and/or other funding mechanisms.

Monterey One Water coordinated with the Monterey Peninsula IRWM Regional Water Management Group (RWMG) on incorporation of this SWRP into the Monterey Peninsula IRWMP. The SWRP was introduced to the RWMG at a meeting on November 1, 2018 and the SWRP was unanimously accepted for inclusion in the IRWMP as an appendix.

ES-8. Education, Outreach, and Public Participation

Stakeholder outreach was built upon the work done by the Monterey Peninsula RWMG to develop the Monterey Peninsula IRWMP. As part of developing the Monterey Peninsula IRWMP, the RWMG identified and contacted 130 stakeholders, representing public agencies, local municipalities and special districts, environmental non-profits, community groups, academic educational institutions, private companies, landowners, and individuals. Stakeholders were informed about the SWRP via multiple emails and invited to attend Stakeholder Group meetings. Stakeholders representing DACs were also mailed postcards with information on the first meeting. Two Stakeholder Group meetings were held to share information and solicit input on the SWRP:

- The first meeting, held on October 17, 2017, introduced the Stakeholder Group to the SWRP planning process, provided information on the metrics and methodology for identifying, assessing, and prioritizing potential projects, presented preliminary findings from the Water Recovery Project Feasibility Study, and provided opportunities for stakeholders to submit project ideas.
- The second meeting, held on February 8, 2018, presented the prioritized list of multi-benefit stormwater capture projects to stakeholders, and requested their feedback on the top ranked projects. Stakeholders were also requested to provide input on project characteristics that should be considered for identifying top projects.

One public meeting was held on June 27, 2018 to present the Public Draft SWRP to stakeholders and the public to obtain their feedback. A bilingual flyer (English and Spanish) advertising the public outreach meeting was developed and distributed via email and community center postings. The bilingual flyer and Public Meeting summary are provided in Appendix H.

Comments received through the public meeting and the public comment period have been addressed in this Final Draft SWRP. A comments matrix with a summary of responses and edits is provided in Appendix H.

1. INTRODUCTION

1.1 Organization of Entities Involved in Plan Development

Monterey One Water, formerly the Monterey Regional Water Pollution Control Agency (MRWPCA), provides wastewater treatment services to the Monterey Peninsula region and was the lead entity in the development of this Stormwater Resource Plan (SWRP) for the Monterey Peninsula, Carmel Bay, and South Monterey Bay (Monterey Peninsula) Integrated Regional Water Management (IRWM) Planning Area (Planning Area). Monterey One Water has prepared this Monterey Peninsula Region SWRP on behalf of the Monterey Regional Stormwater Management Program (MRSWMP), including the cities of Carmel-by-the-Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, and Seaside, and Monterey County. In addition to the MRSWMP members, the Monterey Peninsula Water Management District is also a cooperating entity for the development of this SWRP. Unincorporated communities of Monterey County in this SWRP include Carmel Valley, Pebble Beach, Carmel Highlands, the Laguna Seca area, and the Ord Community. A Consultant Project Team consisting of Geosyntec Consultants, Inc. (Geosyntec), EOA, Inc. (EOA), and Denise Duffy & Associates, Inc. (DD&A) prepared the SWRP and conducted associated analyses.

Preparation of the Monterey Peninsula SWRP was funded by a Proposition 1 Planning Grant and the MRSWMP. The Monterey Peninsula Water Recovery Study Report, the results of which are integrated into this SWRP, was used as a local match for the grant funds, along with the Tool to Estimate Load Reductions (TELR) development project and MRSWMP staff hours. The Monterey Peninsula Water Recovery Study was funded through a Local Water Project Grant from the Monterey Peninsula Water Management District and the City of Monterey's Neighborhood Improvement Program (NIP). The TELR Model was developed through a partnership of the Low Impact Development Initiative (LIDI), the CCRWQCB, and partner Central Coast municipalities, including the MRSWMP agencies.

All components of the SWRP were discussed and reviewed by the Monterey Peninsula Region SWRP Technical Advisory Committee (TAC), which included cooperating entities, regulators, and other interested parties. The TAC is discussed in further detail in Section 2 of this SWRP.

1.2 Regional Water Quality and Quantity Considerations

Water quantity issues in the Monterey Peninsula region include an impacted water supply due to a Cease and Desist Order (CDO) for diversions from the Carmel River in 2009 (Order WR 2009-0060), amended on July 19, 2016 (Order WR 2016-0016), and adjudication of the Seaside Groundwater Basin by the Superior Court in 2006, which are currently the primary water supply sources in the Planning Area. Surface water quality issues in the Monterey Peninsula region include pollutant loading from urban and rural runoff, contributing to five impaired water bodies and one total maximum daily load (TMDL). The Planning Area is also includes three Areas of

Special Biological Significance (ASBS) – the Point Lobos ASBS, which contains the Point Lobos State Marine Reserve; the Carmel Bay ASBS, which borders the City of Carmel and Pebble Beach Golf Course and contains the Carmel Bay State Marine Conservation Area; and the Pacific Grove ASBS, an area adjacent to Pacific Grove near the boundary of the City of Monterey which contains the Pacific Grove State Marine Conservation Area and the Hopkins State Marine Reserve. All three ASBS areas lie within the Monterey Bay National Marine Sanctuary (MBNMS), which was designated in 1992 as a federally-protected marine area. Additionally, coastal and water supply vulnerabilities to climate change impacts are a concern for the Monterey Peninsula region. More information about the issues impacting watersheds in the Planning Area is provided in Section 3 of this SWRP.

1.3 Purpose of Regional SWRP

The purpose of this SWRP is to identify stormwater capture project opportunities that could be utilized as new water supply sources for the Monterey Peninsula and provide additional water quality and environmental benefits. An overview of how project opportunities were identified is provided in Section 5. A summary of the resulting project opportunities is provided in Section 6 and in Appendix E.

The completed SWRP and the project opportunities identified as part of its development will allow the Monterey Peninsula region to be eligible for Proposition 1 implementation grant funding and other state bond-funded grants. Such financial support from state grant funds for stormwater and dry weather capture projects will:

- Help protect beneficial uses of waterbodies in the Monterey Peninsula region, which provide environmental, community, health, and economic benefits;
- Support implementation strategies using multi-benefit projects and treatment of urban runoff as a resource rather than a waste; and
- Assist in the identification of new water supply sources for the Monterey Peninsula.

1.4 Monterey Peninsula Water Recovery Study

The purpose of the Monterey Peninsula Water Recovery Study, which was conducted as part of the development of this Monterey Peninsula Region SWRP, was to examine the feasibility of establishing a Peninsula-wide water recovery and reclamation system, including identifying and evaluating potential projects that could capture sources of wet and dry weather runoff within the Monterey Peninsula IRWM Planning Area for water recovery and use.

The water recovery projects were specifically identified based on their potential to reduce the Peninsula's dependence on the Carmel River, Carmel Valley Alluvial Aquifer, and adjudicated Seaside Groundwater Basin. The study considered how to store, treat, and transport potential sources of runoff prior to entering existing water and wastewater infrastructure for use, but did not identify projects that expand existing water distribution and wastewater storage, treatment, and conveyance system capacities, or determine if this will be needed.

In addition to identifying and evaluating stormwater capture projects that could specifically provide additional water supply to the region, the study also included the development of two project concept designs, along with a 30% design, California Environmental Quality Act (CEQA) checklist, and project implementation plan and schedule for the top project.

All projects identified through the Water Recovery Study were included in the SWRP project list and analyzed using the SWRP metrics-based multi-benefit approach (see Section 5). Selection of the Water Recovery Study projects that were developed into concepts and 30% design were identified using the methods described in Sections 5 and 6. The Water Recovery Study report, which describes the methods and results, is provided as Appendix D.

1.5 Project Concepts and Project Opportunities

As part of the SWRP, seven of the identified project opportunities were selected to be developed into project concept designs (all of which were also identified in the Water Recovery Study). The projects selected for concept development were identified through a multi-step process. Identified projects were preliminarily scored using a metrics-based multi-benefit analyses consistent with the State Water Resources Control Board (SWRCB) SWRP Guidelines (SWRCB, 2015a), as described in Section 5.

Jurisdictions and other public entities owning parcels on which project opportunities were identified were provided the opportunity to rank and prioritize the project opportunities using the preliminary scores along with other locally applicable knowledge. In addition, input on the ranked and prioritized projects was requested from the Stakeholder Groups during a stakeholder meeting held in early February 2018. The preliminary scores and collective input on project opportunities was compiled and presented to the TAC in a meeting held in late February 2018. Using this input, along with local knowledge about water quantity and quality issues, community support, and financing, the TAC selected the seven projects for concept design. The selection process and the seven selected projects are described in Section 6.

1.6 Community Outreach and Coordination

A comprehensive and wide-reaching Stakeholder Group, consisting of dozens of federal, state, regional, and local agencies; water/wastewater districts and water suppliers; non-governmental organizations and citizen groups; academic and research institutions; and private businesses, was developed to provide input on the SWRP. Multiple opportunities for stakeholder and public participation were provided during SWRP development. A summary of outreach to the

Stakeholder Group is provided in Section 8 of this SWRP. The Stakeholder Outreach Plan is provided in Appendix H.

1.7 Report Organization

This report is organized as follows:

- Section 2 provides a summary of the cooperating entities, TAC, and Stakeholder Group, and how each group was involved in the development of the SWRP.
- Section 3 provides an overview of the watersheds present in the Planning Area, along with the water quantity and quality issues associated with each watershed.
- Section 4 provides a discussion of the various water quality regulations present in the Planning Area and strategies for compliance.
- Section 5 summarizes the quantitative methods used to identify, analyze, and prioritize stormwater capture project opportunities.
- Section 6 describes the results of the analyses, including a summary of the identified projects and details regarding selection of the seven projects for development of concept designs.
- Section 7 provides the implementation strategy for the SWRP.
- Section 8 includes a summary of the stakeholder outreach efforts conducted during the development of the SWRP.

In addition, the following appendices are provided as attachments to this plan:

- Appendix A: SWRP Self-Certification Checklist.
- Appendix B: TAC Meeting Summaries.
- Appendix C: Annotated List of Reviewed Data and Reports.
- Appendix D: Monterey Peninsula Water Recovery Study Report.
- Appendix E: Project Database.
- Appendix F: Project Concept Designs.
- Appendix G: Hartnell Gulch Project Concepts and Preliminary CEQA Checklist.
- Appendix H: Summary of Stakeholder Meetings.

2. ORGANIZATION, COORDINATION, AND COLLABORATION

The California Water Code Section requires that local agencies and nongovernmental organizations (NGOs) be consulted in the SWRP development. This section of the SWRP describes the organization and roles of the SWRP developers and the community engagement process that occurred during SWRP development, while Section 7 describes the plan for ongoing collaboration during the SWRP implementation and Section 8 focuses on stakeholder participation during SWRP development.

2.1 Coordination of Cooperating Entities

Cooperating entities participating in the Monterey Peninsula Region SWRP include the MRSWMP member agencies, introduced in Section 1.1, as well as the Monterey Peninsula Water Management District. The cooperating entities provided input and coordination on the SWRP through a sub-committee of MRSWMP members, which met monthly throughout the duration of the project, as well as involvement on the TAC (described in further detail in Section 2.2). In addition to the cooperating entities, several interested parties were involved in the project through participation on the TAC and through the Stakeholder Group (see Section 2.3). A summary of the Monterey Peninsula region cooperating entities and interested parties is provided in Table 1, below. An "x" indicates the entity has signed one of the agreements summarized below or provided a letter of support.

Agreements and/or support letters that demonstrate agency support and inclusion within the Monterey Peninsula Region SWRP include:

- A Joint Exercise of Powers Agreement (JPA) combined public agencies from Monterey County and created Monterey One Water (M1W in Table 1), formerly the Monterey Regional Water Pollution Control Agency (MRWPCA), in 1979.
- In 2002, a regional Memorandum of Agreement (MOA) was signed with other local MS4 agencies to form the MRSWMP. With the onset of the region's first Phase II MS4 Permit, the member agencies began implementing the MRSWMP, which was approved by the Central Coast RWQCB in 2006 for implementation by the MRSWMP members to fulfill municipal permittee obligations locally. The MRSWMP MOA was subsequently updated and renewed by the member agencies in parallel with the second Phase II MS4 Permit timeline.
- A MOA established the Central Coast Regional Areas of Special Biological Significance (ASBS) Dischargers Monitoring Program for all stormwater dischargers to the Carmel Bay ASBS and Pacific Grove ASBS, along with other ASBS outside of the Monterey Peninsula area in 2012. In 2015, this MOA was extended through December 31, 2016.

Table 1: Cooperating Entities and Interested Parties

Entities	Roles and Responsibilities	M1W	MRSWMP	ASBS	Letter of Support
Monterey One Water	Lead Entity	x	x	x	
Monterey Regional Stormwater Management Program	Cooperating Entity		x		
City of Carmel-By-The-Sea	Cooperating Entity		x	x	
City of Del Rey Oaks	Cooperating Entity	x	x		
City of Monterey	Cooperating Entity	x	x	x	
City of Pacific Grove	Cooperating Entity	x	x	x	
City of Sand City	Cooperating Entity	x	x		
City of Seaside	Cooperating Entity	x	x		
County of Monterey	Cooperating Entity	x	x	x	
Monterey Peninsula Water Management District	Cooperating Entity				x
City of Salinas	Interested Party	x			
Fort Ord Military Reservation	Interested Party	x			
California State Parks	Interested Party			x	
Hopkins Marine Station	Interested Party			x	
Monterey Bay Aquarium Foundation	Interested Party			x	
Pebble Beach Company	Interested Party			x	x
California Department of Transportation (Caltrans)	Interested Party			x	
Greater Monterey County Integrated Regional Water Management Program (IRWMP)	Interested Party				x
Central Coast Areas of Special Biological Significance Regional Dischargers Monitoring Program	Interested Party				x
Carmel Area Waste Water District	Interested Party				x
Transportation Agency for Monterey County	Interested Party				x
Big Sur Land Trust	Interested Party				x
Monterey Bay National Marine Sanctuary	Interested Party				x

2.2 TAC Involvement

The TAC provided input on the SWRP through four meetings conducted over the course of the project to date, as well as through review of SWRP state submittals. The TAC was primarily responsible for providing feedback of state submittals prior to delivery by the Project Team, providing input on project identification and metrics-based multi-benefit analyses (see Section 5), selecting the top seven project opportunities developed into concept designs, and selecting the top project, developed into a 30% design. The TAC also provided review of this Administrative Draft SWRP prior to finalizing the public draft.

A summary of the TAC members and roles for the project, including involvement with the MRSWMP Subcommittee, is provided in Table 2, below.

Table 2: TAC Members and Roles

Name	Role(s)	Organization[1]
Scott Ottmar	MRSWMP Subcommittee Member; Technical Reviewer	City of Seaside
Jeff Krebs	MRSWMP Subcommittee Member; Technical Reviewer	City of Monterey
Tom Harty	MRSWMP Subcommittee Member; Technical Reviewer	County of Monterey Resource Management Agency
Jeff Condit	Project Manager; MRSWMP Subcommittee Member; Technical Reviewer	Monterey One Water
Alison Imamura	Technical Reviewer	Monterey One Water
Larry Hampson	Technical Reviewer	Monterey Peninsula Water Management District
Dominic Roques	Technical Reviewer	Regional Water Quality Control Board, Central Coast Region
Sarah Hardgrave	Technical Reviewer	Big Sur Land Trust
Jeffrey Albrecht	Technical Reviewer	State Water Resources Control Board
Elizabeth Payne	Technical Reviewer	State Water Resources Control Board
Jill Bicknell	TAC Facilitator	EOA, Inc. (consultant to Monterey One Water)
Lisa Austin	Project Director	Geosyntec (consultant to Monterey One Water)
Kelly Havens	Technical Task Lead/ Project Manager	Geosyntec (consultant to Monterey One Water)
Lisa Welsh	Assistant Project Manager	Geosyntec (consultant to Monterey One Water)
Denise Duffy	TAC Facilitation, Local Perspective	DD&A (consultant to Monterey One Water)
Rachid Ait-Lasri	Grant Manager	State Water Resources Control Board, Division of Financial Assistance

[1] Individual's organization during the development of the SWRP.

A summary of the TAC meetings and topics of discussion is provided in Table 3, below. TAC meeting summaries are provided as Appendix B.

Table 3: Summary of Monterey Peninsula Region SWRP TAC Meeting Topics

TAC Meeting	Date	Topics Discussed
1/Kickoff	September 12, 2017	Project purpose, background, approach, and schedule. Stormwater Resource Plan Outline. Stormwater Resource Planning Area Description Memorandum. Approach to addressing water quality. Stakeholder Outreach Plan. Approval of TAC member list.
2	November 2, 2017	Stakeholder Meeting #1. Relationship between the SWRP and the IRWMP. Data review and project metrics-based analysis and quantification. Technical Memorandum on Water Recovery Study Methodology.
3	February 22, 2018	Implementation strategy for the SWRP. Water Recovery Study findings. Preliminary SWRP project list and prioritization results. Selection of projects for concept design.
4	April 12, 2018	DRAFT Administrative Draft SWRP. Status of preparation of 10% and 30% concept designs. Plan for the public outreach meeting for presentation of the Public Draft SWRP.
5	August 13, 2018	Public Comments on Public Draft SWRP. Update on 30% Design for Hartnell Gulch. Plan for project completion.

2.3 Stakeholder Involvement

The identified Stakeholder Group was engaged in the SWRP development process through email updates and two stakeholder meetings. The Stakeholder Group includes representatives from city, county, regional, state, and federal government agencies; water and wastewater districts and private water suppliers; research institutions; and non-profit organizations and citizen groups. A full list of the stakeholders is provided in Appendix H. The non-profit organizations working on stormwater and dry weather resource planning and management include the following:

- Big Sur Land Trust
- Carmel River Steelhead Association
- Carmel River Watershed Conservancy
- Carmel Valley Association
- Ecology Action
- Keep Fort Ord Wild
- LandWatch Monterey County
- Monterey Coastkeeper/The Otter Project

- Planning and Conservation League
- Santa Lucia Conservancy
- Save Our Shores
- Sierra Club
- Step Up 2 Green / Sustainability Academy
- Surfrider Foundation
- Sustainable Marina (residents' group)
- The Nature Conservancy
- Trout Unlimited
- Ventana Wilderness Alliance

The first meeting was held on October 17, 2017 and included information on the SWRP purpose, the methods used to identify and preliminarily score the project opportunities using a metrics-based multi-benefit analysis, and next steps for the project. Stakeholder input regarding the development of the SWRP and the project identification and scoring process was documented and considered prior to finalizing the analytical methods used.

The second meeting was held on February 8, 2018 and consisted of an overview of the project identification, analysis, and preliminary scoring results. The prioritized list of multi-benefit stormwater capture projects was presented to stakeholders, and their input on the top ranked projects was requested. Stakeholders were also asked to provide input on project characteristics that should be considered for identifying the projects for concept design. A summary of the stakeholder outreach is provided in Section 8 of this SWRP, and meeting notes and summaries are provided in Appendix H.

Additionally, the Stakeholder Group participated in a public meeting held on June 27, 2018 that focused on the Public Draft SWRP. The public meeting consisted of an overview of (1) the SWRP chapters and the methodology for identifying, evaluating, and prioritizing local and regional stormwater capture projects; (2) the IRWMP and relationship to the SWRP; and (3) the seven project concepts selected by the TAC for conceptual design. After the presentation, attendees were encouraged to walk around the meeting room, view the project concepts displayed on poster boards and ask questions of the project proponents. Stakeholders were also invited to provide written feedback at the meeting and asked to submit additional comments online by July 25, 2018. A summary of the public meeting is provided in Appendix H.

2.4 Coordination with Integrated Regional Water Management Group

The Monterey Peninsula SWRP has been prepared in close collaboration with the Monterey Peninsula IRWM Regional Water Management Group (RWMG). The RWMG includes many of the same agencies that are cooperating entities or interested parties in the development of the SWRP. The Monterey Peninsula IRWM lead is the Monterey Peninsula Water Management District (MPWMD). The SWRP was introduced to the RWMG at a meeting on November 1, 2018 and the SWRP was unanimously accepted for inclusion in the IRWMP as an appendix. Projects proposed in the SWRP will also be vetted through the IRWM project prioritization process and included as part of the IRWM project list (also see Appendix I).

The goals of the 2014 IRWMP were organized into six general categories: water supply, water quality, flood protection and erosion prevention, environmental protection and enhancement, climate change, and regional communication and cooperation (MPWMD and DD&A, 2014). Details related to these goals are provided in Table 4, as updated in 2018 from the 2014 IRWMP (MPWMD and DD&A, 2014; MPWMD, 2019). The 2018 update also resulted in two additional categories from those identified in 2014 (i.e., watershed management and coastal and streamside erosion; erosion had previously been included as part of the flood control category).

Table 4: Monterey Peninsula Regional IRWMP Goals

Water Supply	**Water Quality**
Improve regional water supply reliability through environmentally responsible solutions that promote water and energy conservation. Protect the community from drought and climate change effects with a focus on interagency cooperation and conjunctive use of regional water resources.	Protect and improve water quality for beneficial uses consistent with regional community interests and the RWQCB Basin Plan through planning and implementation in cooperation with local and state agencies and regional stakeholders.
Watershed Management (WM)	**Coastal and Streamside Erosion (CSE)**
Develop watershed scale management strategies, considering climate change effects and maximizing opportunities for comprehensive management of water resources.	Ensure that erosion management strategies are developed and implemented through a collaborative and watershed-wide approach and are designed to consider climate change effects.
Flood Protection (FP)	**Environmental Protection & Enhancement (EV)**
Ensure that flood protection strategies are developed and implemented through a collaborative and watershed-wide approach and are designed to consider climate change effects and maximize opportunities for comprehensive management of water resources.	Preserve the environmental health and well-being of the Region's streams, watersheds, and the ocean by taking advantage of opportunities to assess, restore and enhance these natural resources when developing water supply, water quality, and flood protection strategies. Seek opportunities to conserve water and energy, and adapt to the effects of climate change.

Climate Change (CC)	Regional Communication (RC)
Adapt the region's water management approach to deal with impacts of climate change using science-based approaches, and minimize the regional causal effects related to water resources.	Identify an appropriate forum for regional communication, cooperation, and education. Develop protocols for encouraging integration and reducing inconsistencies in water management strategies between local, regional, State, and Federal entities. Provide balanced access and opportunity for the public, stakeholders, and DACs to participate in IRWM efforts.

A lengthy objective review process, including input from stakeholders, resulted in the identification of IRWMP goals and objectives within each of the identified categories. The IRWMP objectives are provided in Table 5, as updated in 2018 from the 2014 IRWMP (MPWMD and DD&A, 2014; MPWMD, 2019). As of 2018, there are thirty-two (32) total IRWMP objectives identified.

Table 5: IRWM Plan Update Prioritized Regional Objectives

Water Supply (WS)
WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.
WS-2. Maximize use of recycled water and other reuse and where feasible, expand sewer services to areas with onsite systems to increase sources of water for recycling.*
WS-3. Develop opportunities for stormwater capture and reuse pursuant to the Stormwater Resource Plan.
WS-4. Evaluate, advance, or create water conservation throughout the Region.*
WS-5. Improve water supply needs to achieve multiple benefits, beneficial uses and environmental flows. WS-6. Seek long-term sustainable supplies for adopted future demand estimates.
Water Quality (WQ)
WQ-1. Improve inland surface water quality for environmental resources (e.g. steelhead), including headwaters and tributaries of streams, and to protect potable water supplies.*
WQ-2. Improve ocean water quality, including, but not limited to, Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.
WQ-3. Protect and improve water quality in groundwater basins, especially where at risk from seawater intrusion.
Flood Protection (FP)
FP-1. Develop regional projects and plans necessary to protect critical infrastructure and sensitive habitats from flood damage and sea level rise, in particular, along the Carmel Bay and South Monterey Bay shoreline.*
FP-2. Develop approaches for floodplain restoration or adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).
FP-3. Promote floodplain restoration that protect quality and availability of water while preserving or restoring ecologic and stream function.
FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.*
Coastal and Streamside Erosion (CSE)
CSE-1. Manage areas along the shoreline susceptible to erosion, including long-term strategic retreat where appropriate.
CSE-2. Identify opportunities to restore natural stream function, including meandering, in the lower 15 miles of the Carmel River and selected tributaries.
CSE-3. Reduce or prevent adverse downcutting in the main stem Carmel River and its tributaries.

Watershed Management (WM)
WM-1. Reduce human-induced sources of non-point fine sediment runoff.
WM-2. Restore natural fire frequency in headwater forests.
WM-3. Restore the natural hydrologic flow regime in disturbed watersheds where appropriate, including low impact development strategies in urbanized areas.
WM-4. Re-establish a natural level of sediment supply within the Carmel River and its tributaries.
Environmental Protection and Enhancement (EV)
EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds*; including, but not limited to, promoting the steelhead recovery by meeting accepted or approved environmental flows within the regional watersheds. .
EV-2. Assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*
EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.
EV-4. Identify opportunities for open spaces, trails and parks along streams and other recreational areas in the watershed that can be incorporated into projects.*
EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.
EV-6. Promote watershed activities for fire fuel management and adaptive management strategies to protect water quality and water supplies from catastrophic wildfires.*
Climate Change (CC)
CC-1. Implement adaptation measures and mitigation solutions to climate change effects, including increased large storm intensity and/or frequency, sea level rise, drought and wildfire.
CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.
CC-3. Increase energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.
Regional Communication and Cooperation (RC)
RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts.
RC-2. Foster collaboration among regional entities as an alternative to litigation through ongoing meetings of the RWMG and regional data sharing.
RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.
RC-4. Build relationships with State and Federal regulatory agencies and other water forums and agencies.
NOTE: * = Objective is closely aligned with Statewide Priorities.

2.5 Coordination with Regulatory Agencies

Local, regional, and state regulatory agencies have been engaged and actively involved in the development of this Monterey Peninsula Region SWRP. As summarized in Section 2.1, the SWRP cooperating entities include Monterey Peninsula cities, which have regulatory authority over planning and project permitting, along with Monterey One Water and the MPWMD, which locally regulate wastewater and water supply in the region, respectively.

Select cooperating entities were also involved in the project through the MRSWMP subcommittee and the TAC, as described in Sections 2.1 and 2.2. In addition to these cooperating entities, a representative from the Central Coast Regional Water Quality Control Board (CCRWQCB) was a member of the TAC, as well as three representatives from the SWRCB (as summarized in Table 2). These regional and state regulatory agencies had the opportunity to provide input on the SWRP as it was being developed.

Decisions relating to plan implementation that must be made by the involved regulatory agencies include project review and approval. In addition to typical project design review conducted by cities within which projects are located, the CCRWQCB may be involved in facilitating project review and approving required permits, such as 401 certifications. Monitoring and visualization of surface water and/or groundwater is required by the ASBS special protections, is carried out as part of groundwater characterization, and is conducted as part of the MRSWMP monitoring program.

In addition to coordination with local, regional, and state regulatory agencies, this SWRP has been prepared consistent with the SWRP Guidelines (SWRCB, 2015a). A self-certification checklist is provided as Appendix A.

2.6 Relationship to Existing Planning Documents

This SWRP was developed with consideration of numerous existing planning documents. A summary of these existing planning documents is provided in Appendix C. Included in this Annotated List of Plans and Reports are the titles of the applicable plans and reports, the authoring organization, the year the document was finalized, a description of the document, and a matrix indicating the topics covered by the document.

3. WATERSHED IDENTIFICATION

Water Code Sections 10565(c) and 10562(b)(1) require defining the appropriate geographic scale of watersheds for stormwater resource planning. The four United States Geological Survey (USGS) and California Department of Water Resources (DWR) watersheds that are located within the Planning Area have been used as the basis for the Monterey Peninsula Region SWRP. The jurisdictional boundaries within these watersheds were also used to further delineate planning priorities. The USGS and DWR watersheds in the Planning Area include (Figure 1):

- The Carmel River Basin watershed;
- Most of the Canyon Del Rey/Frontal Monterey Bay watershed;
- A small portion of the Big Sur/Frontal Pacific Ocean watershed; and
- A small portion of the El Toro Creek/ Salinas River watershed.

3.1 Watersheds and Subwatersheds Descriptions

The Carmel River Basin is the largest basin in the Planning Area and the Carmel River represents the largest source of potable water for the region. The Carmel River Basin is less developed than the Canyon Del Rey/Frontal Monterey Bay watershed but does have some water quality issues that are discussed as part of this plan. The Carmel River Basin watershed is underlain by the Carmel Valley groundwater basin.

The Canyon Del Rey/Frontal Monterey Bay watershed contains most of the urbanized area within the Planning Area, and thus has different water quality priorities than the Carmel River Basin. The watershed is underlain by the adjudicated Seaside Groundwater Basin, which augments the water supply provided by the Carmel River Basin watershed, but jurisdictions within this watershed constitute many users of water supply from the Carmel River.

The small portion of the Big Sur/Frontal Pacific Ocean watershed within the Planning Area is not as developed as other areas within the region, consisting largely of unincorporated Monterey County lands. The watershed overlies a small portion of the Carmel Valley Alluvial Aquifer. Much of the water quality concerns in the watershed are like those of the Carmel River Basin.

The small portion of the El Toro Creek/Salinas River watershed is located adjacent to urban areas within the Canyon Del Rey/Frontal Monterey Bay watershed. This portion of the watershed is included in the Planning Area as it is largely open space and overlies the Seaside Groundwater Basin. This plan touches on some of the water quality issues within the larger watershed, but largely discusses this watershed in the same context as the Canyon Del Rey/Frontal Monterey Bay watershed.

Figure 1 displays the Planning Area, along with the four USGS watersheds, the jurisdictions, the underlying groundwater basins, state and federal lands, creeks, lakes, rivers, and water distribution, and wastewater facility boundaries. The Planning Area drains to three ASBS: Point Lobos, Carmel Bay, and Pacific Grove. These ASBS are shown in Figure 1; drainage areas to the ASBS are displayed in Figure 2.

The Planning Area is also adjacent to the MBNMS. The MBNMS was designated in 1992 as a federally-protected marine area offshore of California's central coast. Its natural resources include the United States' largest kelp forest, one of North America's largest underwater canyons, and the closest-to-shore deep ocean environment in the continental United States. It is home to one of the most diverse marine ecosystems in the world. Urban stormwater runoff has the potential to impact water quality in the MBNMS, per findings from monitoring and analysis in both the near shore environment and coastal watersheds.

Each of the four watersheds are described in further detail in the following sections.

3.2 Carmel River Basin

The Carmel River Basin comprises the largest area within the Planning Area. The watershed is largely located within unincorporated Monterey County lands, but a portion of the city of Carmel-by-the-Sea is within the Carmel River Basin watershed.

Federal parks in the watershed include the Ventana Wilderness within Los Padres National Forest. Native habitats and natural open space include lands administered by the Bureau of Land Management, along with other open space areas, including several parks and open space administered by the Monterey Regional Park District, the largest of which include the Palo Corona Regional Park and the Garland Ranch Regional Park. These areas are shown in Figure 1.

Land use in the 255-square-mile Carmel River Basin watershed includes wilderness, viticulture, grazing, recreation (golf courses and park areas), and rural residential, suburban, commercial, and light industrial. Very little of the watershed is currently in traditional agricultural use (MPWMD and DD&A, 2014). Open space areas in the Planning Area are shown in Figure 3.

A portion of the Carmel River Basin watershed is underlain by the Carmel Valley Alluvial Aquifer. Currently, over 60% of the potable water (groundwater) used in the Monterey Peninsula region originates from the Carmel Valley Alluvial Aquifer. The Carmel River Basin watershed is also home to 29 fish and wildlife species that are identified federally or by the state of California as "special," "threatened," or "endangered," along with seven plant species (The Carmel River Watershed Conservancy, 2017a; The Carmel River Watershed Conservancy et al., 2017b).

The Carmel River is used as potable water for the region by the California American Water Company (CalAm). CalAm operates the Los Padres Dam and 21 downstream wells which pump water from the Carmel Valley Alluvial Aquifer to the Monterey Peninsula.

The Carmel Valley Alluvial Aquifer is one of only three basins in California in which the SWRCB has determined that groundwater flow is in defined subterranean channels that are under the SWRCB jurisdiction. In 1995, the SWRCB limited the amount of water that can be pumped from under the Carmel River by CalAm, which supplies most of the water on the Monterey Peninsula, and declared the alluvial aquifer to be fully appropriated during the dry season. SWRCB found in Order 95-10[2] that two-thirds of the water CalAm diverted was without authorization or basis of rights and the company was ordered to find replacement supplies. In 2009, SWRCB issued a Cease-and-Desist Order to CalAm and set January 1, 2016 as a deadline to cease unauthorized diversions (SWRCB, 2009). The Cease-and-Desist Order was extended in 2016 with a new deadline of January 1, 2022 for compliance (SWRCB, 2016).

The 2016 Order includes an effective diversion limit of 8,310 acre-feet per year (ac-ft/yr) through December 31, 2021. The 2016 Order indicates that the diversion limit shall be reduced by 1 acre-foot for every acre-foot of Pure Water Monterey Groundwater Replenishment Water delivered. Additionally, there are identified annual milestones in the 2016 Order that, if not met, will result in a reduction of the effective diversion limit of 1,000 ac-ft/yr for each milestone missed.

Table 6 provides a summary of current water rights. While the face value of water rights appears to be sufficient to supply the needs of the Monterey Peninsula, the reality is that a substantial portion of the water rights are subject to meeting instream flow requirements. Because the Carmel River has such a wide range of annual flows, it is not a reliable source to fully meet the community's needs.

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[2] Order 95-102009-0060 (SWRCB, 1995) indicates that CalAm has the following rights: 1) a pre-1914 appropriative right for 1,137 acre-feet per year; 2) approximately 60 acre-feet per year for riparian parcels within the valley through riparian rights; 3) an appropriative right that was reduced from the original licensed amount to divert up to 3,030 acre-feet per year storage to Los Padres Reservoir from October 1 through May 31 through License 11866, though the actual diversion is limited to 2,179 acre-feet per year due to siltation in the reservoir. The Order states that CalAm was diverting about 10,730 acre-feet per year without a valid basis of right (per Order 95-10).

Table 6: Summary of Carmel River Water Rights

Entity	Water Right	Face value (ac-ft/yr)	Yield (ac-ft/yr)	Maximum Diversion Rate (cubic feet per second)
CalAm	Pre-1914	1,137	1,137	1.6
	Riparian	60	60	0.1
	License 11866	3,030	2,179	2.0
	Permit 21330	1,488	400	2.6
Subtotal CalAm		*5,715*	*3,776*	*6.3*
MPWMD	Permit 20808A[1]	2,426	730	6.7
	Permit 20808B	18,764	unknown	42.0
	Permit 20808C[1]	2,900	870	8.0
Subtotal MPWMD		*24,090*	*1,600*	*56.7*
Subtotal CalAm and MPWMD		***29,805***	***5,376***	***63.0***
Other	Table 13[2]	1,256	low	4.3
	Other riparian	2,200	2,200	3.6
Total		**33,261**	**7,576**	**70.9**

Notes:
1. Held jointly by MPWMD and CalAm.
2. Permitted or reserved amounts.

The MPWMD augments, manages, and regulates surface and groundwater resources in the Carmel Valley and the greater Monterey Peninsula. MPWMD's jurisdiction includes the area served by CalAm's Monterey District and CalAm's sources of supply, (the Seaside Groundwater Basin and Carmel Valley Alluvial Aquifer), which MPWMD defines as the Monterey Peninsula Water Resource System. The Monterey Peninsula Water Resource System includes supplies for non-CalAm pumpers in the Seaside Basin and Carmel Valley Alluvial Aquifer, as well. The MPWMD was established by state statute in 1978 to provide integrated management of all water resources for the Monterey Peninsula; among its functions is the allocation of water supply within its boundaries. Monterey Peninsula Water Management District Boundary is shown on Figure 1.

CalAm serves the cities of Carmel-by-the-Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, and some unincorporated Monterey County communities from supplies in the Carmel River Basin and Seaside Groundwater Basin (MPWMD and DD&A, 2014). The Seaside Groundwater Basin is described in the Canyon Del Rey/Frontal Monterey Bay watershed description provided in the following section.

Portions of unincorporated Monterey County within the Carmel River Basin watershed are served by onsite private wells or small water systems. These wells are regulated by DWR, MPWMD, Monterey County, and by the California Coastal Commission (CCC), if serving coastal development. In addition to a well permit issued by DWR, the property owner receives a Use Permit through Monterey County for development of a new well to support planned development, providing that the well yields enough water without significant impacts. For coastal developments, this involves converting a temporary well permit issued by the CCC to a permanent well (MPWMD and DD&A, 2014). MPWMD also regulates private wells within its boundaries through its Water Distribution System Rules and Regulations. The focus of the MPWMD permit system is to limit withdrawals in areas where basins are being over pumped and to monitor the sustainability of using percolating groundwater in other areas.

The Carmel Area Wastewater District (CAWD) provides wastewater treatment for the City of Carmel-by-the-Sea and some unincorporated areas such as the mouth of Carmel Valley, portions of Pebble Beach and Carmel Highlands, and other unincorporated areas surrounding the city of Carmel-by-the-Sea. Most unincorporated areas within Carmel Valley use individual septic systems.

3.2.1 Water Quality

Major tributaries within the Carmel River Basin watershed include Cachagua Creek, Pine Creek, San Clemente Creek, Carmel River, Hitchcock Canyon Creek, Las Garzas Creek, Robinson Canyon Creek, Potrero Creek, and Tularcitos Creek. These waterbodies are shown in Figure 1.

Water quality priorities within the watershed include the sustainment of beneficial uses within the Carmel River, protection of the ASBS that receives drainage from the watershed (Point Lobos; see Figure 2 for drainage areas to the ASBS) along with addressing water pollutant concerns present in the Clean Water Act Section 303(d) (303[d]) listed for Tularcitos Creek. A summary of the waterbody impairments, along with the estimated TMDL completion dates, are provided in Table 7 and shown in Figure 2. These impairments are current as of the approval of the CCRWQCB's 2014 303(d) list, approved through Resolution R3-2016-0053 and accompanying Staff Report (CCRWQCB, 2016).

Table 7: 303(d) Listed Waterbodies in the Carmel River Basin Watershed

Waterbody	Impairment(s)	303(d) Decision ID	TMDL Completion Date
Tularcitos Creek	Chloride	23164	2021
	Sodium	23093	2021
	Fecal Coliform	37561	2011

Tularcitos Creek provides agricultural beneficial uses. The sources of the chloride and sodium impairments in Tularcitos Creek are currently unknown, according to the 2014 303(d) list. The source of fecal coliform impairment is listed as domestic animals/livestock and natural sources. The impairment is currently being addressed by the Tularcitos Creek Fecal Indicator Bacteria TMDL, which also covers the Lower San Antonio River, Cholame Creek, San Lorenzo Creek, and Arroyo De La Cruz watersheds (CCRWQCB, 2011).

3.2.2 Watershed Processes

Precipitation within the Carmel River Basin watershed primarily falls between November and April. Average annual precipitation varies from the inland portion of the watershed to the coast, where annual precipitation is approximately 12% higher (MPWMD, 2014). Precipitation can also vary significantly from year to year, like much of California. Elevations within the watershed range from approximately 5,000 feet above mean sea level (feet msl) to 0 feet msl at the coast. Upland source areas for the Carmel River are the major source of water reaching the lower Carmel Valley (MPWMD, 2014), with annual precipitation reaching over 50 inches per year at the higher peaks in the Santa Lucia range.

Alteration of natural hydrologic processes in the watershed primarily consists of construction of dams on the Carmel River, the use of the Carmel River for water supply, and development in the lower elevations of the watershed. These alterations have resulted in changes to both natural drainage and environmental/ecological processes, as well as water quality and flooding threats as a result of urbanization. The majority of the upper watershed still has relatively few pervious areas, so changes to flow quantity primarily impact the more developed lower areas of the watershed.

Three dams were constructed on Carmel River between 1880 and 1948 – The Old Carmel River Dam (1883), the San Clemente Dam (1921), and the Los Padres Dam (1948). The Old Carmel River Dam and the San Clemente Dam were both removed from the Carmel River in 2015 and 2016, and projects are underway to restore the channel and habitat areas above and below the dams and reestablish sediment transport mechanisms within the River (The Carmel River Watershed Conservancy, 2017a; San Clemente Dam Removal Project, 2017). The removal of the San Clemente Dam is the largest dam removal project to ever occur in California, and reconnected large portions of the Carmel River Basin watershed. Following the removal of the San Clemente Dam, only the upper 45 square miles of the Carmel River Basin watershed remain disconnected by the main-stem Los Padres Dam (MPWMD and DD&A, 2014). These 45 miles primarily consist of Ventana Wilderness areas and support approximately 50 percent of the watershed's steelhead spawning habitat and 42 percent of the watershed's juvenile rearing habitat (MPWMD, 2014).

The Los Padres Dam is located 25 miles inland from the mouth of the Carmel River, and forms the Los Padres Reservoir. The Los Padres Reservoir's estimated usable storage has been reduced significantly since its construction due to sedimentation (MPWMD and DD&A, 2014; The Carmel River Watershed Conservancy, 2017a).

Changes to environmental processes in the watershed have occurred in the lower portion of the watershed to protect built infrastructure. The Carmel River flows from the central portion of Monterey County toward the Pacific Ocean. During dry periods, the Carmel River does not flow into the Pacific Ocean, instead pooling at the Carmel Lagoon located on the coast of the Monterey Peninsula. To prevent flooding to adjacent properties during the rainy season, an artificial channel is often created through the sand barrier that contains the Carmel Lagoon on the west, though this mechanical breaching activity has been opposed by the National Marine Fisheries Service and conservation groups, as the Carmel Lagoon serves as habitat for certain endangered species, including a population of Central California Coast steelhead (The Carmel River Watershed Conservancy, 2017a; Monterey County Resource Management Agency, 2014a). As a result, there are proposals to develop an ecosystem protective barrier at the mouth of the Carmel Lagoon that would allow breaching of the barrier beach to occur naturally, preventing flood risk, while maintaining ecological function (Monterey County Resource Management Agency, 2014a).

Over the 20th century, significant development along the lower 15 miles of the Carmel River within the Carmel River 100-year floodplain has exacerbated storm-related losses during floods that in some cases have caused damage to roads, infrastructure, and private property, including residences (The Carmel River Watershed Conservancy, 2017a; Monterey County Resource Management Agency, 2014b). Flooding of built infrastructure within the floodplain in the lower portion of the watershed is a significant concern, in addition to the environmental changes discussed. As with all development, increased imperviousness also causes changes to flow quantity and water quality.

3.3 Canyon Del Rey/Frontal Monterey Bay

The Canyon Del Rey/Frontal Monterey Bay watershed comprises the second largest watershed area within the Planning Area and contains almost all the urbanized areas. Most of the watershed is located within the Planning Area. The cities of Pacific Grove, Monterey, Sand City, Del Rey Oaks, and Seaside are located entirely within the Canyon Del Rey/Frontal Monterey Bay watershed, and the City of Carmel-by-the-Sea is partially located within the watershed. The remainder of the watershed consists of unincorporated Monterey County land, including some unincorporated rural residential communities, such as Corral de Tierra.

Within the Canyon Del Rey/Frontal Monterey Bay watershed are several smaller urban watersheds, delineated as "Planning Watersheds" per the California Interagency Watershed Map of 1999 (updated May 2004, "calw221"). These include Indian Head Beach, Seaside, Laguna Beach, Point Pinos, and a portion of the Carmel Bay watersheds. These planning-level watersheds may be used for organization of project opportunities; because the watershed characteristics, water quality concerns, and goals are similar among the subwatersheds, they are discussed together in this Planning Area description as part of the Canyon Del Rey/Frontal Monterey Bay watershed.

State and federal lands in the watershed include Ford Ord Dunes State Park, a portion of Ford Ord National Monument, the Naval Postgraduate School, the United States Army Presidio of Monterey, the Monterey County Fairgrounds, Monterey State Historic Park, and a portion of California State University Monterey Bay, as well as several small regional parks. These areas are shown in Figure 1.

Land use within the watershed varies; within the Cities of Monterey, Pacific Grove, Sand City, Del Rey Oaks, Carmel-by-the-Sea, and Seaside, land use is primarily high- and low-density residential and commercial, with some industrial areas. Unincorporated areas within the watershed are largely low-density residential and open space, including several golf courses. Open space areas in the Planning Area are shown in Figure 3.

The Canyon Del Rey/Frontal Monterey Bay watershed is partially underlain by the adjudicated Seaside Groundwater Basin as well as parts of the Salinas Valley – Corral De Tierra Area and the Salinas Valley – Marina Area groundwater sub-basins. See Figure 1 for a map of the underlying groundwater basins.

The Seaside Groundwater Basin (the Basin) underlies an approximately 19- to 24-square-mile area below Sand City, Seaside, Del Rey Oaks, unincorporated Monterey County, and the Fort Ord Community. The action to adjudicate the Seaside Groundwater Basin was filed in 2003 and the Watermaster for the Basin was created in 2006 in response to potential overdraft conditions. Pumping reduction requirements were established by the adjudication decision. The Watermaster carries out the Seaside Basin Monitoring and Management Plan and establishes a procedure for dealing with seawater intrusion, should it occur. The objectives of plan included the development of an exploratory borehole drilling program, geophysical surveys, and new monitoring wells to fully characterize the Basin, piezometric and water quality monitoring to examine longer-term trends, and development and implementation of a management program to optimize pumping and returning the Basin to equilibrium through implementation of conservation methods (Seaside Groundwater Basin Watermaster Board, 2006).

The Canyon Del Rey/Frontal Monterey Bay watershed located within the Planning Area is almost entirely located within the boundary of the Monterey Peninsula Water Management District.

Most of the cities within the watershed obtain water supply from CalAm. The exception to this includes a portion of the City of Seaside, which has a municipal water system that services 3,300 residential customers primarily adjacent to the Ord Community, representing about 10% of the population of the City of Seaside (MPWMD and DD&A, 2014; City of Seaside, 2017). The Seaside Municipal Water System consists of one groundwater well and two 500,000-gallon water tanks (City of Seaside, 2017). Most of the population of the City of Seaside is serviced by CalAm, and the remainder of the City of Seaside, located within the Ord Community, is serviced by the Marina Coast Water District Ord Community service area (MPWMD and DD&A, 2014; Marina Coast Water District, 2017). The Marina Coast Water District also services Central Marina (part of the Greater Monterey County IRWM region and SWRP). The Marina Coast Water District obtains all its water supply from the Salinas Valley Groundwater Basin, and groundwater withdrawals are approximately 3,200 ac-ft/yr through the production wells that the Marina Coast Water District owns and operates (Marina Coast Water District, 2017). The Marina Coast Water District is also a partner in the Pure Water Monterey Project and would like to expand the supply of recycled water from that facility in the future to serve future customers in Fort Ord.

Collection of wastewater within the Canyon Del Rey/Frontal Monterey Bay Watershed is the responsibility of the cities. Monterey One Water is responsible for transferring wastewater from the cities and Ford Ord and treating it at the Regional Treatment Plant in Marina. The Marina Coast Water District provides wastewater collection services for the Ord Community within the Canyon Del Rey/Frontal Monterey Bay watershed. CAWD provides wastewater treatment for the city of Carmel-by-the-Sea, and some adjacent unincorporated areas (see Figure 1).

3.3.1 Water Quality

Major waterbodies within the Canyon Del Rey/Frontal Monterey Bay watershed include Canyon Del Rey, El Estero Lake, Laguna Grande, Roberts Lake, Del Monte Lake, Majors Creek, and Seal Rock Creek.

Water quality priorities within the watershed include addressing water pollutant concerns present in the four 303(d) listed waterbodies within the watershed, along with protection of the MBNMS and the two ASBS that receive drainage from the watershed (Pacific Grove and Carmel Bay; see Figure 2 for drainage areas to the ASBS). The 303(d) listed waterbodies within the Canyon Del Rey/Frontal Monterey Bay watershed include Monterey Harbor, Pacific Ocean at Stillwater Cove Beach, and Majors Creek. A summary of the waterbody impairments and the estimated TMDL completion dates are included in Table 8 and shown in Figure 2. These impairments are current as of the approval of the CCRWQCB's 2014 303(d) list, approved through Resolution R3-2016-0053 and accompanying Staff Report (CCRWQCB, 2016).

Table 8: 303(d) Listed Waterbodies in the Canyon Del Rey/Frontal Monterey Bay Watershed

Waterbody	Impairment(s)	303(d) Decision ID	Expected TMDL Completion Date
Monterey Harbor	Arsenic Copper Oxygen, Dissolved Polychlorinated Biphenyls (PCBs) Toxicity	41157 42111 49417 49419 42195	2027 2027 2027 2027 2023
Majors Creek	Copper *Escherichia coli (E. coli)* Lead Zinc	42843 42895 42433 42726	2027 2027 2027 2027
Pacific Ocean at Stillwater Cove Beach	*Enterococcus*	44433	2027
Pacific Ocean at Monterey State Beach (Del Monte Beach)	*Enterococcus* Total Coliform	36783 37096	2027 2027

The sources of arsenic, copper, lack of dissolved oxygen, PCBs, and toxicity at Monterey Harbor are unknown. Beneficial use of Monterey Harbor includes commercial or recreational collection of fish, shellfish, or organisms.

The source of copper, *E. coli*, lead, and zinc in Majors Creek is urban runoff and storm sewers, as well as unknown sources, according to the 2014 303(d) list. Natural sources are also included as a source for *E. coli* impairment. The beneficial use of Majors Creek is cold freshwater habitat.

The source of *Enterococcus* at Stillwater Cove Beach and *Enterococcus* and total coliform in the Pacific Ocean at Monterey State Beach is unknown, according to the 2014 303(d) list. Beneficial use of the Pacific Ocean at Stillwater Cove Beach includes water contact recreation.

The ASBS Special Protections require water quality monitoring. Additionally, the Cities of Pacific Grove and Monterey have proposed the ASBS Stormwater Management Project to further protect ASBS from some wet weather flows discharged from urbanized areas. The primary goal of the Pacific Grove ASBS Stormwater Management Project is to improve stormwater quality discharged into the ASBS located along the Pacific Grove coastline.

3.3.2 Watershed Processes

The Canyon Del Rey/Frontal Monterey Bay watershed is the most urbanized of the watersheds in the Planning Area. Imperviousness resulting from urbanization is known to increase the quantity of stormwater that is produced and discharged from an area during rainfall events. While much of the soil in the Canyon del Rey and Seaside Basin has a high sand content and is therefore highly pervious, there are still numerous stormwater outfalls that discharge stormwater runoff from the watershed directly into the Monterey Bay. Much of Monterey, Pacific Grove, and Carmel are underlain by older weakly to moderately consolidated deposits with outcrops of the Monterey Formation (shale), sandstone formations, and granodiorite (USGS, 1997). In these areas, infiltration of rainfall and runoff can be low.

Alteration of natural hydrologic processes in the watershed that are caused by urbanization include changes in quantity and timing of flows, potential impacts to water quality discharged to the Monterey Bay, and environmental effects in natural and urbanized channels. Flood protection in the Canyon Del Rey watershed can also be a challenge. Within the incorporated cities in the watershed, flooding problems are generally localized, affecting fewer structures than some flooding in the unincorporated areas. High flows from the urbanized areas can overwhelm the storm drain systems in these areas discharging to Monterey Bay, including ASBS, presenting a challenge in reducing wet weather discharges from urbanized areas to the Bays and ASBS (MPWMD and DD&A, 2014).

3.4 Big Sur/Frontal Pacific Ocean

The portion of the Big Sur/Frontal Pacific Ocean watershed within the Planning Area consists entirely of unincorporated Monterey County land. The area is primarily open space land, with some residential and minor commercial development in the Carmel Highlands community on the coast. State parks in the watershed include Point Lobos State Natural Reserve and the upper portion of Garrapata State Park. The portion of the watershed within the Planning Area is shown in Figure 1.

The Big Sur/Frontal Pacific Ocean watershed is underlain by a portion of the Carmel Valley Alluvial Aquifer. The Carmel Highlands are located within the MPWMD boundary but are served by the Carmel Riviera Mutual Water Company for water supply. The Water Company draws water from eight wells from groundwater stored in miscellaneous formations and the nearby Mal Paso Creek to serve the estimated 600 residents within their service area, working with Carmel Lahaina Utility Services, Inc. to provide water treatment and distribution operations (Water & Wastes Digest [W&WD], 2010). Most of the residential housing south of the Carmel River is not currently connected to CAWD and uses septic tank systems. Carmel Highlands has an Onsite Wastewater Management Plan. The plan describes the terms of a Memorandum of Understanding that the County of Monterey has with the CCRWQCB to administer individual onsite wastewater disposal regulations in conformity with the Water Quality Control Plan for the Central Coast (Basin Plan). The regulations are also provided in Chapter 15.20 of the Monterey County Code (Monterey County Health Department, 2009). CAWD is in the process of examining the potential for annexation of some of the communities to extend the district boundary south to serve additional units (Local Agency Formation Commission [LAFCO] of Monterey County, 2016).

The portion of the watershed in the Planning Area includes two major creeks that are largely unaffected by development – the ecologically important San Jose Creek, and the smaller Mal Paso Creek, which is partially within the Planning Area and provides water supply to the Carmel Riviera Mutual Water Company.

San Jose Creek is a steelhead-bearing waterbody which traverses 14.2 miles of steep terrain prior to discharging into the Pacific Ocean. Promoting the steelhead run, including assessing (and improving) the San Jose Creek Lagoon's connectivity to the ocean, is one of the regional priorities in the IRWMP. A study on San Jose Creek found that sedimentation could inhibit the ability of the Creek to serve as salmonid habitat. A portion of the San Jose Creek has also been designated as critical habitat for California red-legged frogs (MPWMD and DD&A, 2014). Much of the San Jose Creek watershed is conserved public open space managed by State Parks and Monterey Peninsula Regional Park District, and the upper watershed includes open space protected by the Santa Lucia Conservancy and Big Sur Land Trust.

There are no 303(d) listed waterbodies bodies within the portion of the Big Sur/Frontal Pacific Ocean watershed that lies within the Planning Area. A portion of this watershed drains to the Point Lobos ASBS. Water quality priorities are like those within the Carmel River Basin watershed, along with protection of coastal resources. Watershed processes are much the same as the Carmel River Basin, with open space lands primarily located in the upper portion of the watershed and development on the coast. Due to the ecological importance of the San Jose Creek, it is not being considered as a potential water supply source (MPWMD and DD&A, 2014).

3.5 El Toro Creek/Salinas River

A small portion of the El Toro Creek/Salinas River watershed is located within the Planning Area. This area is entirely within the federally managed Fort Ord National Monument, and land uses consist mostly of open space lands (see Figure 3). The portion of the El Toro Creek/Salinas River watershed that lies within the Planning Area is underlain by the adjudicated Seaside Groundwater Basin. The portion of the watershed within the Planning Area is shown in Figure 1. All runoff produced eventually drains towards the Salinas River, which is located within the Greater Monterey SWRP area; however, since the Fort Ord National Monument is entirely included in the Monterey Peninsula SWRP and this area overlies the Seaside Groundwater Basin, this area is included within the Planning Area.

The small portion of the El Toro Creek/Salinas River watershed located within the Planning Area is outside of the MPWMD service area boundary. Water supply needs in this area are limited and are met using private wells.

There are no major waterbodies in the portion of the El Toro Creek/Salinas River watershed within the Planning Area, and therefore no 303(d) listed waterbodies are located within the portion of the watershed that lies within the Planning Area.

While historic military practices in portions of the area have likely altered some of the natural watershed processes, the portion of the watershed within the Planning Area has very few impervious areas. As such, little additional runoff is anticipated to be produced from this portion of the watershed as compared to pre-development levels.

4. WATER QUALITY COMPLIANCE

There are several water quality regulatory requirements that some or all the Cooperating Entities must comply with, including the Phase II Small Municipal Separate Storm Sewer System (MS4) General Permit (Phase II Permit) (Order 2013-0001-DWQ)[3], a guidance letter from the CCRWQCB (13267 Letter), Statewide Trash Amendments, and TMDLs. The SWRP will assist in complying with these various permits and documents, as described below.

4.1 Pollutant-Generating Activities

Runoff from watersheds within the Monterey Peninsula region carries pollutants associated with urban development, industrial, and agricultural land use activities, and atmospheric deposition to local receiving water bodies, as described in Section 3. The Phase II recognizes the following:

> *Finding 2. As human population increases, urban development creates new pollution sources and brings with it proportionately higher levels of car emissions, car maintenance wastes, municipal sewage, pesticides, household hazardous wastes, pet wastes, trash, etc. which can either be washed or directly dumped into the municipal separate storm sewer system (MS4). As a result, the runoff leaving the developed urban area is greater in pollutant load than the pre-development runoff from the same area. Also, when natural vegetated pervious ground cover is converted to impervious surfaces such as paved highways, streets, rooftops, walkways and parking lots, the natural absorption and infiltration abilities of the land are lost. Therefore, runoff leaving developed urban area is significantly greater in runoff volume, velocity, peak flow rate, and duration than pre-development runoff from the same area. The increased volume, velocity, rate, and duration of runoff greatly accelerate the erosion of downstream natural channels. In addition, the greater the impervious cover the greater the significance of the degradation.*

> *Finding 3. Pollutants of concern found in urban runoff include sediments, non-sediment solids, nutrients, pathogens, oxygen-demanding substances, petroleum hydrocarbons, heavy metals, floatables, polycyclic aromatic hydrocarbons (PAHs), trash, pesticides and herbicides.*

> *Finding 4. Trash and litter are a pervasive problem in California. Controlling trash is a priority, because trash adversely affects our use of California's waterways. Trash impacts aquatic life in streams, rivers, and the ocean as well as terrestrial species in adjacent riparian and shore areas. Trash, particularly plastics, persists for years. It concentrates organic toxins, entangles and ensnares wildlife, and disrupts feeding when animals mistake plastic for food*

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[3] http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml. The Phase II Permit requires stormwater agencies to comply with the corresponding TMDL requirements, as specified within the Permit and Attachment G, Region-Specific Requirements for Implementation of TMDLs. However, there are no region-specific requirements affecting the Monterey Peninsula Region.

and ingest it. Additionally, trash creates aesthetic impacts, impairing our ability to enjoy our waterways.

Specific surface water quality issues identified in the Monterey Peninsula region include urban runoff pollution, including impairments for metals, bacteria, dissolved solids, PCBs, and general toxicity. There are four impaired water bodies and one TMDL (Tularcitos Creek TMDL for fecal coliform) in the Planning Area, which are described in Section 3 and summarized in Table 9.

Table 9: Monterey Peninsula Region SWRP Planning Area Impaired Waterbodies

Water Body	2014 303(d) Listed Impairment(s)
Majors Creek in the City of Monterey	*E. Coli*, Copper, Lead, and Zinc
Monterey Harbor	Arsenic, Copper, Dissolved Oxygen, PCBs, and Toxicity
Pacific Ocean at Stillwater Cove	*Enterococcus*
Pacific Ocean at Monterey State Beach (Del Monte Beach)	*Enterococcus*, Total Coliform
Tularcitos Creek in the Carmel River watershed	Chloride, Sodium, and Fecal Coliform (addressed by TMDL)

The Planning Area is also adjacent to three ASBS as well as the MBNMS, and urban runoff is a possible cause of water pollution affecting the MBNMS.

4.2 Permits and TMDLs

4.2.1 Applicable Permit Requirements

MRSWMP member agencies are required to comply with the Phase II Permit. The following provisions of the Phase II Permit are related to analyses and deliverables prepared as part of this SWRP project:

- Provision E.14.a., Program Effectiveness Assessment and Improvement, which requires the development of a Program Effectiveness Assessment and Improvement Plan (PEAIP) and quantitative effectiveness assessment. The CCRWQCB provided a "Water Code Section 13267 Technical Report Order" guidance letter (13267 Letter) on June 13, 2016. The purpose of the 13267 Letter was to provide additional clarification on reporting requirements (in addition to requirements for implementing progress of key activities). The intent was to enable PEAIPs to sufficiently assess stormwater pollutant reductions and aid in developing meaningful stormwater program modifications for the fifth year Annual Reports (due October 15, 2018) (Provision E.14.b). The 13267 Letter specifically requires each Permittee to:

  1. Delineate and characterize catchments within the MS4 Permit area;

2. Create and populate an inventory of structural best management practices (BMPs) located within the MS4 Permit area;
3. Estimate stormwater runoff volumes and pollutant loads from all catchments prior to BMP Implementation (unmitigated scenario);
4. Rank catchments relative to all MS4 Permit area catchments based on unmitigated runoff volume and pollutant loads;
5. Assess all inventoried BMPs to determine BMP effectiveness relative to the intended design;
6. Estimate stormwater runoff volumes and pollutant loads from all catchments after BMP implementation (mitigated scenario); and
7. Rank catchments relative to all MS4 Permit area catchments based on mitigated runoff volume and pollutant loads.

The 13267 Letter includes prescriptive details about how to meet each of the above requirements and allows for alternative approaches that are equivalent and equally defensible.

Data developed for the model that will be used for assessing the effectiveness of program components described within the PEAIP, the TELR model, have been used for some of the SWRP project opportunity metrics-based multi-benefit analyses conducted (see Section 5). The analyses conducted for the SWRP are not anticipated to be used to meet PEAIP requirements of the 13267 Letter, but the potential projects identified could be input into separate PEAIP analyses conducted to meet items 6 and 7 summarized above.

MRSWMP has a Stormwater Technical Guide for Low Impact Development (MRSWMP, 2015) that provides additional resources for new or redevelopment projects that must implement LID measures per the CCRWQCB Post-Construction Requirements (PCRs). The PCRs were adopted by the CCRWQCB in 2013 and apply in urbanized areas within specified Watershed Management Zones. This Stormwater Technical Guide provides design criteria and types of BMPs to be used for such projects (MRSWMP, 2015).

4.2.2 Areas of Special Biological Significance

There are three ASBS in the Planning Area: Point Lobos ASBS, which contains the Point Lobos State Marine Reserve, Carmel Bay from the east boundary of Point Lobos State Park to Ghost Tree in Pebble Beach, and an area adjacent to Pacific Grove near the boundary of the City of Monterey. These areas are subject to ASBS Special Protections, and areas that discharge stormwater to the ASBS must develop compliance plans to meet those Protections.

As summarized in the Monterey Peninsula IRWMP (MPWMD and DD&A, 2014), the ASBS Special Protections generally include the elimination of dry weather runoff to the ASBS, developing measures to prevent wet weather runoff from altering natural water quality in the ASBS, and conducting adequate monitoring to examine if natural water quality and the marine life beneficial use is protected.

4.2.3 Tularcitos Creek TMDL

Grazing lands and ranching are the predominate land use activities in the Tularcitos Creek watershed. The CCRWQCB certified the Tularcitos Creek Fecal Indicator Bacteria TMDL in May 2011 (the TMDL also covers several other water bodies in Monterey County), and the TMDL was approved by United States Environmental Protection Agency (USEPA) in November 2011. The CCRWQCB approved an alternative TMDL implementation program to rectify impairment due to fecal indicator bacteria under the Water Quality Control Policy for Addressing Impaired Waters: Regulatory Structure and Options (SWRCB, adopted by Resolution 2005-0050) (Impaired Waters Policy).[4] The CCRWQCB has certified the California Rangeland Water Quality Management Plan as the mechanism for implementing the TMDL. The SWRP primarily focuses on identifying urban stormwater projects within the Planning Area, and additional project identification analysis will not be conducted to identify rangeland management projects.

4.2.4 Statewide Trash Provisions

On April 7, 2015, the SWRCB adopted the statewide Trash Provisions (SWRCB, 2015b), which amended two statewide water quality control plans to include trash control requirements for owners/operators of MS4s. A primary intent of the requirements is to achieve significant reductions in the discharge of trash to local water bodies from cities and counties throughout the State. The Trash Provisions define trash as follows:

> *Trash means all improperly discarded solid material from any production, manufacturing, or processing operation including, but not limited to, products, product packaging, or containers constructed of plastic, steel, aluminum, glass, paper, or other synthetic or natural materials.*

The Trash Provisions propose to implement the water quality objectives for trash through a conditional prohibition of discharge of trash directly into waters of the state or where trash may ultimately be deposited into waters of the state. The prohibition of discharge applies to both permitted and non-permitted dischargers. Implementation provisions focus on a land-use-based compliance approach that focuses trash controls in areas with high trash generation rates, which

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[4] The Impaired Waters Policy provides for a process in which the Regional Water Quality Control Boards may rely on methods used by another entity that is involved in effective efforts to address an impairment, and that the Regional Water Quality Control Board should seek to take those efforts into account and, where appropriate, take advantage of these third-party efforts. The Impaired Waters Policy establishes a certification process whereby the Regional Water Quality Control Boards can formally recognize regulatory or non-regulatory actions of other entities as appropriate TMDL implementation programs when the Regional Water Quality Control Boards determine those actions will result in attainment of standards.

are referred to as "priority land uses." The Trash Provisions allow for a dual compliance track approach for MS4 Permittees:

- **Track 1:** Install, operate, and maintain full capture systems for the storm drain network that capture runoff from the priority land uses in their jurisdiction.
- **Track 2:** Install, operate, and maintain any combination of full capture systems, multi-benefit projects, other treatment controls, and/or institutional controls within either the jurisdiction of the MS4 permittee or the jurisdiction of the MS4 permittee and contiguous MS4 permittees. Permittees choosing Track 2 must demonstrate that the approach will achieve full capture system equivalency.

MRSWMP permittees received 13383 order letters from the SWRCB in June 2017 that required them to submit methods to comply with the Statewide Trash Provisions.

4.2.5 Federal Lands

Federal agencies are required to reduce stormwater runoff from federal development and redevelopment projects under Section 438 of the Energy Independence and Security Act of 2007. This SWRP acknowledges these requirements for the federal lands that are within the Planning Area, but as these areas are outside the jurisdiction of Monterey One Water and the cooperating entities of this SWRP (federal agencies are interested parties and stakeholders of the SWRP), stormwater compliance requirements for federal lands are not described herein.

4.2.6 Previous Actions Taken Towards Water Quality Protection

There have been numerous actions taken in the region to protect water quality. In addition to wastewater control improvements, the cities participating in the MBNMS Water Quality Protection Program have sought to reduce the impacts of urban runoff pollution through a combination of low impact development, stormwater treatment measures (e.g., bioretention and other measures), and source control programs through the implementation of the Sanctuary's Urban Runoff Plan, the prior Model Urban Runoff Program (1996), Monterey Regional Storm Water Pollution Prevention Program (2002), and the MRSWMP (2006 to present).

Cities and counties subject to requirements of the ASBS Special Protections were required to submit compliance plans to the SWRCB. Cities within the region that have submitted compliance plans include the City of Carmel by the Sea, the City of Pacific Grove, and the City of Monterey (combined submittal with Pacific Grove), along with the County of Monterey.

These plans outline current and future compliance measures, including projects to reduce dry and wet weather flows to the ASBS. The City of Pacific Grove (with cooperation of City of Monterey and Monterey One Water) has completed two phases of a project to divert a portion of dry season flows away from the Pacific Grove ASBS, and the City of Monterey completed an alternatives analysis in 2006 along with an engineering report and Draft Environmental Impact Report (EIR) in 2013 for ceasing discharges in ASBS from Monterey, Pacific Grove, and Pebble Beach (MPWMD and DD&A, 2014). Additionally, the City of Carmel was awarded a Proposition 84 Grant to plan, design, and construct a Dry Weather Diversion Project to eliminate dry weather flows into the Carmel Bay ASBS, a project that began in 2011 (City of Carmel-By-The-Sea, 2014).

In addition to projects planned to reduce the discharge of untreated urban runoff into the ASBS, in early 2013, the Central Coast ASBS Regional Monitoring Program was established through a Memorandum of Agreement for all dischargers on the Central Coast, covering an area from Big Sur, in Monterey County, to Point Reyes, in Marin County. The Central Coast ASBS Regional Monitoring Program results are intended to inform future ASBS compliance efforts (City of Pacific Grove and City of Monterey, 2014).

MRSWMP agencies have also been engaged in the development of TELR and BMP Rapid Assessment Methodology. TELR is intended to be used to prioritize stormwater actions to improve water quality and support water resource objectives, and to track effectiveness of these actions over time.

These stormwater quality improvements add to wastewater pollutant control measures that have been in place in the region since the 1970s to protect water quality in the Monterey Bay. This includes the creation of the Monterey Regional Water Pollution Control Agency (now Monterey One Water) in 1972, along with the consolidation and modernization of wastewater collection and treatment. These projects included the repurposing of old coastal treatment plants into pump stations and the construction of the Regional Treatment Plan, which began operation in 1990, along with construction of the Salinas Valley Reclamation Plant and Castroville Seawater Intrusion Project in the 1990s. In Carmel and surrounding areas, the construction of the Carmel Area Wastewater District treatment plant in 1994 and creation of reclaimed water distribution services resulted in similar water quality benefits.

4.3 SWRP Water Quality Compliance Strategies

Traditional approaches to stormwater management do not fully address water quality impacts from stormwater discharges or necessarily provide multiple benefits such as water supply augmentation and ecological enhancement of the local watershed. The SWRP used a watershed-based approach to identify multi-benefit projects that can yield water quality benefits by reducing the volume of runoff delivered to receiving waters, thus reducing the pollutants discharged while augmenting needed water supplies. Watershed-based approaches to stormwater management also provide social and community benefits beyond traditional management approaches. Through this watershed-based approach, the SWRP projects will assist the MRSWMP permittees in demonstrating compliance with the Phase II Permit.

In addition, SWRP projects support implementation of the Statewide Trash Provisions. The SWRCB has indicated that the following types of BMPs are considered full capture systems (identified as Multi-Benefit Treatment Systems):

- Bioretention;
- Capture and Use;
- Detention Basin;
- Infiltration Trench;
- Infiltration Basin; and
- Media Filter.

Projects with drainage areas with higher anticipated average annual runoff volumes and right-of-way (ROW) opportunities near bus stops, an identified Priority Land Use for the Trash Provisions, have been identified as part of the project opportunity metrics-based multi-benefit analysis. These potential stormwater capture projects could also serve to meet trash management goals. This is discussed further in Sections 5 and 6.

5. QUANTITATIVE METHODS FOR IDENTIFICATION AND PRIORITIZATION OF STORMWATER AND DRY WEATHER CAPTURE PROJECTS

This section describes the quantitative methodology conducted for integrated identification, prioritization, and analysis of multiple benefit projects and programs. To develop the methodology, an evaluation of hydrologic/hydraulic models, water quality models, and other geographic information systems (GIS) and spreadsheet-based decision support tools and models was conducted. All projects identified in the SWRP were evaluated using the metrics-based multi-benefit approach described in this section to score projects based on the benefits achieved.

This section also introduces additional project identification analysis conducted as part of the match-funded Monterey Peninsula Water Recovery Study. The Water Recovery Study Report is provided in Appendix D.

5.1 Overview of Approach

The methodology conducted included the following steps:

1. **Identify project opportunities** – planned and potential project opportunities were identified through three avenues. Planned future projects were provided by SWRP cooperating entities, interested parties, and stakeholders. Additional project opportunity locations were identified and catalogued by the Project Team using a geospatially-based opportunity analysis. Further project opportunities were identified as part of the Monterey Peninsula Water Recovery Study.
2. **Screen and classify identified projects** – all identified project opportunities were classified by project type, scale, and infiltration feasibility utilizing this approach. Project opportunities were screened for project implementation feasibility and potential performance using geospatial data obtained from the TELR model and cooperating entities (data received summary provided in Appendix C).
3. **Score projects using metrics-based multi-benefit analysis** – using the GIS data compiled for each project opportunity as part of Step 2, a quantitative metrics-based multiple benefit evaluation was conducted to score all identified projects.
4. **Prioritize and rank projects based on input from cooperating entities, interested parties, stakeholders, and the TAC** – using the preliminary project opportunity scores along with other institutional knowledge (such as funding availability, areas of proposed redevelopment, and other factors), cooperating entities, interested parties, stakeholders, and the TAC provided input on project ranking and prioritization. The TAC selected the projects for which project concept designs are developed. See Section 6 for details.

5. **Quantification of benefits** –the volume of runoff captured was quantified for projects selected for development of concept design. See Section 6 for details.

A discussion of the evaluation of tools that were considered to conduct project analysis is described in the following section (Section 5.2), and descriptions of the selected methodology are provided in subsequent sections (Section 5.3 and Section 5.4).

5.2 Evaluation of Models and Tools

This section presents an evaluation of models and tools considered to complete the analyses.

5.2.1 Project Identification and Metrics-Based Analyses

A geospatial tool was needed to identify potential project opportunity locations and to characterize them. There are several proprietary and non-proprietary tools that could perform this analysis, including but not limited to the Structural BMP Prioritization and Analysis Tool (SBPAT)[5], the System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN)[6], TELR, or a customized geospatial approach.

The methodology used for project identification in this SWRP combined data and analyses in TELR with a customized GIS approach. This customized combined GIS and TELR-data approach is described greater detail in Section 5.3.

TELR, which was developed for the Central Coast Region, contains considerable information for the Planning Area that is relevant for stormwater facility siting and makes it suitable for incorporation into the analyses approach. Currently, TELR does not include a mechanism for evaluating multiple potential BMPs in an automated fashion, an important function needed to conduct the metrics-based multi-benefit analyses for the thousands of project opportunities that were identified for the SWRP. While SBPAT and SUSTAIN have these capabilities, SBPAT is currently specific to Southern California and would require considerable effort to be relevant for the Monterey Peninsula region. It is worth noting that the GIS approach used for this project included similar operations to SBPAT and therefore provides similar results. SUSTAIN was not selected, as USEPA has indicated on the website that "EPA can no longer develop or support SUSTAIN" (USEPA, 2017b), and the program currently requires use of an older version of ArcGIS (version 9.3). Given this and the proposed future uses of TELR for the region, investing in model development in SUSTAIN likely would not result in a longer-term sustainable model for the Planning Area.

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[5] Available at http://ladpw.org/wmd/bmpmethod/overview.shtm (Los Angeles Department of Public Works, 2017).
[6] Available at https://www.epa.gov/water-research/system-urban-stormwater-treatment-and-analysis-integration-sustain (USEPA, 2017b).

5.2.2 Project Quantification

For all identified project opportunities, simple quantification was conducted using a combination of geospatial data and utilizing analyses that had already occurred for the region as part of the development of TELR. These include the pollutant loading quantification that had been completed for larger-scale catchments within the Planning Area and are provided in the TELR platform.

More detailed quantification was conducted for the seven projects selected for concept design. The estimated volume of captured runoff can be used to quantitatively estimate the benefit that can be achieved by a project. Several proprietary and non-proprietary hydrologic modeling platforms were considered to quantify runoff draining to a facility at a project location. Commonly used non-proprietary hydrologic models include USEPA and USGS Hydrological Simulation Program (HSPF), the United States Army Corps' Hydrologic Modeling System (HEC-HMS) and Technical Release 55 (TR-55), and USEPA's Stormwater Management Model (SWMM). This project utilized results from modeling conducted in USEPA SWMM, which can perform long-term continuous simulation modeling (HEC-HMS and TR-55 do not have this capability). Concept-level quantification is described in Section 6.4.

5.3 Project Identification and Classification

Planned and potential SWRP project opportunities were identified through three avenues, as mentioned in Section 5.1: (1) projects already planned or considered for future implementation by cooperating entities, interested parties, and stakeholders (see Section 5.3.1); (2) projects identified through an algorithmic GIS-based opportunity analysis, to identify feasible locations where a project could be implemented (see Section 5.3.2); and (3) additional project identification analysis conducted as part of the match-funded Monterey Peninsula Water Recovery Study (see Section 5.3.4). The planned projects and projects identified through the GIS opportunity analysis were classified as described below in Section 5.3.3. The additional projects identified as part of the Monterey Peninsula Water Recovery Study were classified as part of the Monterey Peninsula Water Recovery Study (Geosyntec, 2018; see Appendix D).

The interaction between the identification and classification of projects in the Water Recovery Study and the identification and classification that occurred as part of the general SWRP analyses is provided in the flow chart shown as Figure 4. This figure does not include final project prioritization or selection of projects for concept design (Steps 4 and 5 in Section 5.1; also see Section 6).

5.3.1 Planned Projects in the Planning Area

Planned projects in the Planning Area are those projects that a proponent has considered for implementation. These projects may be in various planning stages – from a preliminary idea to the design stage. Planned projects were identified through a project request sent out to cooperating entities, interested parties, and stakeholders. The request for projects was delivered in September 2017 in the form of a spreadsheet that contained "required" and "optional" information necessary to conduct project analyses. Information requested for each project included the proponent name, project name, location (Assessor Parcel Number [APN], address, or geospatial file), project type, drainage area information (required if a regional facility, optional otherwise), and other details about the project. The project request that was sent to cooperating entities, interested parties, and stakeholders is provided in Appendix E. These details were used to map preliminary project footprints and/or drainage areas for use in the metrics-based multi-benefit evaluation.

5.3.2 Identification of Additional Project Opportunities

In addition to identification of projects submitted by cooperating entities, interested parties, or stakeholders, other opportunities for projects were identified by conducting a geospatial screening of publicly-owned parcels and ROWs. The project opportunity analysis was conducted in a GIS platform. The desktop GIS analysis entailed identification of publicly-owned parcels and ROWs that do not have physical feasibility constraints that could preclude implementation of a stormwater recovery project. The project opportunity analysis consisted of the following steps:[7]

1. Identify publicly-owned parcels through Monterey County land use code.[8]
2. Screen identified publicly-owned parcels to identify parcels that are at least 0.1 acres in size and with average slope less than 10% (estimated using USGS topographic data).
3. The parcels that met these criteria were considered for physical feasibility screening. The parcels that did not meet these criteria were not considered for projects.
4. Identify non-state highway public ROW[9] within urban areas. This was conducted by using public road data provided by Monterey County.
5. Identified parcel-based, regional, and ROW locations were screened to remove sites with the following physical constraint:
    a. Sites significantly outside of urbanized area[10] (i.e., assumed to be dominated by open space) that do not overlie a water supply aquifer or riparian corridor; and

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[7] This analysis did not include screening checks that should occur as part of a project design, which include the presence of steep slopes in drainage areas (mostly applicable to regional projects), need for a liner due to proximity to structures, and other feasibility checks. The screening also did not include field checks such as drainage tie-ins, land use checks, or other data verification.

[8] Parcel ownership identified using assessor parcel map data obtained from Association of Monterey Bay Area Governments (AMBAG) (November 2015) along with land use code information from Gary de Amaral at the County of Monterey Assessor's Office (2017). Land use codes 7A and 7B were considered publicly owned (includes municipal, state, and federal land).

[9] This did not include roads that are not classified (e.g., bike path, trails, etc.) in the Monterey County data.

[10] Identified using a combination of city limits, the United States Census Urbanized Areas, and Designated Places (United States Census Bureau, 2017).

b. Sites significantly within areas that are highly susceptible to landslides.[11]

5.3.3 Project Classification

All projects identified through the request for planned projects (Section 5.3.1) and the GIS opportunity analysis (Section 5.3.2) were classified to identify those that could be included in the Water Recovery Study (see Section 5.3.4), and to compile information for the metrics-based multi-benefit evaluation (see Section 5.4).

Projects were classified by the following information:

1. Project scale (i.e., regional, parcel-based, or ROW project);
2. Infiltration feasibility, or feasibility of direct recharge via treatment through wastewater recycling and groundwater replenishment;
3. Facility type; and
4. Drainage area information.

Project Scale

Potential projects were categorized based on project scale as parcel-based (i.e., self-treating parcel) facilities, regional facilities (potential to treat an area outside of the parcel), and ROW/green street facilities (treating the road and areas that flow to the roadway, including, at a minimum, portions of adjacent parcels).

1. All distributed/street-based projects were identified as ROW projects.
2. Projects located on a parcel were classified as regional if:
    a. The parcel contains at least 0.5 acre of undeveloped or open space area (as identified through land use class);[12] and
    b. The location is sufficiently close to a storm drain (i.e., within 500 feet,[13] where storm drain pipe data is available).
3. All other parcel locations were identified as parcel-based projects.

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[11] Identified using data from the Monterey County Open Data GIS portal.
[12] Undeveloped or open space land use identified through available land use data for urban areas; areas outside of urban areas with limited land use data were assumed to have sufficient space to accommodate a regional project.
[13] Storm drain diversion projects identified as part of the Water Recovery Study used a different distance from the storm drain for screening; Monterey Peninsula Water Recovery Study Report, Appendix D.

Infiltration Feasibility

All project opportunity locations were categorized as feasible, partially feasible, or infeasible for infiltration. Locations that are not feasible for infiltration were still considered for partially infiltrating or non-infiltrating stormwater capture projects. Projects were categorized as follows:

1. Hazardous/infeasible for infiltration (i.e., facilities must be lined) – projects that are located:
    a. Where more than 50% of the site is over liquefaction hazards;
    b. Where the surface elevation is within 10 feet (depth) of a water supply aquifer,[14] as data are available;
    c. Within 100 feet of a site with soil or groundwater contamination (based on proximity to active EnviroStor/GeoTracker[15] sites);
    d. Sites within 100 feet of water supply wells;[16] or
    e. Areas overlying Natural Resources Conservation Service (NRCS) "rock outcrop" texture class or without an identified hydrologic soil group (HSG).
2. Infiltration safe but only partially feasible – this is the case when none of the above constraints exist, but the soil underlying the facility is relatively poorly draining (identified as HSG C or D).
3. Infiltration feasible – the site has none of the infiltration hazards present and the soil underlying the facility is relatively well draining (identified as HSG A or B).

Facility Characteristics

Facility characteristics were identified for each potential project for use in the project metrics-based multi-benefit evaluation, as part of the Performance category group. The facility characteristics that were identified include:

1. Water Recovery Project – planned projects or projects identified through the Water Recovery Study as having potential to augment water supply through capture of stormwater or dry weather runoff. See Section 5.3.4.

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[14] Groundwater depth was assumed to the extent possible using data obtained from the California Statewide Groundwater Elevation Monitoring (CASGEM) program.
[15] GeoTracker is a California SWRCB website which tracks sites with the potential to impact water quality in California, including contaminated sites (https://geotracker.waterboards.ca.gov/). EnviroStor, a California Department of Toxic Substances Control site, is another useful tool for identifying contaminated sites: (https://www.envirostor.dtsc.ca.gov/public/).
[16] Currently available data consists of the point locations of several hundred wells throughout the region, provided by MPWMD.

2. Green Infrastructure[17] (distributed or regional) – these types of facilities are assumed to provide good stormwater pollutant removal; moderately reestablish natural hydrology; moderately develop, restore, or enhance habitat and open space; and provide enhanced community benefit.
3. Non-Green Infrastructure Treatment Control Facilities – these facilities, which do not include vegetation, are assumed to provide moderate stormwater pollutant removal and to moderately reestablish natural water drainage systems. They are sized to MS4 water quality requirements.
4. Flood Control Facilities – these facilities may include components of green infrastructure or (more commonly) non-green infrastructure treatment control. These facilities are identified by sizing to specifically control flood flows (considered to be the 1% or 100-year flood).
5. Hydromodification Control, Stream Restoration, or Habitat Restoration – these facilities or areas are designed specifically to restore areas impacted by erosive stormwater or dry weather flows and/or prevent these areas from impacts caused by future erosive flows. These facility components may be added to one of the stormwater capture facility types listed above, or they may be stand-alone areas.
6. Public Use Area or Public Education Area – in most cases, public use areas or public education areas would not be stand-alone projects but would be supplemental features of one of the facility types listed above.
7. Programmatic Stormwater Management Opportunities – these include sidewalk landscaping and impervious surface removal programs, rainwater harvesting subsidy programs, green roof subsidy programs, residential rain garden and downspout disconnection programs, subsidy or credit programs for stormwater management and/or water quality projects on agricultural lands, and similar opportunities.

For planned projects identified by cooperating entities, interested parties, and stakeholders, the facility description or classification provided by the agency or project proponent was used to identify facility characteristics. Any planned projects classified as water supply augmentation projects or water recovery projects were also screened for inclusion in the Water Recovery Study. Project opportunities identified through GIS analyses were classified using the following project classification criteria:

[17] USEPA (2017a) includes the following definition of green infrastructure: "Green infrastructure uses vegetation, soils, and other elements and practices to restore some of the natural processes required to manage water and create healthier urban environments. At the city or county scale, green infrastructure is a patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the neighborhood or site scale, stormwater management systems that mimic nature soak up and store water."

1. Locations conducive to implementation of one of the identified Water Recovery Study project types were screened for inclusion in the Water Recovery Study (see Section 5.3.4).
2. Locations that are not considered feasible for implementation of identified Water Recovery Study project types were classified as follows:
    a. All identified ROW locations were classified as potential distributed green infrastructure projects (conservatively assumed to be sized for water quality control).
    b. Remaining parcel-based and regional projects were classified as potential green infrastructure projects.

Project Drainage Area

For each identified project, the project drainage area was identified and characterized. For those projects identified as Water Recovery Study projects, this occurred as part of the Water Recovery Study analyses (see Appendix D). For all other projects, the following drainage area characterization occurred:

1. All planned projects with identified drainage areas were characterized as provided.
2. For ROW projects for which drainage area had not been characterized, the roadway and an assumed tributary buffer (50 feet) that extends into the adjacent parcels were considered the project drainage area.
3. For parcel-based projects for which drainage area had not been characterized, the entire parcel was assumed to make up the drainage area.
4. For regional projects for which the drainage area had not been characterized, the TELR catchment associated with the estimated drainage area was identified. For areas outside of TELR, the drainage area was approximated using catchments from the National Hydrography Dataset Plus.
5. For all projects, the runoff rate and pollutant loading associated with the drainage area was identified using geospatial files exported from TELR.

5.3.4 Monterey Peninsula Water Recovery Study Projects

Planned projects that incorporate augmentation of water supply using captured stormwater or dry weather runoff were identified as potential Water Recovery Projects and screened for inclusion in the Water Recovery Study. Screening entailed categorization as one of the identified Water Recovery Study project types, and examination of feasibility.

The identified Water Recovery Study project types included:

1. Lakes and Reservoirs;

2. Storm Drain Diversions to Sanitary Sewer;
3. Infiltration into a Water Supply Aquifer; and
4. Onsite Capture and Use.

The identification and feasibility screening for Lakes and Reservoirs, Storm Drain Diversions to Sanitary Sewer, Infiltration into a Water Supply Aquifer and Onsite Capture and Use projects is provided in the Monterey Peninsula Water Recovery Study Report (Geosyntec, 2018, provided as Appendix D). Lakes and Reservoirs and Storm Drain Diversions to Sanitary Sewer could both be categorized as diversion projects for use by existing water recycling projects.

The identification of Infiltration into a Water Supply Aquifer projects and Onsite Capture and Use projects were partially completed as part of the GIS analysis conducted for the entire Planning Area (described in Sections 5.3.2 and 5.3.3). For identification of these projects, the following GIS analyses steps were completed:

1. Public and private parcels with the following attributes were identified as potential Infiltration into a Water Supply Aquifer projects:
   a. Majority of the parcel overlying a Water Supply Aquifer (the Carmel Valley Alluvial Aquifer or the Seaside Groundwater Basin); and
   b. Land use/land cover that is either vacant, open space, irrigated, or flat impervious cover (e.g., parking lot, tennis court) using aerial imagery in GIS. Buildings, beach, and wooded areas were considered not feasible for infiltration.
2. Public and private parcels with the following attributes were identified as potential Onsite Capture and Use projects:
   a. Not identified as a potential Infiltration into Water Supply Aquifer project, unless a cemetery or golf course;
   b. Irrigated park or recreation area; and
   c. Area to house a capture and use facility that can capture sufficient upstream flows to support irrigation demand onsite.

These project opportunity locations were further screened for inclusion in the Water Recovery Study. Those public parcels that are screened as part of the Water Recovery Study and are found to not be feasible to support a Water Recovery project were included in the general SWRP.

5.3.5 Identified Project Database

Projects identified and classified through the methods described in the preceding sections were compiled into a database that includes all project information provided (for planned projects) as well as information identified as part of the GIS screening process. The resulting comprehensive project database is provided in Appendix E and was used as the basis for applying the project metrics-based multi-benefit evaluation. Details regarding project evaluation are provided in the following section.

5.4 Project Metrics-Based Multi-Benefit Evaluation

Potential project locations were evaluated using a quantitative metrics-based multi-benefit approach. The evaluation and scoring scheme proposed has been adapted from the method used to develop the Ventura Countywide Municipal Stormwater Resource Plan (Ventura Countywide Stormwater Quality Management Program, 2016) and the Stormwater Resource Plan for San Mateo County (San Mateo Countywide Water Pollution Prevention Program [SMCWPPP], 2017) and is consistent with the Storm Water Resource Plan Guidelines (SWRCB, 2015a). The quantitative metrics and qualitative components that are evaluated for each project are associated with the potential to provide the multiple benefits identified in the State's SWRP Guidance (i.e., water quality, water supply, flood control, environmental benefit, and community benefit) (SWRCB, 2015a).

5.4.1 Project Scoring

Based on all the information compiled in the identified project database, each project received a score using the point system provided in Table 10. There are two categories of project characteristics that receive points: Implementation Feasibility metrics and Performance metrics. A description of each scored project metric is provided.

The Implementation Feasibility category group includes scores for project characteristics that relate to the ease of implementation. These categories are assumed to apply to all multiple benefit categories (i.e., water quality, water supply, flood control, environmental, and community benefits). This includes the following scoring components related to project metrics:

- Parcel Area (for Regional/Parcel-Based Projects Only) – this scoring component provides more points for larger parcels, assuming that larger projects that capture more runoff would be more feasible on these parcels.
- Opportunity Location Slope – this scoring component is related to ease of construction and implementation. Flatter locations typically require less grading and hydraulic connection considerations.

The Performance category group includes scores for project components that relate to facility performance. This includes the following components:

- Number of Bus Stops (for ROW Projects Only) – the number of bus stops within a 50-foot buffer of the identified ROW centerline segment was used as an indicator of the potential for the site to also achieve trash management goals, as described in Section 4.3.

- Catchment Runoff Rate Associated with Drainage Area – the catchment runoff rate, provided in TELR, was used as an indicator of how much runoff could be captured at the site. This project component is assumed to apply to all benefit categories.
- Infiltration Feasibility – retention of runoff through percolation or infiltration is known to provide enhanced pollutant reduction, reestablishment of natural drainage, recharge potential, and reduction of runoff rates, among other beneficial outcomes. This project component was assumed to apply to all benefit categories.
- Water Recovery Project – Water Recovery Projects received points specific to water supply benefits.
- Estimated Water Supply Provided – increasing points (specific to water supply) were received based on potential water supply (as estimated through the Water Recovery Study).
- Pollutant Loading Rate Associated with Drainage Area – this scoring component is related to the influent pollutant load. Facilities that are located in catchments estimated to have higher pollutant loading rates (based on land use) have greater potential to reduce loads.
- Captures Runoff Ultimately Draining to ASBS or 303(d) – Listed Waterbodies – this scoring component is related to the ultimate discharge location. Facilities that capture runoff that could impact sensitive or impaired waterbodies received more points related to water quality.
- Removes Pollutants from Stormwater – water quality specific points were awarded to facilities designed as treatment control facilities.
- Provides Flood Control Benefits – flood control facilities received points specific to providing flood control benefits.
- Re-establishes Natural Water Drainage Systems or Develops, Restores, or Enhances Habitat and Open Space – hydromodification control, stream restoration, and habitat restoration projects received points specific to providing environmental benefits.
- Provides Community Enhancement – projects that specifically provide public use areas or public education components or are in a Disadvantaged Community[18] (DAC, see Figure 5) were given points specific to providing community benefit.

[18] A DAC is a community with an annual median household income that is less than 80 percent of the statewide annual median household income (Water Code §79505.5). The following four census tracts within the SWRP area are considered DACs:

Tract 127 (Monterey);
Tract 136 (Seaside);
Tract 137 (Seaside); and
Tract 140 (Seaside/Sand City).

Public or private land ownership was not used as a scored criterion (only applies to Water Recovery Study projects).

Lake and Reservoir and Storm Drain Diversions to Sanitary Sewer Projects had a maximum possible score of 24 points (slope and parcel area scores did not apply); ROW projects had a maximum score of 26 points (parcel area score did not apply); and all other projects had a maximum score of 28 points (though it is not expected that one project would be able to achieve the maximum score for all project metrics). A normalized project score was calculated for each project to allow for comparison to a 28-point scale. Although all considerations were weighted equally, there are more point categories specific to water supply and water quality to account for priorities in the region.

Table 10: Project Metrics-Based Multi-Benefit Evaluation Matrix

Project Scoring Metric	Benefit Addressed	Points		
		0	1	2
Parcel Area (For Regional/Parcel-Based Projects Only)	All	< 1 acre	1 - < 4 acres	> 4 acres
Number of Bus Stops (ROW Projects Only)	Water Quality	0	1	2 or more
Location Slope	All	7-10%	3-7%	0-3%
Catchment Runoff Rate Associated with Drainage Area	All	< 0.15 feet per year (ft/yr) (per TELR) or unavailable in TELR	0.15 ft/yr < runoff < 0.40 ft/year (per TELR)	> 0.40 ft/year (per TELR)
Infiltration Feasibility	All	No	Partial or Not Applicable[1]	Yes
Water Recovery Project	Water Supply	No	--	Yes
Estimated Water Supply Provided	Water Supply	0	> 0 ac-ft/yr to <5 ac-ft/yr	5+ ac-ft/yr 10+ ac-ft/yr (3 total points) 20+ ac-ft/yr (4 total points)
Pollutant Loading Rate[2] Associated with Drainage Area	Water Quality	<0.002 tons per acre-year (ton/ac-yr) (per TELR) or unavailable in TELR	0.002 – 0.02 ton/ac-yr (per TELR)	>0.02 ton/ac-yr (per TELR)
Captures Runoff Ultimately Draining to ASBS or 303(d) Listed Waterbodies	Water Quality	No	--	Yes
Removes Pollutants from Stormwater	Water Quality	--	Non-Green Infrastructure Treatment Control Facilities[3]	Green Infrastructure[4]

Project Scoring Metric	Benefit Addressed	Points		
		0	1	2
Provides Flood Control Benefits	Flood	--	Flood Control Facility sized to control smaller than 100-year event	Flood Control Facility sized to control 100-year event
Re-establishes Natural Water Drainage Systems or Develops, Restores, or Enhances Habitat and Open Space	Environmental	--	--	Stream Restoration, Hydromodification Control, or Habitat Restoration Project
Provides Community Enhancement	Community	--	--	Public Use Area or Public Education Project[5]
Provides Enhancement to DAC	Community	--	--	Project located in DAC

Notes:

1. Partial infiltration refers to project opportunity locations that are not identified as hazardous for infiltration, but when but the soil underlying the facility is relatively poorly draining (assumed to apply when underlying soil HSG is C or D). "Not Applicable" projects include those Water Recovery Study projects that would not be designed to include an infiltration component (e.g., Storm Drain Diversions to Sanitary Sewer), regardless of the underlying infiltration feasibility.
2. This corresponds to particulate loading rate provided in TELR.
3. Non-green infrastructure treatment control includes devices that utilize detention, hydrodynamic separation, or filtration for treatment (without vegetation).
4. Green infrastructure are treatment control measures such as bioretention, rain gardens, planter boxes, or other vegetated facilities; infiltration-based facilities; and rainwater harvest and use measures.
5. This includes improvements or enhancements to public use areas or public education projects or added project features.

All project scores were documented in a project database (see Appendix E), which sorts projects based on their score. Narrative descriptions of community benefits claimed by each applicable project are also provided in Appendix E. Preliminary project lists were developed for cooperating entities, interested parties, and stakeholders for input on ranking and prioritization. Results of the identification, metrics-based multi-benefit analysis, and project prioritization are provided in Section 6. The method for selecting the top seven projects for development of concept designs, along with descriptions of those projects, is also provided in Section 6.

6. IDENTIFICATION AND PRIORITIZATION OF PROJECTS

This section presents the results of the project identification, analysis, prioritization, and selection process. The process included the following steps:

1. Identify project opportunities and perform a metrics-based evaluation to obtain a preliminary project "score."
2. Send project opportunities and preliminary scores to project opportunity location organizations to perform project prioritization and rank projects. Following prioritization by identified organizations, compile revised master project database, incorporating rankings from organizations performing prioritization.
3. Send revised master project database with project rankings to Monterey Peninsula Stakeholder Group to obtain feedback. Document stakeholder feedback in or accompanying master project database, Appendix E, and send to the TAC for selection of the top seven projects for preparation of 10% project concept design.
4. Finalize selection of seven projects for concept designs. Select one of the seven projects for preparation of a 30% design and CEQA Checklist.

These steps are described in further detail in the subsequent sections.

6.1 <u>Identified Projects</u>

6.1.1 Project Opportunities Identified in Existing Plans

Planned projects received from the cooperating entities, interested parties, and stakeholders were in various planning stages, ranging from a preliminary idea to the design stage, and consisted of a variety of project types. A total of 84 planned projects were received from 17 entities. Planned projects were processed to account for duplicates and overlapping projects.

6.1.2 Additional Potential Project Opportunities and Feasibility Analysis

Stormwater capture projects located on publicly- and privately-owned parcels that could provide water supply augmentation were identified through the Monterey Peninsula Water Recovery Study. A total of 241 Water Recovery Study projects were identified (this includes some of the planned projects provided by project proponents).

In addition to those projects identified through the Water Recovery Study, the desktop geospatial opportunity analysis described in Section 5 identified a total of 377 parcel-based, 61 regional, and 1,609 ROW projects in the Monterey Peninsula region.

6.1.3 List of Potential Project Opportunities

The Final Project Database is provided in Appendix E. All projects identified would detain (i.e., provide “peak shaving” of the urban hydrograph) or retain (through infiltration or capture and reuse) urban stormwater and dry weather flows that drain towards the Pacific Ocean, thereby partially restoring natural drainage patterns. Approximately 26 projects help to re-establish natural water drainage systems or develop, restore, or enhance habitat and open space by specifically including stream restoration, hydromodification control, or habitat restoration. Approximately 2,205 projects (97% of the total number of projects) are associated with publicly owned lands to capture, clean, store, or use stormwater and dry weather runoff. No new or redevelopment projects were identified as part of this plan, although these projects could be amended to the SWRP in the future. MRSWMP has a Stormwater Technical Guide for Low Impact Development (MRSWMP, 2015) that provides additional resources for new or redevelopment projects that must implement LID measures per the CCRWQCB PCRs. This Stormwater Technical Guide provides design criteria and types of BMPs to be used for such projects (MRSWMP, 2015).

6.2 Results of Integrated Metrics-Based Multi-Benefit Analysis and Prioritized List of Potential Projects

Following completion of the metrics-based multi-benefit evaluation, as detailed in Section 5.4, the projects were compiled into one master database (in Excel format) as well as agency-specific databases. The master and agency-specific databases included information about the project location and scoring, along with the final ‘scores’ resulting from the metrics-based multi-benefit evaluation. These agency-specific databases were sent to the following entities for prioritization:

Table 11: Agencies Performing Project Prioritization

Cooperating Entities	Other Agencies
City of Monterey	Monterey Peninsula Airport District
City of Seaside	Carmel Area Wastewater District
City of Sand City	Fort Ord Reuse Authority
City of Carmel-By-The-Sea	Monterey Peninsula Regional Park District
City of Pacific Grove	California State University Monterey Bay (state/federal)
City of Del Rey Oaks	State of CA Department of Parks and Recreation (state/federal)
County of Monterey	United States Army Garrison / Presidio of Monterey

All cooperating entities, including those listed in Table 11 as well as Monterey One Water and the Monterey Peninsula Water Management District, also received the full compiled preliminary project database. The full compiled project database is included as a tab in the Final Project Database, provided as Appendix E.

The agencies were asked to consider multiple criteria when ranking their projects, such as cost considerations, opportunity considerations, labor/staff considerations, multiple benefit assessments, safety and security considerations, and implementation considerations. Entities were requested to provide their project ranking along with the reasoning for the ranking. Rankings provided by each of the organizations performing prioritization were compiled into a Stakeholder Project Database with the full compiled preliminary project database. The prioritization feedback received from each agency is also provided in the Final Project Database included as Appendix E.

The Stakeholder Project Database also contained a tab of top ranked projects, which included the top-ranked 2% (rounding up) of projects from all the agencies. For agencies that did not provide prioritization feedback, only the preliminary project scores were considered. A total of 53 projects were identified for inclusion in the top ranked projects. The Stakeholder Project Database was provided to the Monterey Peninsula Stakeholder Group on February 6, 2018 and discussed at the Stakeholder Group meeting on February 8, 2018, with an emphasis on receiving input from the stakeholders on selecting projects for concept design. The top ranked projects tab provided to the Stakeholder Group is included in the Final Project Database included as Appendix E.

6.3 Selected Project Concept Designs and Quantitative Analysis of Project Benefits

The TAC selected seven projects for concept design during the third TAC meeting, held on February 22, 2018, by considering the preliminary project scores, the agency rankings, input from the Monterey Peninsula Stakeholder Group, and other local and institutional knowledge. Based on Stakeholder Group and TAC input and comments, the primary factor in project selection was to capture as much usable water as possible to help meet dry weather recycled water demands and augment water supply at other time with prior authorization from Monterey One Water. The project selection for 10% concept and 30% design was finalized through email communication with the TAC over the four weeks following the meeting.

The seven selected projects for concept design are briefly described below and are also included in the “Selected Projects” tab of the Final Project Database, provided as Appendix E. The descriptions below include how each project or program will contribute to the preservation, restoration, or enhancement of watershed processes. Concept designs and additional information about each project, including multi-benefit descriptions, are provided in Appendix F. The top project selected, Hartnell Gulch, was also developed into a 30% design and a preliminary CEQA checklist was completed for it. Hartnell Gulch project description, including multi-benefit descriptions, concept designs and preliminary CEQA checklist are provided as Appendix G. Coastal areas of Monterey are areas of high sensitivity for archaeological, cultural, historical, and Native American resources and the projects will evaluate these resources in future phases of project development.

6.3.1 Hartnell Gulch Restoration and Runoff Diversion

The Hartnell Gulch Restoration and Runoff Diversion project, a proposed diversion to sanitary sewer and creek restoration project, is in the City of Monterey. The project would install a pump to divert underground seepage and dry weather flows into the sanitary sewer. The restoration component would consist of removal of invasive plants, revegetation with native plants, and stabilization of the existing eroded channel. A portion of the approximately 1,100-acre tributary drainage area is in a DAC tract. The project is estimated to achieve between 20 to 100 ac-ft/yr of water supply. Project concept design and preliminary CEQA checklist is provided in Appendix G. This project was also developed into a 30% design, which is provided in Appendix G. The project claims the community benefit “Provides Enhancement to DAC”, as the project is located in a DAC.

6.3.2 Lake El Estero Diversion to Sanitary Sewer

The Lake El Estero Diversion to Sanitary Sewer project is in the City of Monterey. This is a lake project that would augment water supply via a diversion to sanitary sewer and remove urban stormwater and dry weather flows that are currently discharged to Monterey Bay, thereby partially restoring natural drainage patterns and treating any urban pollutants that are associated with the diverted flows. The project would install a diversion valve from the box culvert on the north side of the lake to divert flows into the sanitary sewer system, instead of discharging into Monterey Bay. The project is estimated to achieve over 100 ac-ft/yr of water supply from the approximately 3,670-acre tributary drainage area. The project does not claim a direct environmental or community benefit, but will provide ancillary benefits to the community as it provides a source of alternative water supply.

6.3.3 Monterey Tunnel Stormwater Diversion

The Monterey Tunnel Stormwater Diversion project is in the City of Monterey. The project would divert flows from the downtown Tunnel and Oliver Street storm drain gravity pipe to the sanitary sewer instead of discharging it into Monterey Bay. This would remove dry weather flows that are currently discharged to Monterey Bay, thereby partially restoring natural drainage patterns and treating any urban pollutants that are associated with the diverted flows. The project is estimated to achieve from 10 to 20 ac-ft/yr of water supply from the approximately 150-acre tributary drainage area. The project does not claim a direct environmental or community benefit, but will provide ancillary benefits to the community as it provides a source of alternative water supply.

6.3.4 Carmel-by-the-Sea Stormwater Diversion

Located in the City of Carmel-by-the-Sea, the Stormwater Diversion project would divert dry weather runoff and wet weather first flush flows from the inland storm drain network to the sanitary sewer along San Antonio Avenue for treatment and reuse for golf course irrigation. This would remove urban stormwater and dry weather flows that are currently discharged to the Carmel Bay

ASBS region, thereby partially restoring natural drainage patterns (providing some environmental benefit) and treating any urban pollutants that are associated with the diverted flows. The project is estimated to achieve between 10 to 20 ac-ft/yr of water supply from its approximately 310-acre tributary drainage area. The project does not claim a direct community benefit, but will provide ancillary benefits to the community as it provides a source of alternative water supply.

6.3.5 Pacific Grove-Monterey ASBS Watershed – David Avenue Stormwater Storage and Diversion

The Pacific Grove-Monterey ASBS Watershed – David Avenue Stormwater Storage and Diversion project is in the City of Pacific Grove. This project would store wet weather and dry weather flows for diversion to the Pacific Grove storm drain network instead of discharging runoff into Monterey Bay and the Pacific Grove ASBS region, thereby partially restoring natural drainage patterns in this tributary area and treating any urban pollutants that are associated with the diverted flows. This project is estimated to achieve from 10 to 20 ac-ft/yr of water supply from its approximately 100-acre tributary drainage area. The project does not claim a direct environmental or community benefit, but will provide ancillary benefits to the community as it provides a source of alternative water supply.

6.3.6 Del Monte Manor Park Infiltration

The Del Monte Manor Park Infiltration Project in the City of Seaside is a regional infiltration project. The project includes open space park improvements and flood management to infiltrate runoff from the surrounding ROW. This would remove urban stormwater and dry weather flows that are currently discharged to the Pacific Ocean through infiltration, thereby partially restoring natural drainage patterns, providing an environmental benefit, and removing any urban pollutants that are associated with the infiltrated flows. The project will provide indirect benefits of infiltrating 5 to 10 ac-ft/yr of urban runoff above a potable water supply aquifer from its approximately 25-acre tributary drainage area that contains a DAC. The project claims the community benefits “Provides Community Enhancement”, as it includes open space park improvements, along with “Provides Enhancement to DAC”, as the project is located in a DAC.

6.3.7 Drywell Aquifer Recharge Program

The Drywell Aquifer Recharge Program in the City of Seaside, with support from regional partners, would focus on using drywells to recharge urban runoff to a primary water supply aquifer. The program would recommend potential locations where flows could be diverted from surface ditches or within the storm drain network to a water quality pretreatment system that will discharge to a drywell above the domestic supply aquifers in the Seaside Groundwater Basin. This would remove urban stormwater and dry weather flows that are currently discharged to the Pacific Ocean through infiltration, thereby partially restoring natural drainage patterns and removing any urban pollutants that are associated with the infiltrated flows. The project is estimated to achieve between

20 to 100 ac-ft/yr of water supply. The project claims the community benefit “Provides Enhancement to DAC” as the project is located in a DAC.

6.4 Development of Project Concept Designs

Project concept designs include the following components:

1. Project location;
2. Project drainage area;
3. Project facility type;
4. Project inlet/outlet locations;
5. The proposed location of conveyance associated with the project; and
6. Quantification of project benefits, including water supply and pollutant load reduced.

Quantification of project benefits utilized a conceptual-level modeling approach. Both wet and dry weather runoff were considered. For projects capturing dry weather runoff, estimated benefits were quantified by extrapolating dry weather yield results from previously implemented and evaluated projects, including the Pacific Grove ASBS project and checked with ranges from other studies in southern California (IRWD, 2004 and County of Orange, 2017).

For projects capturing stormwater runoff, estimated benefits were quantified by utilizing previous technical studies available and calculations of wet weather runoff recovery. To obtain an estimate of average annual wet weather volume captured and recovered, the range of potential capture was modeled as a function of catchment hydrology, facility configuration, and drawdown rate. Results from hydrologic models were displayed in a nomograph, developed using continuous hydrologic simulation with USEPA’s SWMM. Nomographs were developed for catchments with impervious percent of 25%, 50%, 75%, and 100%; catchment soils comprised of HSG A and HSG B/C/D; and drawdown times of 12 hours, 1 day, 2 days, 3 days, 1 week, 1 month, 6 months, and 1 year. An example nomograph and modeling details are provided in Appendix D.

Using the nomographs developed, the net average annual wet weather volume captured and recovered was then estimated using the following steps for each relevant facility:

1. Calculate facility drawdown time (days) by dividing the live storage volume available (i.e., storage volume above a permanent pool) by the sum of the facility’s discharge rates (i.e., percolation, capture and use, and diversion).
2. Calculate the unit stormwater runoff depth (acre-feet per acre per year) and percent capture using the nomographs for the four points surrounding the project’s imperviousness and drawdown time and apply four-point linear interpolation.

3. Multiply the annual stormwater runoff depth (acre-feet per acre) by the tributary area (acres) to calculate annual wet weather runoff captured (ac-ft/yr). For comparison, annual stormwater capture was also estimated by multiplying the calculated percent capture by the average annual stormwater runoff using the simplified runoff equation referenced in the Central Coast Joint Effort[19] (CCRWQCB, 2013).
4. Subtract the proposed annual wet weather runoff captured and recovered by that of the existing condition (if applicable) to calculate the net annual wet weather runoff recovered.

The runoff produced from the first flush stormwater event was assumed to be equivalent to the runoff generated from the 85th percentile rainfall event. The runoff corresponding to this first flush/ 85th percentile rain event was calculated in accordance with numeric sizing criteria in the Phase II Permit.

Water quality benefits were estimated for wet season runoff using TELR, where total suspended solids (TSS) is used as a surrogate for several water quality constituents (i.e., reductions in TSS concentrations or loads are often proportional to reductions in other particulate-associated water quality constituents). Estimated TSS load reduced for projects was calculated based on an area-weighted TSS loading rate for TELR catchments in the drainage area.

Projects are not part of new/re-development and thus are not required to meet Phase II Permit volumetric capture requirements. Projects were sized to maximize capture for water recovery within the area available for facility construction. The projects are anticipated to be analyzed as part of CCRWQCB PEAIP requirements. The watershed-based outcomes calculated through the runoff and water quality estimates described above are included on the concept designs provided in Appendix F (Hartnell Gulch provided in Appendix G).

[19] Average annual wet weather runoff was calculated based on multiplying a runoff coefficient (per Attachment 1 of Central Coast Regional Water Board's Resolution No. R3-2013-0032) by a conservatively low mean annual precipitation (12.8 inches), and the tributary area.

7. IMPLEMENTATION STRATEGY AND SCHEDULE

7.1 Resources for Plan and Project Implementation

7.1.1 Resources for Plan Adoption and Adaptive Management

Monterey One Water was the lead entity in the preparation of this SWRP on behalf of MRSWMP, including Monterey County and six incorporated cities within the County: Carmel-by-the-Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City and Seaside. It is anticipated that Monterey One Water and MRSWMP will facilitate future SWRP updates and ongoing adaptive management. The MRSWMP agencies regularly meet to discuss stormwater management, water quality concerns, and other regulatory matters within the Monterey Peninsula region. As part of ongoing management, these regular meetings may include a SWRP meeting agenda item as needed to discuss potential updates to the SWRP and how to prepare and fund the updates.

7.1.2 Resources for Project Implementation

Funding for implementation of projects included in this SWRP will be obtained by the municipal agency, partnership of agencies, or other stakeholder project sponsors capable of implementing the identified projects. Projects identified in this SWRP may be implemented as funding opportunities become available and funds are awarded or allocated to the project.

Sources of project funding may include grants, bond measures, local capital improvement program (CIP) budgets, local revenue streams such as utility rates or fees, and/or other funding mechanisms. Currently projected sources of grant funding include:

- Round 2 of Proposition 1 stormwater implementation grant funding (solicitation expected in early 2020);
- Round 1 of Proposition 1 IRWM implementation grant funding
- Other state bond-funded grants as they become available.

Another potential funding mechanism is through partnerships with Caltrans to fund regional projects that include Caltrans drainage areas.

7.2 Plan Implementation

7.2.1 Timeline for Incorporating the SWRP into the IRWMP

As discussed in Section 2, this SWRP is being prepared in close collaboration with the Monterey Peninsula, Carmel Bay, and South Monterey Bay RWMG. The RWMG is the entity tasked with developing and implementing the IRWMP, reviewing projects submitted to the plan, and choosing which projects to put forward for funding. The RWMG includes many of the same agencies that are cooperating entities or interested parties in the development of this SWRP. The RWMG lead is the MPWMD.

Monterey One Water coordinated with the RWMG on incorporation of this SWRP into the Monterey Peninsula IRWMP. The SWRP was introduced to the RWMG at a meeting on November 1, 2018 and the SWRP was unanimously accepted for inclusion in the IRWMP as an appendix. As IRWMP project solicitation processes occur (in response to timelines for available IRWMP grant funding), projects listed in the final SWRP may be proposed by sponsoring entities, vetted and scored through the IRWMP project prioritization process, and included as part of the IRWMP project list as appropriate. The IRWMP decision support tools, including a description of the project review process and weighting of compliance factors, the project application, and the project solicitation schedule, are provided in Appendix I to this plan.

7.2.2 Actions, Projects, and Studies for SWRP Implementation

This SWRP identifies seven project concepts and additional project opportunities for which concepts can be developed prior to seeking funding. Identified project opportunities and project concepts are described in Section 6. As funding becomes available, sponsoring entities will take the necessary actions to design and construct the projects. While these project opportunities can provide multiple benefits that support their implementation, integrated regional water management planning and the water supply needs of the region will likely drive decision-making analyses for funding, in addition to the stormwater management and permit compliance needs of the MRSWMP agencies.

The Monterey Peninsula Water Recovery Study, developed concurrently with the SWRP, evaluated the feasibility of establishing a Peninsula-wide water recovery and reclamation system, and identified and evaluated potential projects to capture wet weather and dry weather runoff within the Planning Area. The study provided several potential projects for consideration in the SWRP. Due to the inherent water supply benefits of these potential projects, the projects scored well on the SWRP prioritized projects list and were ranked highly by the participating entities. As a result, all the projects selected for concept design and quantification of benefits in the SWRP are water recovery projects and will be considered for implementation when funding is available.

7.2.3 Entities Responsible for Project Implementation

The primary entity responsible for project implementation, should funding become available, is listed with each of the priority projects included in the SWRP list of projects. However, if other jurisdictions or agencies are located within a project drainage area, partnerships may be developed to support project funding and implementation.

7.2.4 Community Participation Strategy for SWRP Implementation

The inclusive stakeholder participation strategy that supported development of the Monterey Peninsula SWRP, described in SWMP Section 8, will provide a strong basis for continued community participation during SWRP implementation. The SWRP has been made available to the public on the MRSWMP[20], and IRWMP[21] websites, and a mechanism is provided for community members to submit new project ideas as they are developed. It is also anticipated that outreach and solicitation for new stakeholder projects would occur routinely with SWRP updates.

Community participation will also occur during individual project implementation, which will focus on the community where the project is located. Each project will include its own public participation process to address the concerns of affected residents and businesses and adjust project designs as appropriate and feasible.

SWRP projects will provide an ideal opportunity to showcase the many benefits of green infrastructure, particularly regarding stormwater capture, reduced local flooding, urban greening, and other features and functionality that will serve the community. With proper educational tools such as interpretive signage, the public can also gain a better understanding of how the project provides opportunities to capture, treat, and conserve water. As a result, constructed projects will provide a mechanism for community participation and education that will help garner support for additional projects implemented over time.

7.2.5 Procedures to Track the Status of SWRP Implementation

As discussed in Section 7.3 below, this SWRP will be updated over time by MRSWMP, in coordination with updates to the IRWMP and at intervals that are aligned with stormwater regulatory requirements, grant program solicitations, and community interests. The status of project implementation will be tracked by the lead agency for the project and will be incorporated into the SWRP when it is updated.

7.2.6 Potential Timelines and Cost Estimates for Implementing Identified Project Opportunities

As described in section 6.1, the SWRP project identification and prioritization process resulted in a total of 2,289 potential and planned project opportunities, included in Appendix E. Of these, seven projects were identified as top priority projects and developed into concept designs; one of the seven was developed into a 30% design and a CEQA checklist was completed. Section 6 and Appendix H include descriptions of the seven top prioritized projects. As funding sources are identified, project concepts will be incorporated into the responsible jurisdiction's CIP for detailed

[20] http://montereysea.org/stormwater-resource-plan/.
[21] http://www.mpirwm.org/Pages/default.aspx

design and construction. Project management documents for these CIP projects will identify project-specific implementation schedules. Table 12 below provides the status and potential timeline for each top prioritized project for which a concept was developed.

Table 12: Project Concept Status and Potential Timeline

Permittee	Project Name	Project Status	Total Estimated Cost	Anticipated Funding Timeline	Anticipated Design Completion Timeline	Anticipated Construction Timeline
Monterey	1. Hartnell Gulch Restoration and Runoff Diversion	30% Design/ CEQA Checklist Complete	$1,300,000	2020/21	2021/22	2022/23
Monterey	2. Lake El Estero Diversion to Sanitary Sewer	10% Concept Design	$320,000	2022/23	2023/24	2024/25
Monterey	3. Monterey Tunnel Stormwater Diversion	10% Concept Design	$190,000	2022/23	2023/24	2024/25
Carmel-by-the-Sea	4. Carmel-by-the-Sea Stormwater Diversion	10% Concept Design	$750,000	2020/21	2021/22	2022/23
Pacific Grove and Monterey	5. Pacific Grove Monterey ASBS Watershed – David Avenue Stormwater Storage and Diversion	10% Concept Design	$9,800,000	2022/23	2023/24	2024/25
Seaside	6. Del Monte Manor Park Infiltration	10% Concept Design	$330,000	2019/20	2020/21	2021/22
Seaside (with regional partners)	7. Dry Well Aquifer Recharge Program[1]	10% Concept Design	$4,300,000	2022/23	2023/24	2024/25

[1] For the Seaside and regional partner Dry Well Aquifer Recharge Program, the estimated full program cost is provided; however, a smaller portion of the program may be implemented by the proposed timeline. The portion of the project that may be implemented is dependent on coordination with regional partners, outcomes of technical feasibility studies, stakeholder input, potential permits needed, and other project investigations.

Appendix E includes additional project opportunities for which concepts can be developed prior to seeking funding. The estimated costs of implementing these additional project opportunities depends on a number of factors, including location, site conditions, project size, administrative costs, project scale, infrastructure upgrades, and other components. For the purpose of estimating the cost of implementation, it was assumed that approximately 1% of the project opportunities identified as part of the SWRP will be implemented over the next 20 years (i.e., the top 23 prioritized projects of the 2,289 projects identified), and will therefore have a need for grant funding assistance. These 23 projects include the top seven projects for which concepts were developed as part of this SWRP, as well as 16 additional projects identified based on project proponent ranking and project metrics-based multi-benefit analysis score. The additional 16 projects included in the cost analysis require additional feasibility analysis (including physical, permitting, administrative, and stakeholder input -based feasibility, among other project analyses) prior to developing concepts, and may or may not ultimately be found to be feasible for implementation. However, the combined top 23 projects used for the cost analysis should be considered representative of the potential composition of projects that could be implemented within the next 20 years, should funding be available and secured.

The 23 projects identified for the implementation costs analysis, along with the estimated costs associated with each, are provided in a tab titled "Top 1% Projects – Costs" in the Appendix E Project Database. Preliminary planning level cost estimates for implementing these 23 projects were developed according to three project categorizations:

- Top prioritized projects, for which concept costs were developed (i.e., the top seven projects, see Appendices F and G for project descriptions and detailed costs);
- Water recovery projects, for which a range of capital costs were developed as described in Appendix D, the Water Recovery Study; and
- Green Infrastructure projects, for which cost range was developed based on a statistical analyses of green infrastructure project costs compiled from Caltrans, nine northern and southern California cities, and Bay Area Stormwater Management Agencies Association pilot projects, and Southern California Enhanced Watershed Management Plan summaries.

A summary of the cost ranges associated with each category are provided in Table 13.

Table 13: Project Concept Status and Potential Timeline

Project Type	Number of Projects	Estimated Net Recovered Water Volume (acre-feet/year)	Assumed Drainage Area (Acres)[1]	Total Estimated Capital Cost (Low)	Total Estimated Capital Cost (High)
Top Prioritized Projects[2]	7	290	6,221	$16,990,000	$16,990,000
Water Recovery Projects[3]	8	1,047	19,124	$23,300,000	$93,000,000
Green Infrastructure[4]	8	--	184	$9,282,000	$32,658,000
Total	**23**	**1,337**	**25,529**	**$49,572,000**	**$142,648,000**

[1] Drainage area represents the tributary area from which runoff is assumed to be captured; however, for water recovery study projects, only a small percentage of total runoff may be estimated to be captured, depending on the assumed project design. The anticipated runoff capture for these projects is described in Appendices F and G for the top prioritized projects, and in the Water Recovery Study (Appendix D) for other water recovery projects. Green infrastructure projects are assumed to be sized to meet MS4 water quality requirements.
[2] Preliminary cost estimates have been developed for these projects, so a range is not provided.
[3] Costs developed based on the range of capital costs provided in Appendix D, the Water Recovery Study.
[4] Costs developed based on a statistical analysis of available green infrastructure projects; the low costs represent the 25th percentile unit (i.e., per acre) cost values, the high costs represent the 75th percentile unit costs.

The top 1% of projects for which costs were developed are assumed to be implemented at an approximately equal rate for each five-year period over the next 20 years. To develop anticipated funding needs for the five year periods between 2020 and 2040, the top seven prioritized projects are assumed to be implemented first, and the remaining sixteen projects are distributed thereafter. The anticipated funding needed to meet this project implementation rate for each five year period is provided in Table 14 below.

Table 14: Estimated Funding Needs for Five-Year Increments 2020 - 2040

Five-year Period	2020-2024	2025-2029	2030-2034	2035-2039
Number of Projects	6	5	7	5
Estimated Cost (Low)	$12,690,000	$15,618,000	$7,824,000	$13,440,000
Estimated Cost (High)	$12,690,000	$45,306,000	$45,838,000	$38,815,000

Project proponents will be responsible for tracking the implementation status of their projects and documenting performance measures for completed projects as described in Section 7.4. The cost to implement all 2,289 SWRP projects included in this plan, should detailed project investigation find feasibility favorable and funding secured, is estimated to range from $670,000,000 to $3,020,000,000 (see Appendix E for cost ranges for each project). Feasible and funded SWRP projects would be anticipated to be implemented by 2120.

7.2.7 Strategy and Timeline for Obtaining Necessary Federal, State, and Local Permits

As funding is identified for projects, the initial task for project implementation will involve a planning phase that will identify necessary permits. All necessary federal, state, and local permits will be obtained by project proponents as needed for project implementation.

7.3 Adaptive Management – Maintaining a Living Document

This SWRP will be updated over time to incorporate additional multi-benefit projects that may be identified after completion of the SWRP. MRSWMP will be responsible for maintaining and updating the SWRP, in coordination with updates to the IRWMP, and at intervals that are aligned with stormwater regulatory requirements, grant program solicitations, and community interests.

This SWRP will be posted on the MRSWMP[22] and IRWMP[23] websites, along with clear procedures for updating or adding future projects. A form has been provided on the websites for agencies and community members to submit project ideas. It is also anticipated that outreach and solicitation for new stakeholder projects would occur routinely with SWRP updates.

In addition to updating the project list, the SWRP may also be revised to reflect changing conditions in local watersheds and knowledge gained through stormwater program implementation, including programs to address TMDL and ASBS requirements. Ongoing adaptations to the SWRP may include and/or be influenced by:

- Re-characterization of water quality priorities;
- Source assessment re-evaluations;
- Project effectiveness assessments;
- An updated metrics-based, quantitative analysis;
- Deleted or new projects;
- Identification of completed projects; and/or
- Modified statutory/stormwater permit requirements (e.g., a new TMDL).

As projects are implemented and lessons learned through wider scale integration of stormwater capture projects within traditional infrastructure, this SWRP will be periodically updated to provide revisions to the project implementation plan. This is expected to occur approximately once

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[22] http://montereysea.org/stormwater-resource-plan/.
[23] http://www.mpirwm.org/Pages/default.aspx

every five years, coinciding with the five-year cycle for updates to the Small MS4 (Phase II) General Permit.

Data related to implemented projects will be stored and made available through the TELR project tracking tool, which will be used to track all projects relevant to MS4 compliance (currently in development). All implementation and monitoring data collected for MRSWMP, including those data related to identified SWRP projects, is reported in MRSWMP Annual Reports, which are available publicly at http://montereysea.org/program-documents/.

Any future projects that may be required to meet new or redevelopment requirements will refer to the Stormwater Technical Guide for Low Impact Development, which provides design criteria and types of BMPs to be used for new or redevelopment (MRSWMP, 2015).

7.4 Implementation Performance Measures

The project concepts and the analyses performed for the Water Recovery Study and the SWRP estimated expected outcomes, or benefits, of the projects included in this SWRP. These outcomes include water supply augmentation and water quality benefits, in addition to the other benefit categories of flood management, community, and environmental benefits. For example, this SWRP provides quantitative estimates for each of the seven concept projects of the volume of water supply that may be provided and the load of a pollutant that may be removed from the receiving water. In addition, for all project opportunities identified in this SWRP, an estimated range of expected water supply benefits (in ac-ft/yr) is provided and a qualitative yes/no assessment for pollutant load reduced.

Extensive surface water and groundwater monitoring is currently being conducted throughout the Planning Area, and this ongoing monitoring will continue. The significant monitoring efforts currently being conducted are intended to assess the quantity and quality of groundwater used for water supply purposes, the overall health of receiving water quality, the quality of stormwater discharges, the impacts of MS4 discharges on receiving waters, and compliance with TMDLs and water quality objectives. Ongoing monitoring results will be analyzed as needed to evaluate how actual project specific performance compares with the expected outcomes of the SWRP. If needed, SWRP implementation may be adjusted based on performance data collected, such that project types with monitoring data showing effective performance are prioritized. The need for additional project specific performance evaluation monitoring will be determined during the project design phase. Grant funded projects may be expected to implement performance monitoring if required by the grant agreement.

8. EDUCATION, OUTREACH, AND PUBLIC PARTICIPATION

8.1 Goals of Outreach, Education, and Public Participation

Meaningful public participation goals, objectives, and strategies are critical to involving the public in the process of recommending and pursuing projects and programs in their communities. A SWRP Stakeholder Outreach, Education, and Engagement Plan (Stakeholder Plan) was prepared to coordinate and guide outreach activities to involve stakeholders in the development of the SWRP and obtain input on water resource issues that are important to them. Stakeholders include the general public, federal agencies, state agencies, local municipalities, water retailers, water/wastewater districts, community groups, business associations, and disadvantaged communities. The Stakeholder Plan identified the goals of stakeholder involvement and described the tasks that would be implemented to conduct outreach to stakeholders.

Stakeholder outreach for the SWRP was conducted to meet the following goals:

1. Inform stakeholders on the SWRP process and the need for stormwater capture and treatment projects.
2. Obtain stakeholder input in identifying locations and types of stormwater capture and treatment projects.
3. Obtain feedback on the initial prioritized list of potential projects.
4. Obtain comments on and support for the SWRP.
5. Obtain feedback on environmental justice needs and concerns associated with SWRP implementation.

8.2 Key Messages

The following key messages were conveyed to stakeholders:

- Benefits of using stormwater as a resource;
- Purpose and content of the SWRP;
- Need for stormwater capture and treatment projects; and
- Process for identifying, assessing, and prioritizing stormwater capture and treatment projects.

8.3 Stakeholder Outreach, Education, and Engagement Tasks

This section describes the tasks that were implemented to meet the goals of stakeholder outreach.

8.3.1 Stakeholder Group Formation

Stakeholder outreach was built upon the work done by the Monterey Peninsula RWMG[24] to develop the Monterey Peninsula IRWMP. As part of developing the Monterey Peninsula IRWMP, the RWMG identified and contacted 130 stakeholders, representing public agencies, local municipalities and special districts, environmental non-profits, community groups, academic educational institutions, private companies, landowners, and individuals. The SWRP project team obtained the IRWMP stakeholder contact list and updated it based on feedback from TAC members to develop the potential Stakeholder List included in Appendix H.

To ensure that DACs were well-represented on the Stakeholder Group, lists of potential DAC stakeholders were obtained from the City of Seaside, and included in the potential SWRP Stakeholder List. The following four census tracts within the SWRP area are considered DACs:

- Tract 127 (Monterey);
- Tract 136 (Seaside);
- Tract 137 (Seaside); and
- Tract 140 (Seaside/Sand City).

In addition to the above, participants on the Technical Stakeholder Group for the Water Recovery Study were also invited to participate on the SWRP Stakeholder Group. The Stakeholder List was updated, as needed, throughout the SWRP process.

8.3.2 Stakeholder Group Information Requests and Meetings

All individuals on the Stakeholder List were informed about the SWRP via multiple emails and invited to attend the Stakeholder Group meetings. Stakeholders representing DACs were also mailed postcards with information on the first meeting. Two Stakeholder Group meetings were held to share information and solicit input on the SWRP:

- The first meeting, held on October 17, 2017, introduced the Stakeholder Group to the SWRP planning process, provided information on the metrics and methodology for identifying, assessing, and prioritizing potential projects, presented preliminary findings from the Water Recovery Project Feasibility Study, and provided opportunities for stakeholders to submit project ideas. After the first meeting, the stakeholders were emailed a spreadsheet for submitting information regarding stakeholder-planned projects relevant

[24] The RWMG includes Big Sur Land Trust, City of Monterey, Monterey Peninsula Water Management District, Monterey County Water Resources Agency, Monterey One Water, Marina Coast Water District, and Resource Conservation District of Monterey County.

to the SWRP. Stakeholders were also encouraged to provide comments on the methodology for prioritizing projects.

- The second meeting, held on February 8, 2018, presented the prioritized list of multi-benefit stormwater capture projects to stakeholders, and requested their feedback on the top ranked projects. Stakeholders were also requested to provide input on project characteristics that should be considered for identifying top projects.

8.3.3 Public Outreach Meeting

One public meeting was held on June 27, 2018 to present the Public Draft SWRP to stakeholders and the public to obtain their feedback. All individuals on the Stakeholder List were invited to attend the meeting. A bilingual flyer (English and Spanish) advertising the public outreach meeting was developed and distributed via email and community center postings. In addition, a public meeting notice was published in the Monterey County Weekly newspaper. The public outreach meeting materials are provided in Appendix H.

8.3.4 Public Involvement in the Implementation of the SWRP and Completion of Projects

Following completion of the final SWRP, further input will be sought from residents and businesses in affected communities as individual projects are planned, designed, and constructed. As described in Section 7.2.4, each project will include its own public participation process to address the concerns of affected residents and businesses and adjust project designs as appropriate and feasible. This step will increase stakeholder involvement in the project design and develop partnerships needed for implementation and operation and maintenance. Mechanisms for public engagement may include the following:

- Posting project information on local agency websites.
- Including articles on individual projects in local agency newsletters.
- Distributing project information via direct mailings, and/or posting information on social media sites (Facebook, Next Door, etc.).
- Presenting project information at neighborhood meetings.
- If needed, conducting bilingual outreach on specific projects to engage residents and businesses located in Disadvantaged Communities (DACs).

Stakeholder involvement will also be included as part of the process for future updates to the SWRP.

8.4 Summary of Tasks and Schedule

Table 15 summarizes the stakeholder outreach, education, and engagement tasks and the schedule for implementation.

Table 15: Summary of Tasks and Schedule

Task	Description	Schedule
1	Stakeholder Group Formation	• Contacted potential stakeholders – September 2017 • Established Stakeholder Group – October 2017
2	Stakeholder Group Information Requests and Meetings	• First meeting and Project Solicitation Request – October 17, 2017 • Second meeting – February 8, 2018 • Project Prioritization Input Request – February 8, 2018
3	Public Outreach Meeting	• June 27, 2018
4	Stakeholder Involvement in Implementation of SWRP and Completion of Projects	• Involvement in SWRP updates as described in Section 7 Implementation Strategy • Involvement in specific project implementation (schedule to be developed as part of each project schedule)

8.5 Summary of Completed Stakeholder Meetings

The two stakeholder meetings were well-attended and provided a good insight into issues that are important to stakeholders. Feedback received from stakeholders at the meetings and via emails was useful in guiding the SWRP development. Overall, stakeholders were satisfied with the SWRP process. Many stakeholders noted that the SWRP should focus on projects that augment water supply, which was consistent with the focus of the TAC members as well. Stakeholders also expressed support for regional projects and emphasized the need for agencies to collaborate on identifying and implementing regional projects.

Stakeholder meeting summary packages are also provided in Appendix H.

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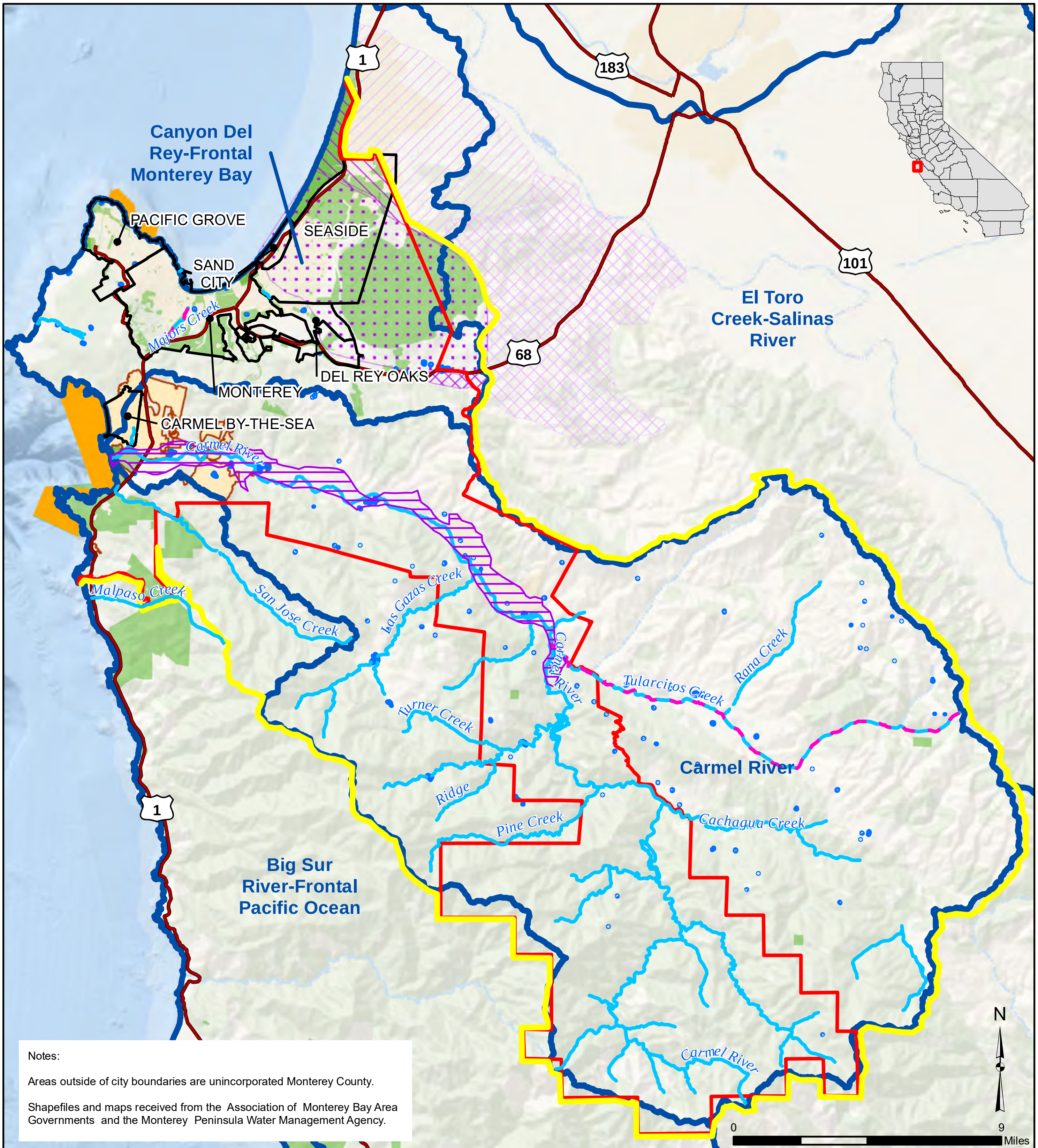
FIGURES



Legend

- Integrated Regional Water Management Plan Area
- Monterey Peninsula Water Management District Boundary
- Carmel Area Waste Water District
- USGS / DWR Watershed
- City Limit

Groundwater Basins

- Adjucated Seaside Groundwater Basin
- Salinas Valley Corral De Tierra Area
- Salinas Valley Marina
- Carmel Valley Groundwater Basin

- 303(d) Listed River/Stream
- River/Stream
- Highway
- Waterbody
- Federal, State, and Regional Parks, and Other Open Lands
- Area of Special Biological Significance

Map of Monterey Peninsula Region Stormwater Resource Plan Planning Area

Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants | Monterey One Water Providing Cooperative Water Solutions

Figure 1

Oakland, CA | September 2018

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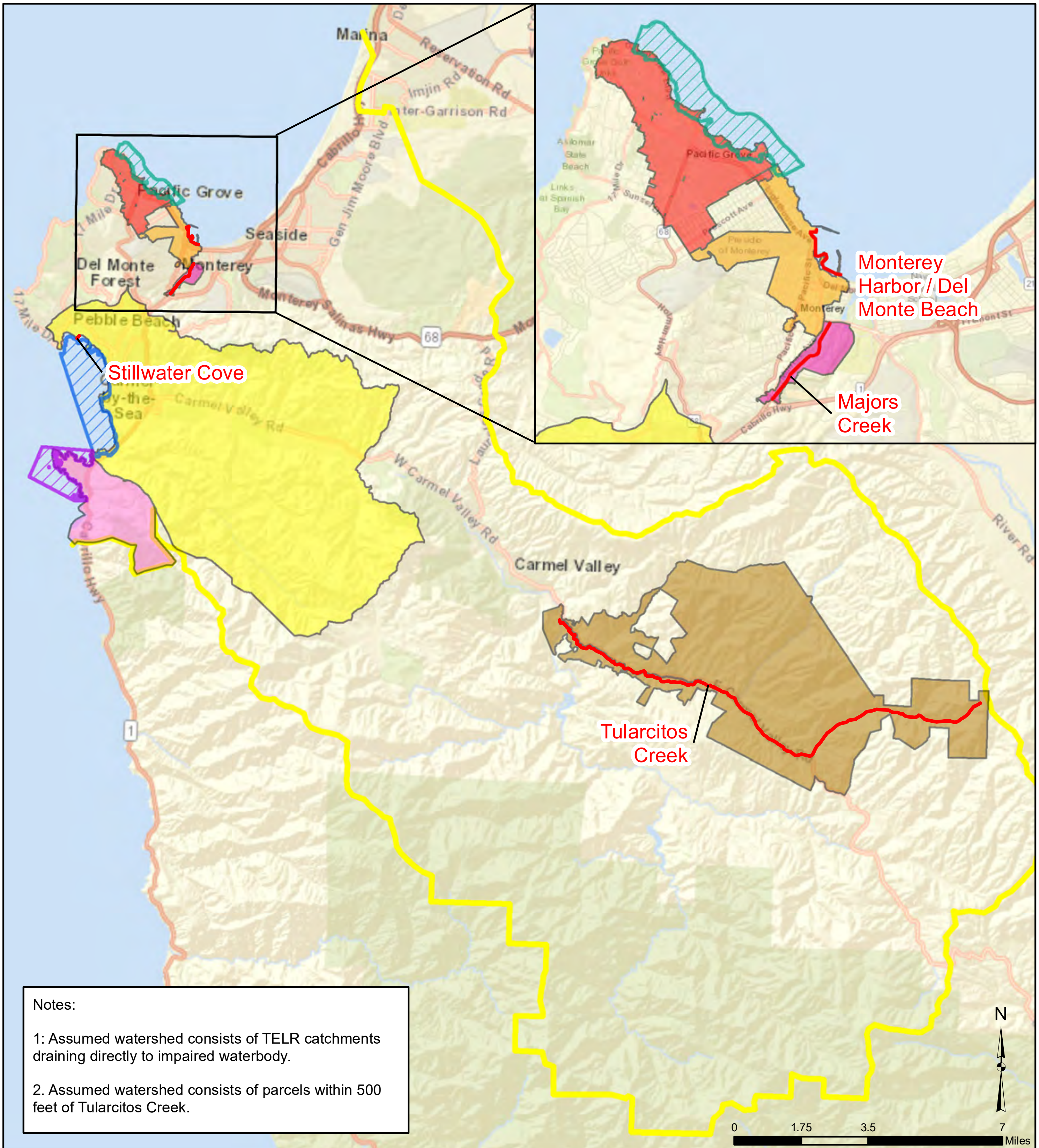

Notes:

1: Assumed watershed consists of TELR catchments draining directly to impaired waterbody.

2. Assumed watershed consists of parcels within 500 feet of Tularcitos Creek.

Legend

Monterey Peninsula IRWMP / SWRP Boundary

303(d) Listed Waterbody

Areas of Special Biological Significance (ASBS)

- Pacific Grove
- Carmel Bay
- Point Lobos

ASBS / 303(d) Watersheds

- Pacific Grove
- Carmel ASBS / Stillwater Cove
- Point Lobos
- Monterey Harbor / Del Monte Beach 303(d) [1]
- Majors Creek 303(d)[1]
- Tularcitos Creek 303(d)[2]

Monterey Peninsula Region
ASBS and 303(d)-Listed Waterbodies
And Associated Watersheds

Monterey Peninsula Stormwater Resource Plan

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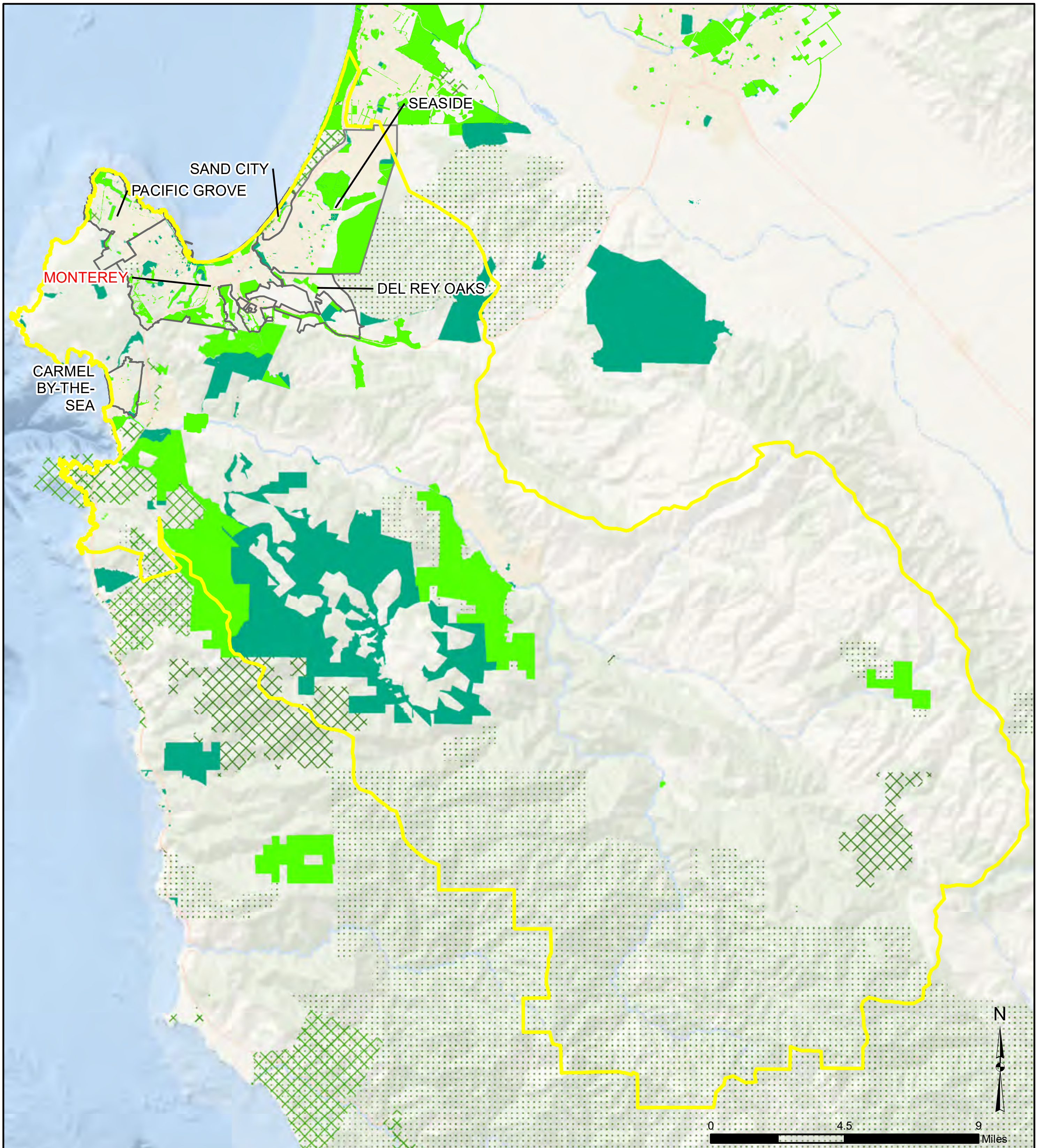
Figure 2

Oakland, CA | September 2018



Legend

- Monterey Peninsula IRWMP/SWRP Boundary
- City Limit
- US Federal Land / Park
- State Park
- Regional Park
- Other Parks and Protected Open Space (Local / County / Special District / Private)

Map of Monterey Peninsula Region
Received Parks & Protected Open Space Data

Monterey Peninsula Stormwater Resource Plan

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Figure

3

Oakland, CA | September 2018

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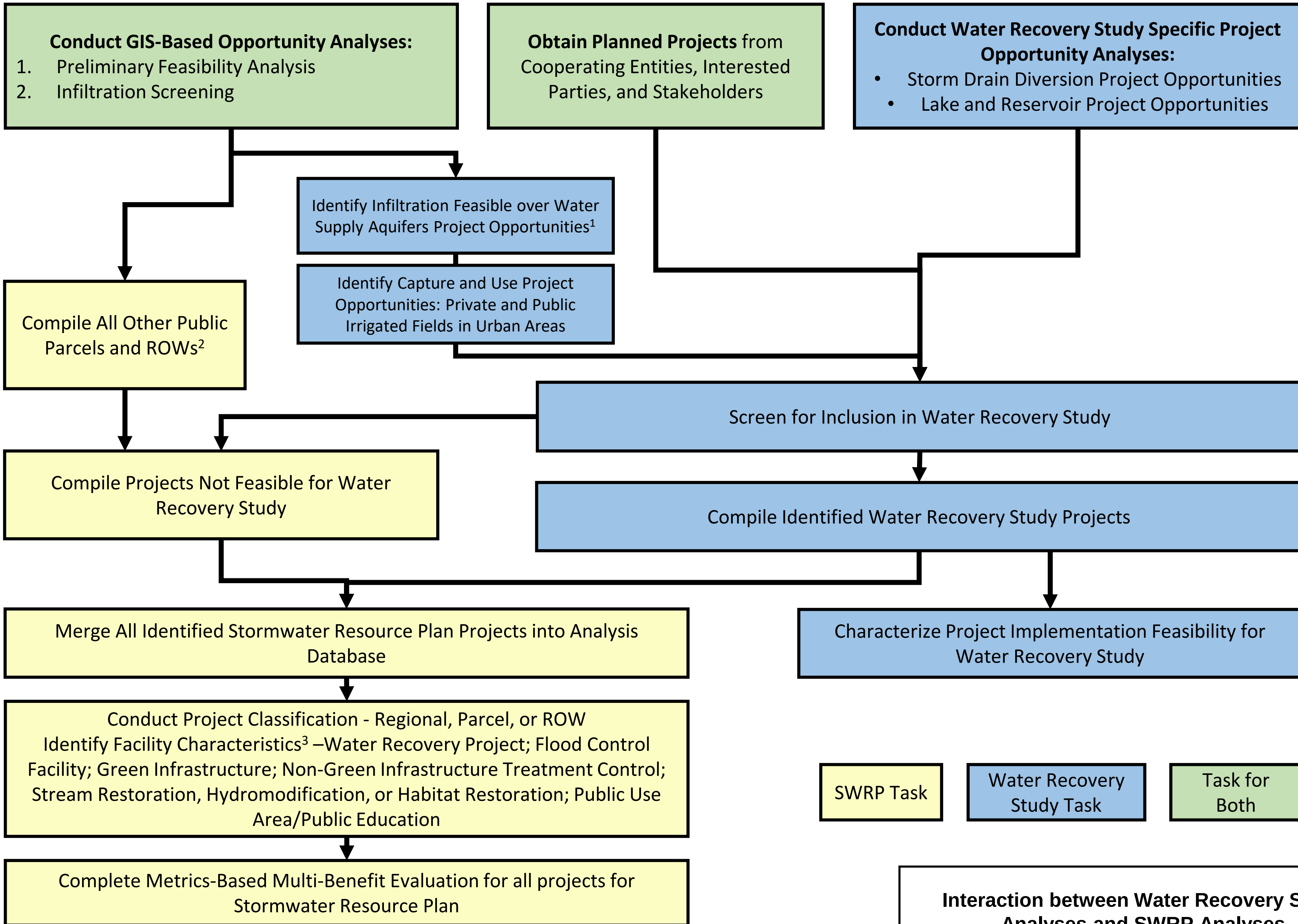


Notes:
1. Public Parcels/ ROWs and Private Undeveloped Parcels
2. Not identified as potential Water Recovery Study Project
3. In some cases, a project may have multiple facility characteristics

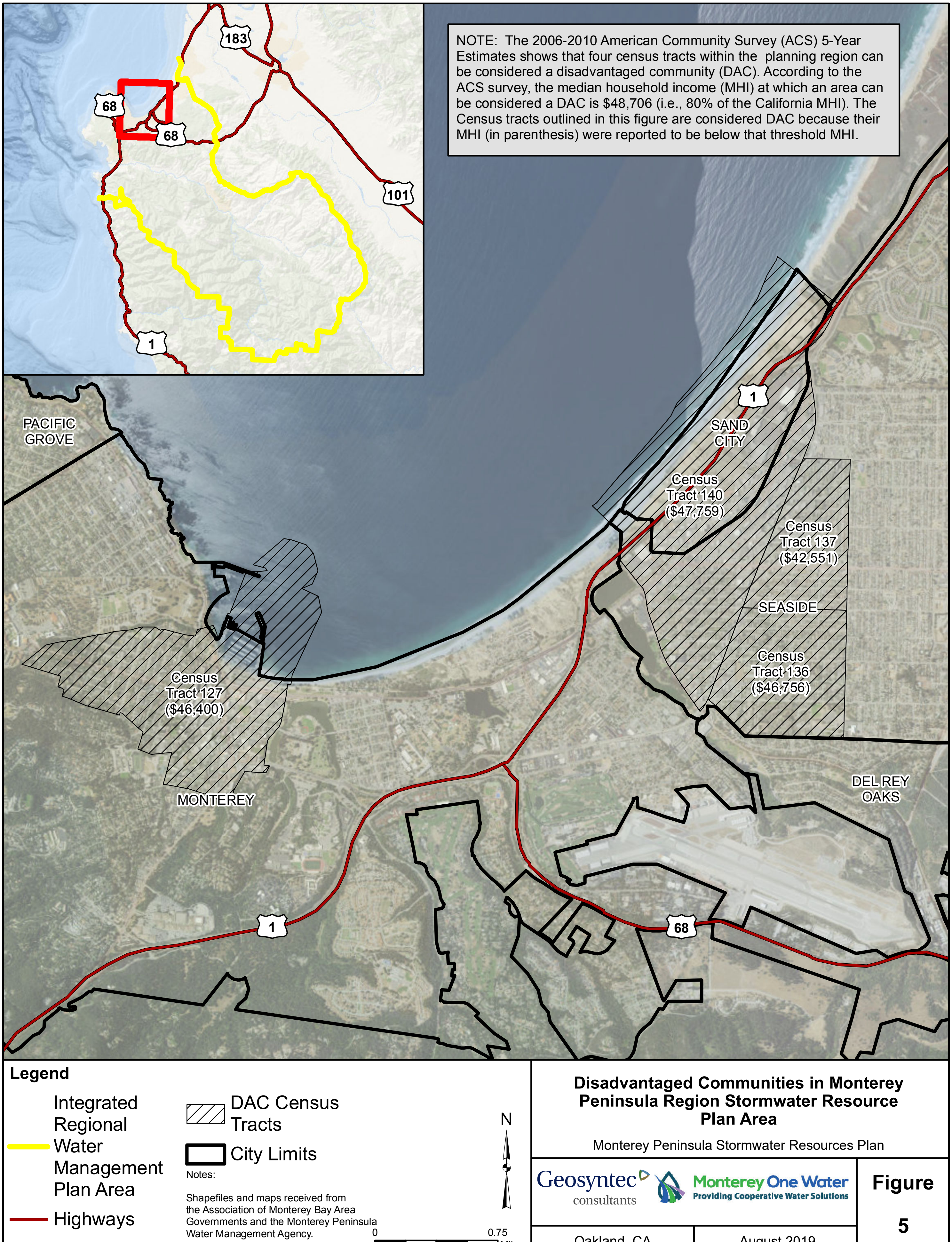
Interaction between Water Recovery Study Analyses and SWRP Analyses

Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants | Monterey Regional Stormwater Management Program

WW2405 | September 2018

Figure 4



Notes:

Shapefiles and maps received from the Association of Monterey Bay Area Governments and the Monterey Peninsula Water Management Agency.

Disadvantaged Communities in Monterey Peninsula Region Stormwater Resource Plan Area

Monterey Peninsula Stormwater Resources Plan

Geosyntec consultants | Monterey One Water — Providing Cooperative Water Solutions

Figure 5

Oakland, CA | August 2019

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APPENDIX A
SWRP Self-Certification Checklist

Storm Water Resource Plan Checklist and Self-Certification

The following should be completed and submitted to the State Water Resources Control Board Division of Financial Assistance in support of a storm water resource plan /functionally equivalent plan. The documents submitted, including this checklist, will be used to determine State Water Board concurrence with the Storm Water Resource Plan Guidelines and statutory water code requirements.

When combining multiple documents to form a functionally equivalent Storm Water Resource Plan, submit a cover letter explaining the approach used to arrive at the functionally equivalent document. The cover letter should explain how the documents work together to address the Storm Water Resource Plan Guidelines.

STORM WATER RESOURCE PLAN GENERAL CONTACT INFORMATION	
Contact Info: **Name** **Phone Number** **Email**	**Jeff Condit, Monterey One Water and** **Monterey Regional Stormwater Management Program** **831-645-4621** **jeff@my1water.org**
Date Submitted to State Water Resource Control Board:	**September 28, 2018; December 20, 2018; April 12, 2019; Final: July 31, 2019**
Regional Water Quality Control Board:	**Central Coast Regional Water Quality Control Board**
Title of attached documents (expand list as needed):	**1. Monterey Peninsula Region Stormwater Resource Plan, Figures, Map Package, and Appendices A-I.**

STORM WATER RESOURCE PLAN INFORMATION	
Storm Water Resource Plan Title:	**Monterey Peninsula Region Stormwater Resource Plan**
Date Plan Completed/Adopted:	**September 28, 2018**
Public Agency Preparer:	**Monterey One Water, on behalf of the** **Monterey Regional Stormwater Management Program**
IRWM Submission:	**November 1, 2018**
Plan Description:	**The Stormwater Resource Plan was developed to assist with the development and implementation of stormwater and dry weather runoff projects that provide multiple benefits in the Monterey Peninsula region.**

Checklist Instructions:

For **each element** listed below, review the applicable section in the Storm Water Resource Plan Guidelines and enter ALL of the following information**.** Be sure to provide a clear and thorough justification if a recommended element (non shaded) is not addressed by the Storm Water Resource Plan.

A. Mark the box if the Storm Water Resource Plan meets the provision

B. In the provided space labeled **References**, enter:
1. Title of document(s) that contain the information (or the number of the document listed in the General Information table above);
2. The chapter/section, **and page number(s)** where the information is located within the document(s);
3. The entity(ies) that prepared the document(s) if different from plan preparer;
4. The date the document(s) was prepared, and subsequent updates; and
5. Where each document can be accessed[1] (website address or attached).

<table>
<tr><td colspan="3">STORM WATER RESOURCE PLAN
CHECKLIST AND SELF-CERTIFICATION</td></tr>
<tr><td colspan="3">Mandatory Required Elements per California Water Code are Shaded and Text is Bold</td></tr>
<tr><td>Y/N</td><td>Plan Element</td><td>Water Code Section</td></tr>
<tr><td colspan="3">WATERSHED IDENTIFICATION
(GUIDELINES SECTION VI.A)</td></tr>
<tr><td>Y</td><td>1. Plan identifies watershed and subwatershed(s) for storm water resource planning.</td><td>10565(c)
10562(b)(1)
10565(c)</td></tr>
<tr><td colspan="3">References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 3 (page 14).</td></tr>
<tr><td>Y</td><td colspan="2">2. Plan is developed on a watershed basis, using boundaries as delineated by USGS, CalWater, USGS Hydrologic Unit designations, or an applicable integrated regional water management group, and includes a description and boundary map of each watershed and sub-watershed applicable to the Plan.</td></tr>
<tr><td colspan="3">References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 3 (pages 14-25), and in Figure 1.</td></tr>
</table>

[1] All documents referenced must include a website address. If a document is not accessible to the public electronically, the document must be attached in the form of an electronic file (e.g. pdf or Word 2013) on a compact disk or other electronic transmittal tool.

WATERSHED IDENTIFICATION
(GUIDELINES SECTION VI.A)

Y	3. Plan includes an explanation of why the watershed(s) and sub-watershed(s) are appropriate for storm water management with a multiple-benefit watershed approach;
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 1.3 (page 2), and Section 3.1 (pages 14-15).	
Y	4. Plan describes the internal boundaries within the watershed (boundaries of municipalities; service areas of individual water, wastewater, and land use agencies, including those not involved in the Plan; groundwater basin boundaries, etc.; preferably provided in a geographic information system shape file);
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 3 (pages 14-25), and in Figure 1 and attached map package of Figure 1 shapefiles.	
Y	5. Plan describes the water quality priorities within the watershed based on, at a minimum, applicable TMDLs and consideration of water body-pollutant combinations listed on the State's Clean Water Act Section 303(d) list of water quality limited segments (a.k.a impaired waters list);
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Sections 3.2.1 (page 18), Section 3.3.1 (page 22), Section 3.4 (page 24), and Section 3.5 (page 25), impaired waters lists in Table 7 (page 18) and Table 8 (page 22).	
Y	6. Plan describes the general quality and identification of surface and ground water resources within the watershed (preferably provided in a geographic information system shape file);
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 3.1 (pages 14-15), and in detail in Sections 3.2-3.5 (pages 15, 16, and 20-24) and in Figure 1 and attached map package of Figure 1 shapefiles.	
Y	7. Plan describes the local entity or entities that provide potable water supplies and the estimated volume of potable water provided by the water suppliers;
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 3.2 (pages 15-19), and Table 6 (page 17), and Section 3.3 (pages 20-22).	
Y	8. Plan includes map(s) showing location of native habitats, creeks, lakes, rivers, parks, and other natural or open space within the sub-watershed boundaries; and
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Figure 3.	

WATERSHED IDENTIFICATION (GUIDELINES SECTION VI.A)	
Y	9. Plan identifies (quantitative, if possible) the natural watershed processes that occur within the sub-watershed and a description of how those natural watershed processes have been disrupted within the sub-watershed (e.g., high levels of imperviousness convert the watershed processes of infiltration and interflow to surface runoff increasing runoff volumes; development commonly covers natural surfaces and often introduces non-native vegetation, preventing the natural supply of sediment from reaching receiving waters).
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 3.2.2 (page 19), Section 3.3.2 (page 23), Section 3.4 (page 24), Section 3.5 (page 25).	

WATER QUALITY COMPLIANCE (GUIDELINES SECTION V)		
Y	**10. Plan identifies activities that generate or contribute to the pollution of storm water or dry weather runoff, or that impair the effective beneficial use of storm water or dry weather runoff.**	**10562(d)(7)**
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 4.1		
Y	**11. Plan describes how it is consistent with and assists in, compliance with total maximum daily load implementation plans and applicable national pollutant discharge elimination system permits.**	**10562(b)(5)**
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 4.2		
Y	**12. Plan identifies applicable permits and describes how it meets all applicable waste discharge permit requirements.**	**10562(b)(6)**
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 4.2 (pages 27-31), and Section 4.3 (pages 31-32).		

ORGANIZATION, COORDINATION, COLLABORATION (GUIDELINES SECTION VI.B)		
Y	**13. Local agencies and nongovernmental organizations were consulted in Plan development.**	**10565(a)**
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 2.1 (pages 5-6), Section 2.3 (pages 8-9), Section 2.5 (page 12).		
Y	**14. Community participation was provided for in Plan development.**	**10562(b)(4)**
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 2.3		

ORGANIZATION, COORDINATION, COLLABORATION
(GUIDELINES SECTION VI.B)

Y	15. Plan includes description of the existing integrated regional water management group(s) implementing an integrated regional water management plan (IRWMP).

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 2.4 (pages 10-12)

Y	16. Plan includes identification of and coordination with agencies and organizations (including, but not limited to public agencies, nonprofit organizations, and privately-owned water utilities) that need to participate and implement their own authorities and mandates in order to address the storm water and dry weather runoff management objectives of the Plan for the targeted watershed.

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 2.3 (pages 8-9), also in Section 8 (pages 57-60).

Y	17. Plan includes identification of nonprofit organizations working on storm water and dry weather resource planning or management in the watershed.

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 2.3 (pages 8-9)

Y	18. Plan includes identification and discussion of public engagement efforts and community participation in Plan development.

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 2.3 (pages 8-9), also in Section 8 (pages 58-61).

Y	19. Plan includes identification of required decisions that must be made by local, state or federal regulatory agencies for Plan implementation and coordinated watershed-based or regional monitoring and visualization

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; described in Section 2.5 (page 12), decisions identified in Section 2.1 (page 5) and Section 2.2 (page 6).

Y	20. Plan describes planning and coordination of existing local governmental agencies, including where necessary new or altered governance structures to support collaboration among two or more lead local agencies responsible for plan implementation.

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; described in Section 2.5 (page 12), decisions identified in Section 2.1 (page 5) and Section 2.2 (pages 6-7). Local governmental agencies are coordinated through the Monterey Regional Stormwater Management Program (MRSWMP), described in Section 1.1 (page 1) and Section 2.1 (page 5).

Y	21. Plan describes the relationship of the Plan to other existing planning documents, ordinances, and programs established by local agencies.

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 2.6 (page 13), details of plan interaction provided in Appendix C.

ORGANIZATION, COORDINATION, COLLABORATION (GUIDELINES SECTION VI.B)	
N/A	22. (If applicable)Plan explains why individual agency participation in various isolated efforts is appropriate.
References: Not applicable.	

QUANTITATIVE METHODS (GUIDELINES SECTION VI.C)	
Y	**23. For all analyses:** Plan includes an integrated metrics-based analysis to demonstrate that the Plan's proposed storm water and dry weather capture projects and programs will satisfy the Plan's identified water management objectives and multiple benefits.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 5	
Y	**24. For water quality project analysis (section VI.C.2.a)** Plan includes an analysis of how each project and program complies with or is consistent with an applicable NPDES permit. The analysis should simulate the proposed watershed-based outcomes using modeling, calculations, pollutant mass balances, water volume balances, and/or other methods of analysis. Describes how each project or program will contribute to the preservation, restoration, or enhancement of watershed processes (as described in Guidelines section VI.C.2.a)
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 5.3 (pages 35-42) and Section 5.4 (pages 42-45) describe how potential projects were identified and analyzed for various scoring metrics associated with the target multiple benefits.	
Y	**25. For storm water capture and use project analysis (section VI.C.2.b):** Plan includes an analysis of how collectively the projects and programs in the watershed will capture and use the proposed amount of storm water and dry weather runoff.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 5.3.3. (pages 37-40) and Section 5.4 (page 42-45) describe the project analysis conducted. Project stormwater or dry weather runoff magnitude was estimated using previous calculations conducted for the regional Tool to Estimate Load Reductions (TELR). Appendix D (the Water Recovery Study) describes how the amount of stormwater or dry weather runoff was calculated for water supply augmentation projects. Full project database provided as Appendix E.	
Y	**26. For water supply and flood management project analysis (section VI.C.2.c):** Plan includes an analysis of how each project and program will maximize and/or augment water supply.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 5.3.3. (pages 37-40) and Section 5.4 (pages 42-45) describe the project analysis conducted. Project stormwater or dry weather runoff magnitude was estimated using previous calculations conducted for the regional TELR. Appendix D (the Water Recovery Study) describes how water supply augmentation projects were identified. Full project database provided as Appendix E.	

QUANTITATIVE METHODS
(GUIDELINES SECTION VI.C)

Y	**27. For environmental and community benefit analysis (section VI.C.2.d):** Plan includes a narrative of how each project and program will benefit the environment and/or community, with some type of quantitative measurement.

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 5.3 (pages 35-42) and Section 5.4 (pages 42-45) describe how potential projects were identified and analyzed for various scoring metrics associated with the target multiple benefits, including environmental and community benefits. Specifically, as summarized on pages 43-44 and in Table 10, project opportunities that "re-establish natural water drainage systems or develop, restore, or enhance habitat and open space" received a score of 2 for providing environmental benefits; and project opportunities that provide "community enhancement" or "enhancement to DAC", i.e., projects that specifically provide public use areas or public education components, or are located in a DAC (see section 5.4.1, page 43), received a score of 2 (each) for providing community benefits. A narrative explaining benefits is included for top projects in section 6.3 (pages 48-51). Full project database, including environmental and community scores and descriptions, as applicable for certain projects, provided as Appendix E.

Y	**28. Data management (section VI.C.3):** Plan describes data collection and management, including: a) mechanisms by which data will be managed and stored; b) how data will be accessed by stakeholders and the public; c) how existing water quality and water quality monitoring will be assessed; d) frequency at which data will be updated; and e) how data gaps will be identified.

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; data collection described in Section 5.1 (page 33), and Appendix C includes data received. Project database provided as Appendix E. Section 7.3 (pages 59-60) and Section 7.4 (pages 60) describe how data will be updated as well as current and ongoing monitoring. The SWRP will be posted on the MRSWMP and IRWMP websites for access to the public, as described in Section 7.3 (pages 59-60).

IDENTIFICATION AND PRIORITIZATION OF PROJECTS
(GUIDELINES SECTION VI.D)

Y	**29. Plan identifies opportunities to augment local water supply through groundwater recharge or storage for beneficial use of storm water and dry weather runoff.**	**10562(d)(1)**

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 6.2 (pages 47-48) describes project identification and Appendix E contains project opportunities for water supply augmentation. Specific projects to augment water supply also included in the Water Recovery Study, provided as Appendix D.

Y	**30. Plan identifies opportunities for source control for both pollution and dry weather runoff volume, onsite and local infiltration, and use of storm water and dry weather runoff.**	**10562(d)(2)**

References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 6.2 (pages 47-48) describes project identification and Appendix E contains project opportunities for source control, infiltration, and use for pollution and dry weather runoff volume. Stormwater and dry weather runoff use project opportunities also included in the Water Recovery Study, provided as Appendix D.		
IDENTIFICATION AND PRIORITIZATION OF PROJECTS (GUIDELINES SECTION VI.D)		
Y	**31. Plan identifies projects that reestablish natural water drainage treatment and infiltration systems, or mimic natural system functions to the maximum extent feasible.**	**10562(d)(3)**
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 6.2 (pages 47-48) describes project identification and Appendix E contains project opportunities for reestablishing natural water drainage treatment and infiltration systems or mimicking natural system functions to the		
Y	**32. Plan identifies opportunities to develop, restore, or enhance habitat and open space through storm water and dry weather runoff management, including wetlands, riverside habitats, parkways, and parks.**	**10562(d)(4)**
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 6.2 (pages 47-48) describes project identification and Appendix E contains project opportunities for developing, restoring, or enhancing habitat and open space through stormwater and dry weather runoff management.		
Y	**33. Plan identifies opportunities to use existing publicly owned lands and easements, including, but not limited to, parks, public open space, community gardens, farm and agricultural preserves, school sites, and government office buildings and complexes, to capture, clean, store, and use storm water and dry weather runoff either onsite or offsite.**	**10562(d)(5), 10562(b)(8)**
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 5.3.2 (pages 36-37) describes how publicly owned project opportunity locations were identified. Section 6.2 (pages 47-48) describes project identification, and Appendix E contains project opportunities for utilizing publicly owned lands and easements to capture, clean, store, and use stormwater and dry weather runoff.		
Y	**34. For new development and redevelopments (if applicable): Plan identifies design criteria and best management practices to prevent storm water and dry weather runoff pollution and increase effective storm water and dry weather runoff management for new and upgraded infrastructure and residential, commercial, industrial, and public development.**	**10562(d)(6)**
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 4.2.1 (pages 27-28) describes required design criteria for best management practices. Section 6.2 (pages 47-48) describes project identification. The MRSWMP Stormwater Technical Guide for Low Impact Development (MRSWMP, 2015) provides design criteria for new and redevelopment best management practices. References to the Technical Guide are provided in Sections 4.2.1 (page 30) , 6.1.3 (page 47), and 7.4 (page 60).		

Y	**35. Plan uses appropriate quantitative methods for prioritization of projects.** **(This should be accomplished by using a metrics-based and integrated evaluation and analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and other community**	**10562(b)(2)**
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 5.4 (pages 42-45) describes metrics-based multi-benefit evaluation, Section 6.2 (pages 47-48) describes project prioritization. Results are provided in Appendix E.		

IDENTIFICATION AND PRIORITIZATION OF PROJECTS
(GUIDELINES SECTION VI.D)

Y	36. *Overall:* Plan prioritizes projects and programs using a metric-driven approach and a geospatial analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and community benefits within the watershed.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 5.2 (pages 34-35) describes models and tools evaluated for approach, Section 5.3 (pages 35-42) describes geospatial project identification and classification method, Section 5.4 (pages 42-45) describes metrics-based multi-benefit evaluation, and Section 6.2 (pages 47-48) describes project prioritization. Results are provided	
Y	37. *Multiple benefits:* Each project in accordance with the Plan contributes to at least two or more **Main Benefits** and the maximum number of **Additional Benefits** as listed in Table 4 of the Guidelines. (Benefits are not counted twice if they apply to more than one category.)
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; multiple benefits provided by each project opportunity are identified and/or scored in Appendix E.	

IMPLEMENTATION STRATEGY AND SCHEDULE
(GUIDELINES SECTION VI.E)

Y	38. Plan identifies resources for Plan implementation, including: 1) projection of additional funding needs and sources for administration and implementation needs; and 2) schedule for arranging and securing Plan implementation financing.	
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 7.1 (page 53), summarizing resources for implementation; and Section 7.2.6 (pages 55 -57), which describes the projected funding needs and schedule for prioiritized proejcts.		
Y	**39. Plan projects and programs are identified to ensure the effective implementation of the storm water resource plan pursuant to this part and achieve multiple benefits.**	**10562(d)(8)**
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 7.2 (pages 53-58).		

Y	**40. The Plan identifies the development of appropriate decision support tools and the data necessary to use the decision support tools.**	**10562(d)(8)**

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 7.1.2 (page 53) describes that funding for implementation of the seven projects included in this SWRP will be obtained by the project sponsor. As included in Section 7.2.1 (pages 53-54), projects and/or project opportunities listed in the final SWRP may be included as part of IRWMP project lists for project implementation, as appropriate. Decision support tools are available through the IRWMP project prioritization process, and have been included in Appendix I of the Monterey Peninsula Region Stormwater Resource Plan. Additional considerations for project implementation are included in Section 7.2.2 (page 54).

IMPLEMENTATION STRATEGY AND SCHEDULE
(GUIDELINES SECTION VI.E)

Y	41. Plan describes implementation strategy, including: a) Timeline for submitting Plan into existing plans, as applicable; b) Specific actions by which Plan will be implemented; c) All entities responsible for project implementation; d) Description of community participation strategy; e) Procedures to track status of each project; f) Timelines for all active or planned projects; g) Procedures for ongoing review, updates, and adaptive management of the Plan; and h) A strategy and timeline for obtaining necessary federal, state, and local permits.

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 7.2 (pages 53-58).

Y	**42. Applicable IRWM plan:** **The Plan will be submitted, upon development, to the applicable integrated regional water management (IRWM) group for incorporation into the IRWM plan.**	**10562(b)(7)**

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 7.2.1 (pages 53-54).

Y	43. Plan describes how implementation performance measures will be tracked.

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 7.2.5 (page 55), Section 7.3 (pages 59-60), Section 7.4 (page 60).

EDUCATION, OUTREACH, PUBLIC PARTICIPATION
(GUIDELINES SECTION VI.F)

Y	**44. Outreach and Scoping:** **Community participation is provided for in Plan implementation.**	**10562(b)(4)**

References:
Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 8 (pages 61-64) and Appendix H.

Y	45. Plan describes public education and public participation opportunities to engage the public when considering major technical and policy issues related to the development and implementation.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 8.3 (pages 61-63) and Table 15 (page 64).	
Y	46. Plan describes mechanisms, processes, and milestones that have been or will be used to facilitate public participation and communication during development and implementation of the Plan.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 8.3 (pages 61-63) and Table 15 (page 64).	

EDUCATION, OUTREACH, PUBLIC PARTICIPATION
(GUIDELINES SECTION VI.F)

Y	47. Plan describes mechanisms to engage communities in project design and implementation.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 8.3 (pages 61-63) and Table 15 (page 64).	
Y	48. Plan identifies specific audiences including local ratepayers, developers, locally regulated commercial and industrial stakeholders, nonprofit organizations, and the general public.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 8.3.1 (page 62) and Appendix H.	
Y	49. Plan describes strategies to engage disadvantaged and climate vulnerable communities within the Plan boundaries and ongoing tracking of their involvement in the planning process.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 8.3.1 (page 62) and Appendix H.	
Y	50. Plan describes efforts to identify and address environmental injustice needs and issues within the watershed.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 8.3.1 (page 62), and Section 8.3.4 (page 63). Projects that provide enhancement to DACs were identified and scored utilizing the metrics based multi-benefit evaluation described in Section 5.4.1 (pages 42-45) and Table 10 (pages 44-45).	
Y	51. Plan includes a schedule for initial public engagement and education.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018, revised final July 30, 2019; Section 8.4 (page 64) and Table 15 (page 64).	

A screenshot of the electronically signed SWRP Self-Certification is provided below. The electronically signed SWRP Self-Certification is provided in a separate file titled "SWRP Self Certification FINAL (09-21-18) PS Electronic Signature.pdf" attached to this compiled SWRP package.

EDUCATION, OUTREACH, PUBLIC PARTICIPATION
(GUIDELINES SECTION VI.F)

Y	47. Plan describes mechanisms to engage communities in project design and implementation.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018; Section 8.3 (pages 58-60) and Table 12 (page 61).	
Y	48. Plan identifies specific audiences including local ratepayers, developers, locally regulated commercial and industrial stakeholders, nonprofit organizations, and the general public.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018; Section 8.3.1 (page 59) and Appendix H.	
Y	49. Plan describes strategies to engage disadvantaged and climate vulnerable communities within the Plan boundaries and ongoing tracking of their involvement in the planning process.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018; Section 8.3.1 (page 59) and Appendix H.	
Y	50. Plan describes efforts to identify and address environmental injustice needs and issues within the watershed.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018; Section 8.3.1 (page 59), and Section 8.3.4 (page 60). Projects that provide enhancement to DACs were identified and scored utilizing the metrics based multi-benefit evaluation described in Section 5.4.1 (pages 42-45) and Table 10 (pages 44-45).	
Y	51. Plan includes a schedule for initial public engagement and education.
References: Located in the Monterey Peninsula Region Stormwater Resource Plan, prepared by Geosyntec Consultants, EOA, Inc., and Denise Duffy & Associates, September 28, 2018; Section 8.4 (page 61) and Table 12 (page 61).	

DECLARATION AND SIGNATURE

I declare under penalty of perjury that all information provided is true and correct to the best of my knowledge and belief.

Paul A. Sciuto Digitally signed by Paul A. Sciuto DN: cn=Paul A. Sciuto, o, ou, email=paul@my1water.org, c=US Date: 2018.09.27 10:30:44 -07'00'

Authorized Signature	Title	Date
Paul A. Sciuto	General Manager	9/27/18

Authorized Signature   Title   Date

Monterey One Water

Public Agency

A - 11

Storm Water Resource Plan Self-Certification Checklist

Revised: 21 September 2018

The Monterey Peninsula Stormwater Resource Plan (SWRP) was edited from the September 28, 2018 version to address comments received from the State Water Board on December 4, 2018 (see "State Water Board Comment" column) and February 26, 2019 (see "DFA [State Board] Comment #2"). The State Water Board provided final comment via e-mail on June 11, 2019 (see final page of this section). A summary of all revisions is provided in the table below. The final SWRP (dated July 30, 2019) is posted to: http://montereysea.org/stormwater-resource-plan/. Minor final changes to the final SWRP were completed in response to final comments from the State Water Board on August 27, 2019. This resulted in replacement of five pages of the SWRP and a new project database on August 27, 2019.

SWRP Section	State Water Board Comment	Project Team Response to Comment – Round 1	DFA [State Board] Comment #2	Project Team Response to Comment – Round 2
Section 5.3.2, Page 36	Provide a summary for each project identified as publicly-owned parcels.	Monterey Peninsula Stormwater Resource Plan (SWRP) Section 5.3.2 describes the methodology to identify opportunities for potential projects. The opportunities identified are included in Attachment E (Project Database). These are opportunities (not developed projects) and as such, additional information and project design has not been developed beyond what is provided in Attachment E. The seven projects identified as part of the SWRP (i.e., those for which project concepts were developed), which are located on publicly-owned parcels, do have summary descriptions in the SWRP; these are provided in SWRP Section 6.3. *No Revision Made.*	Noted. In addition, in Attachment E, please add a column to identify which projects are "source control" projects, i.e., treat and infiltrate storm water locally (LID).	Attachment E (excel spreadsheet) has been edited to include a column that identifies which projects treat or infiltrate stormwater locally (see Appendix E - MontereyPeninsulaSWRP ProjectDatabase (3-18-19).xlsx, column AF of "COMBINED DB" tab).

SWRP Section	State Water Board Comment	Project Team Response to Comment – Round 1	DFA [State Board] Comment #2	Project Team Response to Comment – Round 2
Section 7.2.6, Page 55	The description of the implementation strategy is weak. You should provide estimated timelines depending on each agency's priorities, funding availabilities, status of project (i.e., how far along the concepts are).	A table indicating the status and potential timeline for each project concept has been added to SWRP Section 7.2.6.	The table needs to show proposed timelines for each project: timeline for funding, design, and construction.	Table 12 has been edited to include proposed timelines for funding, design completion, and construction.
Section 7.3, Page 56	Have the website and clear procedures been setup? If so, provide a link.	Footnotes that link to the MRSWMP website (i.e. http://montereysea.org/stormwater-resource-plan/) and the IRWMP website (http://www.mpirwm.org/Pages/default.aspx) have been added to SWRP Section 7.3. Clear procedures for adding projects have been provided on the MRSWMP website.	Noted.	No additional edit needed.
Appendix E	All benefits must be quantified, and the estimated quantity must be provided (not just the range that was used for the scoring matrix) as well as the method used to obtain the number.	All benefits have been quantified in Appendix E, database “Appendix E – Monterey PeninsulaSWRP ProjectDatabase (12-18-18).xlsx”. These are provided in columns Q through AD. The method is described in SWRP Section 5.4.1 and Table 10.	Noted.	No additional edit needed.

SWRP Checklist	State Water Board Comment	Project Team Response to Comment – Round 1	DFA [State Board] Comment #2	Project Team Response to Comment – Round 2
Item #27, Page A-7	Plan must include a narrative of how each project and program will benefit the environment and/or community, with some type of quantitative measurement.	The following statement (in *italics* below) was added to Item #27, Page A-7 of the SWRP Checklist (Appendix A): "…including environmental and community benefits. *Specifically, as summarized on pages 43-44 and in Table 10, project opportunities that "re-establish natural water drainage systems or develop, restore, or enhance habitat and open space" received a score of 2 for providing environmental benefits; and project opportunities that provide "community enhancement" or "enhancement to DAC" received a score of 2 (each) for providing community benefits.* Full project database,…"	A narrative (specifically explaining the benefits to the environment and community, with some type of quantitative measurement) must be provided at least for each selected project that has claimed an environmental or community benefit. Without this, we cannot provide concurrence for the SWRP. This could be done by expanding the project descriptions in Section 6.3.	Narrative has been provided in the project descriptions in Section 6.3 regarding whether the project claims an environmental or community benefit per the metrics-based multi-benefit assessment, and explaining the benefit assessment. The following statement (in *italics* below) was added to Item #27, Page A-7 of the SWRP Checklist (Appendix A): *"A narrative explaining benefits is included for top projects in section 6.3 (pages 50-52)."*

SWRP Checklist	**State Water Board Comment**	**Project Team Response to Comment – Round 1**	**DFA [State Board] Comment #2**	**Project Team Response to Comment – Round 2**
Item #34, Page A-8	Plan says that no new development or re-development projects have been identified. This does not mean one won't be submitted later.	The following statement (in *italics* below) was added to the last sentence of SWRP Section 6.1.3 on Page 47: "No new or redevelopment projects were identified as part of this plan, *although these projects could be amended to the SWRP in the future*."	Unless it is impossible for any new development or re-development projects to be ever implemented in the SRWP area (and in this case you would need to explain why), there needs to be a section about design criteria and types of BMPs to be used for such projects, as recommended by local guidelines, ordinances. Providing references to such documents is acceptable. Please see the attached example from another SWRP. Again, without this, we cannot concur with the SWRP.	A reference to the MRSWMP Stormwater Technical Guide for Low Impact Development (MRSWMP, 2015), which provides design criteria and types of BMPs to be used for new development or re-development projects, has been added to Sections 4.2.1, 6.1.3, and 7.4. The following statement (in *italics* below) was added to Item #34, Page A-8 of the SWRP Checklist (Appendix A): *"The MRSWMP Stormwater Technical Guide for Low Impact Development (MRSWMP, 2015) provides design criteria for new and redevelopment best management practices. References to the Technical Guide are provided in Sections 4.2.1 (page 30) , 6.1.3 (page 49), and 7.4 (page 60)."*

SWRP Checklist	State Water Board Comment	Project Team Response to Comment – Round 1	DFA [State Board] Comment #2	Project Team Response to Comment – Round 2
Item #40, Page A-9	We cannot see decision support tools identified to implement the projects within the plan. These references are pointing to the vague implementation strategy.	The statement in Item #40, Page A-9 of the SWRP Checklist (Appendix A), "Section 7.2 (pages 53-56), Section 7.3 (pages 56-57), and Section 7.4 (page 57)" was replaced with the following: "Section 7.1.2 (page 53) describes that funding for implementation of the seven projects included in this SWRP will be obtained by the project sponsor. As included in Section 7.2.1 (pages 53-54), projects and/or project opportunities listed in the final SWRP may be included as part of IRWMP project lists for project implementation, as appropriate. Decision support tools are available through the IRWMP project prioritization process. Additional considerations for project implementation are included in Section 7.2.2 (page 54)."	The decision support tools mentioned (from IRWMP) must be inserted into this section. The tools we are looking for are those that can be used to size BMPs, quantify benefits, measure performance, project tracking, models developed, etc. (i.e., assess projects that are candidate for insertion into the SWRP).	The decision support tools mentioned (from the IRWMP process) have been inserted into Appendix I and are referenced in section 7.2. Additionally, references to the incorporation of the SWRP into the IRWMP and the IRWMP goals and objectives have been updated throughout the text. The following statement (in *italics* below) was added to Item #40, Page A-9 of the SWRP Checklist (Appendix A): "Decision support tools are available through the IRWMP project prioritization process, *and have been included in Appendix I of the Monterey Peninsula Region Stormwater Resource Plan.*"

Comments received June 11, 2019, with clarifying comments received June 20, 2019, and responses to comments:

SWRP/ Checklist Section	State Water Board Comment (June 11, 2019)	State Water Board Clarifying Instructions (June 20, 2019)	Project Team Response to Comment
Section 7.2	"Regarding the first comment (section 5.3.2, page 36): the SWRP should include language that clarifies that the seven projects are part of the SWRP, and more importantly, that the rest of the opportunities (listed in Appendix E) would need to be further developed prior to inclusion into the SWRP."	"On page 31 of the SWRP guidelines (Section VI, E, 1 and 2), it says: "A Storm Water Resource Plan should identify the resources that the participating entities are committing for implementation of the Plan. The Plan should include the following items to ensure its effective implementation. (Wat. Code, § 10562, subd. (d)(8).): a. Projection of additional funding needs and sources for administration and project implementation needs, above and beyond the needs of the existing storm water management plans and/or integrated regional water management plans; and b. Schedule for arranging and securing Plan financing for project implementation, including identification of phased Plan and/or project implementation." One page 32, it says The Storm Water Resource Plan should identify the following implementation and scheduling components: - Timelines for all active or planned project components and identification of the institutional structure that will ensure Plan implementation;"	Through clarifying comment from the State Water Board, the comment is referring to the requirement to provide funding and schedule estimates for identified SWRP projects and project opportunities. Section 7.2.6 of the SWRP is now titled "Potential Timelines and Cost Estimates for Implementing Identified Project Opportunities," and includes estimates of project cost and schedule for the projects (or representative projects) anticipated to be implemented between 2020 – 2040, should funding be available and secured. All project opportunities identified in Appendix E are considered included in and part of the SWRP; cost ranges and timeline have been provided for each project.
Checklist Item #27, page A-7	Regarding Item #27, page A-7: for the selected projects (section 6.3), you need to explain what exact community benefit is provided for each project. For example, what does "enhancement to DAC" mean? You need to provide a description for each benefit.	n/a	The description is provided on page 43 of the SWRP. A reference to section 5.4.1, page 43, has been provided in the Checklist. The description has been added to each project in Appendix E. DACs in the planning area are shown in the new Figure 5.

APPENDIX B
TAC Meeting Summaries

Stormwater Resource Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Technical Advisory Committee (TAC)
Kick-off Meeting

Tuesday, September 12, 2017
1 pm – 3 pm

Conference Call
Phone: 1-855-266-3436 / Access Code: 954784

AGENDA

MEETING OBJECTIVES:

- *Brief TAC members on the project purpose, background, approach, and schedule.*
- *Review and approve TAC member list.*
- *Solicit TAC input on specific upcoming project submittals (Detailed Project Schedule, Stormwater Resource Plan Outline, Stormwater Resource Planning Area Description Memo, Approach to Addressing Water Quality, and Stakeholder Outreach Plan).*

1:00 pm	1.	Welcome/Introductions	Jeff Condit (Monterey One Water)
1:10 pm	2.	Review of TAC member list, roles and responsibilities *Action: Approve List of TAC Members*	Jill Bicknell (EOA)
1:20 pm	3.	Overview of Project Purpose and Background • Purpose of Stormwater Resource Plan • Description of Project Area Watersheds • Previous and Current Planning Efforts • Water Recovery Study	Jeff Condit/ Kelly Havens (Geosyntec)
1:45 pm	4.	Project Approach • Scope of Work • Schedule *Action: Provide input on project approach. Review Project Detailed Schedule.*	Kelly Havens
2:15 pm	5.	Stormwater Resource Plan (SWRP) Contents *Action: Review Draft SWRP Outline, Planning Area Description, and Approach to Addressing Water Quality*	Kelly Havens

2:35 pm	6.	Stakeholder Involvement *Action: Review Draft Stakeholder Outreach Plan*	Vishakha Atre (EOA)
2:50 pm	7.	Review Action Items	Jill Bicknell
3:00 pm	8.	Adjourn	

Stormwater Resource Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Technical Advisory Committee (TAC)
Kick-off Meeting

Tuesday, September 12, 2017
1 pm – 3 pm

MEETING SUMMARY (Grant Task 2.3)

Participants – Attendance list attached.

1. Welcome/Introductions

   Jeff Condit (Monterey One Water) informed attendees that the purpose of today's meeting is to provide an overview of the Stormwater Resource Plan (SRP) process, approach, and schedule, and obtain initial feedback for several key deliverables. Attendees introduced themselves.

2. Review of TAC Member List, Roles and Responsibilities

   Jill Bicknell (EOA) reviewed the draft TAC Member List with the TAC. Attendees had no comments on the list and approved it for submittal to the Grant Manager.

3. Overview of Project Purpose and Background

   Jeff and Kelly Havens (Geosyntec) provided an overview of the grant, SRP development process, and information on the project boundaries and watershed areas. The MRWPCA (now called Monterey One Water), facilitator of the Monterey Regional Stormwater Management Program (MRSWMP), received a Prop 1 Grant to prepare a SRP for the Monterey Peninsula Region. The total grant amount received is $358,716. The City of Monterey's Neighborhood Improvement Program (NIP), the Monterey Peninsula Water Management District, and MRSWMP program are providing the required 50% match. Grant deliverables include the following:

   - Monterey Regional Water Recovery Study which will examine the feasibility of establishing a Peninsula-wide water recovery and reclamation system
   - SRP for the Monterey Peninsula IRWMP
   - GIS-based screening analysis to identify and prioritize potential projects
   - Approximately 30% design for the top prioritized project. The goal is to apply for Prop 1 Implementation Funding in 2018
   - 10% Conceptual Designs for the next seven prioritized projects

   The MRSWMP Subcommittee will provide oversight of the SRP, and input will be provided by the TAC and a stakeholder group. Next week, Geosyntec will send out a data request to these groups to collect information on planned projects. Generally, private regulated projects will not be included in the prioritized projects list; however, public-private partnership projects may be included.

4. Project Approach

Kelly described the grant tasks and schedule for completion, including the timeline for TAC meetings, key deliverables, and anticipated review periods.

5. SRP Contents

The project team has prepared a draft SRP Outline for submittal to the Grant Manager. It was e-mailed to the TAC prior to today's meeting. Kelly described the SRP contents and provided an overview of the Water Recovery Study. She asked attendees which acronym they prefer using: SRP or SWRP. TAC members did not express a strong preference; however, the same acronym should be used throughout the process and all documents.

Draft technical memos on the SRP Planning Area Description and the Approach to Addressing Water Quality were also sent to the TAC for review. Comments are due by September 25.

6. Stakeholder Outreach and Engagement Plan

Vishakha Atre (EOA) provided an overview of the Stakeholder Outreach and Engagement Plan. Stakeholders will be solicited from Monterey Peninsula Integrated Regional Water Management Plan (IRWMP) stakeholders list. The TAC reviewed the Stakeholder Outreach and Engagement Plan and provided the following feedback:

- Include additional outreach for engaging disadvantaged communities (DACs). Jill Bicknell (EOA) said that while efforts will be made to involve DACs in the Stakeholder Group, it is likely that they will be more involved if projects are identified within their communities. Additional efforts will be made to engage DACs after the potential projects are identified. Jeff Krebs (City of Monterey) and Scott Ottmar (City of Seaside) said that they will provide contact information for DACs within their jurisdictions.
- Involve stakeholders from the Monterey Regional Water Recovery Study with the SRP Stakeholder Group. Add a paragraph about the interaction between the SRP Stakeholder Group and the Water Recovery Stakeholder Group to the Stakeholder Outreach and Engagement Plan.
- Include a paragraph about coordination with the Monterey Regional Water Recovery Study.
- Jeff Condit noted that he will review the stakeholder contact list and provide updates.

7. Action Items:

Action items are summarized in the following table:

Action Item	Description	Responsibility	Due Date
1	Prepare Draft TAC meeting summary for TAC review	Consultant team	9/19/17
2	Issue request for projects and data to stakeholders	Consultant team	9/22/17
3	Schedule and prepare for first stakeholder meeting	Consultant team	10/17/17
4	Add a paragraph about coordinating with the Monterey Regional Water Recovery Study Stakeholders to the SRP Stakeholder Outreach Plan	Consultant Team	9/25/17
5	Provide comments on the following documents: • Draft Detailed Schedule • Draft Detailed SRP Outline • Draft Stakeholder Outreach Plan • Draft Memo on Planning Area Description, Map, and Boundaries • Draft Memo on Description of Approach for Addressing Water Quality	TAC	9/25/17
5	Review and update the IRWMP Stakeholder List	Jeff Condit	9/30/17
6	Send DAC contacts for the City of Seaside	Scott Ottmar	9/30/17
7	Send DAC contacts for the City of Monterey	Jeff Krebs	9/30/17
8	Send Figure 1 of the Planning Area Description to the TAC	Jill Bicknell	9/13/17

Next Meeting:

November 2, 2017, 12:30-2:30 pm, at Monterey One Water Conference Room

Technical Advisory Committee (TAC) Kick-off Conference Call
September 12, 2017

Attendance List

Name	Organization
Scott Ottmar	City of Seaside
Jeff Krebs	City of Monterey
Tom Harty	County of Monterey Resource Management Agency
Jeff Condit	Monterey One Water
Alison Imamura	Monterey One Water
Larry Hampson	Monterey Peninsula Water Management District
Dominic Roques	Regional Water Quality Control Board, Central Coast Region
Sarah Hardgrave	Big Sur Land Trust
Jill Bicknell	EOA, Inc. (consultant to Monterey One Water)
Vishakha Atre	EOA, Inc. (consultant to Monterey One Water)
Kelly Havens	Geosyntec (consultant to Monterey One Water)
Denise Duffy	Denise Duffy & Assoc. (consultant to Monterey One Water)
Diana Staines	Denise Duffy & Assoc. (consultant to Monterey One Water)
Rachid Ait-Lasri	State Water Resources Control Board, Div. of Financial Assistance

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Monterey Peninsula Stormwater Resource Plan TAC Kick-Off Call

Jeff Condit, EOA, Inc., and Geosyntec Consultants

9/12/2017
1 – 3 PM

TAC Kick-Off Call Agenda

MEETING OBJECTIVES:

- *Brief TAC members on the project purpose, background, approach, and schedule.*
- *Review and approve TAC member list.*
- *Solicit TAC input on specific upcoming project submittals (Detailed Project Schedule, Stormwater Resource Plan Outline, Stormwater Resource Planning Area Description Memo, Approach to Addressing Water Quality, and Stakeholder Outreach Plan).*

1:00 pm	1.	Welcome/Introductions	Jeff Condit (Monterey One Water)
1:10 pm	2.	Review of TAC member list, roles and responsibilities *Action: Approve List of TAC Members*	Jill Bicknell (EOA)
1:20 pm	3.	Overview of Project Purpose and Background • Purpose of Stormwater Resource Plan • Description of Project Area Watersheds • Previous and Current Planning Efforts • Water Recovery Study	Jeff Condit/ Kelly Havens (Geosyntec)
1:45 pm	4.	Project Approach • Scope of Work • Schedule *Action: Provide input on project approach. Review Project Detailed Schedule.*	Kelly Havens
2:15 pm	5.	Stormwater Resource Plan (SWRP) Contents *Action: Review Draft SWRP Outline, Planning Area Description, and Approach to Addressing Water Quality*	Kelly Havens
2:35 pm	6.	Stakeholder Involvement *Action: Review Draft Stakeholder Outreach Plan*	Vishakha Atre (EOA)
2:50 pm	7.	Review Action Items	Jill Bicknell
3:00 pm	8.	Adjourn	

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Welcome and Introductions

Today's Presenters:

- ❖ Jeff Condit – Stormwater Program Manager, MRSWMP; SRP Project Manager
- ❖ Jill Bicknell – Managing Engineer, EOA, Inc.; TAC Facilitator/Technical Advisor
- ❖ Kelly Havens – Senior Engineer, Geosyntec Consultants; Project Manger/ Technical Lead
- ❖ Vishakha Atre – Senior Engineer, EOA, Inc.; Stakeholder Outreach Lead (with Denise Duffy & Associates)

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TAC Member Roles and List

Actions for Today:

- Review and Approve TAC Member List
- Review TAC Member Responsibilities:
  - Provide technical guidance to Monterey One Water and its consultants on the development of the Stormwater Resource Plan
  - Review, provide technical input to, and approve specific grant deliverables

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Stormwater Resource Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Jeff Condit, Program Manager
Monterey Regional Stormwater Management Program

SB985 (2014)

- Requires a Stormwater Resource Plan (SRP) as a condition of receiving funds for stormwater and dry weather runoff capture projects from any bond approved by voters after January 2014.
- An SRP represents a collaborative watershed-based planning document that views stormwater and dry weather runoff as a resource, prioritizing projects based on regional multi-benefit objectives, while promoting water quality protection consistent with individual MS4 NPDES permits.

Prop 1 Planning Grant

- The State Water Resources Control Board allocated $20m of the $200m Prop 1 Stormwater Grant Program toward planning grants intended for the development of SRPs.
- The MRWPCA, facilitator of the Monterey Regional Stormwater Management Program, was requested to serve as Lead Agency toward the Prop 1 Grant
- The MRWPCA was awarded $358,716 Prop 1 Planning Grant toward pursuit of a regional SRP.

Prop 1 Planning Grant

- Due to a Prop 1 Planning Grant 50% match requirement, the $358,716 grant is part of a $717,432 effort. Local match includes:
  - The City of Monterey's Neighborhood Improvement Program (NIP) allocated $85,000 to analyze opportunities and constraints of stormwater capture regionally
  - The Monterey Peninsula Water Management District awarded an $85,000 match toward this study of regional capacity
  - The MRSWMP program spent considerable staff time toward the development of a quantitative modeling program that will assist with Planning Grant requirements
  - The MRSWMP Program Manager and partner Staff time

Partner Engagement

- MRSWMP Subcommittee
- Technical Advisory Committee (TAC)
- Stakeholder Outreach
  - Build on IRWMP stakeholder process
  - Include outreach to DACs
- Public Outreach

SRP Objectives

From SRP Guidelines (p. 17):

- "Stormwater management on a watershed basis provides for a combination of stormwater management objectives and multiple benefits throughout the watershed or sub-watershed"
- "The Plan must discuss how its objectives and projects fit into the broader water management goals of the applicable IRWM Plan."

SRP Objectives

- Water Quality
- Water Supply
- Flood Management
- Environmental
- Community

Grant Deliverables

- Monterey Regional Water Recovery Study
  - Examine the feasibility of establishing a Peninsula-wide water recovery and reclamation system
- Stormwater Resource Plan for the Monterey Peninsula IRWMP
- GIS-based Screening Analysis to identify and prioritize potential projects
- For the top prioritized project, an approximately 30% design, a CEQA Initial Study, and a Project Implementation Plan
  - Goal of Prop 1 Implementation Funding in 2018
- 10% Conceptual Designs for the next seven prioritized projects

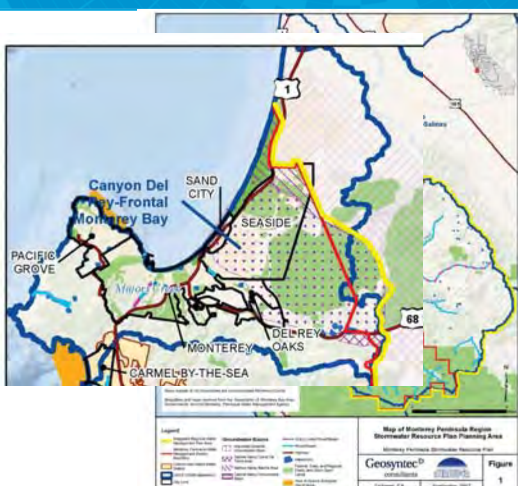
Incorporation into the IRWMP

- Upon development, [a Storm Water Resource Plan must] be submitted to any applicable integrated regional water management group. Upon receipt, the Integrated Regional Water Management group shall incorporate the [Storm Water Resource Plan] into its integrated regional water management plan. (Wat. Code, § 10562, subd. (b)(7).)

Incorporation into the IRWMP

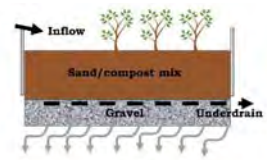
- The SRP must discuss how its objectives and projects fit into the broader water management goals of the applicable IRWM plan.
- For the purposes of receiving project implementation funding, submittal of a Storm Water Resource Plan to the applicable IRWM group (for further incorporation into an existing IRWM plan) fulfills the public agency's requirement for "incorporation."

Planning Region Watersheds



Identification of Planned Projects

- E-mail request to cooperating entities, interested parties, and stakeholders
- Planned projects:
  - Location
  - Drainage Area
  - Facility Type



Stormwater Technical Guide for Low Impact Development
MRSWMP

Figure 1-1. Bioretention facilities infiltrate most runoff (above) and can be an attractive landscape amenity (below).

Scope of Work

- Grant Task 1: Project Administration/Management
- Grant Task 2: Technical Advisory Committee
- Grant Task 3: Data Collection and Watershed Identification
- Grant Task 4: Stormwater Resource Plan Development
  - Includes project identification and prioritization
  - Includes conducting Water Recovery Study
- Grant Task 5: Planning and Design
- Grant Task 6: Stakeholder Outreach

Project Schedule

Water Recovery Study

- Examine the feasibility of Peninsula-wide recovery and reclamation system along with:
  – Possibilities for sources
  – Water transport, treatment, storage
- Identify the Monterey Peninsula Water Recovery Study Stakeholders
- Select a preferred project and alternate project
- Prepare CEQA Initial Study Checklist for the preferred project
- Develop a Project Implementation Plan

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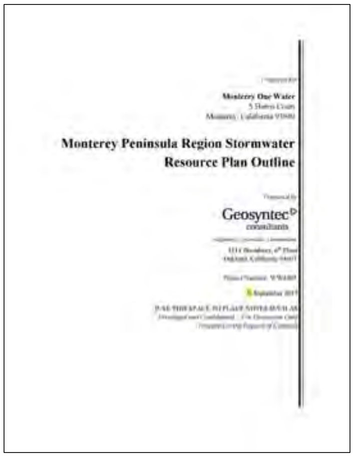
Stormwater Resource Plan Contents

- *SWRP vs. SRP*
- Draft SWRP Outline
- Planning Area Description
- Approach to Addressing Water Quality



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Stakeholder Involvement

- **Goals**
  - Provide information on SRP process and need for stormwater capture and treatment projects
  - Obtain input in identifying locations and types of projects
  - Obtain feedback on initial prioritized list of potential projects
  - Obtain comments on, and support for SRP
  - Obtain feedback on environmental justice needs and concerns associated with SRP implementation
- **Key Messages**
  - Benefits of using stormwater as a resource
  - Need for stormwater capture and treatment projects
  - Purpose and content of the SRP
  - Process for identifying, assessing, and prioritizing stormwater capture and treatment projects

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Stakeholder Involvement

Stakeholder Outreach Tasks

- Task 1 - Stakeholder Group Formation - September 2017
- Task 2 - Quarterly Updates - Beginning November 2017
- Task 3 - Stakeholder Group Information Requests and Meetings
  - Data request (plans, reports, data, & solicitation of projects) – September 2017
  - First meeting (feedback on prioritization methodology, potential projects ideas) - October 2017
  - Second meeting (feedback on Prioritized Project List) - January 2018
  - Feedback on draft SRP – May 2018
- Task 4 - Public Workshop – June 2018
- Task 5 - Stakeholder Involvement in Implementation of SRP and Completion of Projects

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Review Action Items

- TAC: Review and comment by 9/25/17
  – Detailed Schedule
  – Detailed SRP Outline
  – Stakeholder Outreach Plan
  – Planning Area Description, Map, and Boundaries
  – Description of Approach for Addressing Water Quality
- Consultant Team:
  – Prepare Draft TAC Meeting Summary for TAC Review
  – Issue Request for Projects and Data
  – Schedule and Prepare for First Stakeholder Meeting
- Other Actions from the Meeting?

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Stormwater Resource Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Technical Advisory Committee (TAC)
Meeting #2

Thursday, November 2, 2017
12:30 pm – 2:30 pm

Monterey One Water Conference Room
5 Harris Court, Building D, Monterey, CA

Call-in Option
Phone: 855-266-3436/ Access Code: 274784

AGENDA

MEETING OBJECTIVES:

- *Update TAC members on SWRP task activity since the last TAC meeting, including Stakeholder Meeting #1.*
- *Discuss the relationship between the SWRP and the IRWMP.*
- *Solicit TAC input on specific upcoming project submittals related to data review and project metrics-based analysis and quantification.*
- *Solicit TAC input on the Technical Memo on Water Recovery Study Methodology.*

12:30 pm	1.	Welcome/Introductions	Jeff Condit (Monterey One Water)
12:35 pm	2.	Additions or Revisions to the Agenda	Jill Bicknell (EOA)
12:40 pm	3.	Update on SWRP Task Activity: • Summary of Stakeholder Meeting #1 • Summary of deliverables submitted, under review, and in progress *Action: Receive update on activity during Sept-Oct 2017.*	Jill Bicknell / Kelly Havens (Geosyntec)
12:55 pm	4.	Discussion Topic – How does the SWRP fit into the IRWMP?	Jeff Condit
1:10 pm	5.	SWRP Task 3 – Data Review • Annotated list of reviewed plans and reports • Summary of data received (i.e., GIS data) • Summary of planned projects received *Action: Provide input prior to review period for these products.*	Kelly Havens

1:30 pm	6.	SWRP Task 4 - Technical Memo on Project Feasibility, Identification, and Modeling Tools and Methodologies (Project Metrics-Based Analysis and Quantification Technical Memo) *Action: Receive information on the technical memo and provide input prior to the review period for this product.*	Kelly Havens
2:00 pm	7.	Discussion of Water Recovery Study Methodology *Action: Provide input on draft Water Recovery Study Methodology memo.*	Kelly Havens
2:20 pm	8.	Review Action Items	Jill Bicknell
2:30 pm	9.	Adjourn	

Stormwater Resource Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Technical Advisory Committee (TAC)
Meeting #2

November 2, 2017
12:30 pm – 2:30 pm

MEETING SUMMARY

Participants – Attendance list attached.

1. Welcome/Introductions

   Jeff Condit (Monterey One Water) welcomed TAC participants and informed them that the purposes of today's meeting are to update the TAC on recent Stormwater Resource Plan (SWRP) activities; discuss the relationship between the SWRP and the Integrated Regional Water Management Plan (IRWMP); and solicit TAC input on upcoming SWRP submittals and the Water Recovery Study methodology. Attendees introduced themselves.

2. Additions/Revisions to the Agenda

   Jill Bicknell (EOA) reported that there was one stakeholder comment on the SWRP that she would like to discuss with the TAC, under Agenda Item 3. There were no other additions or revisions to the agenda.

3. Update on SWRP Task Activity

   a. Summary of Stakeholder Meeting #1 -- Jill reported that the first stakeholder meeting was well attended and that a lot of good input on the SWRP approach was received. Attendees were asked to provide information on potential projects and comments on the project prioritization methodology presentation by October 31.

      Jill described a letter received from the Ohlone/Costanoan-Esselen Nation (OCEN), requesting consultation on projects affecting their aboriginal homelands. Jeff Krebs (City of Monterey) said that he can provide a GIS map of archeologically sensitive areas, but others pointed out that many burial sites are unknown, and consultations are typically required on major construction projects. Sarah Hardgrave (Big Sur Land Trust) said she has been looking at integrating a consultation process into the IRWMP, and she will reach out to the OCEN representative.

   b. Summary of deliverables submitted, under review, and in progress -- Kelly Havens (Geosyntec) provided a summary of the status of the grant deliverables and due dates for comments (see attached presentation).

4. Discussion Topic – How does the SWRP fit into the IRWMP?

   There is a requirement in the State Water Board's SWRP Guidelines that the final SWRP be incorporated into the local IRWMP. This does not have to be a complicated process, but there will be two separate lists of prioritized projects (prioritized using different criteria) and it is unclear how they would be integrated. Sarah mentioned that she is involved with a planning process for updating the IRWMP prior to the next IRWM implementation grant solicitation. It was suggested that members of the TAC involved with the IRWM group look at the scoring and prioritization criteria and consider whether any IRWM criteria should be added to the SWRP methodology.

5. SWRP Task 3 – Data Review

   a. Annotated list of reviewed plans and reports – Kelly reported that a draft of this list will be provided to the TAC by November 10 and comments will be due on November 17. She would like input on any relevant reports that may be missing.

   b. Summary of data received – Kelly provided an overview of the Excel spreadsheet sent to the TAC which summarizes data received/collected and reviewed. The following questions/comments were raised/provided:

      - Are pollutant load estimate data included?
        - Project Team is planning to use TELR load estimates. Will add this to the table.
      - Water District has aerial photos of the entire study area.
        - Project Team will request from AMBAG (Gina Schmidt)/ Monterey Peninsula Water Management District (MPWMD).
      - New Carmel Area Wastewater District (CAWD) Boundary is needed.
        - Project Team will request from Drew Lander (CAWD).
      - Project Team will request pump station locations from the cities.
      - Monterey County Resource Agency should have a map of known flood hazard areas.
      - Water quality monitoring data for MRSWMP and ASBS areas suggested to be added.
        - Project Team will try to obtain this data.
      - Project Team asked if additional flow monitoring data available?
        - There may be data from Monterey County. Project Team will request.
      - Open space layer does not include County parks, regional parks, and conservation areas. Sarah to provide an updated layer.

      Kelly asked that any other comments be provided by November 10. The data deliverable will be submitted to the State on November 27.

   c. Summary of planned projects received – Kelly reported that she has received projects from 15-20 entities so far. She will review them for potential overlap and missing data and then send to the TAC for review by November 10. Comments are due by November 17.

6. SWRP Task 4 – Technical Memo on Project Feasibility, Identification, and Modeling Tools and Methodologies

Kelly reviewed the technical memo that was provided to the TAC on November 1. The discussion focused on Section 4, Project Identification and Classification, and Section 5, Project Metrics-Based Multi-benefit Evaluation. The following comments were provided:

Section 4:

- Decision to include Federal and State-owned parcels in project opportunity screening, such as the Presidio of Monterey and Fort Ord.
- There was a suggestion to look at undeveloped (vacant) private parcels as well.
  - Project team will look at private parcels that overlie water supply aquifers and/or could be used for capture and use water supply projects.
- What is the definition of "urbanized areas"? Decision was to use census designation.

Section 5:

- Decided to remove the scoring based on level of traffic (e.g., do not rank by street classification).
- Decided to lower the points given for projects based on quantity of water supply provided (e.g., 0 points for < 5 af/yr, 1 point for 5-10 af/yr, and 2 points for 10-20 af/yr, etc.).
- There was a question regarding the ability to evaluate cost effectiveness at this stage.
  - No, but will evaluate this when selecting projects for conceptual design.
- Suggestion to consider how projects that drain to ASBS will be ranked.
- Consider whether flood control projects should be ranked by size of storm controlled (i.e., provide 1 point for projects that control the 5 or 10 year storm) or size of project.

7. Discussion of Water Recovery Study Methodology

Kelly reviewed the Water Recovery Study Approach Memorandum. The following comments were provided:

- The Pacific Grove dry weather diversion project is not permitted to divert wet weather flows. The memo should describe the section of the ASBS that it covers. The amount of diversion is limited by pump capacity. Upgrades are planned to increase capacity.
- There may be an issue with charging for diversion to sanitary sewer.
- Complexity of permitting should be considered, e.g., DSOD permit for David Ave. reservoir.
- Comment that we don't want to exclude "dirty water" from recharge.

8. Review Action Items:

In addition to the summary of deliverables and reviews, the following actions will be completed by the consultant team prior to TAC Meeting #3:

- Conduct analyses for both the SWRP and the Water Recovery Study
- Produce list of ranked SWRP projects
- Produce list of potential water recovery projects
- Hold Stakeholder Meeting #2

Next Meeting: To be scheduled (during the February 2018 timeframe)

Technical Advisory Committee (TAC) Meeting #2
November 2, 2017

Attendance List

Name	Organization
Scott Ottmar	City of Seaside
Jeff Krebs	City of Monterey
Tom Harty	County of Monterey Resource Management Agency
Jeff Condit	Monterey One Water
Alison Imamura	Monterey One Water
Larry Hampson	Monterey Peninsula Water Management District
Dominic Roques	Regional Water Quality Control Board, Central Coast Region
Sarah Hardgrave	Big Sur Land Trust
Jill Bicknell	EOA, Inc. (consultant to Monterey One Water)
Kelly Havens	Geosyntec (consultant to Monterey One Water)
Lisa Austin	Geosyntec (consultant to Monterey One Water)
Diana Staines	Denise Duffy & Assoc. (consultant to Monterey One Water)

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Monterey Peninsula Stormwater Resource Plan

TAC Meeting #2

2 November 2017

TAC Meeting #2 Agenda

- Update on SWRP Task Activity
- Discussion Topic – How does the SWRP fit into the IRWMP?
- SWRP Task 3 – Data Review
- SWRP Task 4 – SWRP Technical Memo
- Discussion of Water Recovery Study Methodology Memo
- Review Action Items

Monterey Peninsula SWRP TAC Meeting #2 11/28/2017 2

Overview of Stakeholder Meeting #1


Monterey Peninsula SWRP TAC Meeting #2 11/28/2017 3

Summary of Grant Deliverables

Grant Item #	Description / Submittal	Final Draft to State	Submittal Status
1.3	Final Detailed Project Schedule	9/29/2017	Submitted
2.1	List of TAC Member, Roles, and Responsibilities	9/29/2017	Submitted
2.2	Agenda, Notes for TAC Kick-Off Meeting	10/7/2017	Submitted
2.2	Agenda, Notes for 2nd TAC Meeting	11/27/2017	In progress
3.1	Annotated List of Plans and Reports	11/27/2017	In progress
3.1	Database of Planned Projects	*Discussion*	In progress
3.1	Summary of Data Received	11/27/2017	In progress
3.2	Planning Area Description, Map, and Boundaries	10/14/2017	Submitted
4.1, 4.2	Detailed SRP Outline	9/29/2017	Submitted
4.3	Description of Approach for Addressing Water Quality	10/7/2017	Submitted
4.4.1	Technical Memo on Water Recovery Study Approach	*Discussion*	In progress
4.4.1/2	Technical Memo on Modeling Tools and Methodologies	11/27/2017	In progress
6.1.1	Stakeholder Outreach Plan	10/7/2017	Submitted
6.1.2	Stakeholder Meeting 1 Notes	2017 Q4 Report	In progress
6.1	Public Education Goals	10/7/2017	Submitted

Monterey Peninsula SWRP TAC Meeting #2 11/28/2017 4

Discussion Topic

- How does the SWRP fit into the IRWMP?

Monterey Peninsula SWRP TAC Meeting #2 11/28/2017 5

Grant Task 3.1 – Data Review

- Annotated List of Plans and Reports (Deliverable)
  - In Progress (Geosyntec/ DD&A) – TAC draft on 11/10, comments due back 11/17
- Summary of Data Received (Deliverable)
  - TAC draft sent out 10/30, comments due back 11/10
- Database of Planned Projects – Discussion
  - TAC draft sent 11/10, comments due back 11/17

Monterey Peninsula SWRP TAC Meeting #2 11/28/2017 6

Grant Task 4.1.1/4.1.1 – SWRP Methodology Memo

- Draft sent to TAC 11/1
- Outline:
  - Overview of Approach
  - Evaluation of Models and Tools
  - Project Identification and Classification
  - Project Metrics-Based Evaluation
  - Development of Project Concept Designs

Monterey Peninsula SWRP TAC Meeting #2 11/28/2017 7

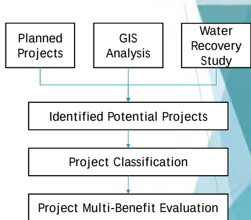
Overview of Approach

- Identify Projects
- Screen and Classify Projects
- Score Projects using Metrics-Based Evaluation
- Prioritize Projects
- Detailed Quantification of Benefits for Concept Designs

Monterey Peninsula SWRP TAC Meeting #2 11/28/2017 8

Project Identification

- Planned Projects
  - Through project request spreadsheet
- GIS Project Opportunity Analysis
- Water Recovery Study – specific project types



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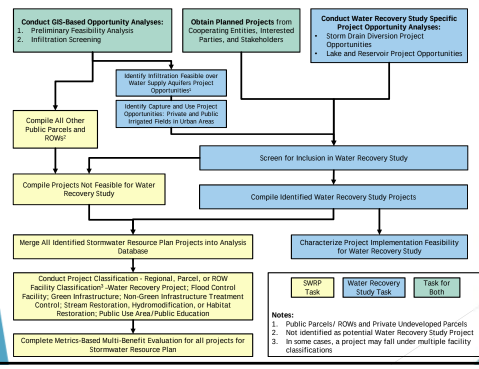


Interaction between Stormwater Resource Plan and Water Recovery Study

11/28/2017 10

GIS Opportunity Analysis

- Publicly-owned parcels at least 0.1 acre, slope < 10% and Public ROWs
  - Screened for physical constraints
- Classified based on
  - Project Size: Parcel-based, Regional, ROW
  - Infiltration Feasibility: Hazardous, Partial, Full Infiltration
  - Facility type
  - Drainage Area

Monterey Peninsula SWRP TAC Meeting #2 11/28/2017 11

Facility Types

- Water Recovery Project
- Green Infrastructure
- Non-GI Treatment Control
- Flood Control Facilities
- Hydromodification Control, Stream/Habitat Restoration
- Public Use Area or Public Education Area
- Programmatic Stormwater Management Opportunity

Monterey Peninsula SWRP TAC Meeting #2 11/28/2017 12

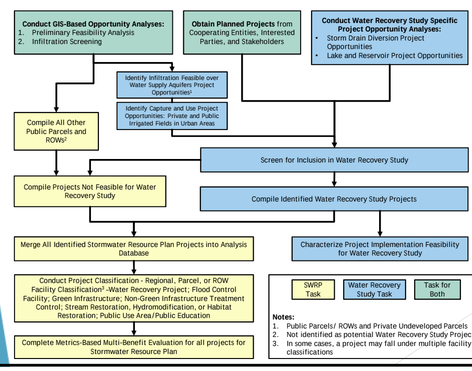
Project Component	Benefit Addressed	Points		
		0	1	2
Parcel area (For Regional/Parcel-Based Projects Only)	All	< 1 acre	1 - < 4 acres	> 4 acres
Street type (for ROW Projects Only)	All	High Traffic	Medium Traffic	Low Traffic
Location Slope	All	7-10%	3-7%	0-3%
Catchment Runoff Rate	All	< 0.15 ft/yr (per TELR) or unavailable in TELR	0.15 ft/yr < runoff < 0.40 ft/year (per TELR)	> 0.40 ft/year (per TELR)
Infiltration feasible	All	No	Partial or Not Applicable[2]	Yes
Water Recovery Project	Water Supply	No	--	Yes
Estimated Water Supply Provided	Water Supply	0	0 – 50 ac-ft/yr	50+ ac-ft/yr 100+ ac-ft/yr (+1 point) 200+ ac-ft/yr (+2 points)
Pollutant Loading Rate[1]	Water Quality	<0.002 ton/ac-yr (per TELR) or unavailable in TELR	0.002 – 0.02 ton/ac-yr (per TELR)	>0.02 ton/ac-yr (per TELR)
Captures Runoff Ultimately Draining to ASBS or 303(d) listed waterbodies	Water Quality	No	Partial	Yes
Removes pollutants from stormwater	Water Quality	--	Non-Green Infrastructure Treatment Control Facilities	Green Infrastructure[3]
Provides Flood Control Benefits	Flood	--	--	Flood Control Facility
Re-establishes drainage, develops, restores, or enhances habitat	Environmental	--	--	Stream Restoration, Hydromodification Control, or Habitat Restoration Project
Provides community				Public Use Area or Public

3

Project Prioritization, Selection, Concepts

- Prioritize Projects
  - Cooperating entities, interested parties, and stakeholders will have the option to review their scores and re-rank
- Detailed Quantification of Benefits for Concept Designs
  - Planning level hydrologic models anticipated to be developed for selected projects for concept design

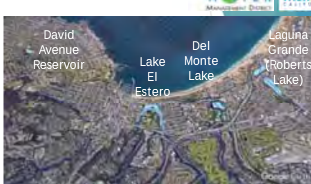
Water Recovery Study Methodology Discussion



Interaction between Stormwater Resource Plan and Water Recovery Study

Project Identification – Lakes and Reservoirs

- Planned Projects ⟶
- Opportunity Analysis
  - Other lakes fed by:
    - NHDplus stream, or
    - Storm drain
  - Potential to recover additional runoff via:
    - Percolation to a water supply aquifer
    - Capture and use
    - Diversion to sanitary sewer
    - Optimization
  - In-channel obstructions (e.g., rubber dams) not considered



Project Identification – Storm Drain Diversions to Sanitary Sewer

- Planned Projects
  - M1W
    - New Monterey urban diversion to Reeside pump station
    - Del Monte Blvd and Bay Ave outfall diversion to Seaside pump station
  - CAWD
    - Carmel Bay ASBS Project
- Opportunity Analysis
  - Storm drains near sanitary sewer pump stations

Project Identification – Infiltration to Aquifers

- GIS analysis to identify public/private parcels (and ROW) feasible for infiltration into water supply aquifers
  - Aquifer locations
  - Underlying soil type
  - Infiltration hazards
  - Depth to Groundwater
  - Set-backs
  - Undeveloped Parcels
- Other considerations
  - Hydrogeological
  - Riparian connectivity

Project Identification – Capture and Use

- Planned projects
  - Cistern water tank rebates
- GIS analysis to identify public and private parks/fields
  - Irrigated with potable water
  - Proximity to storm drain
  - Drainage area size, and
  - Space/physical considerations; onsite storage capacity

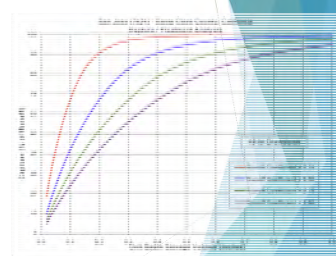
Photo Credit: LADWP

Project Feasibility Characteristics

- Water supply
- Planning level cost
- Ease of implementation

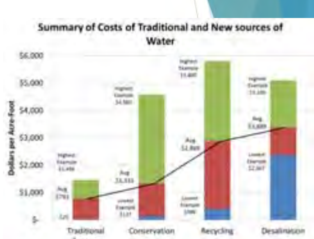
Project Feasibility – Water Supply

- Categories: 10s, 100s, or 1,000s AFY
- Wet weather runoff
  - Catchment hydrology
  - Facility configuration and drawdown
  - % Capture = f (runoff coefficient, DD time, unit basin storage)
  - Potential water supply = % Capture * Annual volume
- Dry weather runoff
  - Extrapolate from available studies and Pacific Grove ASBS project data



Project Feasibility – Planning Level Cost

- Categories ($/AF)
- Analogy from previously implemented and evaluated projects
- Rough conceptual screening cost estimates for subset of projects



Project Feasibility – Ease of Implementation

- Financing
  - Project cost: $10Ks, $100Ks, $1Ms, $10Ms
- Seasonality vs. Demand
  - Diversion to sanitary sewer during wet season? (Yes, Partially, No)
- Complexity of Permitting

Summary of Work to be Completed Prior to TAC #3

- SWRP Project Identification, Metrics-Based Evaluation, and Prioritization
  - List of SWRP Projects - Scored and Ranked (Grant Task 4.5)
- Water Recovery Study Project Identification, Evaluation
  - Matrix of WRS Project Evaluation Findings
- Stakeholder Meeting #2 (Grant Task 6.1.2)

Goals for TAC Meeting #3

- Review identified projects
- Select seven projects for 10% concept design (2 of which must be Water Recovery Study projects)
- Select one project for 30% design (Water Recovery Study project)
- Discuss Implementation Strategy

Stormwater Resource Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Technical Advisory Committee (TAC)
Meeting #3

Thursday, February 22, 2018
10:00 am – 1:00 pm

Monterey One Water Conference Room
5 Harris Court, Building D, Monterey, CA

Call-in Option/GoToMeeting Link:
Phone: 855-266-3436/ Access Code: 81350
https://global.gotomeeting.com/join/774335109

AGENDA

MEETING OBJECTIVES:

- *Update TAC members on SWRP task activity since the last TAC meeting.*
- *Receive TAC input on the implementation strategy for the SWRP.*
- *Provide TAC members with an overview of the Water Recovery Study findings.*
- *Update TAC members on the preliminary SWRP project list and prioritization results.*
- *Solicit TAC input on and approval of the selected projects for conceptual design.*

10:00 am	1.	Welcome/Introductions	Jeff Condit (Monterey One Water)
10:05 am	2.	Additions or Revisions to the Agenda	Jill Bicknell (EOA)
10:10 am	3.	Update on SWRP Task Activity • Update on activity during Nov. 2017 – Jan. 2018 • Summary of deliverables submitted, under review, and in progress	Lisa Welsh (Geosyntec)
10:25 am	4.	Implementation Strategy Memo Discussion • Review of outline and input from TAC	Jill Bicknell
10:45 am	5.	Overview of Water Recovery Study Findings	Lisa Welsh
11:05 am	6.	Task 4 - Project Identification, Prioritization and Analysis • Summary of preliminary project list and prioritization results • Outcomes from Stakeholder meeting	Lisa Austin / Lisa Welsh (Geosyntec)

11:30 am BREAK

11:45 am 7. Selection of Projects for Concept Design — Lisa Austin/ Lisa Welsh

- Selection process and recommendations
- TAC input and approval of final selection

12:45 pm 8. Review Action Items — Jill Bicknell

1:00 pm 9. Adjourn

Stormwater Resource Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Technical Advisory Committee (TAC)
Meeting #3

Thursday, February 22, 2018
10:00 am – 1:00 pm

MEETING SUMMARY

Participants – Attendance list attached.

1. Welcome/Introductions

   Jeff Condit (Monterey One Water) welcomed TAC participants and informed them that the purposes of today's meeting are to: update TAC members on SWRP task activity since the last TAC meeting; receive TAC input on the implementation strategy for the SWRP; provide TAC members with an overview of the Water Recovery Study findings; update TAC members on the preliminary SWRP project list and prioritization results; and solicit TAC input on and approval of the selected projects for conceptual design. Attendees introduced themselves.

2. Additions or Revisions to the Agenda

   There were no additions or revisions to the agenda. Jill Bicknell (EOA) reviewed the handout materials, all of which had been sent to the TAC prior to the meeting.

3. Update on SWRP Task Activity

   Lisa Welsh (Geosyntec) reviewed the consultant team's task activity during November 2017 through January 2018, and the summary of grant deliverables (Slide 4 of the TAC PowerPoint presentation, attached). Larry Hampson asked if there was a place to find all the deliverables that had been submitted. Lisa said Geosyntec would set up a dropbox folder or equivalent containing all deliverables produced to date, that could be accessed by TAC and MRSWMP members. The draft SWRP will be posted on the MRSWMP website for public review in May.

4. Implementation Strategy Memo Discussion

   Jill reviewed a proposed outline of the Implementation Strategy section of the SWRP, which addresses the requirements in the State Board's SWRP Guidelines (Slides 6-10), and explained that the purpose of this agenda item is to obtain TAC input on the content of the Strategy. Although the Strategy is a chapter of the SWRP, a memo on the draft Implementation Strategy is a separate grant deliverable. TAC comments included the following:

   - Incorporation into the IRWMP -- The consultant team should coordinate with the Regional Water Management Group (RWMG) to define the process for incorporation of the SWRP into the Monterey Peninsula IRWMP. The RWMG is the entity tasked with developing and implementing the IRWMP, reviewing projects submitted to the plan, and choosing which projects to put forward for funding. The public draft of the SWRP should be introduced to the RWMG at an August meeting and the process for incorporation confirmed. The final SWRP will be completed by September 30, 2018, and should be incorporated into the IRWMP by December. SWRP projects can be submitted for IRWM scoring through the IRWM solicitation process.

- Maintaining and Updating the SWRP -- The TAC discussed whether the RWMG or MRSWMP should be responsible for maintaining and updating the SWRP. As part of the IRWMP, the SWRP could be updated on the same schedule as the IRWMP, using the same public process. However, it may make more sense for a stormwater-focused organization like MRSWMP to maintain and update the SWRP separately (in coordination with the IRWMP), in a way that is more responsive to stormwater regulatory requirements and issues/interests.
- Performance Measure Tracking – The TAC discussed the potential use of TELR, possibly supplemented with other spreadsheet tools, to track implementation of projects and benefits achieved. Current Water Management District tracking tools for water supply well locations and monitoring could also be considered. Larry mentioned the need to coordinate with the Seaside Water Master for approval to extract recharged water. The TAC discussed the need for having a way to monitor and get credit for either stormwater diversion to sanitary or recharge to the aquifer.
- Other Comments -- Rachid Ait-Lasri informed the TAC that the solicitation for grant proposals for Round 2 of the Prop 1 Stormwater Grants is expected to be released in the first half of 2019, and no revisions to the guidelines are expected. Dominic Roques commented that the next version of the Phase II permit will likely mention the importance of public involvement and integration of stormwater program efforts with SWRPs and IRWMPs and their public processes. Sarah Hardgrave mentioned that DWR met with the Central Coast IRWMs yesterday and suggested having a workshop in late spring on the topic of integrated water management planning and public involvement.

5. Overview of Water Recovery Study (WRS) Findings

The draft WRS was provided to the TAC for review on February 16 and comments are due on March 2. Lisa Welsh provided an overview of WRS findings, including graphics displaying identified opportunities by jurisdiction and by net recovered water volume (Slides 12-14). Lisa explained that the WRS looked only at water supply project opportunities (capture and use, infiltration to a water supply aquifer, diversion to sanitary sewer, and lake/reservoir storage), whereas the SWRP identified opportunities for infiltration for water quality benefits as well. She noted that the diversion projects were limited by sanitary sewer capacity, and it was assumed that diversions would be primarily dry weather flow, unless there was an opportunity for storage upstream. Larry commented that in winter months, nearly 7 MGD of treated water is being discharged to the Bay due to lack of demand for recycled water during the winter. There is also a need to expand the recycled water project as a potential means of developing additional replacement supplies for the Monterey Peninsula to satisfy the requirements of the SWRCB CDO concerning Carmel River diversions and the requirement by the Superior Court adjudication of the Seaside Groundwater Basin to reduce pumping of native groundwater to the Physical Safe Yield. Judd added that the WRS distinguished wet weather supply from dry weather supply benefits.

6. Task 4 - Project Identification, Prioritization and Analysis

   a. Summary of preliminary project list and prioritization results

      Lisa Welsh provided a summary of the progress to date on the database of project opportunities, preliminary scoring, ranking by the MRSWMP jurisdictions, and the resulting total metrics-based scores (Slides 16-19). A Google Earth file was also developed to show project opportunity locations. Lisa Austin asked the TAC if any project opportunities should be deleted from the database (which will be appended to the SWRP), and the TAC agreed that none should be deleted unless a specific request to delete had been provided by a jurisdiction.

   b. Outcomes from Stakeholder meeting

      Lisa Welsh described Stakeholder Meeting #2, which was held on February 8, 2018 to present the prioritized list of project opportunities and get stakeholder input for identifying projects for conceptual design. The meeting summary and a table of stakeholder comments were distributed to the TAC. The top project characteristics important to stakeholders were: 1) water supply benefits; 2) synergy of project with upcoming projects; 3) project was part of larger restoration or watershed improvement plans; and 4) water quality benefits. The key comments from stakeholders were: 1) develop a more user-friendly version of the project opportunities table; and 2) ensure that project implementation is a collaborative effort and that identified projects compliment and not conflict with each other. Additional information was also received on several Carmel project opportunities, which was used to update the project database.

7. Selection of Projects for Concept Design

   a. Selection process and recommendations

      Lisa Welsh explained that the SWRP scope of work includes development of seven projects at 10% conceptual design, and development of one of the seven projects at 30% conceptual design. The consultant team developed a list of the suggested top seven projects, as well as nine alternative projects, that represent jurisdiction and project type diversity (Slides 24 and 25). The selection of the top and alternative projects was based on the list of the top 2% of projects in each jurisdiction (based on scores and ranks), stakeholder comments, and largest water supply benefits.

b. TAC input and approval of final selection

Each suggested top project and alternative project and its associated benefits were discussed with the TAC in detail. From the original list of seven top projects, the TAC agreed to eliminate the Del Rey Oaks Capture and Use Project at City Hall and the Sand City Contra Costa Street Green Street Project because they did not provide water supply benefits (the TAC's and stakeholders' highest priority). These were replaced with two alternative projects: City of Seaside Del Monte Blvd Diversion Project and the City of Monterey Hartnell Gulch Diversion Project. These are consistent with the TAC's expressed priority to divert more dry weather flows to sanitary to help meet dry weather recycled water demands. The Carmel diversion project was modified based on comments from the City of Carmel-by-the-Sea (Agnes Topp) prior to the meeting. In addition, the TAC agreed to limit the Dry Well Catch Basin Retrofit Program to areas with infiltration above the Seaside groundwater basin. Jeffrey Albrecht clarified that programmatic projects like the Dry Well Catch Basin Retrofit Program can be included in the SWRP, although they may need a different method of scoring for multiple benefits.

The final list of top projects for 10% design is attached. The TAC agreed that the El Estero Lake Reservoir Project was the #1 project for 30% design because it offered a large amount of potential storage capacity (>100 AF/yr) and proximity to a sanitary sewer for diversion.

8. Review Action Items

As described in the summary of deliverables and reviews, the following products will be completed by the consultant team prior to TAC Meeting #4 (see Slides 4 and 27):

- Draft SWRP Implementation Strategy
- Prioritized Projects Technical Memorandum
- Administrative Draft SWRP and Self-Certification Checklist
- Draft 10% level designs of top seven projects

Technical Advisory Committee (TAC) Meeting #3

February 22, 2018

Attendance List

Name	Organization
Scott Ottmar	City of Seaside
Jeff Krebs	City of Monterey
Tom Harty	County of Monterey Resource Management Agency
Jeff Condit	Monterey One Water
Larry Hampson	Monterey Peninsula Water Management District
Jill Bicknell	EOA, Inc. (consultant to Monterey One Water)
Lisa Welsh	Geosyntec (consultant to Monterey One Water)
Lisa Austin	Geosyntec (consultant to Monterey One Water)
Diana Staines	Denise Duffy & Assoc. (consultant to Monterey One Water)
Sarah Hardgrave (phone)	Big Sur Land Trust
Dominic Roques (phone)	Regional Water Quality Control Board, Central Coast Region
Jeffrey Albrecht (phone)	State Water Resources Control Board
Rachid Ait-Lasri (phone)	State Water Resources Control Board
Judd Goodman (phone)	Geosyntec (consultant to Monterey One Water)
Denise Duffy (phone)	Denise Duffy & Assoc. (consultant to Monterey One Water)

Top 7 Projects for Conceptual Design

Project ID	Project Name	Proponent	Rank	Score	Project Category	Estimated Water Volume Recovered, AFY
LR_04	**El Estero Lake**	**Monterey**	**1**	**12**	**Lake or Reservoir**	**100+**
Modified DSS_08 (Scenic and 8^{th})	South Carmel and 4^{th} Avenue Dry Weather Diversion with CAWD holding tank	Carmel-By-The-Sea, CAWD	1	10 and 11	Diversion to Sanitary Sewer	20-100
LR_02	David Ave Reservoir	Pacific Grove	1	15	Lake or Reservoir	10-20
planned_51	Hartnell Gulch	Monterey	3	21	Diversion to Sanitary Sewer	100+
planned_19	Del Monte Manor	Seaside	1	22	Infiltration to a Water Supply Aquifer	10-20
DSS_06 (Seaside Pump Station #23)	Del Monte Blvd Storm Drain Diversion	Seaside	2	12	Diversion to Sanitary Sewer	100+
INF_DW_SEA	Dry Well Catch Basin Retrofit Program	Seaside	Programmatic Project (total numeric score and rank not applicable at this time)		Infiltration to a Water Supply Aquifer	20-100

Monterey Peninsula Stormwater Resource Plan

TAC Meeting #3

22 February 2018

TAC Meeting #3 Agenda

- 1. Welcome/Introductions
- 2. Additions or Revisions to the Agenda
- 3. Update on SWRP Task Activity
- 4. Implementation Strategy Memo Discussion
- 5. Overview of Water Recovery Study Findings
- 6. Project Identification, Prioritization and Analysis
- 7. Selection of Projects for Concept Design
- 8. Review Action Items

Monterey Peninsula SWRP TAC Meeting #3 3/2/2018 2

3. Update on SWRP Task Activity

Monterey Peninsula SWRP TAC Meeting #3 3/2/2018 3

Summary of Grant Deliverables

Grant Item #	Description / Submittal	Final Draft to State	Submittal Status
2.2	Agenda, Notes for 2nd TAC Meeting	11/24/2017	Submitted
2.2	Agenda, Notes for 3rd TAC Meeting	03/30/2018	In progress
3.1	Annotated List of Plans and Reports	11/24/2017	Submitted
3.1	Database of Planned Projects	Discussion	Completed
3.1	Summary of Data Received	11/24/2017	Submitted
4.4.1	Technical Memo on Water Recovery Study Approach	11/27/2017*	Completed
4.4.1/2	Technical Memo on Modeling Tools and Methodologies	11/24/2017	Submitted
4.5	Results of Analysis, Prioritization, and Project Selection (Prioritized Projects Technical Memorandum)	3/30/2018	In progress
4.5	Water Recovery Study Results (Report)	3/16/2018*	Draft Completed
4.6.3	Technical Memo on Draft Implementation Strategy	3/30/2018	In progress
4.7	Administrative Draft SWRP and Self-Certification Checklist	4/30/2018	In progress
6.1.2	Stakeholder Meeting 1 Notes	2017 Q4 Report	Submitted
6.1.2	Stakeholder Meeting 2 Notes	2018 Q1 Report	In progress

*not a grant deliverable

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4. Implementation Strategy Memo Discussion

Monterey Peninsula SWRP TAC Meeting #3 3/2/2018 5

SWRP Implementation Strategy Topics*

- Resources for Plan Implementation
- Plan Implementation (Projects and Programs)
- Adaptive Management (Maintaining a Living Document)
- Implementation Performance Measures

*Per SWRCB SWRP Guidelines (2015)

Monterey Peninsula SWRP TAC Meeting #3 3/2/2018 6

Resources for Plan Implementation

- Projected additional funding needs and sources
  - Estimated costs of concept-designed projects
  - Costs/funding for Water Recovery Study projects
  - Sources: grants, CIP budgets, water rates? Other?
- Schedule for securing "Plan financing for project implementation"?

Project-specific

Plan Implementation

- Timeline for incorporating SWRP into IRWMP
- Identification of specific actions, projects and studies
- Entities responsible for project implementation
- Institutional structure to ensure implementation
- Procedure to track status of each Plan element
- Community participation strategy
- Timelines for active/planned project components
- Strategy for obtaining needed federal, state, and local permits

Project-specific

Adaptive Management

- Living document – ongoing, adaptive program
  - Need clear procedures for updating/adding future projects
  - Reflect current understanding of the watershed and address changing conditions
  - Example updates that may be needed:
    - Re-characterization of water quality priorities
    - Source assessment re-evaluation
    - Effectiveness assessment of projects
    - Updated metrics-based, quantitative analysis of benefits
    - Deleted or new projects
    - Identification of completed projects

Implementation Performance Measures

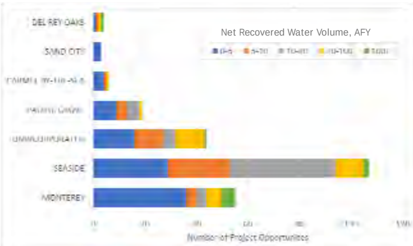
- Document how identified projects will achieve multiple benefits
- Discuss required data, technical analyses and performance measures for the following:
  - Evaluation of expected and actual Plan outcomes
  - Quantification of multiple benefits and environmental outcomes
  - Monitoring/data management systems needed for performance data
  - Mechanisms to adapt Plan and project operations
  - Mechanisms to share performance data with stakeholders

5. Overview of Water Recovery Study Findings

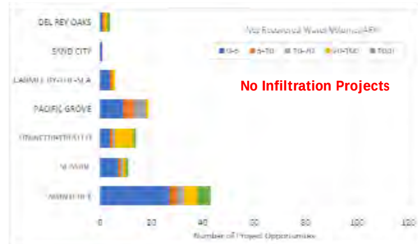
Water Recovery Study Findings Overview

- Draft Report sent to City of Monterey, TAC, and Technical Stakeholders
- 240 potential projects evaluated for water volume recovered and project feasibility
- 4 Project Categories:
  1. Capture and use
  2. Infiltration to a water supply aquifer
  3. Diversion to sanitary sewer
  4. Lake/reservoir
- Resources for project consideration:
  - List of projects with the highest water volume recovered and lowest project cost
  - List of two projects with greatest water volume recovered in each jurisdiction
  - Map of water volume recovered by catchment

Identified Opportunities by Jurisdiction and by Net Recovered Water Volume



Identified Opportunities by Jurisdiction and by Net Recovered Water Volume

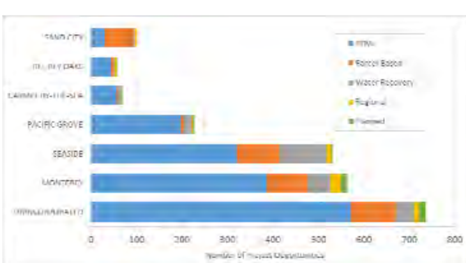


6. Task 4 – Project Identification, Prioritization and Analysis

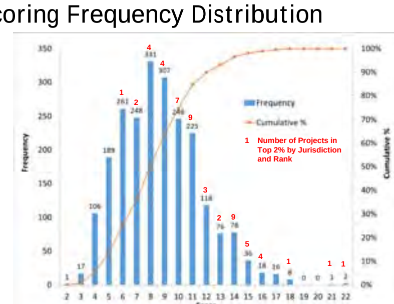
Summary of Deliverables

- Project Database
  - Excel workbook with preliminary scoring of project opportunities
  - Unique db_index code for each project opportunity
  - Editable Fields
    - Project Rank
    - Rank Reasoning
  - Total Score
  - Metric-based multi-benefit scores
- Prioritization instructions memo for Permittees
- Google Earth files of GIS-identified project opportunities and stakeholder projects
  - Identifies locations of Water Recovery Study, Planned, ROW, and Parcel-based, and Regional project opportunities
  - Project opportunities are searchable

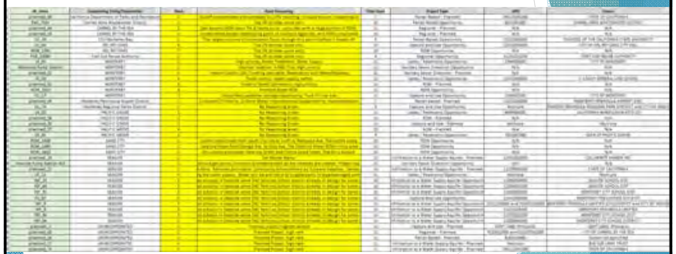
Identified Opportunities by Jurisdiction



Scoring Frequency Distribution



Grant Task 4.5 – Project Identification, Prioritization, and Analysis



Grant Task 6.1.2 – Outcomes from Stakeholder Meeting #2

- Results from sticker voting activity – top project characteristics
  1) Water supply benefits
  2) Synergy of project with upcoming projects
  3) Project part of larger restoration or watershed improvement plans
  4) Water quality benefits
- Stakeholder feedback documented in comment matrix

7. Selection of Projects for Concept Design

Selection of Projects for Concept Design

- Seven projects developed at 10% conceptual design
- One of the seven projects developed at 30% conceptual design
- Resources for project consideration
  - Feedback from Stakeholder Meeting #2
  - List of the top 2% of projects
  - List of projects with the highest water volume recovered and lowest project cost
  - List of two projects with most water volume recovered in each jurisdiction
  - Map of water volume recovered by catchment

Suggested Top 7 Projects

Objective: Jurisdictional and project type diversity among top ranked projects

1. Carmel-By-The-Sea → planned_43 and planned_44 (Carmel, Dry Weather Diversion)
2. Pacific Grove → LR_02 (David Avenue Reservoir)
3. Monterey → LR_04 (El Estero Lake)
4. Del Rey Oaks → CU_84 (Del Rey Oaks City Hall)
5. Seaside → planned_19 (Del Monte Manor Infiltration Project)
6. Sand City → ROW_1658 (Contra Costa Street)
7. County of Monterey → INF_DW_CV (Dry Well Catch Basin Retrofit Program)

Alternative Projects

Objective: Most Water Volume Recovered (100+ AFY)

Monterey
a) *LR_04 (El Estero Lake) – listed on previous slide*
b) LR_03 (Del Monte Lake)
c) LR_12 (Laguna Grande)
d) DSS_planned_51 (Hartnell Gulch)
e) DSS_04 (City of Monterey Tunnel & Calle Principal diversion into sanitary sewer)

Seaside
a) DSS_06 (Del Monte Blvd diversion into sanitary sewer)
b) INF_DW_SEA (Dry Well Catch Basin Retrofit Program)

Monterey County
a) DSS_14 (Los Padres Reservoir)

Del Rey Oaks
a) LR_08 (Monterey Peninsula Regional)

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8. Review Action Items and Next Steps

Monterey Peninsula SWRP TAC Meeting #3 3/2/2018 26

TAC #4 Discussion Topics

- Prioritized Projects Tech Memo (Grant Task 4.5)
  - Included in 3/30 State Submittal
- Draft Implementation Strategy Tech Memo (Grant Task 4.6.3)
  - Included in 3/30 State Submittal
- Draft Administrative Draft SWRP (Grant Task 4.7)
  - Send to TAC for review by 4/9
- Draft 10% Level Designs (Grant Task 5.1)
  - Send to TAC for review by 4/9

Monterey Peninsula SWRP TAC Meeting #3 3/2/2018 27

Stormwater Resource Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Technical Advisory Committee (TAC)
Meeting #4

Thursday, April 12, 2018
10:00 am – 12:00 noon

Monterey One Water Conference Room
5 Harris Court, Building D, Monterey, CA

Call-in Number: 605-475-6711; Access Code: 675-7310
https://global.gotomeeting.com/join/745754045

FINAL AGENDA

MEETING OBJECTIVES:

- *Update TAC members on SWRP task activity since the last TAC meeting.*
- *Receive TAC input on the DRAFT Administrative Draft Stormwater Resource Plan (SWRP).*
- *Update TAC members on the status of preparation of 10% and 30% concept designs of selected projects and receive TAC input on example 10% concept designs.*
- *Solicit TAC input on plans for the public workshop for presentation of the Public Draft SWRP.*

10:00 am	1. Welcome/Introductions	Jeff Condit (Monterey One Water)
10:05 am	2. Additions or Revisions to the Agenda	Jill Bicknell (EOA)
10:10 am	3. Update on SWRP Task Activity • Update on activity during February – April 2018 • Summary of deliverables submitted, under review, and in progress	Lisa Welsh (Geosyntec)
10:25 am	4. Task 4.7 -- DRAFT Administrative Draft SWRP • Overview of document and key areas for input • Input from TAC review	Lisa Welsh
10:35 am	5. Task 5.1 – Project Concept Designs • Review of final list of projects for 10% and 30% concept design and selection process • Input from TAC review of example 10% concept designs	Lisa Welsh

11:40 am	6.	Task 6.1.2 -- Public Outreach Meeting (June 2018) • Potential date, time, and location • Meeting format • Pre-meeting outreach plan	Jill Bicknell
11:55 am	7.	Review Action Items	Jill Bicknell
12:00 pm	8.	Adjourn	

Stormwater Resource Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Technical Advisory Committee (TAC)
Meeting #4

Thursday, April 12, 2018
10:00 am – 12:00 noon

MEETING SUMMARY

1. Welcome/Introductions

   Jeff Condit (Monterey One Water) welcomed TAC participants and informed them that the purposes of today's meeting are to: update TAC members on Stormwater Resource Plan (SWRP) task activity since the last TAC meeting; receive TAC input on the DRAFT Administrative Draft SWRP; update TAC members on the status of preparation of 10% and 30% concept designs of selected projects and receive TAC input on example 10% concept designs; and solicit TAC input on plans for the public workshop for presentation of the Public Draft SWRP. Attendees introduced themselves.

2. Additions or Revisions to the Agenda

   There were no additions or revisions to the agenda.

3. Update on SWRP Task Activity

   Lisa Welsh (Geosyntec) reviewed the consultant team's task activity during March and April 2018, and the summary of grant deliverables to date and in progress (Slide 5 of the TAC PowerPoint presentation, attached). She also reviewed the items for TAC review in April and May (Slide 6). The TAC's current focus for review is the DRAFT Administrative Draft SWRP. Comments are due by April 23. TAC members will have another opportunity to review the Admin Draft after it is submitted on April 30 and before the Public Draft is completed (May 31).

   Dominic Roques (Central Coast Regional Water Board) asked about the CEQA process for the SWRP and the 30% concept design for the Hartnell Gulch project. Lisa explained that the SWRP itself is exempt from CEQA but there will be a CEQA checklist prepared for the Hartnell project and included in the Public Draft SWRP. Larry Hampson (Monterey Peninsula Water Management District) asked if a CEQA initial study was required prior to submitting a project for a Prop 1 implementation grant. Rachid Ait-Lasri (State Water Board Grant Manager) confirmed that CEQA documentation is not required as part of the grant application; however, completion of some or all of the CEQA process for a project will improve project scoring (as it is a measure of project readiness).

4. Task 4.7 -- DRAFT Administrative Draft SWRP

Lisa reviewed the outline of the Admin Draft SWRP sections (Slide 8). She recommended that TAC members conduct a high level review, since they have already reviewed most of the content in the form of technical memoranda. The key items for input at this point are the project concepts.

Larry asked if the issue of excess wet weather flows and options for capture and use would be described in the SWRP. Judd Goodman (Geosyntec) said that options for improvements to water and wastewater infrastructure, that would allow for additional runoff capture, will be included in Section 4 of the Water Recovery Study (WRS). The section will describe what can be done with current infrastructure and with future enhancements. Lisa added that another option for capturing wet weather flows is the proposed drywell program. It was agreed that capturing wet weather flows is a lower priority than diverting dry weather flows.

5. Task 5.1 – Project Concept Designs

Lisa presented the final list of projects for 10% and 30% concept design (Slide 11) and described that the list of projects was finalized through email communication with the TAC over the weeks following the last TAC meeting. Maps were prepared for each project concept, included contributing drainage area and key features, and a template for describing the projects in the SWRP was provided (using the Hartnell Gulch project as an example). Lisa noted that all project descriptions will be provided to project proponents for review before including them in the Public Draft SWRP.

Lisa described the details of each project considered for the 10% concept design, and the TAC provided the following input:

<u>Hartnell Gulch</u>

- Dominic - It may be difficult to get permits to put fill in the creek. It might be a good idea to bring in Fish & Game staff and Central Coast Regional Water Board 401 Certification staff (contact Phil Hammer). He also suggested that options for creek restoration be investigated. Judd – portions of the canyon are narrow with steep banks.
- Sarah Hardgrave (Big Sur Land Trust) – look at opportunities to widen channel banks and add wetlands. Also suggested including permeable paving in parking lot near Pacific. Photographs of the area would be helpful.
- Diana Staines (Denise Duffy & Associates) – will trails and signage be part of the project? Jeff – possible locations for trails and signs will be indicated, but not designed.
- Dominic – the write-up in the template for the Hartnell project needs to be improved.
- Larry – Can the template include cross sections? Judd – templates are for 10% design; cross sections will be included in the 30% concept design.

- Sarah – consider a CDS unit or other measure to collect sediment upstream of the diversion structure and maintenance costs.
- Dominic – a 30-year planning horizon should include consideration of climate change impacts. Judd – it would be difficult to consider climate change without looking at specific model results for the location because climate predictions are model dependent. The 30-year life cycle cost estimate would provide a range that indirectly accounts for climate change impacts.
- Larry – there was a USGS climate change study done for the Carmel River watershed which could be a good reference.
- Judd – Excess capacity in the sanitary sewer needs to be known in order to define the rate of diversion.

Lake El Estero

- Judd – the 10% design is consistent with the project in the EIR. A new aspect being investigated is the ability to store additional wet weather flow. Estimates of runoff recovery volume will be provided assuming both existing infrastructure constraints (divert during the dry season only) and potential future infrastructure improvements (divert at any time of year, but not during or immediately following storm events)

Monterey Tunnel and Calle Principal Stormwater Diversion

- Discussed different diversion locations.
- Jennifer Gonzalez (Monterey One Water) – connection to the Monterey One Water interceptor pipeline requires a flow meter. Gravity connections from storm drain to sanitary sewer are not an option; diversions would have to be pumped.
- Judd – Excess capacity in the sanitary sewer needs to be known in order to define the rate of diversion. Jeff Krebs had mentioned previously he was going to get metering data of seepage flows that can be diverted during the dry season.

David Avenue Reservoir

- A stormwater management project that included David Avenue Reservoir was completed by Fall Creek Engineering in 2014 and included a 40% design. A follow up study is underway by the Wallace Group to revise/update analyses from the Fall Creek report. Work by Wallace will not be completed in time for inclusion in the SWRP but Geosyntec will make sure that their data and calculations are consistent with what Wallace is using.
- Judd – will need feedback from the TAC on sanitary sewer capacity, which may dictate the rate of discharge to the sanitary sewer, if this is the preferred option over discharging to the storm drain.
- Sarah – there have been improvements in the storm drainage infrastructure downstream of the project, including installation of trash capture devices, that should be considered.

Del Monte Manor Park

- Lisa – the concept is to use a vegetated swale to direct runoff to a rain garden in the corner of the park, which would then discharge to an infiltration well.
- Scott – will run the concept by other staff. There may be other storm drains in the area that can be diverted.

Dry Well Aquifer Recharge Program

- Lisa – the concept is to divert storm drains to infiltration wells with pretreatment. Depths to groundwater are 30 to 60 feet in the area. The most downstream locations were selected to capture the largest drainage areas. Locations are indicated as parcel-sized, but they only require an area the size of a parking stall. They can be installed in the public right of way, such as under a sidewalk. Some locations may require several drywells in combination.
- Sarah – How often does the pretreatment chamber need to be maintained? Lisa – approximately once per year on average. Sarah – make sure there is access for maintenance.
- Scott – note that some of the streets convey a lot of surface runoff; it is not all piped flow. Lisa – could look at two options, capturing street flow and diverting piped flow.
- Scott – interested in draining street runoff from Hilby Ave and Kimball Ave to a bioretention facility that could also be used for traffic calming.

South Carmel and 4th Avenue Dry Weather Diversion

- Lisa – Project concept is storm water diversion to the sewer main along San Antonio Ave. Concept will also mention a larger potential project that would include construction of a new stormwater pipe along San Antonio and a new dedicated stormwater holding tank at Rio Park (behind the Mission and Larson Field). Water demand is in the dry and wet season for golf course irrigation in Del Monte Forest (Pebble Beach).

6. Task 6.1.2 -- Public Outreach Meeting (June 2018)

   a. Potential date, time, and location

   Lisa explained that the Public Draft will be released by May 31, which would make a mid-June date appropriate. Jeff Condit said that Jeff Krebs is looking into the use of either the Monterey Convention Center (first choice) or Monterey City Council Chambers. It would be an evening meeting, about one hour in duration.

   b. Meeting format

   It was suggested that the format consist of a brief presentation followed by an opportunity for the public to walk around to different stations at which exhibits describing the concept projects were displayed. It was also suggested that exhibits be prepared with basic information on the water needs of the region and how the projects will help to augment water supply. A translator will be available at the meeting (Diana and Sarah can provide contacts).

c. Pre-meeting outreach plan

- The Public Draft SWRP will be posted on the www.montereysea.org website. Other organizations (e.g., IRWM, MWD) will be asked to post links to the document.
- A bilingual flyer will be developed, and released about 2 weeks before the meeting. TAC members and MRSWMP agencies will help post the flyer in public places (e.g., city halls and libraries) and online. The flyer will also be emailed to the stakeholder list.
- An advertisement will be developed and placed in the Monterey County Weekly. The City of Monterey will help post a notice on Next Door.

7. Action Items

- TAC members will provide comments on the DRAFT Admin Draft by April 23.
- Geosyntec will work with project proponents to address project issues and complete the 10% concept designs in May and the 30% concept design in June.
- Jeff Condit will work with Jeff Krebs to identify a date, time and location for the public workshop.
- EOA will develop the public workshop flyer and send to Jeff Condit by May 31. EOA will also look into placing an ad in the Monterey County Weekly.
- Diana and Sarah will provide contacts for Spanish translators to EOA.
- The project team will schedule TAC Meeting #5 for late July.

Technical Advisory Committee (TAC) Meeting #4

April 12, 2018

Attendance List

Name	Organization
Scott Ottmar	City of Seaside
Richard Lancero	City of Monterey
Tom Harty (phone)	County of Monterey Resource Management Agency
Jeff Condit	Monterey One Water
Jennifer Gonzalez	Monterey One Water
Larry Hampson	Monterey Peninsula Water Management District
Sarah Hardgrave	Big Sur Land Trust
Dominic Roques (phone)	Regional Water Quality Control Board, Central Coast Region
Rachid Ait-Lasri (phone)	State Water Resources Control Board
Lisa Welsh	Geosyntec (consultant to Monterey One Water)
Judd Goodman	Geosyntec (consultant to Monterey One Water)
Lisa Austin (phone)	Geosyntec (consultant to Monterey One Water)
Jill Bicknell (phone)	EOA, Inc. (consultant to Monterey One Water)
Diana Staines	Denise Duffy & Assoc. (consultant to Monterey One Water)

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Monterey Peninsula Stormwater Resource Plan

TAC Meeting #4

12 April 2018

TAC Meeting #4 Agenda

- 1. Welcome/Introductions
- 2. Additions or Revisions to the Agenda
- 3. Update on SWRP Task Activity
- 4. Administrative Draft SWRP
- 5. Project Concept Designs
- 6. Public Outreach Meeting (June 2018)
- 7. Review Action Items

Monterey Peninsula SWRP TAC Meeting #4 4/30/2018 2

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2. Additions or Revisions to the Agenda

Monterey Peninsula SWRP TAC Meeting #4 4/30/2018 3

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3. Update on SWRP Task Activity

Monterey Peninsula SWRP TAC Meeting #4 4/30/2018 4

Summary of Grant Deliverables

Grant Item #	Description / Submittal	Final Draft to State	Submittal Status
2.2	Agenda, Notes for 3rd TAC Meeting	3/29/2018	Submitted
2.2	Agenda, Notes for 4th TAC Meeting	4/30/2018	In progress
4.5	Results of Analysis, Prioritization, and Project Selection (Prioritized Projects Technical Memorandum)	3/29/2018	Submitted
4.5	Water Recovery Study Report	3/30/2018*	Final Draft Completed
4.6.3	Technical Memo on Draft Implementation Strategy	3/29/2018	Submitted
4.7	Administrative Draft SWRP and Self-Certification Checklist	4/30/2018	In progress
4.8	Public Draft SWRP with 10% Concept Designs & CEQA	5/31/2018	In progress
6.1.2	Stakeholder Meeting 2 Notes	2018 Q1 Report	In progress

*not a grant deliverable

Monterey Peninsula SWRP TAC Meeting #4 4/30/2018 5

Items for TAC Review

Grant Item #	Description / Submittal	Final Draft to State	Submittal Status
2.2	Agenda, Notes for 3rd TAC Meeting	3/29/2018	Submitted
2.2	Agenda, Notes for 4th TAC Meeting	4/30/2018	In progress
4.5	Results of Analysis, Prioritization, and Project Selection (Prioritized Projects Technical Memorandum)	3/29/2018	Submitted
4.5	Water Recovery Study Report	3/30/2018*	Final Draft Completed
4.6.3	Technical Memo on Draft Implementation Strategy	3/29/2018	Submitted
4.7	Administrative Draft SWRP and Self-Certification Checklist	4/30/2018	In progress
4.8	Public Draft SWRP with **10% Concept Designs & CEQA**	5/31/2018	In progress
6.1.2	Stakeholder Meeting 2 Notes	2018 Q1 Report	In progress

Monterey Peninsula SWRP TAC Meeting #4 4/30/2018 6

4. Administrative Draft SWRP

Administrative Draft SWRP Outline

- 1. Introduction
- 2. Organization, Coordination, and Collaboration
- 3. Watershed Identification
- 4. Water Quality Compliance
- 5. Quantitative Methods for Identification and Prioritization
- 6. Identification and Prioritization of Projects
- 7. Implementation Strategy and Schedule
- 8. Education, Outreach, and Public Participation

Administrative Draft SWRP Appendices

- A – Self Certification Checklist
- B – TAC Meeting Summaries
- C – Annotated List of Data and Plans
- D – Water Recovery Study Report
- E – Planned Project Data Request and SWRP Project Database
- F – Project Concepts (May)
- G – CEQA Checklist (May) & 30% Project Concept (June)
- H – Stakeholder Outreach Plan and Meeting Summaries

5. Project Concept Designs

Concept Projects

Project Name	Project Proponent	Project Type	Project Description
Hartnell Gulch	**Monterey**	**Diversion to sanitary sewer and creek restoration project**	**Install two pumps to divert underground seepage into the sanitary sewer as well as stream restoration to improve the riparian corridor.**
Lake El Estero	Monterey	Lake project with diversion to sanitary sewer	Install diversion valve from box culvert on north side of the lake to divert flows into the sanitary sewer.
Tunnel and Calle Principal Stormwater Diversion	Monterey	Diversion to sanitary sewer project	Install diversion pump for underground seepage and divert to the sanitary sewer.
South Carmel and 4th Avenue Dry Weather Diversion	Carmel-by-the-Sea	Diversion to sanitary sewer project	Divert dry weather runoff and small wet weather flows to the sanitary sewer for treatment and reuse for golf course irrigation.
David Ave Reservoir	Pacific Grove	Reservoir project with diversion to sanitary sewer	Store and divert runoff to the sanitary sewer.
Del Monte Manor Park Infiltration	Seaside	Regional infiltration project	Open space park improvements and flood management to infiltrate runoff from the surrounding right-of-way.
Dry Well Aquifer Recharge Program	Seaside with support from regional partners	Infiltration to domestic supply aquifer program	Divert flows from the storm drain network into a water quality pretreatment system that will discharge to a dry well above the domestic supply aquifer.

6. Public Outreach Meeting

Public Outreach Meeting

- Logistics: Date (mid June), Time, Location
- Meeting Format
- Pre-Meeting Outreach Plan
  - Posting of the Admin Draft SWRP
    - Online Version
    - Print Copy
  - Bilingual Flyer (distributed via email and community center postings)

Monterey Peninsula SWRP TAC Meeting #4 4/30/2018 13

8. Review Action Items and Next Steps

Monterey Peninsula SWRP TAC Meeting #4 4/30/2018 14

TAC Meeting #5 – Late July

- Response to Comments on Public Draft SWRP
- Response to Comments on CEQA Checklist

Monterey Peninsula SWRP TAC Meeting #4 4/30/2018 15

Stormwater Resource Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Technical Advisory Committee (TAC)
Meeting #5

Monday, August 13, 2018
10:00 am – 12:00 noon

Conference Call Only

MEETING SUMMARY

1. Welcome/Introductions

   Jeff Condit (Monterey One Water) welcomed TAC participants and informed them that the purposes of today's meeting are to: update TAC members on Stormwater Resource Plan (SWRP) task activity since the last TAC meeting; receive TAC input on responses to comments on the Public Draft SWRP; update TAC members on the 30% design for the Hartnell Gulch Project and receive input; and discuss next steps and remaining deliverables through the end of the project. Attendees introduced themselves.

2. Additions or Revisions to the Agenda

   There were no additions or revisions to the agenda.

3. Update on SWRP Task Activity

   Kelly Havens (Geosyntec) reviewed the consultant team's task activity during May – August 2018, and the summary of grant deliverables to date and in progress.

4. Task 4.7 -- Public Draft SWRP

   Lisa Welsh (Geosyntec) provided an overview of the Public Meeting held on June 27, 2018 to present the SWRP to the public. The meeting was well attended. The meeting included an update on the SWRP process, IRWMP process, and presentation of conceptual project designs. The meeting was video recorded and the recording is posted on the MontereySEA.org website.

   Kelly said that a Draft Responses to SWRP Public Comments Matrix was e-mailed to the TAC for review. The matrix includes a summary of the public comments received at the public meeting, as well as written comments received during the public comment period. She provided an overview of the following comments that will lead to some changes in the SWRP, and asked for the TAC's input:

- In response to a comment, all statements referring to removal of urban pollutants associated with urban flows will be revised to replace “removal” with “treatment”. The TAC agreed with this response.

- Three projects for which Conceptual Designs were prepared propose to use stormwater runoff to help recharge the Seaside Groundwater Basin. One public comment noted that additional permits may be needed from Seaside Basin Watermaster. Kelly asked if it would be appropriate to include additional language to the SWRP stating that implementation of these projects would require filing a storage application and obtaining a permit from the Seaside Basin Watermaster in order to authorize the recharge to be performed. Scott Ottmar (Seaside) noted that these projects propose using green infrastructure facilities, and should not require additional permitting. Dominic Roques (Regional Water Board) supported Scott’s statement.

- A comment was received at the public meeting and stakeholder meetings noting that agencies should ensure that project implementation is a collaborative effort, and identified projects should not be in conflict with each other. Kelly informed the TAC that project footprints do not overlap; however, project drainage areas may overlap. Overlapping drainage areas were identified in the Water Recovery Study as described in Appendix D of the SWRP. Prior to moving forward with project design, overlapping drainage areas may need to be considered. However, this level of coordination is outside of the SWRP Scope of Work. The TAC agreed with this response.

- Tom Reeves submitted a number of questions and comments on the Public Draft SWRP and Water Recovery Study. The TAC agreed that all of his questions are good ones, but addressing most of them is outside of the scope of work for the SWRP. There are policy questions related to economic analysis, distribution of benefits to the community, interagency agreements, and water rights that will need to be addressed as projects are implemented. In response to his question about the cities achieving the goal of “zero discharge”, Sarah Hardgrave (Big Sur Land Trust) suggested clarifying that this goal is specific to dry weather flows being discharged to an Area of Special Biological Significance (ASBS). Sarah offered to set up a meeting with Alison Imamura, Larry Hampson, Jeff Krebs, and others to discuss how to address some of the policy questions. Kelly said she would edit the matrix and send it to the group in advance of the meeting.

5. Task 5.1 – Project Concept Designs – Update on 30% Design for Hartnell Gulch

   - Kelly reviewed the design details for the Hartnell Gulch project and the implementation plan. Dominic Roques (Regional Water Board) had the following comments:

- With the high flow diversion eliminated, did the design try to address the effects of high flows on the channel? Kelly replied that grade controls had been added. Jeff Krebs added that raising the channel bed allowed the channel to be wider, which reduces flow velocities, and that channel armoring was also planned.
- Has Geosyntec staff contacted the 401 Certification staff at the Water Board? Kelly replied no, this will be part of the next steps on the project. Dominic encouraged her to contact them as soon as possible to discuss the project.

6. Next Steps and Project Completion

- Kelly reviewed the remaining steps for completion of the project (Slide 15). Key deliverables include completing the Final Draft SWRP by August 31; and completing the Final SWRP and Self-Certification Checklist, the Final 30% Level Design and Project Implementation Plan, and the CEQA Study Final Draft by September 30.

7. Action Items

In addition to the steps described in Item 6 above, other action items included:

- Kelly will revise the response to comments matrix and email it to the TAC, along with a redlined version of the revised SWRP, including the responses to comments.
- Sarah will set up a meeting to discuss policy issues related to SWRP comments.

Technical Advisory Committee (TAC) Meeting #5

August 13, 2018

Attendance List (all by phone)

Name	Organization
Scott Ottmar	City of Seaside
Jeff Condit	Monterey One Water
Alison Imamura	Monterey One Water
Larry Hampson	Monterey Peninsula Water Management District
Jeff Krebs	City of Monterey
Sarah Hardgrave	Big Sur Land Trust
Dominic Roques	Regional Water Quality Control Board, Central Coast Region
Lisa Welsh	Geosyntec (consultant to Monterey One Water)
Kelly Havens	Geosyntec (consultant to Monterey One Water)
Jill Bicknell	EOA, Inc. (consultant to Monterey One Water)
Vishakha Atre	EOA, Inc. (consultant to Monterey One Water)
Diana Staines	Denise Duffy & Assoc. (consultant to Monterey One Water)

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Monterey Peninsula Stormwater Resource Plan

TAC Meeting #5

August 13, 2018

TAC Meeting #5 Agenda

1. Introductions
2. Additions or Revisions to the Agenda?
3. Update on SWRP Task Activity
4. Public Draft SWRP – Comments Received and Response Discussion
5. Update on 30% Design for Hartnell Gulch
6. Next Steps and Project Completion
7. Review Action Items

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2. Additions or Revisions to the Agenda?

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3. Update on SWRP Task Activity

Summary of Grant Deliverables – Q2, Q3, Q4 2018

Grant Item #	Description / Submittal	Final Draft to State	Submittal Status
2.2	Agenda, Notes, Sign-In for 4th TAC Meeting	4/30/2018	Submitted
2.2	Agenda, Notes, Sign-In for 5th TAC Meeting	8/31/2018	In progress
4.7	Administrative Draft SRP and Draft Self-Certification Checklist	4/30/2018	Submitted
4.8	Public Draft SRP	6/25/2018	Submitted
4.9	Summary of Comments	7/25/2018	Submitted
4.9	*Responses to Comments (to TAC only)*	*8/8/2018*	*Submitted*
4.1	Final Draft SRP	8/31/2018	In progress*
4.11	Final SRP and Signed Self-Certification and Submittal to State, TAC, and IRWM Group	9/30/2018	In progress
5.1	10% Level Designs - Seven Concepts	6/25/2018	Submitted
5.2	30% Level Design and Project Implementation Plan	9/30/2018	In progress
5.2	CEQA Study Final Draft	9/30/2018	In progress (Complete)
6.1.2	Public Outreach Meeting (Public Draft SWRP)	2018 Q2 Report	In progress

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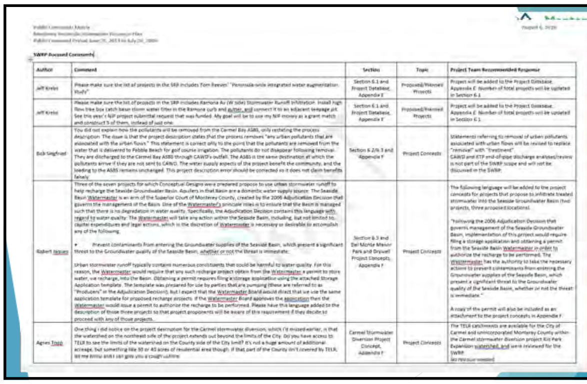
Overview of Public Meeting

4. Public Draft SWRP – Comments Received and Response Discussion



5. Update on 30% Design for Hartnell Gulch

Overview of Proposed Design

- Invasive plants to be replaced with native vegetation
- Bed elevation to be raised to promote public access
  - Drop structure at downstream limit
- Buried stone grade controls located at upstream limits of project, and three bridge crossings
- Dry weather flow to be diverted to sanitary sewer via new manhole in Hartnell Street
  - Diversion includes stop log structure, gravity pipe, hydrodynamic separator, pump station, and forcemain
- High flow bypass stormdrain was found to be infeasible due to high peak design flowrates

DRAFT – In Progress

Hartnell Gulch Project Implementation Plan

- Introduction/Overview
- Major Implementation Tasks
  - Field Testing
  - Design
  - Permitting/Approval/Reporting
  - Construction
- Suggested Implementation Schedule

6. Next Steps and Project Completion

Summary of Grant Deliverables – Q3, Q4 2018

Grant Item #	Description / Submittal	Final Draft to State	Submittal Status
2.2	Agenda, Notes, Sign-In for 5th TAC Meeting	8/31/2018	In progress
4.1	Final Draft SRP	8/31/2018	In progress*
4.11	Final SRP and Signed Self-Certification and Submittal to State, TAC, and IRWM Group	9/30/2018	In progress
5.2	30% Level Design and Project Implementation Plan	9/30/2018	In progress
5.2	CEQA Study Final Draft	9/30/2018	In progress (Complete)
6.1.2	Public Outreach Meeting (Public Draft SWRP)	2018 Q2 Report	In progress

7. Review Action Items

APPENDIX C
Annotated List of Reviewed Data and Reports

APPENDIX C: ANNOTATED LIST OF REVIEWED DATA AND REPORTS

This SWRP Appendix includes the Annotated List of Reviewed Data and Reports, as required by Grant Task 3.1. The deliverable is organized as follows:

Attachment A: Annotated List of Reviewed Data

The Annotated List of Reviewed Data includes the geospatial information system (GIS) and other data provided by cooperating entities that will be used to conduct the analyses for the SWRP. The list includes the data type, the source, the spatial coverage, and other relevant information. The “required”, “recommended”, and “optional” notes correspond to how critical the data is to complete the proposed analyses.

Attachment B: Annotated List of Plans and Reports

The Annotated List of Plans and Reports summarizes plan and report documents used for the development of the SWRP. Each plan and report included is summarized by their title, the organization (i.e., lead author), year published, a description, the study or report type, and the benefits applicable to the report. The study or report type and the benefits applicable to the report are included by “Y” (yes) or “N” (no) in columns included in Table 1 below. Descriptions of each of the columns are also provided in Table 1.

Table 1: Columns Included in Annotated List of Plans and Reports and Associated Descriptions

Annotated List of Plans and Reports – Table Column Header	Column Description
Existing Conditions	Discusses existing conditions and/or goals more generally at the watershed scale.
Watershed reports	Watershed characterization studies/ plans/ assessments or reports
Watershed stewardship	Watershed stewardship manuals
Floodplain management	Floodplain management plans
Water Management	Water management plans (including potable/non-potable water use studies)
Stream Restoration	Stream restoration plans and/or in-stream project plans/reports
Stormwater/LID	Stormwater or LID management plans/ master plans/ guidance
General Plans	General Plans and Specific Plans (for development/redevelopment projections)
Water Projects/CIP Lists	Flood/ Water Treatment/ Wastewater Projects or CIP lists

Annotated List of Plans and Reports – Table Column Header	Column Description
Water Quality Study	Stormwater quality studies and/or TMDL implementation studies, or ASBS Studies
Other	Other
Water Quality	Water Quality (related to reducing pollutant loads)
Water Supply	Water Supply (related to water supply augmentation)
Flood Control	Flood Control (related to minimizing or mitigate a flood or inundation risk)
Environmental	Environmental Benefit (relates to providing habitat, urban forestry, mitigate heat island effects, restore watershed function)
Community	Community Benefit (relates to improvement of public spaces, provide parks and play areas, improve community aesthetics, improve pedestrian or bicycle safety)

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Attachment A: Annotated List of Reviewed Data

Type	Source	Required / Recommended / Optional	Received / Create	Notes	Comprehensive Regionwide Coverage	Multi-jurisdictional, but Not Comprehensive Regionwide Coverage	Unincorporated Monterey County	Monterey	Pacific Grove	Sand City	Carmel	Del Rey Oaks	Seaside
Administrative Datasets													
Political boundaries (eg, council districts, city boundaries)	Local jurisdictions, US Census	Required	Received		X		X	X	X	X	X	X	X
Road centerlines	Local jurisdictions, US Census	Required	Received		X		X	X					X
Water utility boundaries	MPWMD	Required	Received		X								
Disadvantaged Community (DAC) boundaries	US Census	Required	Public data downloaded		X								
Regional Park Boundaries	AMBAG, California Protected Areas Database	Required	Received		X								
State/National Park boundaries	AMBAG, Local jurisdictions, US Census, US Bureau of Land Management, California Protected Areas Database	Required	Received or downloaded.		X								X
Rights-of-Way boundaries (polygon)	Local jurisdictions	Recommended	Received from jurisdictions as indicated								X		X
Municipality owned, maintained, operated areas (polygon)	Monterey County Assessor	Optional	Received		X								
Water and Wastewater District Boundaries		Optional	Received		X								
Building footprints	Local jurisdictions	Optional	Received from jurisdictions as indicated										X
Elevation Datasets (one or more of the following, based on best available)													
LiDAR	MPWMD	Required	Received, can supplement with USGS data	Large coverage of western coastal portion of county, but does not cover portions of Seaside		X							
Digital Elevation Models (DEMs)	USGS	Required	Public data downloaded, not received from local jurisdictions		X								
Contours	MPWMD, local jurisdiction	Required	Received from jurisdictions as indicated	Will use to supplement LiDAR data received				X					X
Contours	USGS	Required	Derived from USGS DEM	Will use to supplement LiDAR data received	X								
Land Use Datasets													
Parcels with Land Use and Ownership only	Local jurisdictions, AMBAG, Monterey County Assessor	Required	Received		X		X			X	X		X
Parcels with Land Use, Ownership, and Zoning	Local jurisdictions	Optional	Received from jurisdiction as indicated										X
Parcels with Land use and Zoning only	Local jurisdictions	Optional	Received from jurisdiction as indicated						X				
Parcels with Land Use only	Local jurisdictions	Optional	Received from jurisdictions as indicated					X				X	
Schools	Geosyntec	Recommended	Geosyntec developed this data for all local jurisdictions and portions of unincorporated Monterey County through trash management project.			X							
Parks	Geosyntec	Recommended	Geosyntec developed this data for all local jurisdictions and portions of unincorporated Monterey County through trash management project.			X							
Impervious cover (w/ any attributes such as feature type)		Recommended	Not received										
Planned Areas		Recommended	Not received										
Specific Plan Areas		Recommended	Not received										
General Plans		Recommended	Not received										
Environmental Datasets *(GI siting and sizing)*													
Streams/Rivers/Waterbodies	Local jurisdictions, AMBAG, State / Federal public data	Required	Received		X			X			X	X	X
303(d) Streams/Rivers/Waterbodies	Federal public data	Required	Received		X								
Watersheds	AMBAG, Central Coast Regional Water Quality Control Board	Required	Received		X								
Locally-derived soil/geology/ hydrogeology/ geotechnical coverages	Local jurisdiction, MPWMD, USGS	Required	Received		X						X		

Type	Source	Required / Recommended / Optional	Received / Create	Notes	Comprehensive Regionwide Coverage	Multi-jurisdictional, but Not Comprehensive Regionwide Coverage	Unincorporated Monterey County	Monterey	Pacific Grove	Sand City	Carmel	Del Rey Oaks	Seaside
County specific rain gauge locations	NOAA	Required	Public data downloaded	Public hourly data downloaded	X								
Depth to groundwater with date of sampling	CASGEM	Required	Public data downloaded; not received from local jurisdictions or agencies	Point data at various wells in Monterey County. Comprehensive regionwide coverage may not exist		X							
Local flood inundation or flood risk areas	FEMA	Required	Public data downloaded; not received from local jurisdictions or agencies		X								
County specific rain gauge locations	MPWMD	Recommended	Partially received; can supplement with public data	Limited daily recods from the Navy Postgradaute School and MPWMD Office. MPWMD data needs to be digitized		X							
Mapped contaminant plumes or contaminated sites		Optional	Not received										
Rainfall isohyetal maps	MPWMD	Optional	Received		X								
Habitat protection areas or similar designations	AMBAG, US Fish and Wildlife, local jurisdiction	Optional	Received	Unsure if data is comprehensive		X							X
Natural resource areas or similar designations	AMBAG, US Fish and Wildlife	Optional	Received	Unsure if data is comprehensive		X							
Archaeologically Sensitive Areas	Local Jurisdictions	Optional	Partially Received				X	X					
Stormwater/Water Quality Program Datasets													
Storm Drains Network (inlets, outfalls, open channels and gravity mains)	Local jurisdictions	Required	Received			X	X	X	X	X	X	X	X
Reservoirs	USEPA / USGS	Required	Public data downloaded; not received from local jurisdictions or agencies	National Hydrography Dataset Plus (NHDPlus). Unsure if data is comprehensive.		X							
Flow gage locations (storm drains and channels)	USGS	Required	Public data downloaded; not received from local jurisdictions or agencies	Channels only		X							
Runoff Rate (by catchment)	SWTELR	Required	Received from existing SWTELR data	Full coverage of all jurisdictions and partial coverage of unincorporated Monterey County. Catchment areas may not match other received catchment data.		X							
Pollutant Loading (by catchment)	SWTELR	Required	Received from existing SWTELR data			X							
Catchment/Sub-basin/Drainage Areas to Outfalls if available	Local jurisdictions	Recommended	Received from jurisdictions as indicated				X	X	X	X	X	X	X
Existing or Proposed (eg CIP) structural BMPs by type	Local jurisdictions	Recommended	Received from jurisdictions as indicated				X	X	X	X	X		X
Discharge Points	Local jurisdictions	Optional	Received from jurisdictions as indicated					X	X	X	X	X	X
Operations and maintenance (inlet offsets, trash removal/cleanout records)	Local jurisdictions	Optional	Received from jurisdiction as indicated						X				
Trash priority areas	Geosyntec	Optional	Developed by Geosyntec	Comprehensive coverage in all local jurisdictions and portions of Unincorporated Monterey County		X							
Water Quality Data	Urban Watch	Optional	In Progress	Data request pending with Urban Watch		X							
Locations of water treatment facilities (and locations of distribution lines which convey water from source to treatment facility)		Optional	Not received										
Transportation Planning Datasets													
Proposed road diets or similar designations		Optional	Not received										

Type	Source	Required / Recommended / Optional	Received / Create	Notes	Comprehensive Regionwide Coverage	Multi-jurisdictional, but Not Comprehensive Regionwide Coverage	Unincorporated Monterey County	Monterey	Pacific Grove	Sand City	Carmel	Del Rey Oaks	Seaside
Proposed complete streets or similar designations		Optional	Not received										
Proposed bicycle networks or similar designations		Optional	Not received										
Proposed pedestrian networks or similar designations		Optional	Not received										
Safe routes to school networks		Optional	Not received										
High Resolution Aerial Imagery													
Any available information	MPWMD	Optional	Received	Carmel River area only		X							
Sanitary Sewer Datasets													
Gravity mains	Local jurisdictions, Monterey One Water	Required	Received from jurisdictions as indicated			X		X		X		X	X
Pump stations	Local jurisdicitons	Required	Received from jurisdictions as indicated	No pump stations expected in unincorporated Monterey County				X	X	X	X	X	X
Waste water treatment plants		Recommended	Not received										
Waste water treatment plant effluent lines (ocean outfalls, groundwater replenishment, recycled purple pipe water lines)		Recommended	Not received										

Attachment B: Annotated List of Plans and Reports

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
Stormwater Tool to Estimate Load Reduction Draft Final Technical Document	2NDNATURE	2016	Manual describing the use of the Tool to Estimate Load Reductions (TELR).	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N
AACE Classification System	AACE International	2005	Cost estimate classification system for engineering, procurement, and construction costs	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N
Coastal Regional Sediment Management Plan for Southern Monterey Bay (2008)	Association of Monterey Bay Area Governments	2008	Summarizes the Southern Monterey Bay Coastal Erosion Workgroup's list of potential ways of addressing coastal erosion in the area, and evaluates the applicability of those technologies in the near future. Report proposes feasibility studies for proposed projects.	Y	Y	N	Y	N	N	N	Y	N	N	N	N	N	Y	Y	N
Monterey Bay Area Regional Forecast Population, Housing Unit and Employment Projections for Monterey, San Benito and Santa Cruz Counties to the Year 2035 (2008)	Association of Monterey Bay Area Governments	2008	A regional forecast of population, housing and employment for the Monterey Bay region. The forecast is used to provide data support for long term regional planning documents, special districts' master plans, as well as to support city and county long range planning. Mentions, but does not detail, current and planned Water District projects.	N	N	N	N	Y	N	N	N	Y	N	N	Y	Y	N	N	N
Coastal Regional Sediment Management Planning in Southern Monterey Bay, California (2011)	Association of Monterey Bay Area Governments	2011	This paper presents the findings of the Coastal Regional Sediment Management (RSM) Plan developed to address erosion in the Bay. The Plan first evaluates the sedimentary processes, erosion rates and sensitive species and habitat along the coast. Those data sets are then combined with economic, ecological, and societal considerations, to identify critical areas of erosion and to propose RSM-based solutions.	Y	Y	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N
Monterey County Williamson Act FY 2015-16	Association of Monterey Bay Area Governments	2016	Map of agricultural land as defined by the Williamson Act.	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y
Carmel River Floodplain Restoration and Environmental Enhancment Project - 35% Design Basis Report	Big Sur Land Trust	2015	Design Report describing the Floodplain Restoration and Enviornmental Enhancement Project	Y	Y	N	Y	N	N	N	N	Y	Y	N	Y	N	Y	Y	Y
Restoration and Management Plan for the Carmel River Floodplain Restoration and Environmental Enhancement Project	Big Sur Land Trust	2015	Summary of the Plan for the Carmel River Floodplain Restoration and Environmental Enhancement Project.	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	Y
CalAm Monterey Peninsula Water Supply Project Draft EIR	California American Water	2015	Draft EIR for Monterey Peninsula Water Supply Project to develop up to 9,752 ac-ft/yr of water supplies for CalAm's Monterey District Service Area.	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
Urban Water Management Plan for the Central Division – Monterey County District (2015)	California American Water	2015	Meets a requirement for the California Urban Water Management Planning Act. Provides information for Water Supply Assessments and Written Verifications of Water Supply, supports regional long-range planning documents including City and County General Plans, provides standard methodology for water utilities to assess their water resource needs and availability.	N	N	N	N	N	N	Y	N	N	N	N	N	Y	N	N	N
Memorandum - Recommended Capacity for the Monterey Peninsula Water Supply Project (MPWSP) Desalination Plant (2013)	California American Water	2013	Summarizes design capacity for desalination plant for the Monterey Peninsula Water Supply Project (MPWSP), which will become the principal supply for CAW's system, replacing a major portion of the supply from the Carmel River and the Seaside Groundwater Basin.	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	Y	N
The Impacts of Sea-Level Rise on the California Coast (2009)	California Climate Change Center	2009	Summarizes potential impacts of sea level rise on the California Coast, including analysis of current population, infrastructure, and property at risk from projected sea level rise.	Y	N	N	N	N	N	N	N	N	N	Y	N	N	Y	Y	Y
Monterey County Important Farmland (2010)	California Department of Conservation	2010	Map of agricultural land in Monterey Peninsula.	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y
What will be the Cost of Future Sources of Water for California?	California Public Utilities Commission	2016	Paper provides examples of various costs for sources of water throughout California.	N	N	N	N	Y	N	N	N	N	N	N	N	Y	N	N	N
Model-Based Prediction of the effect of development on increased runoff and mitigating effec ponds- a case study of Canyon del Rey Creek	California State University Monterey Bay	2013	HEC-HMS model results for Canyon del Rey creek	Y	Y	N	N	N	N	N	N	N	N	N	Y	N	Y	N	N
Model-Based Prediction of the effect of development on peak flows- Canyon del Rey watershed	California State University Monterey Bay	2013	HEC-HMS model results for Canyon del Rey watershed	Y	Y	N	N	N	N	N	N	N	N	N	Y	N	Y	N	N
Model-Based Prediction of the effect of developmentof the Del Rey Oaks portion of former Fort Ord on peak flows - Arroyo Del Rey, Monterey County, CA	California State University Monterey Bay	2013	HEC-HMS model results for Del Rey Oaks portion of Arroyo Del Rey	Y	Y	N	N	N	N	Y	N	N	N	N	N	N	N	N	N
Stormwater Best Management Practices Handbook New Development and Redevelopment	California Stormwater Quality Association	2003	CASQA BMP Manual	N	N	N	N	N	N	Y	N	N	N	N	Y	Y	Y	N	N
Land Use History and Mapping in California's Central Coast Region (2003)	Central Coast Watershed Studies	2003	Provides a history of land use and changes over time in the Cities of Seaside and Monterey.	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	Y

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
Physical and Hydrologic Assessment of the Carmel River Watershed California (2004)	Central Coast Watershed Studies	2004	The report documents the present hydrologic and physical condition of the Carmel Watershed. The descriptions and interpretations are based upon digital, aerial, and land-based views, and a review of the regional literature. The report provides an overview of geology, climate, hydrology, and susceptibility to landslides and erosion. Following those broad descriptions, each subwatershed of the Carmel River is analyzed in more detail. Lastly, recommendations for future watershed management strategies are provided.	Y	Y	Y	Y	N	Y	Y	N	N	N	N	Y	N	Y	Y	N
Stormwater outfall watershed delineation, land cover characteristics, and recommended priorities for monitoring and mitigation in the City of Pacific Grove, California	Central Coast Watershed Studies	2011	This study was conducted as part of a class project by students in the Advanced Watershed Science and Policy (ENVS660) course at California State University at Monterey Bay. The primary objectives of this study were to 1) research and review the historical and regulatory context for stormwater management within the City of Pacific Grove, California, 2) provide mapping of all major stormwater outfalls with the City limits, 3) conduct a Geographic Information Systems (GIS) analysis to delineate the surface watershed of each of the major stormwater outfalls, 4) quantify the characteristics of those watersheds, and 5) provide recommendations for future monitoring and stormwater mitigation activities.	Y	N	N	N	Y	N	Y	N	N	Y	N	Y	N	N	Y	Y
Streamflow gaging at Greenwood Park, Pacific Grove, California: January-April 2012	Central Coast Watershed Studies	2012	This report describes work done by staff & students at the Watershed Institute (CSUMB) for the Monterey Bay Sanctuary Foundation and the City of Pacific Grove. The overall scope of work was to gage stormwater flow above and below Greenwood Park in the City of PG during the winter of 2011-12.	Y	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N
Understanding Stormwater Management Options Using a Water Balance Framework	Central Coast Watershed Studies	2013	This study was conducted as part of a class project by students in the Advanced Watershed Science and Policy (ENVS660) course at California State University at Monterey Bay. The primary objectives of this study were to 1) Develop an annual water balance examining the effects of different components of the water cycle in the small, medium, and large storm seasons, as well as in the dry season, 2) Estimate the percentage of stormwater that could be diverted or treated before reaching the ASBS during small, medium and large storms under three potential management scenarios, and 3) Estimate the percentage of stormwater that could be retained or treated using low impact development (LID) based on land use type and stormwater runoff during small, medium, and large storms.	Y	N	N	N	Y	N	Y	N	N	Y	N	Y	N	N	Y	Y
An Existing Conditions and Drought-year Stormwater Quality Study of Majors Creek: Monterey, CA (2014)	Central Coast Watershed Studies	2014	Examines why Majors Creek was listed on the 303(d) list and outlines a plan to remove the Creek from the list, delineates the watershed, summarizes water quality sample results from monitoring conducted, analyzes management and improvement strategies using the Watershed Treatment Model, and documents the physical condition of the Creek.	Y	Y	N	N	N	Y	N	N	N	Y	N	Y	Y	N	Y	N

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
Stormwater mapping and land use analysis, City of Del Rey Oaks, California	Central Coast Watershed Studies	2015	In support of the Del Rey Oaks PEAIP, we used a Global Positioning System (GPS) unit to collect locations of unmapped storm drain inlets and outfalls, and verified locations of currently mapped inlets and outfalls. We compiled metadata identifying the type and size of outfalls, and photographed inlets and outfalls. We conducted storm drain watershed (stormshed) delineations to aid in the understanding of stormwater routing within Del Rey Oaks. Land use areas within each stormshed were calculated to identify areas of priority where increased pollution in runoff may occur. We identified potential mitigation areas in the city where runoff and pollution may be diminished. These efforts will support the necessary next steps for Phase II compliance.	Y	N	N	N	N	N	Y	N	N	Y	N	Y	N	N	N	N
Developing Adaptive Management Tools for the Carmel River Floodplain Restoration and Environmental Enhancement Project	Central Coast Watershed Studies	2016	This report was a class project conducted by students in the Advanced Watershed Science and Policy (ENVS 660) course at California State University Monterey Bay (CSUMB). ENVS 660 partnered with the Big Sur Land Trust (BSLT) to plan for long term planting and management of the Tier 2 restoration of the Carmel River Floodplain Restoration and Environmental Enhancement (FREE) project, located within the lower Carmel River Watershed in Monterey County, California.	Y	N	Y	Y	Y	Y	N	N	N	Y	N	N	N	Y	Y	Y
Effects of Local Runoff on Water Levels and Water Quality in the Carmel River Lagoon During Dry-River Periods	Central Coast Watershed Studies	2016	This was a class project conducted by students in the Advanced Watershed Science and Policy (ENVS 660) course at California State University at Monterey Bay (CSUMB). Our goal was to determine how local runoff influences water levels and WQ in the CRL during the river not connected (RNC) season.	Y	N	N	Y	N	N	N	N	N	Y	N	Y	N	N	N	N
Stormflow monitoring and modelling at Pacific Grove, California, 2012 and 2015	Central Coast Watershed Studies	2016	This report describes work done by staff and students at the Watershed Institute (CSUMB) for the City of Pacific Grove. The overall scope of work was to measure stormwater flow in the City of Pacific Grove within diverse watersheds, and to use a data-driven modeling approach to estimate current stormflow and predict future stormflow under specific stormwater control measures (SCMs).	Y	N	N	N	N	N	N	N	N	Y	N	Y	N	N	N	N
Pacific Grove Area of Special Biological Significance (ASBS) Revised Final Compliance Plan (2016)	Cities of Monterey and Pacific Grove	2016	Demonstrates how the Cities of Pacific Grove and Monterey will comply with the Special Protections for Beneficial Uses of the ASBS. The Pacific Grove ASBS extends for 3.2 miles along the Pacific Grove shoreline west from the Monterey Bay Aquarium to Asilomar Boulevard just before Point Pinos, with close to 500 ocean acres within the Monterey Bay National Marine Sanctuary (MBNMS). The Pacific Grove ASBS receives runoff from approximately 1,106 acres in Pacific Grove and 101 acres in Monterey.	Y	Y	N	N	N	N	Y	N	Y	Y	N	Y	N	N	Y	Y
40% Design Engineering Report Stormwater Management Project	Cities of Pacific Grove and Monterey	2014	This project addresses stormwater discharges into the Pacific Grove Area of Special Biological Significance (ASBS), which receives urban runoff from the New Monterey District in the City of Monterey and from the City of Pacific Grove. Over the past several years, the Cities of Monterey and Pacific Grove have been evaluating alternative stormwater management projects to address regulatory requirements imposed by the State Water Resources Control Board (SWRCB) for stormwater discharges to the ASBS.	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	Y	Y
City of Marina General Plan (2010)	City of Marina	2010	General Plan for future new and re-development in the City of Marina	N	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
Final Environmental Impact Report - City of Monterey General Plan Update (2004)	City of Monterey	2004	Impact report for City of Monterey General Plan for new and re-development build out	N	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y
City of Monterey General Plan (2005)	City of Monterey	2005	General Plan for future new and re-development in the City of Monterey	N	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y
Final Environmental Impact Report for the 2010 Draft City of Monterey General Plan Update (2010)	City of Monterey	2010	Impact report for City of Monterey General Plan for new and re-development build out	N	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y
Engineering Analysis Development of Non-potable Irrigation Water Systems (1999)	City of Monterey	1999	Identifies properties where non-potable water could be utilized, and evaluates the feasibility of developing non-potable supply sources to serve these properties.	Y	N	N	N	Y	N	N	Y	N	N	N	N	Y	N	Y	Y
Land Use Plan for the Laguna Grande/Roberts Lake Local Coastal Program (Addendum) (2000)	City of Monterey	2000	Change in land use designation to land use around Laguna Grande/Roberts Lake	N	Y	N	N	Y	N	N	N	N	N	N	N	N	N	N	Y
Del Monte Beach Land Use Plan (2003)	City of Monterey	2003	Fulfills a mandate of the California Coastal Act. Establishes policies regarding habitat preservation, coastal erosion, land use designations and public access to Del Monte Beach. Also identifies issues of importance to residents and property owners in the beach area.	Y	Y	N	N	Y	N	N	Y	N	Y	N	Y	Y	Y	Y	Y
Monterey Harbor Land Use Plan (2003)	City of Monterey	2003	Land Use Plan provides the specific goals, policies, and implementation actions that govern land and water use within the coastal zone. The Land Use Plan together with its implementing measures (Coastal Implementation Plan, or CIP) constitute the Local Coastal Program.	N	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y
Groundwater Replenishment Project Urban Runoff Capture at Lake El Estero (2014)	City of Monterey	2014	Plan describes a proposed project which involves diversion of stormwater flows into the sanitary sewer system, which will be used as a source of water supply for the Pure Water Program following treatment.	Y	N	N	N	Y	N	N	Y	N	Y	N	Y	Y	N	N	N
Final Sea Level Rise and Vulnerable Analyses, Existing Conditions and Issues Report	City of Monterey	2016	Study examining the potential impact of sea level rise on the Monterey Coast within the Monterey Peninsula region, including model results.	Y	Y	N	Y	N	N	N	N	Y	N	N	N	N	Y	N	Y
Alternatives Analysis and Data Acquisition for Pacific Grove and Carmel Bay Areas of Special Biological Significance (2006)	City of Monterey Public Works	2006	This report presents the results of alternatives analysis and data acquisition for storm water and non-storm water discharges to the Pacific Grove Area of Special Biological Significance (ASBS) and the Carmel Bay ASBS. (MACTEC) performed the study to assess the feasibility of diverting, storing, treating, and/or reusing storm water from the Del Monte Forest, the New Monterey section of the City of Monterey, and the City of Pacific Grove, and preventing these storm water and non-storm water discharges from entering the Pacific Grove and Carmel Bay ASBS.	Y	Y	N	N	Y	N	N	Y	N	Y	N	Y	Y	N	N	N
Pacific Grove General Plan (1994)	City of Pacific Grove	1994	General Plan for new and re-development in the City of Pacific Grove.	N	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
City of Pacific Grove Urban Runoff Diversion Project Phase II Final Report - SWRCB Agreement No. 02-227-50-1	City of Pacific Grove	2008	The project diverts the 8th Street and 17th Street storm drain outfalls to the Monterey One Water sanitary sewer system during the dry season.	Y	Y	N	N	Y	N	Y	N	N	Y	N	Y	N	N	Y	N
Local Water Project Draft Facility Plan Report WRFP No. 3316-010	City of Pacific Grove	2014	The City of Pacific Grove is pursuing the construction and operation of a Satellite Recycled Water Treatment Plant (SRWTP) to produce recycled water for non-potable water demands in the City of Pacific Grove with future capability to expand to service other local demands outside of the City. This study documents the work conducted in support of this effort as part of the City of Pacific Grove Local Water Project (PGLWP). See Chapter 4 for analysis of potential non-potable water use sites.	Y	N	N	N	N	N	N	N	Y	N	N	N	N	N	Y	Y
Monterey Pacific Grove ASBS Stormwater Management Project Final EIR	City of Pacific Grove	2014	Final EIR for the Monterey/ Pacific Grove ASBS Stormwater Management Project.	Y	Y	N	N	N	N	Y	N	Y	Y	N	Y	N	N	Y	Y
City of Pacific Grove Urban Greening Plan	City of Pacific Grove	2016	This Urban Greening Plan identifies projects, plans, policies, and programs the City of Pacific Grove (City) can implement to achieve numerous environmental and community benefits. For example, green spaces can help to reduce flooding and improve stomwater quality, provide wildlife habitat, help maintain air quality, reduce urban heat islands, and provide gathering spaces for neighborhood socializing and community building.	Y	N	Y	N	N	N	N	N	Y	N	N	N	N	N	Y	Y
Pacific Grove Low Impact Development (LID) Infrastructure Plan (2016)	City of Pacific Grove	2016	The City of Pacific Grove applied for and was awarded a Proposition 84 Grant to develop an Urban Greening Plan. The LID Plan (scheduled to begin in 2016) will consist of initial planning and conceptual design of priority areas for green infrastructure and the urban forest to implement stormwater treatment measures.	Y	Y	N	N	N	N	Y	N	N	Y	N	Y	N	N	Y	N
Master Plan for Improvements to the Regionla Storm Drainage System Final Report	City of Seaside	2001	The Preliminary Design Report (FDR), Fort Ord Reuse Authority (FORA) Stormwater Infrastructure- Phase 1, is based on the engineering work funded through EDA Technical Assistance Grant Award No. 07-79-03954. The TA Grant was awarded to assist in a master planning effort for storm drainage on the former Fort Ord and to eliminate the existing ocean outfalls on lands to be transferred to the State of California, Department of Parks and Recreation. Removal of the outfalls requires the development of alternate means of stormwater disposal.	Y	Y	N	N	Y	N	Y	Y	Y	Y	N	N	N	N	Y	Y
Seaside General Plan (2003)	City of Seaside	2003	General plan for future new and re-development for Seaside.	N	Y	N	N	Y	N	N	N	N	N	N	N	N	N	N	Y
Seaside General Plan EIR (2004)	City of Seaside	2004	EIR General plan for future new and re-development for Seaside.	N	Y	N	N	Y	N	N	N	N	N	N	N	N	N	N	Y
Seaside East Conceptual Master Plan (2010)	City of Seaside	2010	General plan for future new and re-development for Seaside.	N	Y	N	N	Y	N	N	N	N	N	N	N	N	N	N	Y
City of Seaside Local Coastal Program (2013)	City of Seaside	2013	Land Use Plan provides the specific goals, policies, and implementation actions that govern land and water use within Seaside's coastal zone. The Land Use Plan together with its implementing measures (Coastal Implementation Plan, or CIP) constitute the Local Coastal Program.	N	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
Seaside Stormwater Master Plan Update – Phase 1 (2014)	City of Seaside	2014	Plan to investigate and address system deficiencies by developing improvement projects, an O&M and inspection program, and a stormwater utility fee study. The storm drain collection system serves the City of Seaside including Seaside proper, Seaside Highlands and Presidio of Monterey Annex (POMA).	Y	Y	N	Y	N	N	Y	N	Y	N	N	Y	N	Y	N	N
Infiltration and Groundwater Recharge Estimate for the Seaside Coastal Subareas	Fall Creek Engineering, Inc	2015	Study to examine areas conducive to recharging the Seaside Groundwater Basin and potential recharge amounts	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y	N
Fort Ord Reuse Plan (1997)	Fort Ord Reuse Authority	1997	Focuses on the concepts for and elements of re-development of the former Fort Ord military reservation, including the history of the site, current conditions, market opportunities, reuse considerations, environmental impact, and integration into the regional economy.	Y	Y	N	N	Y	N	N	Y	N	Y	N	Y	Y	N	Y	Y
Fort Ord Storm Water Master Plan (2005)	Fort Ord Reuse Authority	2005	Summarizes existing infrastructure and hydrologic conditions for the former Fort Ord cantonment area and provides guidelines for the on-site infiltration obligation.	Y	Y	N	N	N	N	Y	N	N	Y	N	Y	N	Y	N	N
Fort Ord Reuse Plan Reassessment (2012)	Fort Ord Reuse Authority	2012	Describes topics and potential options for modifications to the Fort Ord Base Reuse Plan or to the Fort Ord Reuse Authority’s operational procedures. The reassessment was mandated through a lawsuit settlement with the Sierra Club, and involved information gathering from the public and reevaluation of the plan’s policies and programs.	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	Y	Y	Y	Y	N
Water Storage in the Seaside Basin - Memorandum	From District Counsel to Chairmain, Board Members, and General Manager	2007	Memorandum to describe the process to store water in the Seaside Basin in light of the Superior Court Decision in California American Water v. City of Seaside et al, Case No. M66343.	N	N	N	N	Y	N	N	N	N	N	N	N	Y	N	N	N
Resistivity imaging reveals complex pattern of saltwater intrusion along monterey coast	M. Goebel, A. Pilisecky, R. Knight	2017	Journal article summarizing a study to examine saltwater intrusion along the coast of Monterey adjacent to the Seaside Groundwater basin.	Y	Y	N	N	N	N	N	N	N	N	N	Y	Y	N	Y	N
Regional Urban Water Augumentation Project, Final Environmental Impact Report	Marina Coast Water District	2004	The Regional Water Augmentation Project proposes to provide an additional water supply of 2,400 acre-feet per year (AFY) for the Ord Community area (also known as the former Fort Ord military base) as identified in the Fort Ord Reuse Plan (FORP).	Y	N	N	N	Y	N	N	N	Y	N	Y	N	Y	N	N	Y
Marina Coast Water District Urban Water Management Plan (2005)	Marina Coast Water District	2005	Overview of water management plan for Marina Coast Water District municipal water supplier.	Y	N	N	N	Y	N	Y	Y	Y	Y	N	Y	Y	N	N	N
Regional Urban Water Augumentation Project, Addendum No. 1 to Environmental Impact Report	Marina Coast Water District	2006	The Regional Water Augmentation Project proposes to provide an additional water supply of 2,400 acre-feet per year (AFY) for the Ord Community area (also known as the former Fort Ord military base) as identified in the Fort Ord Reuse Plan (FORP).	Y	N	N	N	Y	N	N	N	Y	N	Y	N	Y	N	N	Y

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
Regional Urban Water Augumentation Project, Addendum No. 2 to Environmental Impact Report	Marina Coast Water District	2007	The Regional Water Augmentation Project proposes to provide an additional water supply of 2,400 acre-feet per year (AFY) for the Ord Community area (also known as the former Fort Ord military base) as identified in the Fort Ord Reuse Plan (FORP).	Y	N	N	N	Y	N	N	N	Y	N	Y	N	Y	N	N	Y
Final Public Review RUWAP Shared Pipeline Addendum EIR	Marina Coast Water District	2016	Addendum to the Regional Urban Water Augmentation Project EIR, compiled by City of Marina.	N	N	N	Y	N	N	N	N	N	N	N	Y	Y	N	N	N
Marina Coast Water District Urban Water Management Plan (2015) Final	Marina Coast Water District	2016	Overview of water management plan for Marina Coast Water District municipal water supplier (update)	Y	N	N	N	Y	N	Y	Y	Y	Y	N	Y	Y	N	N	N
Regional Urban Water Augumentation Project, Addendum No. 3 to Environmental Impact Report	Marina Coast Water District	2016	The Regional Water Augmentation Project proposes to provide an additional water supply of 2,400 acre-feet per year (AFY) for the Ord Community area (also known as the former Fort Ord military base) as identified in the Fort Ord Reuse Plan (FORP).	Y	N	N	N	Y	N	N	N	Y	N	Y	N	Y	N	N	Y
Monterey Bay Aquarium (MBA) - Storm Water and Waterfront Management Plan (2014)	Monterey Bay Aquarium	2014	Fulfills MBA's Ocean Plan Exception requirements for both a Storm Water and Waterfront Management Plan and to protect the ocean water quality of the ASBS. Plan goals include: 1) ensuring seawater effluent locations do not contain constituents in exceedance of the Ocean Plan, 2) eliminating dry weather flow from our facility, 3) utilizing best management practices to improve the quality of storm water runoff, and 4) practicing safe waterfront operations	Y	Y	Y	N	N	N	N	N	N	Y	N	Y	N	N	Y	N
Monterey Bay National Marine Sanctuary Final Management Plan (2008)	Monterey Bay National Marine Sanctuaries	2008	Management Plan for the Monterey Bay National Marine Sanctuary	Y	Y	Y	N	N	N	N	N	N	Y	N	Y	N	N	Y	N
Monterey Bay National Marine Sanctuary Condition Report (2009)	Monterey Bay National Marine Sanctuaries	2009	Description of the condition of the Monterey Bay National Marine Sanctuary	Y	Y	Y	N	N	N	N	N	N	Y	N	Y	N	N	Y	N
Strategic Plan for Central Coast Water Quality Monitoring Coordination and Data Synthesis (2009)	Monterey Bay National Marine Sanctuary	2009	Strategic Plan to improve regional capacity to coordinate monitoring, synthesize information, communicate, and respond with adaptive management for monitoring on the Central Coast.	Y	Y	Y	N	N	N	Y	N	N	N	N	Y	N	N	Y	N
Preparing for the Future: Climate Change and the Monterey Bay Shoreline (2011)	Monterey Bay National Marine Sanctuary	2011	Summary of a Monterey Bay region-wide gathering on climate change adaptation.	Y	Y	N	Y	N	N	N	N	N	N	N	N	N	Y	Y	N

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
Comparison of the Six Central Coast Integrated Regional Water Management Plans and Recommendations for Collaborative Programs (2008)	Monterey Bay National Marine Sanctuary	2008	This document compares the six IRWMPs that have been developed for the Central Coast region with the goal of identifying the major priorities of each plan and common interests and concerns. It is meant to facilitate coordination between the individual public agency plans, programs, and projects within each IRWMP region.	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Central Coast Water Quality Data Assessment (2008)	Monterey Bay National Marine Sanctuary/Sanctuary Integrated Monitoring Network	2008	The purpose of this data assessment was to characterize existing and accessible water quality data sets, evaluate their applicability to fundamental questions about non-point source pollution on the Central Coast, and identify important water quality and other data gaps.	Y	Y	N	N	N	N	N	N	N	Y	N	Y	N	N	N	N
Monterey Economic Forecast (2011)	Monterey County	2011	Presents national, state, and local economic forecasts for the County of Monterey, as well as descriptions of the state of business, agriculture, real estate, and demographics in the County.	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
Carmel River Watershed Stewardship Manual (2013)	Monterey County Resource Management Agency	2013	The purpose of this manual is to provide techniques to support solutions for many of the resource issues (e.g. erosion, groundwater overdraft, invasive plants) experienced in the Carmel Valley. Techniques range from roof runoff management to rural road erosion control to wildlife-friendly pond and pasture management.	Y	N	Y	N	N	Y	N	N	N	Y	N	Y	N	N	Y	N
Carmel Bay Area of Special Biological Significance (ASBS) Draft Compliance Plan (2014)	Monterey County Resource Management Agency	2014	Plan describes how the Carmel Bay ASBS watershed that is under County jurisdiction will comply with the Special Protections for Beneficial Uses of the ASBS. It addresses the portion of the Carmel Bay ASBS watershed that is under County jurisdiction and subject to the Phase II Small MS4 General Permit. The ASBS encompasses 1,584 acres (6.7 miles of coastline) of various coastal marine habitats between Pescadero and Granite Points, and is entirely overlapped by the Carmel Bay State Marine Conservation Area.	Y	Y	N	N	Y	N	Y	N	N	Y	N	Y	N	N	Y	Y
Greater Monterey Peninsula Area Plan (1995)	Monterey County Resource Management Agency	1995	Outlines current conditions and implementation plans for the Monterey Peninsula, touching on natural resources, environmental constraints, human resources, and development in the area.	Y	Y	N	Y	N	N	N	Y	Y	Y	N	Y	Y	Y	Y	Y
Fishery Analysis for the Carnel River Lagoon Biological Assesment Report	Monterey County Resource Management Agency	2014	Analyses of environmental and other factors at the Carmel River Lagoon to fish populations in the Carmel River.	Y	Y	N	Y	N	Y	N	N	N	Y	N	Y	N	Y	Y	N

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
Memorandum of Understanding for the Construction Phase of the Carnel River FREE Project	Monterey County Resource Management Agency, Big Sur Land Trust	2017	MOU between the Monterey Peninsula Regional Park District and the Monterey County Resource Management Agency/ Big Sur Land Trust for Constructing the Floodplain Restoration and Envionmental Establishment Project on the Carmel River.	N	N	N	Y	Y	N	Y	N	Y	Y	N	N	N	Y	Y	Y
Monterey County Water Resources Agency Act (1995)	Monterey County Water Resources Agency	1995	Act to provide for control of flood and stormwater for Monterey County.	N	N	N	Y	N	Y	Y	N	N	N	N	Y	Y	N	N	N
Monterey County Groundwater Management Plan (2006)	Monterey County Water Resources Agency	2006	This report establishes a set of management objectives for the basin, describes existing conditions, outlines historical and projected water demands in the basin, and presents a set of general groundwater management actions.	Y	Y	N	N	Y	N	N	N	Y	N	N	Y	Y	Y	N	N
Monterey County Floodplain Management Plan (2008)	Monterey County Water Resources Agency	2008	This is an update of a 2002 report identifying the flooding sources affecting Monterey County, and establishing an implementation plan to reduce flood hazards.	Y	Y	N	Y	Y	N	Y	N	Y	Y	N	N	N	Y	Y	N
Monterey County Floodplain Management Plan (updated 2014)	Monterey County Water Resources Agency	2014	Completed as part of the FEMA NFIP Community Rating System. Intended to assess the flooding hazards within unincorporated areas of Monterey County and summarize floodplain management program and mitigation strategy within the county. Areas included in the plan are: Carmel, North County, Carmel Valley, Greater/Central Salinas, Del Monte Forest/Big Sur, Monterey Peninsula, South County.	Y	Y	N	Y	N	N	N	N	N	N	N	N	N	Y	N	Y
Pure Water Monterey Groundwater Replenishment Project, http://purewatermonterey.org/	Monterey One Water	2014	Website for the Monterey Peninsula Groundwater Replenishment Project.	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N
Section IV: Operations and Maintenance Program of the Sewer System Management Plan	Monterey One Water	2014	Summary of the O&M Program for the Sewer System Management Plan	N	N	N	N	Y	N	Y	N	Y	N	N	Y	Y	N	N	N
Consolidated Final Environmental Impact Report for the Pure Water Monterey Groundwater Replenishment Project	Monterey One Water	2016	Final EIR for the Pure Water Monterey Recycled Water Project, located at the Regional Treatment Plant on the Monterey Peninsula.	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
Grant Agreement between Monterey Peninsula Water Management District and the City of Monterey for Local Water Project Development Expenses (Water Recovery Study)	Monterey Peninsula & The City of Monterey	2016	Grant Agreement for the Water Recovery Study	N	N	N	N	Y	N	Y	N	Y	Y	N	N	Y	N	N	N
San Jose Creek Watershed Assessment (2014)	Monterey Peninsula Regional Park District	2014	Assessment of the watershed draining to San Jose Creek.	Y	Y	N	N	N	N	N	N	N	Y	N	Y	N	N	Y	N
Aquifer Storage and Recovery Project, Environmental Impact Report	Monterey Peninsula Water Management District	2006	The ASR project would allow diversion of a limited amount of flow from the Carmel River during high flow conditions for storage in, and later recovery from, the Seaside Groundwater Basin.	Y	Y	N	N	Y	N	N	N	N	N	Y	N	Y	N	Y	Y
Study Plan for Long Term Adaptive Management of the Carmel River State Beach and Lagoon (2007)	Monterey Peninsula Water Management District	2007	Summary of analyses to devize a Beach and Lagoon Management scheme to support both homeowners needing protection from potential flood inundation and protection of rare fish and amphibian species.	Y	Y	Y	N	N	N	Y	N	N	N	N	Y	N	N	Y	N
Monterey Peninsula Water Management District Water Supply Charge (2012)	Monterey Peninsula Water Management District	2012	Summary of MPWMD Supply Charge.	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N
Monterey Peninsula Water Management District Annual Reports http://www.mpwmd.net/resources/annual-reports/	Monterey Peninsula Water Management District	2013	Website providing annual reports summarizing the MPWMD's previous year's goals, accomplishments, and other activitites.	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N
Monterey Peninsula Water Management District Mission, Vision & Goals http://www.mpwmd.net/who-we-are/mission-vision-goals/	Monterey Peninsula Water Management District	2013	Website summarizing MPWMD's mission statement.	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N
Canyon del Rey Master Drainage Plan – Draft (2014)	Monterey Peninsula Water Management District	2014	Presents an update to the Master Drainage Plan for Canyon del Rey originally prepared for the Monterey County Water Resources Agency in 1977. This updated plan accounts for changes in hydrologic and hydraulic conditions in the watershed, as well as the addition of new and updated flood management facilities. It also provides a new investigation and evaluation of sediment related processes in the watershed, including analyses of sediment transport, erosion, and deposition within the stream channel system.	Y	Y	N	Y	N	N	N	Y	N	N	N	N	N	Y	N	N

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
Los Padres Dam and Reservoir Long-Term Strategic and Short-Term Tactical Plan (2014)	Monterey Peninsula Water Management District	2014	Overview of Los Padres Dam History along with future plans for dam operation.	Y	Y	N	N	Y	N	N	N	Y	N	N	Y	Y	N	Y	N
Draft Monterey Peninsula, Carmel Bay and South Monterey Bay Integrated Regional Water Management Plan Update (2014)	Monterey Peninsula Water Management District	2014	IRWM Plan update to address the major challenges and opportunities related to managing water resources within the Monterey Peninsula IRWM region (Region).	N	N	N	Y	Y	N	Y	N	Y	Y	N	Y	Y	Y	Y	Y
Seaside Groundwater Basin Salt & Nutrient Management Plan (2014)	Monterey Peninsula Water Management District	2014	Summary of the Salt and Nutrient Management Plan Prepared for the Seaside Groundwater Basin.	N	N	N	N	Y	N	N	N	N	Y	N	Y	Y	N	N	N
Assessment of Previous Models, Data Inventory, and Development of a Conceptual Model for Simulating Flow in the Carmel River and its Alluvial Aquifer: Support Services for MPWMD's IRWMP Project 8 (2015)	Monterey Peninsula Water Management District	2015	The Carmel River Basin is found to fill to capacity every year due to Carmel River streamflow. There have been extensive studies conducted recently examining the Carmel Valley , particularly surface and groundwater interactions in the Basin. A detailed hydrologic model that links GSFLOW and MODFLOW has been developed and is undergoing calibration. The model simulates flows and diversions in the Carmel River and its alluvial aquifer.	Y	Y	N	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	N
Carmel River Watershed Assesment and Action Plan 2016 update	Monterey Peninsula Water Management District	2016	Update of the 2014 Action Plan	Y	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	Y	Y	Y
Summary of Operations Monterey Peninsula ASR Project WY 2016	Monterey Peninsula Water Management District	2016	Summary of operations of the Monterey Peninsula Aquifer Storage and Recovery (ASR) Project during Water Year 2016.	N	N	N	N	Y	N	N	N	N	Y	N	Y	Y	N	N	N
Integrated Natural Resources Management Plan (Sept. 2013)	Naval Support Activity Monterey	2013	The document charts the management and use of installation natural resources, establishes conservation priorities, and provides a basis for formulating budgets. The plan covers 1,000 acres of properties owned and managed by the Naval Support Activity Monterey.	N	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y
Presidio of Monterey Non-Potable Water Concept Plan (2013)	Presidio of Monterey	2013	Study to determine potential to incorporate greywater applications as part of a sustainable water program.	N	Y	N	N	Y	N	N	N	Y	N	N	Y	N	Y	N	N

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
Stormwater characterization for reduction and reuse: Presidio of Monterey, California (2014)	Presidio of Monterey	2014	The objective of the study is to determine the effectiveness of LID in stormwater management in the Presidio of Monterey.											N	Y	Y	Y	Y	N
Draft California 2014 Integrated Report Region 3 Central Coast Regional Water Quality Control Baord	Region 3 Central Coast Regional Water Quality Control Baord	2016	2014 303(d) list for the Central Coast Regional Water Quality Control Board	N	N	N	N	N	N	N	N	N	Y	N	Y	N	N	N	N
Water Quality Control Plan for the Central Coastal Basin (2011)	Regional Water Quality Control Board	2011	The Central Coast Basin Plan provides a summary of water quality standards for the Central coast region along with the various beneficial uses for water bodies present in the region. The Basin Plan also describes the programs, projects, and other actions needed to meet the standards, State and Regional Board plans and policies to protect water quality, and statewide and regional monitoring programs.	N	N	N	N	N	N	N	N	N	Y	N	Y	N	N	N	N
Certification of Fecal indicator Bacteria TMDLs and Alternative Implementation Programs for Lower San Antonio River, Tularcitos Creek, Cholame Creek, San Lorenzo Creek, and Arroyo De La Cruz Watersheds	Regional Water Quality Control Board, Central Coast Region	2011	TMDL for fecal indicator bacteria for Tularcitos Creek and other receiving water bodies	N	N	N	N	N	N	N	N	N	Y	N	Y	N	N	N	N
Seaside Basin Monitoring and Management Program	Seaside Groundwater Basin Watermaster	2006	Summary of the monitoring and management plan for the Seaside Groundwater Basin.	N	N	N	N	Y	N	N	N	N	Y	N	Y	Y	N	N	N
Seaside Groundwater Basin Modeling and Protective Groundwater Elevations (2009)	Seaside Groundwater Basin Watermaster	2009	Summary of the results of the calibrated groundwater flow model of the Seaside Groundwater Basin.	N	N	N	N	Y	N	N	N	N	N	N	N	Y	N	N	N
Water Year 2011 Seawater Intrusion Analysis Report – Seaside Basin, Monterey County California (2011)	Seaside Groundwater Basin Watermaster	2011	This report addresses the potential for, and extent of, seawater intrusion in the Seaside Groundwater Basin.	Y	Y	N	N	N	N	N	N	N	N	N	Y	Y	N	Y	N
Water Year 2014 Seawater Intrusion Analysis Report – Seaside Basin, Monterey County California (2014)	Seaside Groundwater Basin Watermaster	2014	This report addresses the potential for, and extent of, seawater intrusion in the Seaside Groundwater Basin.	Y	Y	N	N	N	N	N	N	N	N	N	Y	Y	N	Y	N
Seaside Basin Amended Decision (2005)	State of California	2005												N					

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
Fort Ord Dunes State Park General Plan and Environmental Impact Report (2004)	State Park and Recreation Commission	2004	This report was prepared to address comprehensive management of the state park's lands, by defining a framework for resource stewardship, interpretation, facilities, visitor use, and services. Describes current hydrologic conditions in the park.	Y	Y	Y	N	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N
Order on Four Complaints Filed Against the California-American Water Company (1995)	State Water Resources Control Board	1995	Initial order on complaints against CalAm relating to Carmel River drafting.	Y	Y	N	N	Y	N	N	N	N	Y	N	N	Y	N	Y	N
Cease and Desist Order WR 2009-0060 (Carmel River)	State Water Resources Control Board	2009	Cease and Desist Order from the state of California to limit overdraft on the Carmel River by CalAm.	N	N	N	N	Y	N	N	N	N	N	N	N	Y	N	N	N
Post-Construction Stormwater Management Requirements for Development Projects in the Central Coast Region - User Guide for Municipal Implementation	State Water Resources Control Board	2013	Summary of requirements for implementing stormwater management projects in the Central Coast.	Y	Y	N	N	N	N	Y	N	N	Y	N	Y	N	N	N	N
Recycled Water Policy (2013)	State Water Resources Control Board	2013	Summary of the State Board's Recycled Water Policy.	N	N	N	N	Y	N	Y	N	Y	N	N	Y	Y	N	N	N
Storm Water Resource Plan Guidelines	State Water Resources Control Board	2015	State Board Guidelines on developing a Stormwater Resource Plan.	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y
Order of Amending in Part Requirements of State Water Baord Order WR 2009-0060.	State Water Resources Control Board	2016	Amended Cease and Desist Order for the Carmel River	Y	N	N	N	Y	N	N	N	N	N	N	N	Y	N	Y	N
Carmel River Watershed Action Plan 2014 Update (2014)	The Carmel River Watershed Conservancy	2014	The Action Plans are based on scientific studies, mission statement objectives and input from our prospective partners and the Public. There are 57 actions in the Action Plan, which are subdivided into eight Action categories: Flows, Groundwater, Habitat, Sedimentation, Steelhead, Education, Public Safety, and Water Quantity.	Y	Y	Y	Y	N	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y
Active Projects in the Carmel River Watershed	The Carmel River Watershed Conservancy	2017	List of current water resources, environmental and/or restoration related projects ongoing in the Carmel River Watershed.	Y	Y	N	N	N	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y
Supplemental Carmel River Watershed Action Plan (2007)	The Planning and Conservation League Foundation and the Carmel River Watershed Conservancy	2007	This report analyzes the opportunities that exist to remove the antiquated dam, reduce downstream groundwater pumping, and implement an integrated watershed restoration and sediment management strategy. It focuses on opportunities to provide benefits to the downstream community and the public through restoration of the Carmel River Watershed.	Y	Y	Y	N	N	N	Y	N	Y	N	N	Y	N	N	Y	N

Title	Organization	Year	Description	Existing Conditions	Watershed reports	Watershed stewardship	Floodplain management	Water Management	Stream Restoration	Stormwater/LID	General Plans	Water Projects/CIP Lists	Water Quality Study	Other	Water Quality	Water Supply	Flood Control	Environmental	Community
Watershed and Riparian Assessment Report (WRAR): Bureau of Land Management Lands Former Fort Ord, Monterey County, California (2002)	The Watershed Institute	2002	Characterizes the dominant physical, ecological, and cultural components of a portion of the former Fort Ord landscape.	Y	Y	N	N	N	N	N	N	Y	Y	N	N	N	Y	Y	Y

APPENDIX D
Monterey Peninsula Water Recovery Study Report

Geosyntec consultants

engineers | scientists | innovators

MONTEREY REGIONAL Stormwater Management PROGRAM

Monterey Peninsula Water Recovery Study Report

Part of the Monterey Peninsula Stormwater Resource Plan

Prepared for

Monterey Regional Stormwater Management Program (MRSWMP)
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Project Number: WW2405

April 16, 2018

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ACRONYMS AND ABBREVIATIONS

ADWF	average dry weather flow
AF	acre-foot
AFY	acre-feet per year
ASBS	Area of Special Biological Significance
ASR	Aquifer Storage and Recovery
AWPF	Advanced Water Purification Facility
BP	Big Sur River – Frontal Pacific Ocean Catchment
CAWD	Carmel Area Wastewater District
CalAm	California American Water
CEQA	California Environmental Quality Act
CM	Canyon Del Rey – Frontal Monterey Bay Catchment
CMAC	Continuous Monitoring and Adaptive Control
CRFREE	Carmel River Floodplain Restoration and Environmental Enhancement
CSIP	Castroville Seawater Intrusion Project
CU	Capture and Use
DSS	Diversion to Sanitary Sewer
DWR	Department of Water Resources
GIS	Geographic Information System
GWR	Ground Water Replenishment
HSG	Hydrologic Soil Group
INF	Infiltration to a Water Supply Aquifer
IRWM	Integrated Regional Water Management
IRWMP	Integrated Regional Water Management Plan
LR	Lake or Reservoir
M1W	Monterey One Water
MGD	million gallons per day

MPWMD	Monterey Peninsula Water Management District
MRWPCA	Monterey Regional Water Pollution Control Agency
NED	National Elevation Dataset
NHD	National Hydrography Dataset
NOAA	National Oceanic and Atmospheric Administration
NRCS	National Resource Conservation Service
PBCSD	Pebble Beach Community Services District
PWMGWR	Pure Water Monterey Groundwater Replenishment
PWWF	peak wet weather flow
RTP	Regional Treatment Plant
RWQCB	Regional Water Quality Control Board
SVRP	Salinas Valley Reclamation Project
SWRCB	State Water Resources Control Board
SWRP	Stormwater Resource Plan
TAC	Technical Advisory Committee
TELR	Tool to Estimate Load Reduction
USGS	U. S. Geological Survey
WBD	Watershed Boundary Dataset
WWTP	Wastewater Treatment Plant

1. INTRODUCTION AND BACKGROUND

This report documents how the Monterey Peninsula (the Peninsula) Water Recovery Study (the Study) evaluated the feasibility of establishing a Peninsula-wide water recovery and reclamation system. The methodology presented herein focuses on identifying and evaluating potential projects to capture sources of wet and dry weather runoff within the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management (IRWM) Region (the Planning Area) for water recovery and use. These water recovery projects are meant to reduce the Peninsula's dependence on the Carmel River, Carmel Valley Alluvial Aquifer, and adjudicated Seaside Groundwater Basin (currently the primary water supply sources in the Planning Area). The study considers how to store, treat, and transport potential sources of runoff prior to entering existing water and wastewater infrastructure for use, but does not identify projects that expand existing water distribution and wastewater storage, treatment, and conveyance system capacities, or determine if this will be needed. The study provides a foundation for more project-specific analyses in the future.

1.1 Study Objectives

The objectives of this Study include:

1. Examine the feasibility of a region-wide water recovery and reclamation system to reduce dependence on existing water supply sources.
2. Consider stormwater and non-stormwater sources (wet and dry weather runoff) and how the sources can be stored, treated, and transported prior to entering existing water and wastewater infrastructure for use.
3. Identify two, at a minimum, projects selected by the Water Recovery Study proponents – City of Monterey, Monterey Peninsula Water Management District, and Monterey One Water – for development of conceptual designs as part of the Study.

1.2 Study Tasks

The tasks conducted as part of this Study include:

- Task A: Develop a memorandum describing the methodology used to examine the feasibility of region-wide water recovery and reclamation system; conduct outreach to technical stakeholders.
- Task B: Use the methodology to identify projects focusing on treatment, transport, and storage; consider system optimization; and document the results in a report.
- Task C: Develop concept designs for the preferred project and at least one alternative project.
- Task E: Complete a California Environmental Quality Act (CEQA) checklist for the preferred project and prepare a 30% design.
- Task F: Develop a project implementation plan.

This report is the deliverable associated with Task B. Project identification is described in Section 2 and project feasibility evaluation is described in Section 3. Tasks C, E, and F are described in Section 4, but the results of these tasks will be reported separately.

1.3 Planning Area

As described in the Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM Plan Update (MPWMD and DD&A, 2014), the Planning Area is in the Central Coast Regional Water Quality Control Board (RWQCB Region 3) and lies between the Salinas River groundwater basin and the Big Sur coast. The Planning Area was established based on watershed and groundwater basin limits, portions of the near-shore environment areas affected by inland area activities, and takes into consideration jurisdictional limits, powers, and responsibilities for water resource management. The Planning Area comprises approximately 340 square miles and consists of coastal watershed areas in Carmel Bay and south Monterey Bay between Point Lobos on the south and Sand City on the north – a 38.3-mile stretch of the coast that includes two Areas of Special Biological Significance (Carmel Bay and Pacific Grove). The area encompasses the six Monterey Peninsula cities of Carmel-by-the-Sea, Del Rey Oaks, Pacific Grove, Monterey, Sand City, Seaside, and extends into portions of the unincorporated area of Monterey County at the former Fort Ord, in the Carmel Highlands, Pebble Beach, the inland areas of Carmel Valley and the Laguna Seca area. A map of the Planning Area is provided in Figure 1.

1.3.1 Watersheds

The U.S. Geological Survey (USGS) and California Department of Water Resources (DWR) watersheds that are located within the Planning Area will be used as the basis for the Water Recovery Study. The jurisdictional boundaries within these watersheds will also be used to further delineate planning priorities. The USGS and DWR watersheds in the region, shown in Figure 1, include:

- The Carmel River Basin watershed,
- Most of the Canyon Del Rey/ Frontal Monterey Bay watershed,
- A small portion of the Big Sur/ Frontal Pacific Ocean watershed, and
- A small portion of the El Toro Creek/ Salinas River watershed.

The Carmel River Basin watershed makes up the most area within the Planning Area (255 square miles) and is the only watershed fully contained within the Planning Area boundary. The Carmel River and the Carmel Valley Alluvial Aquifer (approximately 6.8 square miles within the Carmel River Basin watershed) currently represent the largest source of potable water for the region. The watershed has less urban development than the Canyon Del Rey/ Frontal Monterey Bay watershed.

The Canyon Del Rey/ Frontal Monterey Bay watershed (69 square miles, approximately 53 of which are within the Planning Area) contains the majority of urbanized areas within the Planning Area, as well as the majority of the water demand. The watershed is underlain by the adjudicated Seaside Groundwater Basin and small portions of the Salinas Valley Groundwater Basin, which are hydraulically connected and used for water supply. The extent of these groundwater aquifers is 69 square miles, 25 square miles of which are within the Planning Area. Those 25 square miles represent 47% of the portion of the Canyon Del Rey/ Frontal Monterey Bay watershed within the Planning Area.

A small portion of the Big Sur/ Frontal Pacific Ocean watershed is within the Planning Area, consisting of approximately 24 square miles of the 167-square mile watershed. The watershed does not have a main water supply source within the Planning Area, though there is some water supply from miscellaneous formations of groundwater within the watershed.

A very small portion of the El Toro Creek/ Salinas River watershed is within the Planning Area, consisting of approximately 6 square miles of the 415-square mile watershed. This area is east of the Canyon Del Rey/ Frontal Monterey Bay watershed and is entirely underlain by the Seaside and Salinas Valley Groundwater Basins (Figure 1).

1.3.2 Catchments

Catchments were delineated using the Tool to Estimate Load Reduction (TELR) and NHDplus[1] (National Hydrography Dataset) catchments. The catchments are defined based on the storm drain outfalls to the ocean. Projects within the same catchments may be combined to create a regional water supply recovery and reclamation system. A map of the delineated catchments for this Study is shown on Figure 2. Appendix A provides a table of the Study catchments with tributary area, level of urban development, and rough estimates of average annual runoff (in units of acre-feet per year, AFY). The runoff estimates provide context for what is potentially available for water recovery. In total, it is estimated that catchments that drain through the Planning Area yield approximately 700 to 1,000 AFY of dry weather runoff and approximately 6,100 AFY of urban stormwater runoff.

1.4 Technical Stakeholder Group

The Water Recovery Study Technical Stakeholder Group includes participants in the region that are familiar with stormwater and wastewater distribution systems, treatment, and/or have technical knowledge of the Carmel River and Carmel Valley Alluvial Aquifer or the Seaside Groundwater Basin. The Technical Stakeholder Group attended an interagency Technical Stakeholder Group meeting on October 17, 2017, the intent of which was to get input on the study objectives and methodology. The Technical Stakeholder Group also provided input on project evaluation once the initial analysis was complete. The Technical Stakeholders are listed in Appendix B.

1.5 Water Recovery Study Methodology Overview

The Water Recovery Study methodology includes the following components:

1. Identification of Water Recovery Study projects, and
2. Evaluation of Water Recovery Study project feasibility characteristics.

[1] NHDPlus is a geo-spatial, hydrologic framework dataset built by the US EPA Office of Water, assisted by the US Geological Survey. NHDPlus is an integrated suite of application-ready geospatial data sets that incorporate many of the best features of the National Hydrography Dataset (NHD), the National Elevation Dataset (NED), and the Watershed Boundary Dataset (WBD).

In addition to the Water Recovery Study components described herein, additional analyses were conducted to evaluate the Water Recovery Study projects as part of the development of the Monterey Peninsula Stormwater Resource Plan (SWRP). A flow chart that describes the interaction between the Water Recovery Study and the SWRP is provided in Figure 3. As indicated in Figure 3, certain aspects of project identification (i.e., obtaining planned stakeholder projects and performing some of the project opportunity analyses) are shared tasks between the SWRP and Water Recovery Study. All projects screened for inclusion in the Water Recovery Study, whether they are identified as Water Recovery projects or not, are included in the list of SWRP projects. The characterization of project feasibility of the Water Recovery Study was performed independently of the SWRP's project classification and evaluation.

The evaluation conducted as part of the SWRP (identified as 'SWRP Tasks' in the flow chart) is summarized in the *Methodology for Integrated Identification, Prioritization, and Analysis of Monterey Peninsula SWRP Projects Memorandum* (Geosyntec, 2017). The identification and evaluation of Water Recovery Study projects (identified as 'Water Recovery Study Tasks' or 'Tasks for Both' in the flow chart) are described in Sections 2 through 4 of this memorandum.

2. WATER RECOVERY STUDY PROJECT IDENTIFICATION

The first step in the Water Recovery Study was to identify potential projects that could recover wet and dry weather runoff for water supply. The four categories of water recovery projects that were considered in the study[2] include:

- Storage and diversion, infiltration, or irrigation from lakes and reservoirs,
- Diversions to sanitary sewer to supplement recycled water,
- Infiltration into a potable water supply aquifer, and
- On-site capture and use.

These project types, as well as the method used to identify the project type, are described in Sections 2.1 through 2.4 below.

In addition, planned projects identified by SWRP cooperating entities, interested parties, and stakeholders were screened and classified into the above project types for inclusion in the Water Recovery Study. A description of how planned projects were submitted for the SWRP is provided in the *Methodology for Integrated Identification, Prioritization, and Analysis of Monterey Peninsula SWRP Projects Memorandum* (Geosyntec, 2017).

In total, 241 Water Recovery Study projects were identified as part of the study. Of the 82 planned projects submitted by stakeholders for the SWRP, 33 were considered Water Recovery projects. Of these 33 planned Water Recovery Study projects, 19 had overlap with Water Recovery projects identified via a Geographic Information System (GIS) opportunity analysis, while 14 were unique in that they did not overlap with projects identified in the opportunity analysis.

2.1 Lakes and Reservoirs

This Study examined existing lakes and reservoirs that receive runoff from substantial tributary area and have existing storage volume that could be used to detain runoff and recover it via percolation (if located above a water supply aquifer), capture and use, and/or diversion to the sanitary sewer system. The study also considered optimizing the operation of lakes and reservoirs to increase runoff capture and use as a potential mechanism to enhance water recovery.

Typically, stormwater detention facilities are not continuously monitored and rely on a passive hydraulic outlet to release flows (e.g., stagnant orifices, weirs, and/or pumps with level settings). To improve upon these conventional designs, remote continuous monitoring and adaptive control (CMAC) has been identified as a promising technology for providing better data collection and management of runoff (California SWRCB, 2016). CMAC can use real-time National Oceanic and Atmospheric Administration (NOAA) rainfall forecast information, along with water level and flow rate monitoring data, to automatically draw down a stormwater facility and provide storage for forecasted runoff based on site and system objectives. The results can include significant improvements in performance, such as runoff capture and reuse (WERF, 2014). CMAC can be

[2] Micro-treatment and injection into perched aquifers was initially considered as a project category. However, a lack of available information on perched aquifers necessitated the removal of this category from the study.

paired with lakes and reservoirs to time diversions to the sanitary sewer to optimize water reuse potential while staying within the available capacity of wastewater conveyance and treatment systems, and additionally, reduce the amount of runoff discharged to Monterey Bay, Carmel Bay, and the Pacific Ocean.

At the outset of this study, Lake El Estero, Laguna Grande (Roberts Lake), David Avenue Reservoir, and Lake Del Monte (Navy Lake) were identified as Lake and Reservoir projects of primary interest. An opportunity analysis was performed to identify other potential lake and reservoir projects within the Planning Area. These opportunities were identified using NHDplus surface water bodies and whether that surface water body has met the following criteria:

1. Has potential to receive a substantial source of stormwater by being located within 10 feet of an NHDplus stream or within 50 feet of an existing storm drain line, and
2. Has potential to recover additional runoff via percolation to a water supply aquifer, capture and use, diversion to sanitary sewer, or optimization.

In-stream obstructions such as rubber dams, which can temporarily inflate to divert runoff or enhance percolation into the subsurface, were not considered as part of this study and are not included in this project category. Surface impoundments that are already a part of the Carmel Area Wastewater District (CAWD) recycled water program in Del Monte Forest were also not considered as part of this opportunity analysis.

There were 13 projects identified in the Lake and Reservoirs (LR) opportunity analysis and one unique project concept submitted by stakeholders that did not overlap with projects identified in the opportunity analysis and was categorized as a Lake and Reservoirs project. The unique project concept is a new detention facility that could be implemented in open space (behind the Safeway on Canyon Del Rey Boulevard in Del Rey Oaks) upstream of Laguna Grande (Roberts Lake). Lake and Reservoir projects are mapped on Figure 4 and listed in the project feasibility matrix provided in Appendix C. The pathway for recovering water (i.e., diversion to sanitary sewer, infiltration into a potable water supply aquifer, or capture and use) for each identified LR project is provided in Table 1.

Table 1: Pathway for Water Recovery for Lake and Reservoir Projects

LR Project ID	Lake/Reservoir Name	Pathway for Water Recovery
LR_01	County and Private Pond	Diversion to sanitary sewer
LR_02	David Avenue Reservoir	Diversion to sanitary sewer
LR_03	Lake Del Monte	Diversion to sanitary sewer, capture and use
LR_04	Lake El Estero	Diversion to sanitary sewer, capture and use
LR_05	Glen of Pacific Grove	Diversion to sanitary sewer, capture and use
LR_06	Laguna Seca	Infiltrate to a potable water supply aquifer
LR_07	Laguna Seca Golf Ranch	Capture and use
LR_08	Monterey Peninsula Regional	Diversion to sanitary sewer, capture and use
LR_10	Nicklaus Club – Monterey	Capture and use

LR Project ID	Lake/Reservoir Name	Pathway for Water Recovery
LR_11	Pacific Grove Golf Links	Diversion to sanitary sewer, capture and use
LR_12	Roberts Lakes / Laguna Grande	Diversion to sanitary sewer, capture and use
LR_13	Santa Lucia Conservancy	Capture and use, other[1]
LR_14	Los Padres Reservoir	Other[1]
LR_planned_79	New Detention behind Safeway	Diversion to sanitary sewer

[1]Another pathway considered was to detain runoff in reservoirs tributary to the Carmel River and release the water at opportune times such that the timing of allowable diversion via the California American Water (CalAm) supply wells could be extended.

2.2 Diversions to Sanitary Sewer

Storm drains that receive runoff from substantial tributary area and can be conveyed to sanitary sewer pump stations can be retrofitted to divert dry weather runoff to the sanitary sewer system for treatment and ultimate reuse. Increased or new detention storage was considered as part of these projects if the first flush of stormwater runoff could be diverted as well. Pretreatment was considered as part of this project category.

Within the Monterey One Water (M1W) (formerly Monterey Regional Water Pollution Control Agency [MRWPCA]) service area, which is primarily within the Canyon Del Rey/Frontal Monterey Bay watershed as well as portions of the northern Salinas Valley, runoff can be diverted to the Regional Treatment Plant (RTP) via gravity sewer and then through one of the M1W Interceptor Pipelines (pressurized force mains and/or gravity main). At the RTP, wastewater undergoes primary and secondary treatment and then can be reclaimed by either: (1) undergoing tertiary treatment and used as recycled 'purple pipe' water for irrigation, via the Salinas Valley Reclamation Project (SVRP) recycled water plant and the Castroville Seawater Intrusion (CSIP) distribution system; or (2) starting in 2019, undergoing advanced treatment, transport, and injection into the Seaside Groundwater Basin, via the Advanced Water Purification Facility (AWPF) of the Pure Water Monterey Groundwater Replenishment (PWMGWR) Project currently under construction. An average of 60 percent of M1W wastewater is recycled each year and that percentage will increase when the PWMGWR Project is operational. M1W currently serves a population of approximately 250,000 people (M1W, 2017) and treats 17.2 million gallons per day (MGD) average dry weather flow (ADWF) for the 2014-2016 period (A. Imamura, personal communication, March 20, 2018), with a peak wet weather flow (PWWF) of 36.8 MGD (M1W, 2016). The RTP is permitted for design flows of 29.6 MGD ADWF and 75.6 MGD PWWF, indicating available capacity for future runoff diversions. Pump station capacity for accepting diversions from lakes and reservoirs as well as additional storm drain diversions was considered as part of this study.

Within the CAWD service area, which is primarily within the Carmel River Watershed, runoff can be diverted to the Wastewater Treatment Plant (WWTP) via gravity sewer and force main. Treated wastewater is reclaimed by sending recycled 'purple pipe' water to Del Monte Forest where it is used to irrigate seven golf courses (Pebble Beach Golf Links, Spyglass Hill, The Links at Spanish Bay, Peter Hay, Cypress Point, Monterey Peninsula Country Club, and Poppy Hills). CAWD's service area is approximately 5.5 square miles and serves 11,000 people within the district and treatment and disposal for an additional 4,500 people in Del Monte Forest from the Pebble Beach

Community Services District (PBCSD) (CAWD, 2017). Current ADWF is approximately 1.8 MGD, 1.2 MGD of which is from CAWD and 0.6 MGD from the Pebble Beach Community Services District. The CAWD WWTP has been designed to treat 4.0 MGD of primarily domestic wastewater and the plant has a permitted capacity of 3.0 MGD, indicating available capacity for future runoff diversions.

One dry weather storm drain diversion project currently in operation is the Pacific Grove Area of Special Biological Significance (ASBS) Dry Weather Diversion System. It has been implemented in three phases between 2001 and June 2014 and currently covers the section of coastline from Lovers Point east to the Hopkins Marine Station (Pacific Grove and Monterey, 2016). This project currently diverts dry weather urban runoff from a 652-acre catchment area to the M1W Interceptor Pipeline that is processed at the RTP (Pacific Grove and Monterey, 2016). Upgrades and expansions of the existing dry weather diversion system are proposed to increase the capacity of the collection system to be able to divert up to the 85th percentile wet weather storm from a portion of the City of Pacific Grove to the M1W Interceptor Pipeline. These proposed upgrades include: stormwater diversions for the Lovers Point and Sea Palm catchments, by diverting runoff into underground storage tanks and metering it to the M1W Interceptor Pipeline; and Greenwood, Eardley, David Avenue, and Pine Street diversions, which would expand facilities already constructed to divert dry weather flows and/or evaluate additional opportunities to utilize new infrastructure such as the David Avenue Reservoir (Pacific Grove and Monterey, 2016). Another dry weather storm drain diversion that is currently being considered is for Lake El Estero. Preliminary analysis has been conducted to divert water from Lake El Estero to the sanitary sewer system (MRWPCA, 2016). Both David Avenue Reservoir and Lake El Estero have been identified in this study as Lake and Reservoir (LR) projects, as stated in Section 2.1.

At the outset of this Study, identified projects in the Diversions to Sanitary Sewer category included: the New Monterey Urban Diversion to the M1W Reeside pump station in the City of Monterey; Del Monte Boulevard and Bay Avenue Outfall Diversion to the M1W Seaside pump station in the City of Seaside; and the Carmel Bay ASBS Project, as identified in the Integrated Regional Water Management Plan (IRWMP) (MPWMD, 2014), which would divert dry-weather runoff to the CAWD sanitary sewer system. An opportunity analysis was performed to identify other potential storm drain diversions to sanitary sewer in the Planning Area. The most readily available opportunities were identified based on storm drain outfalls along the coast that could divert runoff to a sanitary sewer pump station. It was assumed that coastal outfalls could divert runoff upstream or downstream to the nearest sanitary sewer pump station along the pressurized sewer main, which extends parallel to the coast from Pacific Grove through Monterey and Sand City. Along the gravity sewer main, which extends for approximately one mile along the coast in Monterey, coastal outfalls were directed to the nearest downstream sanitary sewer pump station. The coastal sanitary sewer pump stations that were considered include those operated by M1W, jurisdictions which connect to the M1W Interceptor Pipeline (e.g., Seaside County Sanitation District, City of Monterey, Naval Postgraduate School, and Presidio of Monterey), and CAWD. A concept design that could be considered in future analyses includes subsurface storage of storm water runoff under beach parking lots. This type of project is currently underway and in the construction phase in Santa Monica, California.

There were eleven projects identified in the Diversions to Sanitary Sewer (DSS) opportunity analysis and one unique planned project submitted by stakeholders that did not overlap with projects identified in the opportunity analysis and was categorized as a DSS opportunity. The unique stakeholder project is the Hartnell Gulch creek restoration and stormwater diversion project in the City of Monterey. Flows from Hartnell Gulch may be diverted to Lake El Estero and/or temporarily stored underground in the adjacent public library parking lot for additional recovery. DSS opportunities are mapped on Figure 4 and listed in the project feasibility matrix provided in Appendix C.

2.3 Infiltration into a Potable Water Supply Aquifer

Passive recharge into a potable water supply aquifer provides another option for water supply augmentation. Passive recharge into a potable water supply aquifer entails locating an infiltrating stormwater capture facility, such as a subsurface infiltration gallery over a groundwater basin used for water supply or a dry well that is situated above a potable water supply aquifer. Potential passive recharge projects were identified over the Seaside Groundwater Basin, including the Paso Robles and Santa Margarita Aquifers, and the Carmel Valley Alluvial Aquifer.

Overbank flood waters were considered a source of water recovery if stored on the floodplain and allowed to percolate into a water supply aquifer. Candidates for infiltration projects included riparian areas where floodplain connectivity could safely increase without causing flood impacts to infrastructure. The only such planned project is the proposed Carmel River Floodplain Restoration and Environmental Enhancement (CRFREE) Project, co-sponsored by the Monterey County Resource Management Agency and the Big Sur Land Trust, located just east of Highway 1 immediately south of the Carmel River Bridge. The southern floodplain proposed for restoration is above the Carmel River Groundwater Basin, although potential water supply yield from this portion of the aquifer is not appreciable since no potable water supply wells are within or downstream from the project area. Irrigation wells at the CRFREE Project site and west of Highway 1 will benefit from groundwater recharge from storm flow inundation onto the floodplain, which is planned to occur for 5-year storm events and larger. Recharge to the aquifer from the CRFREE Project will primarily result in environmental benefits associated with increased base flows to the Carmel Lagoon, which has extensive habitat supporting the local steelhead salmon population. No other riparian floodplains with permeable soils that are located above aquifers used for water supply were identified.

A geospatial opportunity analysis was conducted to identify potential passive recharge projects. This analysis involved overlaying geographic information regarding physical constraints that could preclude infiltration into a water supply aquifer. Physical constraints that were identified and mapped as part of this effort to delineate feasible infiltration areas (see Figure 5) included:

- Underlying soil type - National Resource Conservation Service (NRCS) Hydrologic Soil Group (HSG) 'A' and 'B' type soils are considered conducive for infiltration.
- Depth to groundwater – sufficient separation (greater than 10 feet) from the base of the facility to underlying groundwater is recommended to protect groundwater quality.

- Geotechnical hazards – infiltration is not considered feasible if landslides are present or if there is high or very high liquefaction potential.
- Contamination – adjacent or underlying soil or groundwater contamination creates an infeasible condition for groundwater recharge due to the potential for migration of pollution.
- Set-backs – infiltration must be located a sufficient distance (greater than 100 feet) away from water supply wells and septic fields, for groundwater quality purposes. Set-backs from structures and utilities may also be needed to prevent infiltration from impacting structural stability.
- Groundwater basins – Infiltration into a water supply aquifer can only occur if the project overlies one of the identified water supply aquifers in the Seaside Groundwater Basin or Carmel Valley Groundwater Basin.

Locations identified as physically practical for infiltration into a water supply aquifer were further screened to identify locations with sufficient tributary drainage and undeveloped or open space area to implement regional projects, and/or locations that could be considered for smaller distributed infiltration projects. These locations were considered opportunities for implementation of passive regional or distributed stormwater and dry weather runoff recharge projects.

The following data sources were used to identify locations that could be feasible for infiltration opportunities on a parcel basis:

- All opportunities identified in the capture and use opportunity analysis (see Section 2.4);
- Parcels with the following County of Monterey land use codes for vacant land:

Land Use Code	Description	Land Use Code	Description
1A	Vacant S.F.D. 1 Site	3C	Undeveloped 41 to 300 Acres
1B	Vacant S.F.D. 2 or more Sites	3D	Undeveloped 301 or more acres
1M	Vacant Transitional	5A	Vacant Commercial
2A	Vacant Zoned for Multi Family	5Z	Vacant Transitional
2M	Vacant Transitional	6A	Vacant Industrial
3A	Res. Use, Vacant up to 10 ac.	6M	Vacant Transitional
3B	Res. Use, Vacant, 11 to 40 ac.		

The following criteria were used to identify potential infiltration project opportunities:

- Majority of parcel overlying areas feasible for infiltration to a water supply aquifer,
- Parcel size greater than or equal to 0.1 acres,
- Parcel located within 500 feet of a storm drain line,
- Land use/land cover that is either vacant, open space, irrigated, or flat impervious cover (e.g. parking lot, tennis court) using aerial imagery in GIS. Buildings, beach, and wooded areas were considered not feasible for infiltration.

In addition to the parcel-based analysis, two other infiltration project types were considered: (1) a dry well program that could be implemented in residential areas in Seaside and/or Carmel Valley, and (2) projects where runoff could be diverted from tributaries to the Carmel River via the storm drain network. The dry well program would divert flows from storm drain network in residential neighborhoods to a water quality pretreatment system that will discharge to a dry well above domestic supply aquifers. Projects that would detain and infiltrate diverted runoff from tributaries to the Carmel River would be constructed to delay the timing of infiltration into the Carmel Valley Alluvial Aquifer and could retain water for up to one month or longer.

If both infiltration and capture and use water recovery pathways were identified as opportunities on the same parcel, the priority was given to infiltration, except for golf courses and cemeteries, which were prioritized as capture and use projects.

There were 140 projects identified in the Infiltration into a Water Supply Aquifer (INF) category, including two programmatic dry well programs (Seaside and Carmel Valley), six potential opportunities to divert runoff from tributaries to the Carmel River, and three unique planned projects submitted by stakeholders that did not overlap with projects identified in the opportunity analysis and were categorized as an infiltration opportunity. These projects are mapped on Figure 4 and listed in the project feasibility matrix provided in Appendix C.

2.4 Capture and Use

Harvesting of wet and dry weather runoff as a water source is possible throughout the Planning Area where a demand is present. Water storage facilities, including cisterns and above- or below-ground tanks that capture and harvest stormwater from rooftops and other impervious surfaces and then store the water for water supply use, are utilized for these water recovery projects. Irrigation demand for vegetated landscapes was the targeted candidate for capture and use projects.

Cistern water tanks are typically used for smaller distributed facilities, whereas larger above- or below-ground storage tanks are typically used for regional facilities (i.e., capturing runoff from a larger tributary area). Currently, the Monterey Peninsula Water Management District (MPWMD) and CalAm offer rebates for distributed cistern water tanks through the Monterey Water Conservation program (MPWMD, 2017). The rebates offered to residential, commercial, and industrial property owners is $50 per 100 gallons of water storage capacity (up to 500 gallons) in a cistern, then $25 per 100 gallons of water storage capacity up to a maximum storage capacity of 25,000 gallons per qualifying property.

To identify locations where regional capture and use storage facilities could be implemented, a geospatial analysis was conducted to identify potential locations for use of captured water in urban areas. This entailed an identification of public and private irrigated lands, by screening for recreation, park, institutional (i.e., municipal buildings and schools), and open space land uses. The locations were examined in further detail to identify those currently irrigated by potable water. Large irrigated areas that would require considerable water demand were further examined to identify whether the location could be configured to capture sufficient upstream flows (e.g., via storm drain diversion) to support irrigation demand on-site, and whether there is area to house a large capture and use facility.

The following data sources were used to identify areas feasible for capture and use project opportunities:

- Recommended projects based on Table ES1 from the City of Pacific Grove Local Water Project Facility Plan Report (WRFP No. 3316-010), dated January 2014;
- Irrigated green space in the urban areas at the 1:30,000 scale using the World Topographic Map[3] in GIS;
- Parcels with the following County of Monterey land use codes:

Land Use Code	Description	Land Use Code	Description
3H	Wholesale Nurseries, Mushroom Houses	4K	Agriculture Preserves, Irrigated, Row Crop
4C	Row Crop	4N	Ag. Preserve Vineyard, orchard
4D	Field Crops, Alfalfa, Pasture	5W	Recreational, golf courses, resorts, tennis courts
4F	Vineyards	7E	Schools, Colleges, Day Schools, Land and/or Impr.
4G	Orchards (fruits or nuts)	7G	Cemeteries, Etc.

- Public parcel owners associated with County of Monterey land use codes 7A and 7B that have been screened for potential municipal buildings and schools (table provided in Appendix D); and
- Properties within urban areas in the California Protected Areas Database[4].

The following criteria were used to identify potential locations that would be feasible for capture and use:

- Parcel area greater than or equal to 0.1 acres,
- Parcel located within 500 feet of a storm drain line for potential storm drain diversion, and

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[3] This map is designed to be used as a basemap by GIS professionals and as a reference map by anyone. The map includes administrative boundaries, cities, water features, physiographic features, parks, landmarks, highways, roads, railways, and airports overlaid on land cover and shaded relief imagery for added context. Coverage is provided down to ~1:4k. This basemap was compiled from a variety of best available sources from several data providers, including the U.S. Geological Survey (USGS), U.S. Environmental Protection Agency (EPA), U.S. National Park Service (NPS), Food and Agriculture Organization of the United Nations (FAO), Department of Natural Resources Canada (NRCAN), GeoBase, Agriculture and Agri-Food Canada, DeLorme, HERE, Esri, OpenStreetMap contributors, and the GIS User Community. For more information on this map, including the terms of use, visit http://goto.arcgisonline.com/maps/World_Topo_Map.

[4] The California Protected Areas Database (CPAD) contains data on lands owned in fee by governments, non-profits and some private entities that are protected for open space purposes. Data includes all such areas in California, from small urban parks to large national parks and forests, mostly aligned to assessor parcel boundaries. California Protected Areas Database (CPAD - www.calands.org). August 2017.

- Potential for irrigated land uses (e.g., ball/recreational fields, parks, golf courses) using aerial imagery in GIS.

There were 75 projects identified in the Capture and Use (CU) category including nine unique planned projects submitted by stakeholders that did not overlap with projects identified in the opportunity analysis and were categorized as a CU opportunity. These are mapped on Figure 4 and listed in the project feasibility matrix provided in Appendix C.

3. CHARACTERIZATION OF PROJECT FEASIBLITY

The identified Water Recovery Study projects were compiled into a Water Recovery Study project database. Each identified project was characterized for project implementation feasibility. This semi-quantitative characterization considered the study objectives and the interests of the stakeholders. This characterization was used to assist with selecting projects for which conceptual designs will be developed.

The three project feasibility characteristics that were evaluated include:

1. Water supply – the estimated annual volume of water that could be recovered for water supply.
2. Planning level cost – the planning level estimate of the unit project cost.
3. Ease of Implementation – considerations for project financing, environmental constraints, complexity of permitting and land acquisition, seasonality of water recovery source, rights to source water, water quality implications, water loss considerations due to hydrogeology, and project coordination and optimization.

Capacity considerations at the RTP and within the sanitary sewer pipeline system were identified when evaluating projects using documented pump station capacities (MRWPCA, 2016) and available pipe diameters, but quantitative evaluation of treatment capacity was not a part of the scope of this study. When considering projects for implementation at the design level, treatment capacity will need to be quantified in detail. Future wastewater generated because of new land development in the service area should also be considered at the design level to estimate the excess capacity available at build-out conditions.

3.1 Water Supply

The estimated amount of annual runoff that could potentially be recovered at the project site to augment water supply is provided as a range. Ranges include 0 - 5 AFY; 5 - 10 AFY; 10 - 20 AFY; 20 - 100 AFY; and 100+ AFY. Estimated net recovery volume was calculated assuming there are no other Water Recovery Study projects implemented in the area tributary to the project. Both wet and dry weather runoff were considered.

Wet weather runoff supply was calculated for all projects opportunities. Wet weather runoff supply was calculated as a function of catchment hydrology, facility configuration, and drawdown rate using the following steps:

a) Calculate the runoff depth (acre-feet per acre per year) as a function of live storage volume, normalized by tributary area (inches); drawdown time (days); and runoff coefficient (unitless). This was displayed in a nomograph, constructed using continuous hydrologic simulation (see nomograph example in Figure 6). Nomographs were developed for catchments with impervious percent of 25%, 50%, 75%, and 100%; catchment soils comprised of HSG A and HSG B/C/D; and drawdown times of 12 hours, 1 day, 2 days, 3 days, 1 week, 1 month, 6 months, and 1 year.

b) Calculate drawdown time (days) by dividing the live storage volume available (i.e., storage volume above a permanent pool) by the sum of the facility's discharge rates (i.e., percolation, capture and use, and diversion).

c) Calculate the stormwater runoff depth (acre-feet per acre per year) and percent capture using the nomographs for the four points surrounding the project's imperviousness and drawdown time and apply four-point linear interpolation.

d) Multiply the annual stormwater runoff depth (acre-feet/acre) by the tributary area (acres) to calculate annual wet weather runoff (AFY).

e) Apply an optimization factor based on available technical literature if use of CMAC is anticipated (i.e., for Lakes and Reservoirs).

Dry weather runoff was estimated for a subset of projects by extrapolating dry weather yield results from previously implemented and evaluated projects, including the Pacific Grove ASBS project and checked with ranges from other studies in southern California (IRWD, 2004 and County of Orange, 2017).

Estimates of net recovered water volume are provided for each project in the project feasibility matrix in Appendix C. The number of projects in each project category that fall within each range of net recovered water volume is summarized in Table 2 below.

Table 2: Net Recovered Water Volume by Project Category (Number of Projects)

Net Recovered Water Volume (AFY)	Lakes / Reservoirs	Diversion to Sanitary Sewer	Infiltration to a Water Supply Aquifer	Capture and Use	Total Number of Projects
0-5	0	4	48	52	104
5-10	1	0	42	9	55
10-20	4	2	39	6	48
20-100	5	4	11	8	28
100+	4	2	0	0	6
Total Number of Projects	14	12	140	75	241

3.2 Planning Level Unit Cost

The planning level estimate of unit project cost (dollars per acre-foot [$/AF] of runoff volume recovered per year) for an assumed design life of 30 years is provided as a range. Ranges include <$800/AF (lower range for traditional water supply); $800 - $2,000/AF (upper range for traditional water supply); $2,000 - $5,000/AF (range for desalination); $5,000 - $10,000/AF; and $10,000+/AF. Planning level cost estimates include capital and operational costs for pretreatment, storage, pumps, electrical power, purchase/lease of private property, and sewer connection fees, where applicable.

Planning level unit costs were calculated for every project opportunity. The cost estimates performed were a Class 5 (AACE, 1997) estimate prepared at a level consistent with rough concept screening. The estimates used available cost information from previously implemented and evaluated projects in the Planning Area.

Estimates of planning level unit cost are provided in the project feasibility matrix in Appendix C. The breakdown of results is summarized in Table 3 below.

Table 3: Planning Level Unit Cost by Project Category (Number of Projects)

Unit Project Cost ($/AF)	Lakes / Reservoirs	Diversion to Sanitary Sewer	Infiltration to a Water Supply Aquifer	Capture and Use	Total Number of Projects
<$800	9	0	0	0	9
$800 - $2,000	3	2	25	1	31
$2,000 - $5,000	1	10	53	4	68
$5,000 - $10,000	0	0	26	0	26
$10,000+	1	0	36	70	107
Total Number of Projects	14	12	140	75	241

3.3 Ease of Implementation

Ease of implementation was evaluated semi-quantitatively based on considerations for project financing, seasonality constraints, complexity due to permitting and land acquisition, potential water quality constraints, water loss considerations associated with hydrogeology, and project coordination.

3.3.1 Financing – Planning Level Capital Cost

Larger projects tend to be more difficult to finance. Thus, the planning level capital cost of each project was categorized based on an order of magnitude estimate. Categories of planning level cost include <$100k; $100k - $1M; $1M - $10M; and $10M+. The same data used to estimate planning level unit cost was used here.

Estimated ranges of planning level capital cost are provided in the project feasibility matrix in Appendix C. The breakdown of results is summarized in Table 4 below.

Table 4: Planning Level Capital Cost by Project Category (Number of Projects)

Capital Project Cost ($)	Lakes / Reservoirs	Diversion to Sanitary Sewer	Infiltration to a Water Supply Aquifer	Capture and Use	Total Number of Projects
<$100k	4	3	8	7	22
$100k - $1M	8	3	92	15	118
$1M - $10M	1	6	37	42	86
$10M+	1	0	3	11	15
Total Number of Projects	14	12	140	75	241

3.3.2 Seasonality Constraints - Portion of Water Recovery that is Diverted to Sanitary Sewer as Wet Weather Runoff

Discussions with M1W and CAWD staff indicated that diverted runoff to the sanitary sewer system is most valuable in the dry season, when water demand is highest, and the recycled purple pipe system is being utilized by agriculture and golf course customers. Starting in the winter of 2019-2020, M1W will have the capability to treat additional water at the RTP, including stormwater that is added to the wastewater collection system. Once treated through the primary and secondary systems, the secondary effluent is currently recycled to advanced tertiary level for crop irrigation. After completion of the Pure Water Monterey Project in late 2019, the water will also be able to be recycled through the advanced water purification facility currently under construction for groundwater recharge/replenishment injection into the Seaside Groundwater Basin. Producing purified recycled water is more expensive than treating the water to a tertiary level for crop irrigation, and the capacity for advanced treatment and groundwater replenishment is limited to 5 MGD of treatment capacity/injection as currently designed. In addition, there is not expected to be any demand or need for new influent water for recycling at the RTP between the months of approximately November and March when excess municipal wastewater is available and irrigation demands are typically low. For that reason, a higher cost for treatment of that water will likely apply, unless waters can be seasonally stored and thus beneficially used for recycling during approximately April through October.

CAWD does not have capability for advanced treatment at its WWTP nor does it have a means to transport treated wastewater for groundwater replenishment. Thus, diversion of stormwater runoff to CAWD's system during the wet season will not be considered for this study. Each project was assessed for how much of the water recovered would be diverted to the sanitary sewer as wet weather runoff. Categories include most (more than half), some (less than half), or none.

The estimated portion of water recovered that is diverted to the sanitary sewer as wet weather runoff is provided in the project feasibility matrix, Appendix C. The breakdown of results is summarized in Table 5 below.

Table 5: Seasonality Constraints[1] by Project Category (Number of Projects)

Portion of Recovered Water Diverted to Sanitary Sewer as Wet Weather Runoff	Lakes / Reservoirs	Diversion to Sanitary Sewer	Infiltration to a Water Supply Aquifer	Capture and Use	Total Number of Projects
No recovered water diverted as wet weather runoff	5	10	140	75	230
Some recovered water diverted as wet weather runoff	2	2	0	0	4
Most recovered water diverted as wet weather runoff	7	0	0	0	7
Total Number of Projects	14	12	140	75	241

[1]Each project was assessed for how much of the water recovered would be diverted to the sanitary sewer as wet weather runoff. Categories include most (more than half), some (less than half), or none.

3.3.3 Complexity of Permitting and Land Acquisition

Complexity of project implementation due to potential permitting and land acquisition was characterized for each project as lower, medium, or higher. Higher permitting complexity was assigned to those identified projects that: are in streams; are in the coastal zone (California Coastal Commission's Coastal Zone Boundary for the State of California); include infiltration to a water supply aquifer via a dry well; and/or a Lakes and Reservoir project. Medium permitting complexity was assigned to those identified projects that are: located on school or public park parcels; located on private parcels requiring purchase or lease agreements (excluding golf courses); and/or projects with potential water rights issues, identified as those which overlie the Seaside Adjudicated Groundwater Basin or the Carmel Valley Alluvial Aquifer. Lower permitting and land acquisition complexity was assigned to all projects not categorized as medium or higher.

The relative complexity of permitting and land acquisition is provided in the project feasibility matrix in Appendix C. The breakdown of results is summarized in Table 6 below.

Table 6: Complexity of Permitting by Project Category (Number of Projects)

Complexity of Permitting (Lower, Medium, Higher)	Lakes / Reservoirs	Diversion to Sanitary Sewer	Infiltration to a Water Supply Aquifer	Capture and Use	Total Number of Projects
Lower	0	0	1	11	12
Medium	0	0	133	46	179
Higher	14	12	6	18	50
Total Number of Projects	14	12	140	75	241

3.3.4 Potential Water Quality Constraints

Water quality implications/constraints were considered for each project based on what is known about the water source proposed. Specifically, the ability to treat stormwater and dry weather runoff at the RTP (via diversion to the wastewater collection system) may be limited by the salinity of the water. If lakes or reservoirs are being used to temporarily store stormwater, the quality of the water diverted into the wastewater collection system will need to be monitored to insure salinity (and potentially other constituent concentrations) is not too high. Diversion to sanitary sewers assumes that periodic water quality monitoring and operations and maintenance costs will be part of the constraints. Additionally, high suspended solids in stream runoff could be a constraint for reuse. Projects that have potential water quality constraints associated with salinity (i.e., low lying lakes along the coast) or suspended solids (i.e., recovered water from streams) were differentiated from ones that do not. This field may not identify all potential water quality constraints but is an approximation for planning purposes.

Projects with potential water quality constraints are identified in the project feasibility matrix in Appendix C. The breakdown of results is summarized in Table 7 below.

Table 7: **Potential Water Quality Constraints by Project Category (Number of Projects)**

Potential Water Quality Constraints (No, Yes)	Lakes / Reservoirs	Diversion to Sanitary Sewer	Infiltration to a Water Supply Aquifer	Capture and Use	Total Number of Projects
No	11	11	133	75	230
Yes	3	1	7	0	11
Total Number of Projects	14	12	140	75	241

3.3.5 Water Loss Considerations Associated with Hydrogeology

An important consideration related to infiltrating into a water supply aquifer is that not all runoff that is infiltrated, even if directly above a groundwater basin, can be considered completely recovered by an aquifer. This is due to evapotranspiration losses in the vadose zone and geologic hydraulic constrictions. These hydrogeologic considerations affect the timeframe of recharge and the volume of water recovery in a non-trivial way. Runoff that is recovered via diversion to the sanitary sewer and capture and use is anticipated to be a more direct source of water supply than infiltrating into an aquifer.

Project opportunities that infiltrate into water supply aquifers, all of which have water loss considerations associated with hydrogeology, are identified in the project feasibility matrix in Appendix C. The breakdown of results is summarized in Table 8 below.

Table 8: Water Loss Considerations Associated with Hydrogeology by Project Category (Number of Projects)

Water Loss Considerations (No, Yes)	Lakes / Reservoirs	Diversion to Sanitary Sewer	Infiltration to a Water Supply Aquifer	Capture and Use	Total Number of Projects
No	13	12	0	75	100
Yes	1	0	140	0	141
Total Number of Projects	14	12	140	75	241

3.3.6 Project Coordination and Optimization – Catchment and Sanitary Sewer System Grouping

Consideration of how the identified projects could be combined to create a regional water supply recovery and reclamation system was included as part of project implementation feasibility characterization. It was determined that projects within the same catchment (see Figure 2 and Figure 2A for a map of the catchments in the Monterey Peninsula region) could be combined to create a regional water supply recovery and reclamation system. Additionally, projects that divert runoff to the same wastewater treatment plant (i.e., M1W or CAWD) could also be combined to improve coordination and optimization.

The number of identified project opportunities in the same catchment and the destination of diversions to the sanitary sewer are provided in the project feasibility matrix in Appendix C. The breakdown of results is summarized in Table 9, Table 10, and Table 11 below.

Table 9: Catchment Project Coordination by Project Category (Number of Projects)

Catchment Name	Lakes / Reservoirs	Diversion to Sanitary Sewer	Infiltration to a Water Supply Aquifer	Capture and Use	Total Number of Projects
BP[1]-2	0	0	1	0	1
Carmel River	2	0	28	6	36
CM[2]-02	0	0	1	0	1
CM-03	0	0	0	1	1
CM-04	0	0	6	0	6

Catchment Name	Lakes / Reservoirs	Diversion to Sanitary Sewer	Infiltration to a Water Supply Aquifer	Capture and Use	Total Number of Projects
CM-05	0	0	9	2	11
CM-06	0	0	67	2	69
CM-07	7	0	26	8	41
CM-09	1	0	0	8	9
CM-10	1	0	0	6	7
CM-11	0	1	0	10	11
CM-13	0	0	0	3	3
CM-14	0	0	0	1	1
CM-15	0	0	0	7	7
CM-20	0	0	0	1	1
CM-21	1	0	0	5	6
CM-22	0	0	0	1	1
CM-23	0	0	0	1	1
CM-24	0	0	0	1	1
CM-29	1	0	0	1	2
CM-33	0	0	0	2	2
CM-35	1	0	0	3	4
CM-37	0	0	0	1	1
CM-41	0	0	0	2	2
CM-42	0	0	0	1	1
N/A	0	11[3]	2[4]	2[4]	15
Total Number of Projects	14	12	140	75	241

[1]Big Sur River – Frontal Pacific Ocean Catchment (BP).
[2]Canyon Del Rey – Frontal Monterey Bay Catchment (CM).
[3]Diversion to sanitary sewer opportunity and includes diversion from more than one catchment. See Table 10 for more details.
[4]Programmatic project and includes diversion from more than one catchment.

Table 10: Catchments Associated with Diversions to Sanitary Sewer Projects

DSS Project ID	Catchment Names	DSS Project ID	Catchment Names
DSS_01	CM[1]-31, CM-32, CM-33	DSS_07	CM-01 through CM-04
DSS_02	CM-29, CM-30	DSS_08	CM-41, CM-42, Carmel River
DSS_03	CM-14, CM-15	DSS_09	CM-42
DSS_04	CM-08 through CM-11, CM-13	DSS_10	Carmel River

DSS Project ID	Catchment Names	DSS Project ID	Catchment Names
DSS_05	CM-07	DSS_planned_51	CM-11
DSS_06	CM-05, CM-06, CM-07	DSS_planned_60	CM-15 through CM-28

[1]Canyon Del Rey – Frontal Monterey Bay Catchment (CM).

Table 11: Sewer System Project Coordination by Project Category (Number of Projects)

Sanitary Sewer System Destination	Lakes / Reservoirs	Diversion to Sanitary Sewer	Infiltration to a Water Supply Aquifer	Capture and Use	Total Number of Projects
CAWD	0	3	0	0	3
M1W	9	9	0	0	18
Not applicable	5	0	140	75	220
Total Number of Projects	14	12	140	75	241

4. PROJECT SELECTION, DESIGN, AND IMPLEMENTATION PLAN

All Water Recovery Study projects were incorporated into the list of projects in the Monterey Peninsula SWRP and were analyzed as part of the SWRP in addition to the analysis conducted for this study. This entailed classification and a metrics-based evaluation, as shown on Figure 3. The details of SWRP project evaluation is described in the *Methodology for Integrated Identification, Prioritization, and Analysis of Monterey Peninsula SWRP Projects Memorandum* (Geosyntec, 2017).

Utilizing the feasibility characterization described in Section 3, a shortlist of 26 projects which have the highest estimated net recovered water volume (>20 AFY) and lowest unit project cost (<$5,000/AF) was developed (see Appendix E). Projects with the highest net recovered water volume and the lowest unit project cost may be perceived as having the greatest environmental and financial value. Regional LR and DSS projects comprise about half of the list, despite there being far fewer number of projects in these categories than CU and INF. This indicates that these project types may be the most cost effective and appear to be the most promising project types for water recovery based on the characterization of project feasibility.

4.1 Project Selection

By considering the metrics-based evaluation, input from the Monterey Peninsula stakeholders, and other local and institutional knowledge, the Monterey Peninsula SWRP Technical Advisory Committee (TAC) selected seven projects for concept design. Based on stakeholder feedback, the primary factor in project selection was to capture as much usable water as possible to help meet dry weather recycled water demands and augment water supply. Thus, all seven project projects for concept design were also identified in the Water Recovery Study.

The seven selected projects for concept design are described below. The top project selected, Hartnell Gulch, will also include a 30% concept design, a CEQA checklist, and a project implementation plan.

4.1.1 Hartnell Gulch

The Hartnell Gulch project, a proposed diversion to sanitary sewer and creek restoration project, is in the City of Monterey. The project will install a pump to divert underground seepage and stormwater into the sanitary sewer as well as potentially store wet weather runoff underground in the adjacent parking lot or divert it to Lake El Estero. The stream restoration component will improve and restore the riparian corridor. The approximately 1,100-acre tributary drainage area is in a disadvantaged community (DAC) tract. The project is estimated to achieve between 20 to 100 AFY of water supply. Project is identified in Water Recovery Study database as "DSS_planned_51."

4.1.2 Lake El Estero

The Lake Estero project is in the City of Monterey. This is a lake project that will recover water supply via a diversion to sanitary sewer. The project will install a diversion valve from the box culvert on the north side of the lake to divert flows into the sanitary sewer system, instead of discharging into Monterey Bay. The project is estimated to achieve over 100 AFY of water supply from the approximately 2,800-acre tributary drainage area. The project is identified in the Water Recovery Study database as part of "LR_04."

4.1.3 Tunnel and Calle Principal Stormwater Diversion

The Tunnel and Calle Principal stormwater diversion project is in the City of Monterey. The project will install a diversion pump for underground seepage and stormwater flow from the downtown Tunnel and Calle Principal storm drain gravity pipe and divert to the sanitary sewer instead of discharging into Monterey Bay. The project is estimated to achieve from 10 to 20 AFY of water supply from the approximately 290-acre tributary drainage area. The project is identified in the Water Recovery Study database as part of "DSS_04."

4.1.4 South Carmel and 4th Avenue Dry Weather Diversion

Located in the City of Carmel-by-the-Sea, the South Carmel and 4th Avenue Dry Weather Diversion project will divert dry weather runoff and small wet weather flows from the inland storm drain network to the sanitary sewer along San Antonio Avenue for treatment and reuse for golf course irrigation. The project is estimated to achieve between 20 to 100 AFY of water supply from its approximately 125-acre tributary drainage area. The project is identified in the Water Recovery Study database as part of "DSS_08."

4.1.5 Pacific Grove-Monterey ASBS Watershed - David Avenue Reservoir

The Pacific Grove-Monterey ASBS Watershed - David Avenue Reservoir project is in the City of Pacific Grove. This project will store rainwater for diversion to the sanitary sewer instead of discharging into Monterey Bay and the Pacific Grove ASBS region. This project is estimated to achieve from 10 to 20 AFY of water supply from its approximately 28-acre tributary drainage area. The project is identified in the Water Recovery Study database as "LR_02."

4.1.6 Del Monte Manor Park Infiltration

The Del Monte Manor Park Infiltration Project in the City of Seaside is a regional infiltration project. The project includes open space park improvements and flood management to infiltrate runoff from the surrounding right-of-way. The project is estimated to achieve from 10 to 20 AFY of water supply from its approximate 3.6-acre tributary drainage area that contains a DAC. The project is identified in the Water Recovery Study database as "INF_planned_19."

4.1.7 Dry Well Aquifer Recharge Program

The Dry Well Aquifer Recharge Program in the City of Seaside will focus on using dry wells to recharge urban runoff to a potable water supply aquifer. The program will divert flows from the storm drain network to a water quality pretreatment system that will discharge to dry wells above the domestic supply aquifers in the Seaside Groundwater Basin. The project is estimated to achieve between 20 to 100 AFY of water supply. The project is identified in the Water Recovery Study database as "INF_DW_SEA."

4.2 Considerations for Future Improvements to Water and Wastewater Infrastructure

This Study focused on how to store, treat, and transport potential sources of runoff prior to entering existing water and wastewater infrastructure and did not consider improvements to the water and wastewater infrastructure. Consideration for future improvements to these systems is important to understanding how the water recovery opportunities identified in this Study may be utilized in the future. This is particularly the case for the DSS and LR projects that propose to divert runoff to the M1W and CAWD sanitary sewer systems for eventual recycling. As mentioned in Section 4, these project types are among the most cost effective and feasible for water recovery based on the characterization performed in this Study. Future improvements to water and wastewater infrastructure to facilitate additional water recover may include, but are not limited to, those described in the following sections.

4.2.1 Pure Water Monterey Ground Water Replenishment Expansion

With the implementation of the Pure Water Monterey Ground Water Replenishment (GWR) project, potential diversions of runoff to the M1W sanitary sewer system during the dry season (i.e., from April to October) could result in recovery of hundreds to thousands of acre-feet per year of water supply. As summarized in Appendix A, an estimated 390 to 550 AFY of dry weather runoff and 4,300 to 5,200 AFY of wet weather runoff is generated in catchments that drain through M1W's service area. All this dry weather runoff and a portion of the wet weather runoff could feasibly be diverted to the sanitary system for recycling at the RTP via the DSS and LR projects identified in this Study. In combination, the projects associated with Lake El Estero (LR_04), Laguna Grande - Roberts Lake (LR_12), David Avenue Reservoir (LR_02), and Del Monte - Navy Lake (LR_03) could recover at least a few hundred acre-feet per year of stormwater runoff via the GWR project.

Expansion of the Pure Water Monterey GWR project could allow for injection of a greater volume of AWPF product water into the Seaside Groundwater Basin and replenishment of the aquifer during the winter season, when source water is plentiful. Figures 7 and 8 provide flow schematics for the Pure Watery Monterey GWR project, as currently planned (MRWPCA, 2016). The water supply gap for the CalAm Monterey region will be reduced by 3,500 AFY (from 9,752 AFY to 6,252 AFY) with the currently planned Pure Water Monterey GWR project. The excess source water could potentially produce additional ATWF product water to reduce the region's supply gap to as low as 2,118 to 3,428 AFY depending on the type of operational year, although the total use of source water would likely be less due to the seasonal timing of the excess (MRWPCA, 2016). Nonetheless, with the implementation of Water Recovery Study projects on top of excess source water, closing the CalAm water gap appears to be within reach.

Expanding the planned 5 MGD ATWF to a 7 MGD capacity is the estimated maximum for the currently undeveloped footprint available at the RTP facility (M1W, 2018). While this would help shrink the water shortage gap, increasing the advanced treatment capacity beyond 7 MGD and building additional delivery infrastructure opens more possibilities for reliable runoff capture and recovery from LR and DSS, after all other existing source waters are fully utilized.

4.2.2 Recycled Water Storage Expansion

Expanded storage of recycled water from both the M1W RTP and CAWD WWTP would allow for collection of more wet weather runoff in the wet season for use in the dry season. This seasonality issue is at the crux of the water recovery problem because supply of source water occurs at a different time than demand. The cost of storing recycled water in new tanks or reservoirs is likely greater than utilizing available storage in the Seaside aquifers, but if there are political, hydrogeological, or other technical constraints to storing more recycled water in the groundwater basin, then new above ground storage would be an option. One major constraint to storing recycled water above ground is the potential for algae buildup with significant holding times (M1W, 2018). Enclosed storage could help address this problem but would be an expensive solution.

Currently the 80 acre-feet of storage in the SVRP only addresses diurnal storage needs for operations and not seasonal needs. Additional storage along the CSIP pipeline could be a strategic approach for storage expansion. Similarly, storage along the CAWD recycled pipelines could help address the seasonal discrepancy between supply and demand for golf course irrigation.

One readily available option for getting slightly more water treated at the AWTF and less discharged to the ocean outfall during storm events could be to temporarily utilize empty clarifier tanks at the RTP. This approach would involve detaining water coming from the RTP primary and secondary processes at the peak of the hydrograph so that more water could be metered to the AWTF and injected into the Seaside aquifers at the designed treatment rate.

4.2.3 Advanced Treatment at CAWD Wastewater Treatment Plant

As summarized in Appendix A, an estimated 320 to 460 AFY of dry weather runoff and 1,700 AFY of urban wet weather runoff is generated in catchments that drain through the CAWD and PBCSD service area. Unlike the M1W system, only dry weather and some first flush runoff can be feasibly diverted to the CAWD/PBCSD sanitary sewer system for recycling because there is no current seasonal storage capacity or capability for advanced treatment of source water in the wet season. Advanced treatment capabilities at the CAWD WWTP, possibly coupled with a conveyance pipeline from the WWTP to injection wells into the Carmel River groundwater basin, is a possible pathway to recover wet weather runoff via CalAm's aquifer storage and recovery (ASR) system. Piping of CAWD advanced treatment water to injection wells in the Seaside aquifers is believed to be cost prohibitive.

4.2.4 Micro-Treatment of Lake Water for Groundwater Replenishment

If lake water could be treated by micro-treatment plants to a potable level, then this water could be sent directly to CalAm's ASR system to replenish the Seaside aquifers. Alternatively, if the micro-treatment plants can produce water to a level comparable to the ATWF product water, then it could be piped directly to injection wells in the Seaside aquifers, like what is currently being implemented for the Pure Water Monterey GWR project. Timing-wise, this micro-treatment approach could provide flexibility to recover runoff whenever it is desired, including during the wet season, because operational constraints associated with the RTP, ATWF, SVRP, and its source waters would not exist. The source water locations for the micro-treatment plants could initially focus on Lake El Estero, Laguna Grande (Roberts Lake), and Del Monte (Navy Lakes) because the vicinity of these existing lakes to one another could allow for only one micro-treatment plant.

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FIGURES

Legend

- Monterey Peninsula IRWMP/SWRP Boundary
- Monterey Peninsula Water Management District Boundary
- Carmel Area Waste Water District
- USGS / DWR Watershed
- City Limit

Groundwater Basins

- Adjucated Seaside Groundwater Basin
- Salinas Valley Corral De Tierra Area
- Salinas Valley Marina Area
- Carmel Valley Groundwater Basin

Notes:
**Pink hue indicates Groundwater Basin is outside of IRWMP Area*

- 303(d) Listed River/Stream
- River/Stream
- Highway
- Waterbody
- Federal, State, and Regional Parks, and Other Open Lands
- Area of Special Biological Significance

Study Planning Area

Monterey Peninsula Water Recovery Study

Geosyntec consultants

MONTEREY REGIONAL Stormwater Management PROGRAM

Figure 1

Oakland, CA | April 2018

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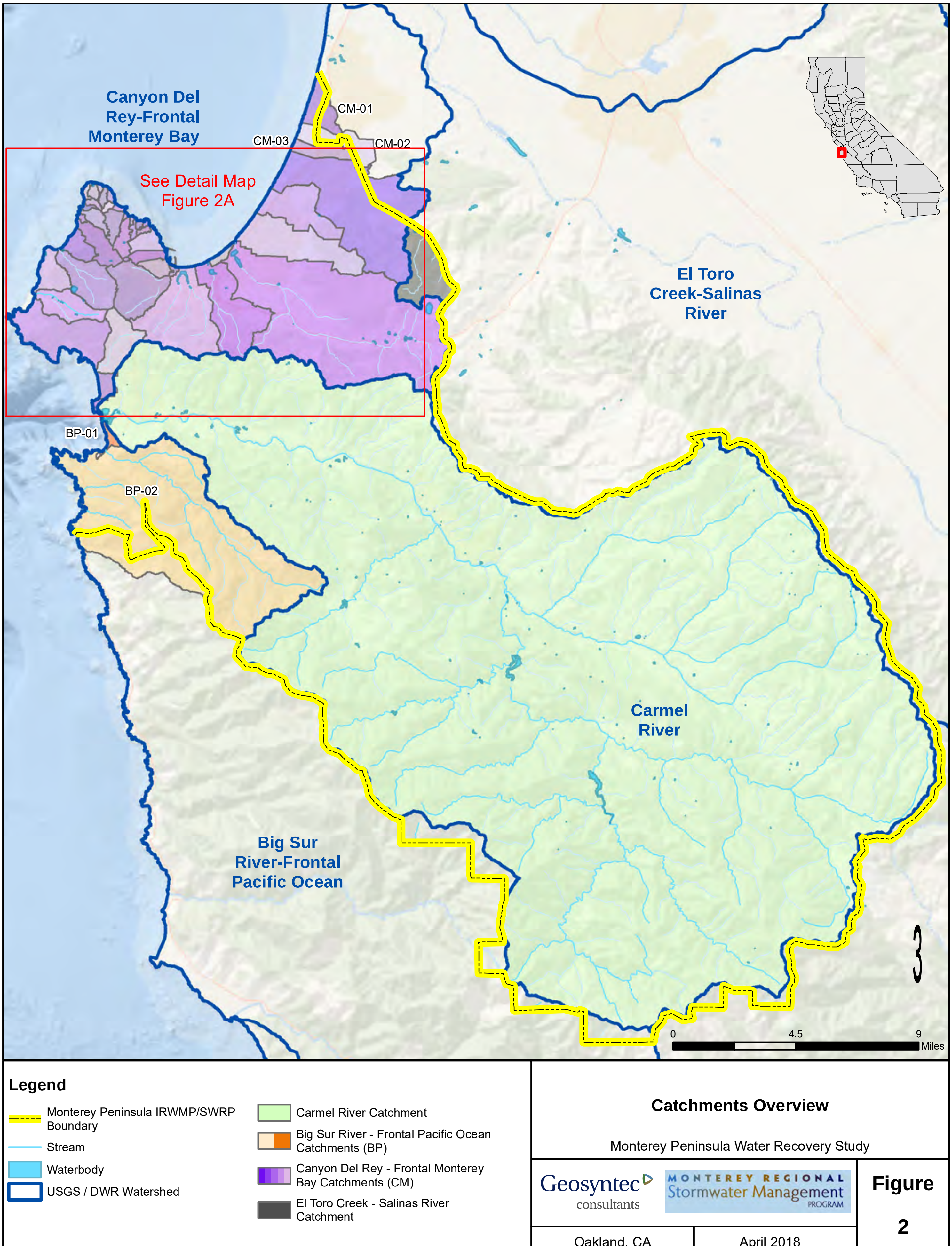


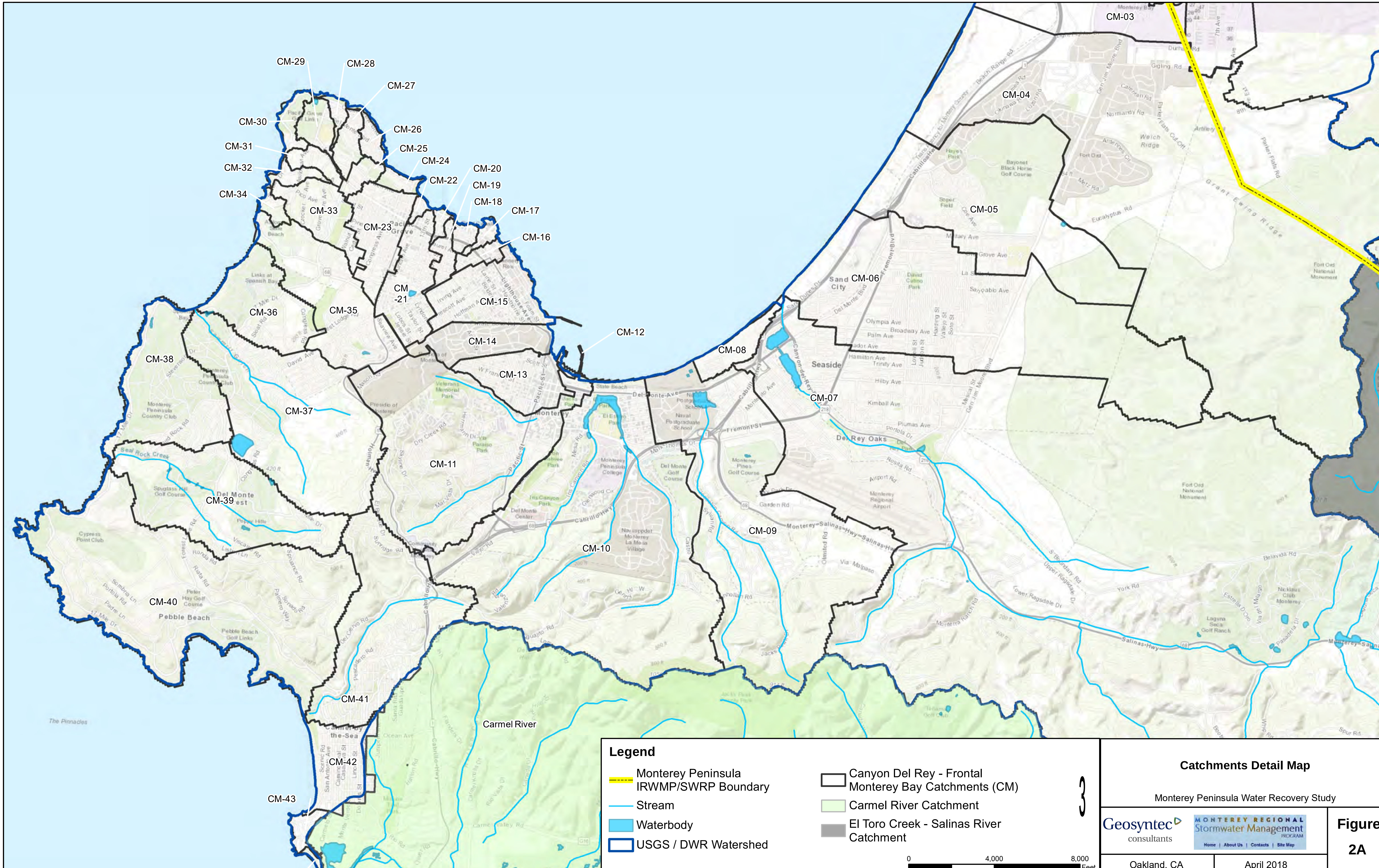
Catchments Overview

Monterey Peninsula Water Recovery Study

Geosyntec consultants

MONTEREY REGIONAL Stormwater Management PROGRAM

Oakland, CA	April 2018	Figure 2



Catchments Detail Map

Monterey Peninsula Water Recovery Study

Geosyntec consultants

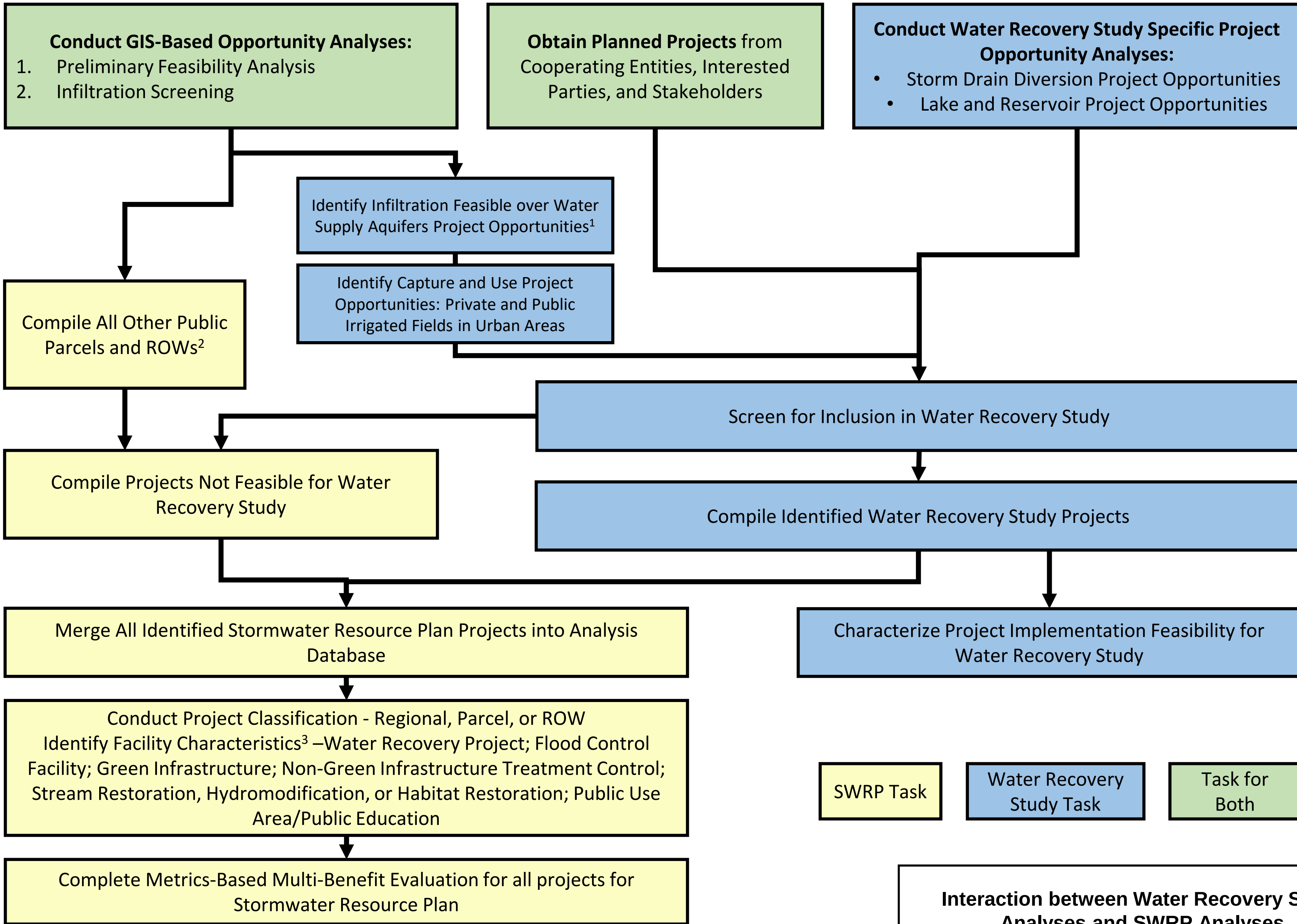
Monterey Regional Stormwater Management Program

Figure 2A

Oakland, CA

April 2018

P:\GIS\MRWPCA\Project\Water Recovery Study Report\Figure 2A - Catchments Detail.mxd 3/28/2018 9:28:51 AM



Interaction between Water Recovery Study Analyses and SWRP Analyses

Monterey Peninsula Water Recovery Study

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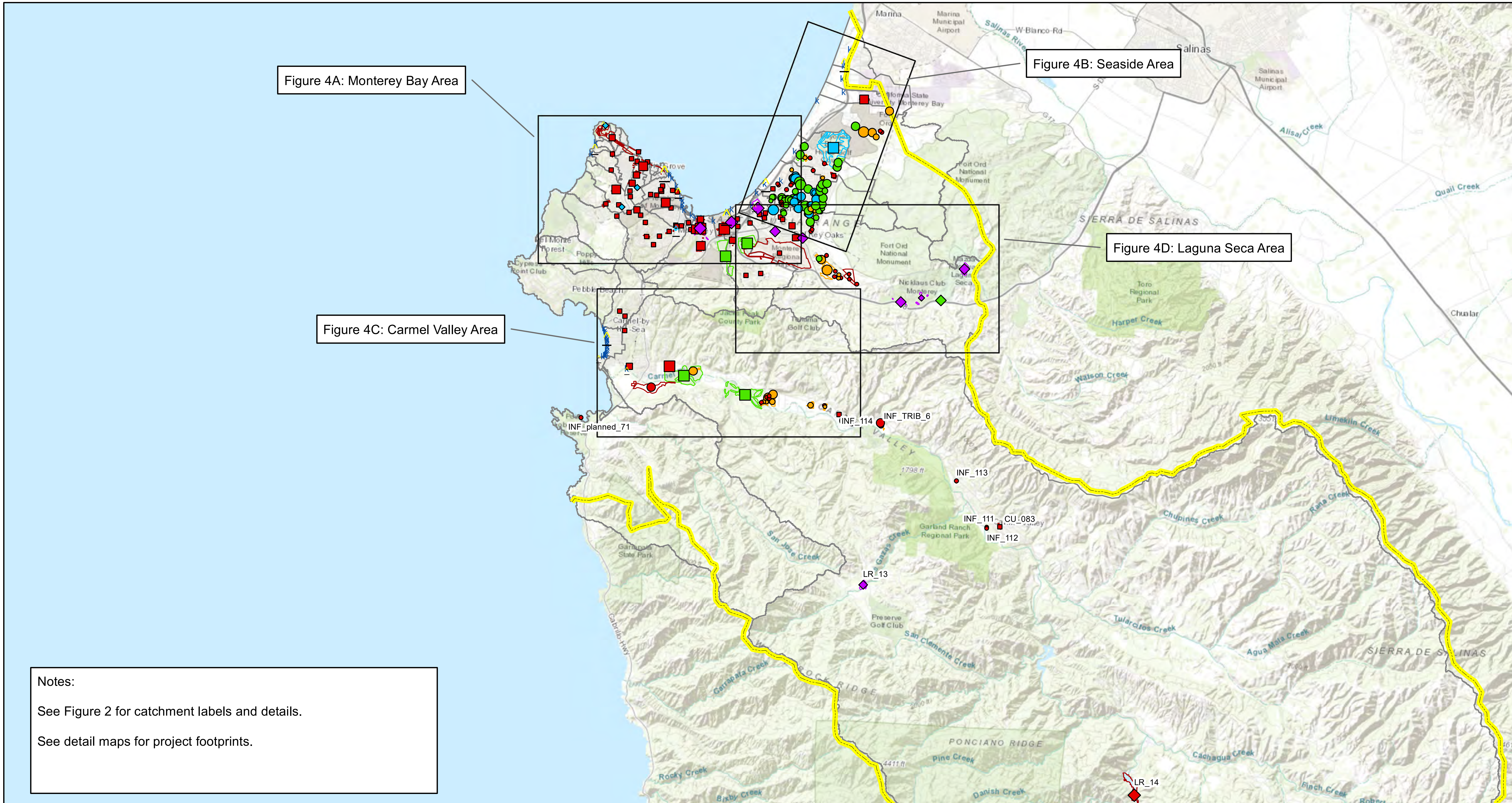
Figure 3

Notes:

1. Public Parcels/ ROWs and Private Undeveloped Parcels
2. Not identified as potential Water Recovery Study Project
3. In some cases, a project may have multiple facility characteristics



Notes:

See Figure 2 for catchment labels and details.

See detail maps for project footprints.

Legend

Monterey Peninsula IRWMP/SWRP Boundary
Catchment Boundary

Unit Project Cost, $/AF
- <$800
- $800-$2,000
- $2,000-$5,000
- $5,000-$10,000
- $10,000+

Recovered Water Volume, AFY
- 100+
- 20-100
- 10-20
- 5-10
- 0-5

Project Type
- Infiltration to a Water Supply Aquifer
- Capture and Use
- Lakes / Reservoirs
- Diversion to Sanitary Sewer

k Diversion of Storm Drain or Stream

0 2.75 5.5 Miles

Identified Project Opportunities Overview

Monterey Peninsula Water Recovery Study

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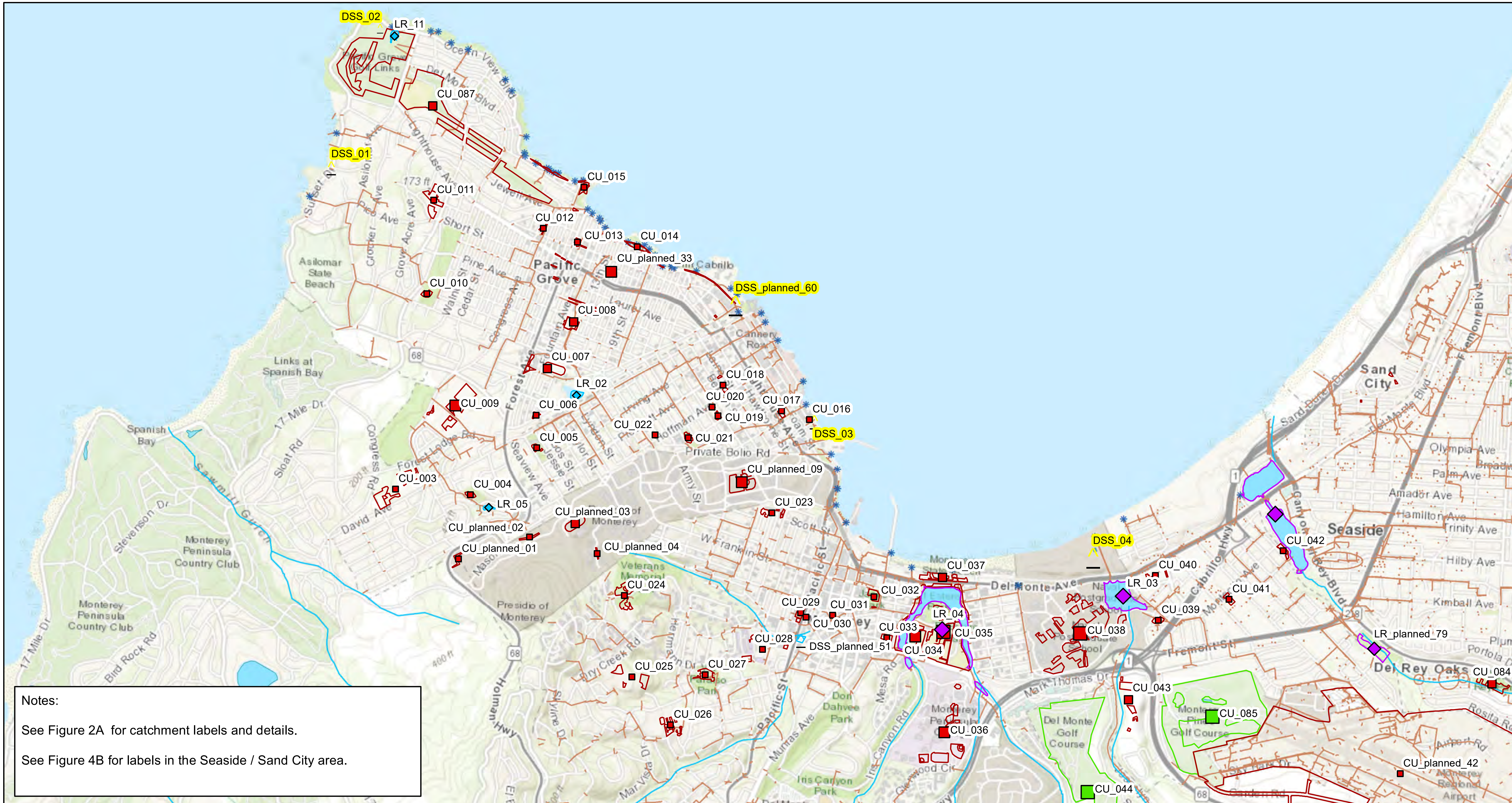
Figure 4

P:\GIS\MRWPCA\Project\Water Recovery Study Report\Figure 4 - WRS Projects Overview.mxd 3/28/2018 9:35:15 AM



Notes:

See Figure 2A for catchment labels and details.

See Figure 4B for labels in the Seaside / Sand City area.

Legend

- Monterey Peninsula IRWMP/SWRP Boundary
- Stream
- Storm Drain
- Waterbody
- Catchment Boundary

Unit Project Cost, $/AF

- <$800
- $800-$2,000
- $2,000-$5,000
- $5,000-$10,000
- $10,000+

Recovered Water Volume, AFY

- 100+
- 20-100
- 10-20
- 5-10
- 0-5

Project Type

- Infiltration to a Water Supply Aquifer
- Capture and Use
- Lakes / Reservoirs
- Diversion to Sanitary Sewer

k Diversion of Storm Drain or Stream

0 0.5 1 Miles

Identified Project Opportunities Monterey Bay Area

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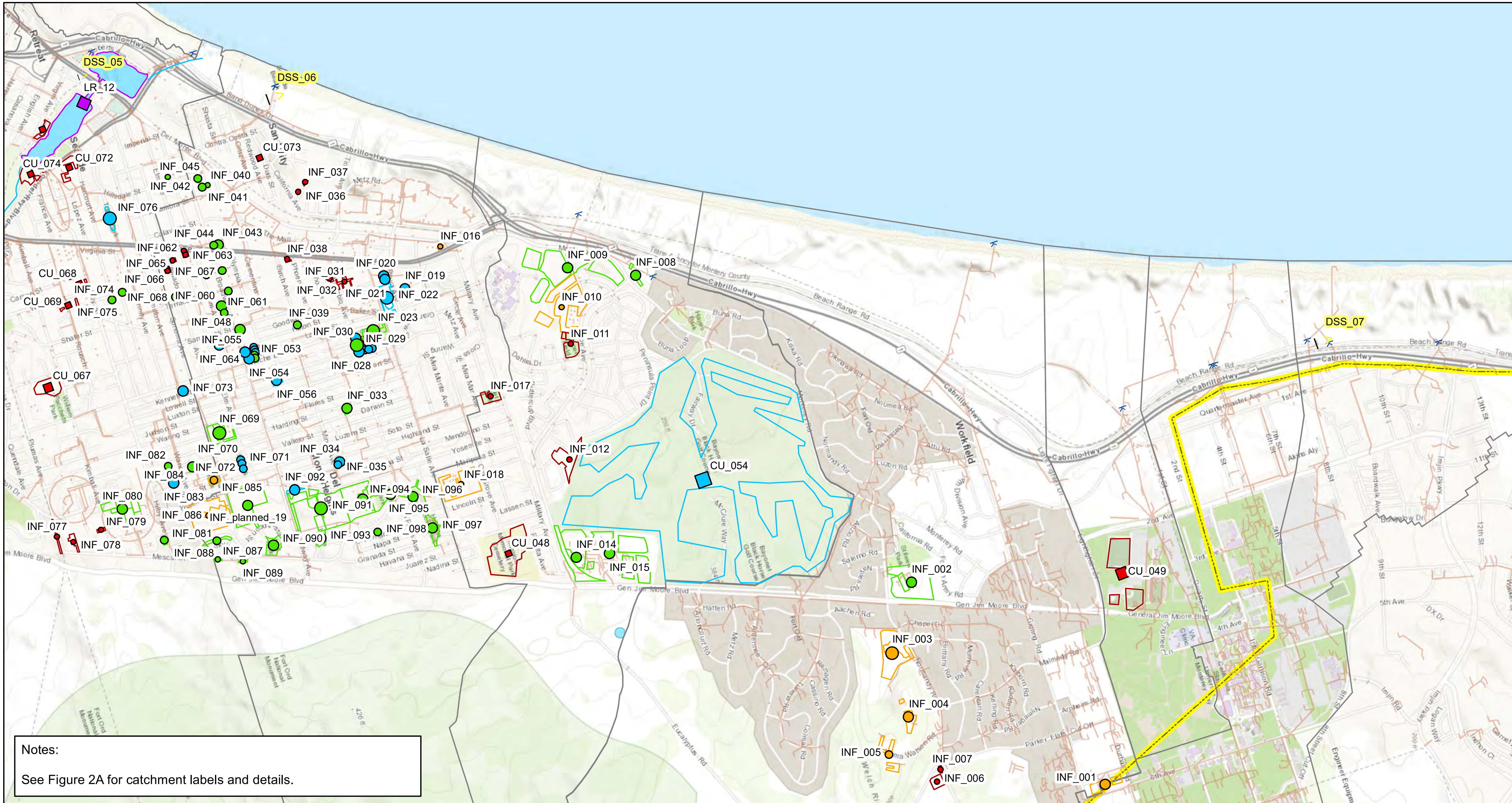
Figure 4A

P:\GIS\MRWPCA\Project\Water Recovery Study Report\Figure 4A - WRS Projects - Monterey.mxd 3/22/2018 3:41:34 PM



Notes:

See Figure 2A for catchment labels and details.

Legend

- Monterey Peninsula IRWMP/SWRP Boundary
- Stream
- Storm Drain
- Waterbody
- Catchment Boundary

Unit Project Cost, $/AF

- <$800
- $800-$2,000
- $2,000-$5,000
- $5,000-$10,000
- $10,000+

Recovered Water Volume, AFY

- 100+
- 20-100
- 10-20
- 5-10
- 0-5

Project Type

- Infiltration to a Water Supply Aquifer
- Capture and Use
- Lakes / Reservoirs
- Diversion to Sanitary Sewer

Diversion of Storm Drain or Stream

Identified Project Opportunities
Seaside Area

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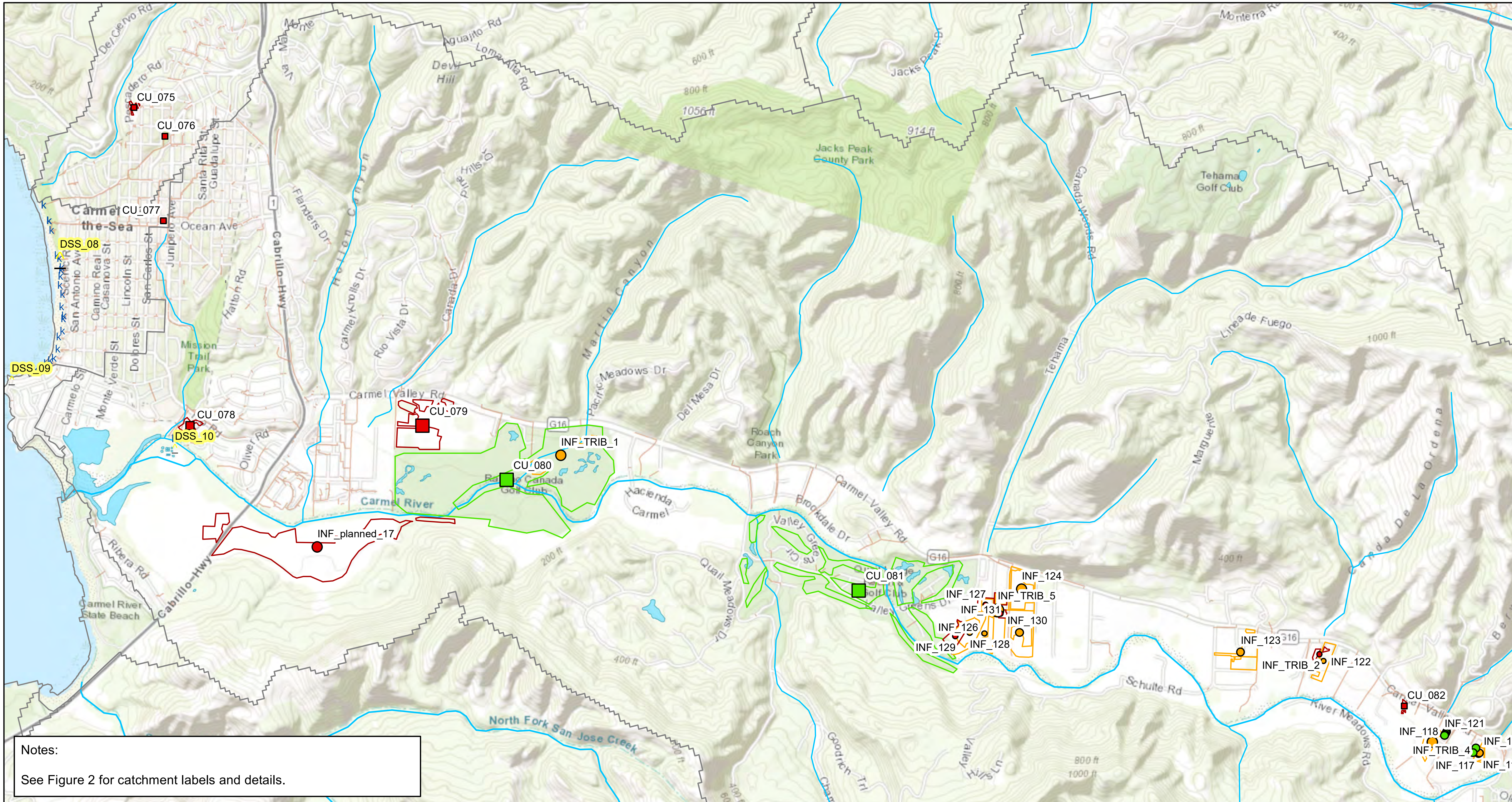
Figure 4B

P:\GIS\MRWPCA\Project\Water Recovery Study Report\Figure 4B - WRS Projects -Seaside Detail.mxd 3/28/2018 9:23:47 AM



Legend

- Monterey Peninsula IRWMP/SWRP Boundary
- Stream
- Storm Drain
- Waterbody
- Catchment Boundary

Unit Project Cost, $/AF

- <$800
- $800-$2,000
- $2,000-$5,000
- $5,000-$10,000
- $10,000+

Recovered Water Volume, AFY

- 100+
- 20-100
- 10-20
- 5-10
- 0-5

Project Type

- Infiltration to a Water Supply Aquifer
- Capture and Use
- Lakes / Reservoirs
- Diversion to Sanitary Sewer

k Diversion of Storm Drain or Stream

0 0.5 1 Miles

Identified Project Opportunities
Carmel Valley Area

Monterey Peninsula Water Recovery Study

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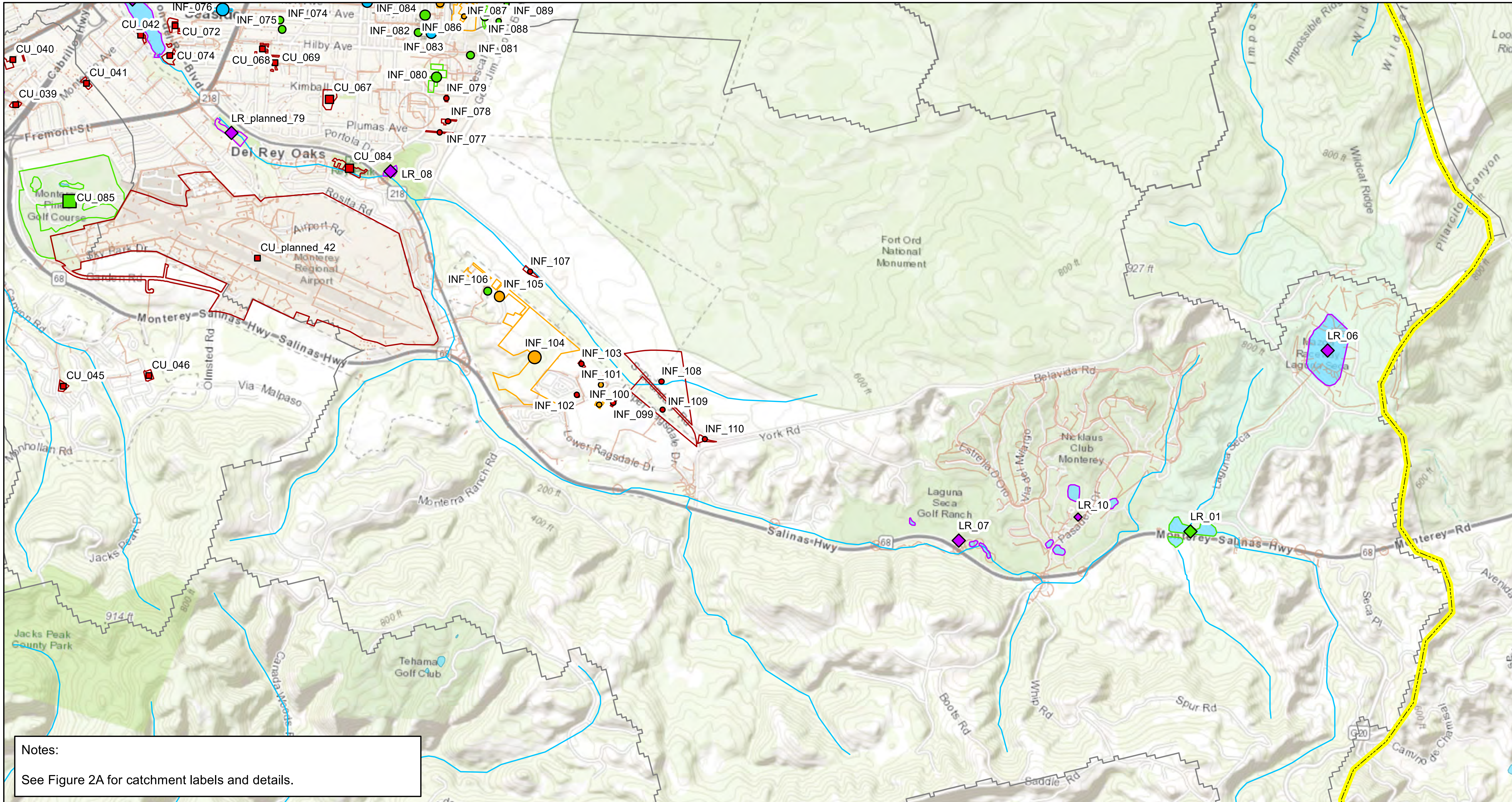
Figure 4C



Legend

- Monterey Peninsula IRWMP/SWRP Boundary
- Stream
- Storm Drain
- Waterbody
- Catchment Boundary

Unit Project Cost, $/AF

- <$800
- $800-$2,000
- $2,000-$5,000
- $5,000-$10,000
- $10,000+

Recovered Water Volume, AFY

- 100+
- 20-100
- 10-20
- 5-10
- 0-5

Project Type

- Infiltration to a Water Supply Aquifer
- Capture and Use
- Lakes / Reservoirs
- Diversion to Sanitary Sewer
- Diversion of Storm Drain or Stream

0 0.5 1 Miles

Identified Project Opportunities
Laguna Seca Area

Monterey Peninsula Water Recovery Study

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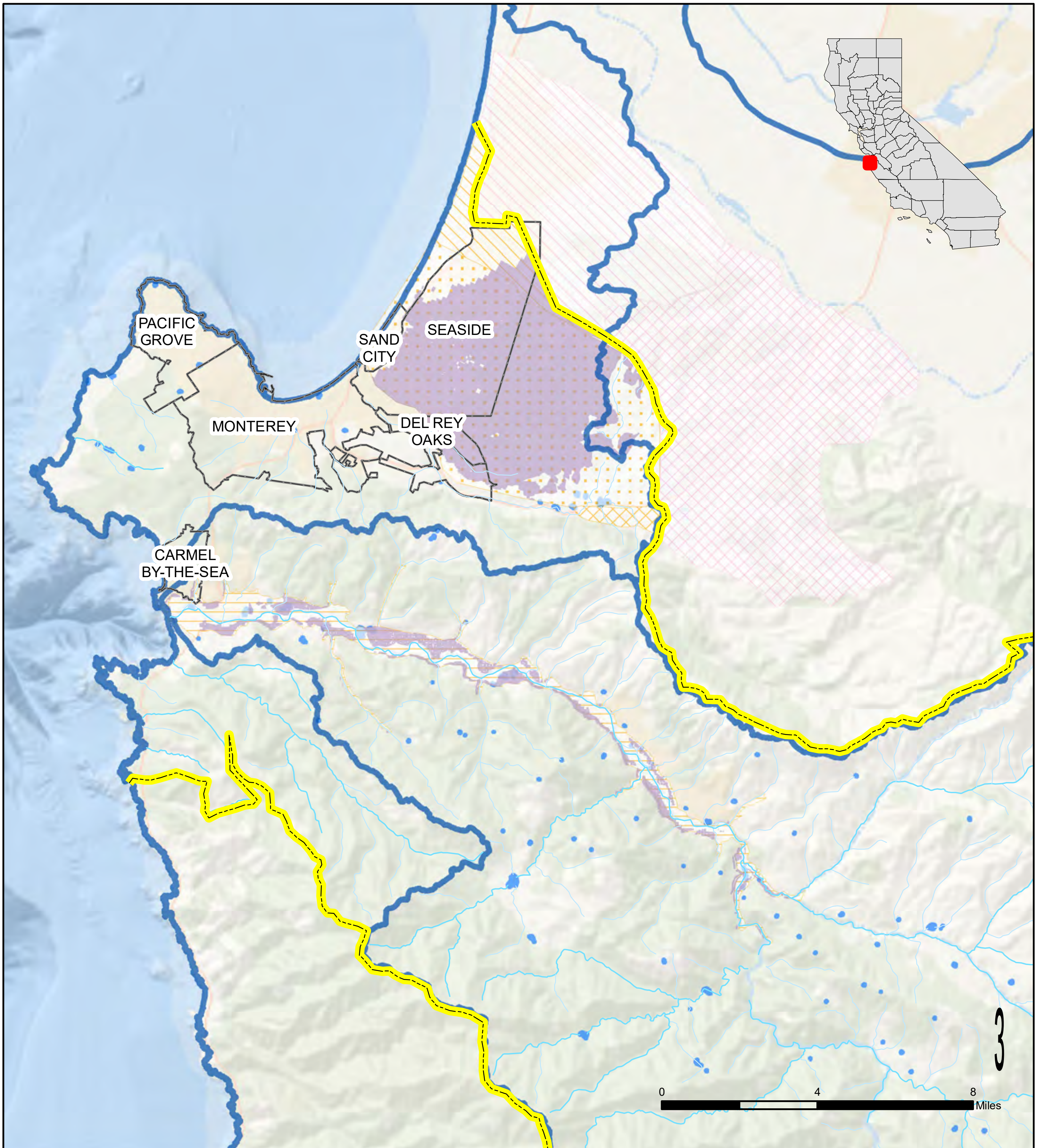
P:\GIS\MRWPCA\Project\Water Recovery Study Report\Figure 4D - WRS Projects - Laguna Seca.mxd 3/22/2018 3:13:40 PM



Legend

- Monterey Peninsula IRWMP/SWRP Boundary
- River/Stream
- Waterbody
- USGS / DWR Watershed
- City Limit
- Adjucated Seaside Groundwater Basin
- Salinas Valley Corral De Tierra Area
- Salinas Valley Marina Area
- Carmel Valley Alluvial
- Area Feasible for Infiltration to a Water Supply Aquifer

Feasibility for Infiltration to a Water Supply Aquifer

Monterey Peninsula Water Recovery Study

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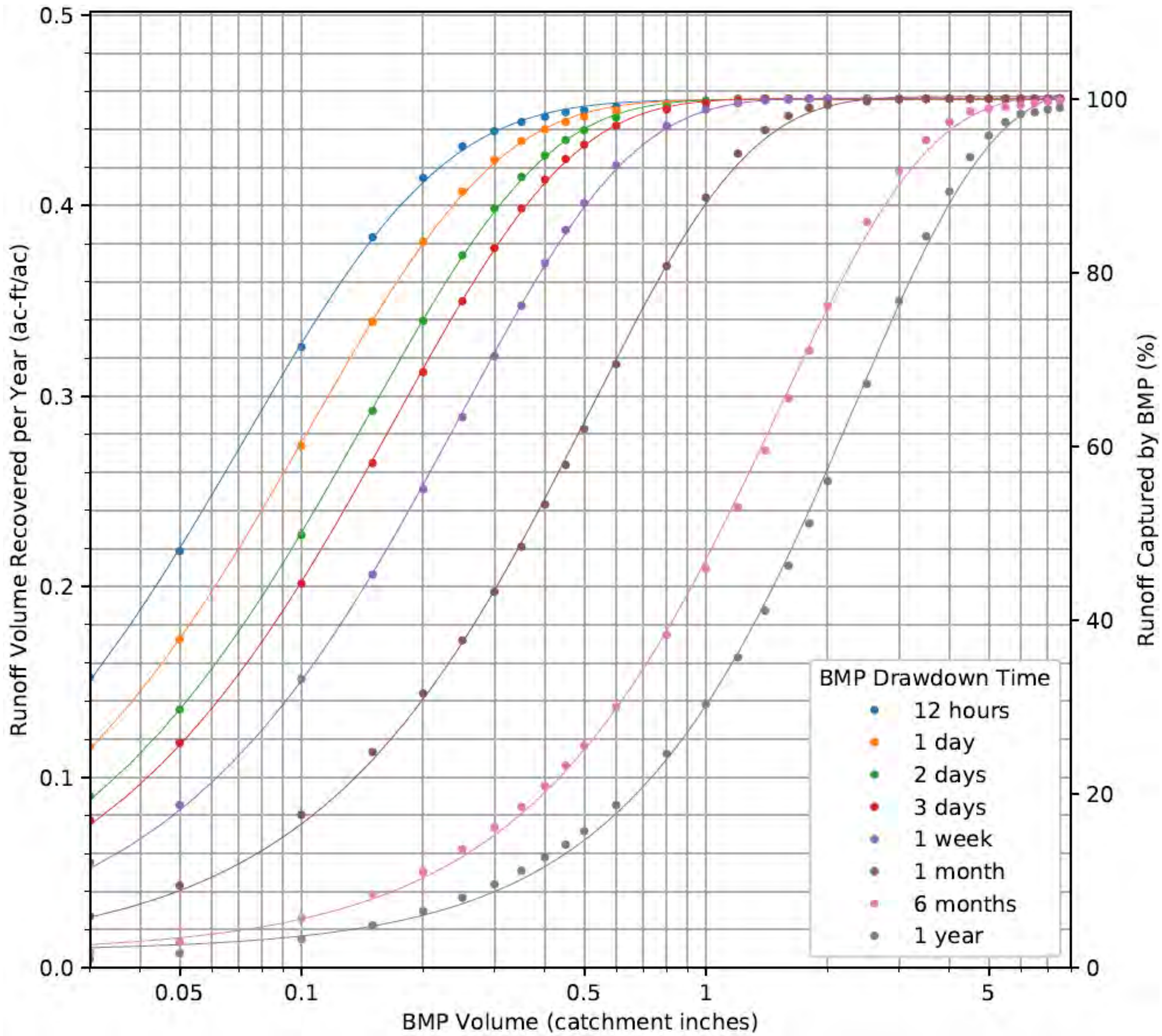
Figure 5

P:\GIS\MRWPCA\Project\Water Recovery Study Report\Figure 5 - Infiltration Feasibility.mxd 3/28/2018 9:25:52 AM



Notes:
Example nomograph shown is for drainage areas with 50% imperviousness underlain by Soil Type A.

Example Nomograph for Runoff Capture

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Figure 6

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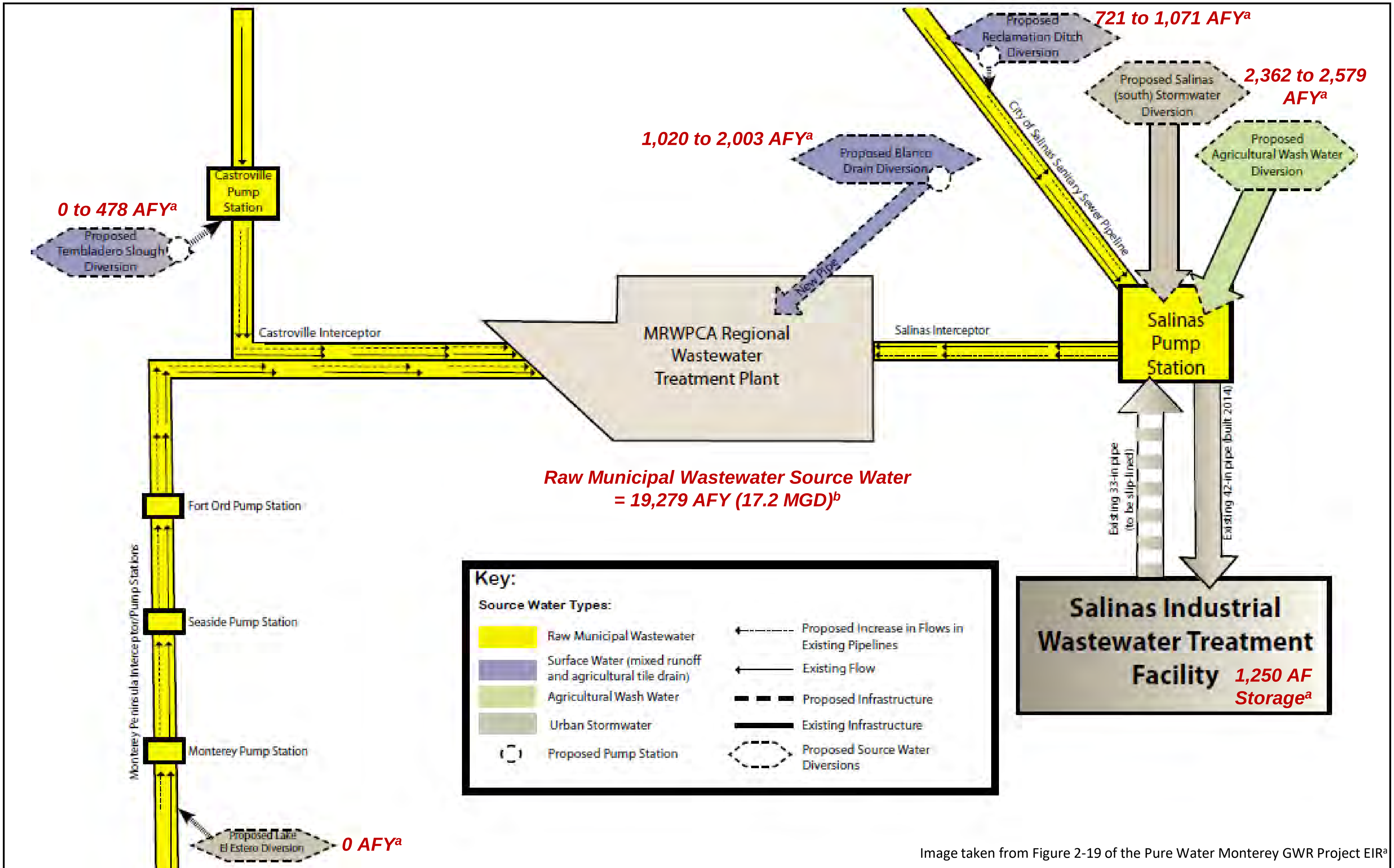

Image taken from Figure 2-19 of the Pure Water Monterey GWR Project EIR[a]

Notes:

a) Monterey Regional Water Pollution Control Agency (MRWPCA). 2016. Pure Water Monterey Groundwater Replenishment Project Consolidated Final Environmental Impact Report. State Clearinghouse No. 2013051094. January.

b) Monterey Regional Water Pollution Control Agency (MRWPCA). 2018. Email: RE: Monterey Peninsula Water Recovery Study - DRAFT Report for Review. from Alison Nemura. March 20.

Pure Water Monterey Flow Schematic - Source Water to Treatment
Monterey Peninsula Water Recovery Study

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Figure 7

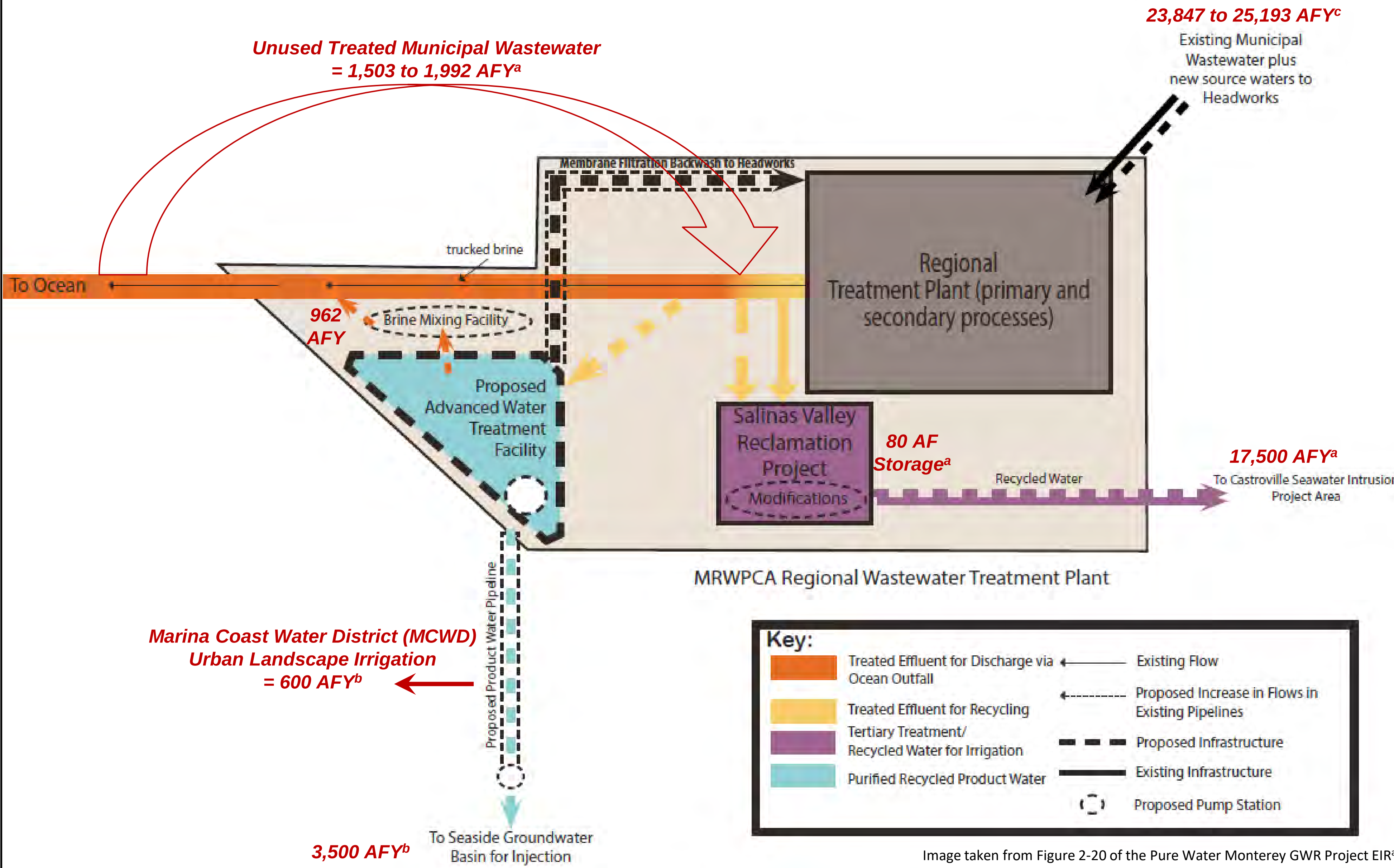

Image taken from Figure 2-20 of the Pure Water Monterey GWR Project EIR[a]

Notes:

a) Monterey Regional Water Pollution Control Agency (MRWPCA). 2016. Pure Water Monterey Groundwater Replenishment Project Consolidated Final Environmental Impact Report. State Clearinghouse No. 2013051094.January.

b) Monterey Regional Water Pollution Control Agency (MRWPCA). 2017. Pure Water Monterey Groundwater Replenishment Project Consolidated Final Environmental Impact Report. State Clearinghouse No. 2013051094. Addendum No. 3. October 24.

c) See Figure 7

Pure Water Monterey Flow Schematic - Regional Treatment Plant

Monterey Peninsula Water Recovery Study

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Figure 8

APPENDIX A

Summary of Catchment Size, Level of Urban Development, and Estimated Runoff

Catchment ID	Tributary Area (acres)	% Urban Development[1]	% Impervious Cover[1]	Estimated Dry Weather Runoff (AFY)[2]	Estimated Wet Weather Runoff (AFY)[3]	Estimated Urban Wet Weather Runoff (AFY)[3]	Associated Sanitary Sewer System
CM-01[4]	654	93.6	46.1	16 to 22	220	218	M1W
CM-02	818	95.8	45.9	20 to 28	274	272	M1W
CM-03	419	94.5	26.3	10 to 14	92	90	M1W
CM-04	5,284	35.0	8.5	47 to 67	566	382	M1W
CM-05	1,337	72.9	19.6	25 to 35	240	217	M1W
CM-06	2,067	58.1	37.8	30 to 43	589	575	M1W
CM-07	10,837	31.7	11.1	87 to 124	1,359	925	M1W
CM-08	105	91.5	56.5	2 to 3	43	43	M1W
CM-09	1,991	59.5	19.3	30 to 43	354	301	M1W
CM-10	2,637	47.1	13.5	31 to 45	373	289	M1W
CM-11	1,307	78.3	20.9	26 to 37	244	226	M1W
CM-12	7	74.6	45.9	-	2	2	M1W
CM-13	232	99.9	60.5	6 to 8	102	102	M1W
CM-14	209	93.2	31.6	5 to 7	52	51	M1W
CM-15	309	99.9	60.7	8 to 11	137	137	M1W
CM-16	41	100.0	64.2	1	19	19	M1W
CM-17	27	98.9	53.2	1	10	10	M1W
CM-18	30	100.0	54.2	1	12	12	M1W
CM-19	53	100.0	55.6	1 to 2	21	21	M1W
CM-20	19	100.0	53.2	0 to 1	7	7	M1W
CM-21	255	99.1	44.0	6 to 9	82	82	M1W
CM-22	15	100.0	65.2	0 to 1	7	7	M1W
CM-23	241	99.9	49.8	6 to 9	87	87	M1W
CM-24	34	100.0	46.3	1	12	12	M1W
CM-25	49	97.4	28.6	1 to 2	11	11	M1W
CM-26	42	100.0	42.8	1 to 2	13	13	M1W
CM-27	69	100.0	29.0	2	16	16	M1W
CM-28	28	100.0	34.2	1	7	7	M1W
CM-29	78	100.0	15.1	2 to 3	12	12	M1W
CM-30	59	94.2	22.3	1 to 2	12	11	M1W
CM-31	56	97.7	33.5	1 to 2	15	14	M1W
CM-32	40	85.4	24.3	1	8	8	M1W
CM-33	198	83.0	20.2	4 to 6	36	34	M1W
CM-34	33	78.6	31.2	1	8	8	M1W
CM-35	533	77.0	26.1	10 to 15	116	108	M1W

Catchment ID	Tributary Area (acres)	% Urban Development[1]	% Impervious Cover[1]	Estimated Dry Weather Runoff (AFY)[2]	Estimated Wet Weather Runoff (AFY)[3]	Estimated Urban Wet Weather Runoff (AFY)[3]	Associated Sanitary Sewer System
CM-36	352	59.8	9.6	5 to 8	41	33	CAWD/PBCSD
CM-37	1,140	54.7	7.7	16 to 23	116	91	CAWD/PBCSD
CM-38	578	69.6	11.7	10 to 15	75	65	CAWD/PBCSD
CM-39	806	45.2	4.6	9 to 13	64	43	CAWD/PBCSD
CM-40	1,957	63.4	8.2	31 to 45	206	171	CAWD/PBCSD
CM-41	875	57.2	6.2	13 to 18	80	62	CAWD/PBCSD
CM-42	243	88.9	24.5	5 to 8	51	49	CAWD/PBCSD
CM-43	43	99.1	28.0	1 to 2	10	10	CAWD/PBCSD
CM-44	11	64.1	29.2	-	3	2	CAWD/PBCSD
Carmel River	162,411	5.0	0.6	205 to 293	7,753	1,084	CAWD/PBCSD
BP-1[5]	142	54.8	16.5	2 to 3	23	19	CAWD/PBCSD
BP-2	14,030	5.7	0.5	20 to 29	654	86	CAWD/PBCSD
El Toro Creek - Salinas River	1,486	14.7	1.9	6 to 8	86	30	N/A
Total	**214,186**	**13.1**	**3.4**	**711 to 1016**	**14,320**	**6,078**	
M1W Total	30,112	50.7	18.6	387 to 552	5,160	4,333	
CAWD/PBCSD Total	182,589	6.9	0.9	319 to 455	9,074	1,715	

1 Level of urban development and impervious cover was calculated based on the 2011 National Land Cover Dataset (NLCD).

2 Average annual dry weather runoff was calculated based on applying an assumed dry weather flow rate (0.7 to 1.0 x 10^{-4} cfs/urban acre, per Pacific Grove ASBS dry weather diversion data) over six months duration to the area of urban development.

3 Average annual wet weather runoff was calculated based on multiplying a runoff coefficient (per Attachment 1 of Central Coast Regional Water Board's Resolution No. R3-2013-0032) by a conservatively low mean annual precipitation (12.8 inches), and the tributary area.

4 Canyon Del Rey – Frontal Monterey Bay Catchment (CM).

5 Big Sur River – Frontal Pacific Ocean Catchment (BP).

APPENDIX B
List of Technical Stakeholders

Water Recovery Study Technical Stakeholder Group List

Agency/Organization	Name	Contact Information
Monterey One Water	Jeff Condit	jeff@my1water.org
Monterey One Water	Alison Imamura	alison@my1water.org
Monterey One Water	Mike McCullough	mike@my1water.org
Monterey Peninsula Water Management District	Larry Hampson	Larry@mpwmd.net
Monterey Peninsula Water Management District	Tom Lindberg	Tom@mpwmd.net
Carmel Area Wastewater District	Drew Lander	Lander@cawd.org
City of Seaside	Scott Ottmar	sottmar@ci.seaside.ca.us
City of Monterey	Jeff Krebs	krebs@monterey.org
City of Monterey	Tricia Wotan	wotan@monterey.org
City of Monterey	Laurie Willamson	williamson@monterey.org
City of Pacific Grove	Milas Smith	msmith@cityofpacificgrove.org
City of Carmel	Agnes Topp	atopp@ci.carmel.ca.us
City of Sand City	Leon Gomez	lgomez@cdengineers.com
Monterey County	Tom Harty	hartytr@co.monterey.ca.us
Seaside Groundwater Basin Technical Manager	Bob Jaques	bobj83@comcast.net
Monterey Peninsula Regional Water Authority	Jim Cullem	j.ecull@comcast.net
California American Water	Christopher Cook	Christopher.Cook@amwater.com
California American Water	Ian Crooks	Ian.Crooks@amwater.com
USGS	Rich Niswonger	rniswon@usgs.gov
Monterey County Water Resources Agency	Howard Franklin	franklinh@co.monterey.ca.us
Marina Coast Water District	Brian True	btrue@mcwd.org
Stanford University	Rosemary Knight or Meredith Goebel	rknight@stanford.edu mgoebel@standord.edu
City of Monterey (retired City Engineer)	Tom Reeves	gtreeves@sbcglobal.net
Big Sur Land Trust	Sarah Hardgrave	shardgrave@bigsurlandtrust.org
Consultant Project Team		
Geosyntec Consultants	Lisa Austin Judd Goodman	laustin@geosyntec.com jgoodman@geosyntec.com
Denise Duffy & Associates	Denise Duffy Diana Staines	Dduffy@ddaplanning.com DStaines@ddaplanning.com
EOA, Inc	Jill Bicknell Vishakha Atre	jcbicknell@eoainc.com vatre@eoainc.com

APPENDIX C
Water Recovery Project Feasibility Matrix

						1. WATER SUPPLY	2. PLANNING LEVEL COST	3. EASE OF IMPLEMENTATION							
													Project Coordination		
WRS Project ID/ SWRP db_index[1]	Included Stakeholder Projects[2]	Project Category[3]	Owner[4]	Project Name[5]	Jurisdiction[6]	Net Recovered Water Volume (AFY)[7]	Unit Project Cost ($/AF)[8]	Financial - Total Capital Cost ($)[9]	Portion Diverted to Sanitary Sewer as Wet Weather Runoff (none, some, most)10	Complexity of Location due to Permitting and Land Acquisition (lower, medium, higher)[11]	Potential Water Quality Constraints (yes, no)[12]	Water Loss Considerations Associated with Hydrogeology (yes, no)[13]	Sanitary Sewer Diversion Destination (CAWD or M1W)[14]	Catchment Name[15]	Number of Identified Project Opportunities in Catchment[16]
CU_076		Capture and Use	CITY OF CARMEL BY THE SEA		CARMEL BY-THE-SEA	0-5	$10,000+	$100k-$1M	none	Higher	no	no	na	CM-41	2
CU_077	Park Branch Library - Devendorf Rainwater Capture	Capture and Use	CITY OF CARMEL BY THE SEA		CARMEL BY-THE-SEA	0-5	$10,000+	$1M-$10M	none	Higher	no	no	na	CM-42	1
CU_078		Capture and Use	DIOCESE OF MONTEREY EDUCATION &		CARMEL BY-THE-SEA	5-10	$10,000+	$1M-$10M	none	Higher	no	no	na	Carmel River	36
DSS_08	4th Avenue Dry Weather Diversion Pilot; South Carmel Dry Weather Diversion; Scenic Road Dry-Weather Diversion	Diversion to Sanitary Sewer		Scenic & 8th Pump Station	CARMEL BY-THE-SEA	20-100	$2,000-$5,000	$1M-$10M	none	Higher	no	no	CAWD	na	na
DSS_09	Scenic Road Dry-Weather Diversion	Diversion to Sanitary Sewer		Bay & Scenic Pump Station	CARMEL BY-THE-SEA	0-5	$2,000-$5,000	<$100k	none	Higher	no	no	CAWD	na	na
DSS_10		Diversion to Sanitary Sewer		R6PS_2	CARMEL BY-THE-SEA	0-5	$2,000-$5,000	<$100k	none	Higher	no	no	CAWD	na	na
CU_084		Capture and Use	CITY OF DEL REY OAKS CITY HALL		DEL REY OAKS	5-10	$10,000+	$10M+	none	Medium	no	no	na	CM-07	41
CU_planned_42	Non-Potable Well Water Conveyance System (with Aquifer and Well System Testing/Evaluations)	Capture and Use	MONTEREY PENINSULA AIRPORT DIST		DEL REY OAKS	0-5	$10,000+	$100k-$1M	none	Lower	no	no	na	CM-07	41
LR_08		Lakes / Reservoirs	na	Monterey Peninsula Regional	DEL REY OAKS	20-100	<$800	$100k-$1M	some	Higher	no	no	M1W	CM-07	41
LR_planned_79	New Detention Behind Safeway	Lakes / Reservoirs	CITY OF DEL REY OAKS		DEL REY OAKS	20-100	<$800	$100k-$1M	some	Higher	no	no	M1W	CM-07	41
CU_005		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$100k-$1M	none	Medium	no	no	na	CM-21	6
CU_016		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$100k-$1M	none	Higher	no	no	na	CM-15	7
CU_017		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-15	7
CU_018		Capture and Use	MONTEREY SCHOOL DIST		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-15	7
CU_019		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	<$100k	none	Medium	no	no	na	CM-15	7
CU_020		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	<$100k	none	Medium	no	no	na	CM-15	7
CU_021		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-15	7
CU_022		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$100k-$1M	none	Medium	no	no	na	CM-15	7
CU_023		Capture and Use	MONTEREY CITY SCHOOL DIST		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-13	3
CU_024		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-11	11
CU_025		Capture and Use	MONTEREY CITY SCHOOL DIST		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-11	11
CU_026		Capture and Use	MONTEREY CITY SCHOOL DIST		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-11	11
CU_027		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-11	11
CU_028		Capture and Use	MONTEREY UNION HIGH SCHOOL		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-11	11
CU_029		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-13	3
CU_030		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$100k-$1M	none	Medium	no	no	na	CM-13	3
CU_031		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$100k-$1M	none	Medium	no	no	na	CM-11	11
CU_032		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-11	11
CU_033		Capture and Use	DIOCESE OF MONTEREY EDUCATION &		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-10	7
CU_034		Capture and Use	ROMAN CATHOLIC BISHOPS OF MTY		MONTEREY	10-20	$10,000+	$10M+	none	Medium	no	no	na	CM-10	7
CU_035		Capture and Use	CITY OF MONTEREY		MONTEREY	20-100	$10,000+	$10M+	none	Medium	no	no	na	CM-10	7
CU_036		Capture and Use	MTY PENINSULA JR COLLEGE DIST		MONTEREY	10-20	$10,000+	$10M+	none	Medium	no	no	na	CM-10	7
CU_037		Capture and Use	CITY OF MONTEREY		MONTEREY	5-10	$10,000+	$10M+	none	Higher	no	no	na	CM-10	7
CU_038		Capture and Use	U S NAVY GENERAL LINE SCHOOL		MONTEREY	20-100	$10,000+	$10M+	none	Medium	no	no	na	CM-09	9
CU_039		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-09	9
CU_040		Capture and Use	MONTEREY PENINSULA UNIFIED		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-09	9
CU_041		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	<$100k	none	Medium	no	no	na	CM-09	9
CU_042		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$1M-$10M	none	Higher	no	no	na	CM-07	41
CU_043		Capture and Use	SANTA CATALINA SCHOOL		MONTEREY	5-10	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-09	9
CU_044		Capture and Use	PEBBLE BEACH COMPANY	Del Monte Golf Course	MONTEREY	20-100	$2,000-$5,000	$1M-$10M	none	Lower	no	no	na	CM-10	7
CU_045		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-09	9
CU_046		Capture and Use	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	<$100k	none	Medium	no	no	na	CM-09	9
CU_085		Capture and Use	U S A	Monterey Pines Golf Club	MONTEREY	20-100	$2,000-$5,000	$1M-$10M	none	Lower	no	no	na	CM-09	9
CU_planned_02	Pacific Grove Drainage Stormdrain Retrofit	Capture and Use	GOVT LAND		MONTEREY	0-5	$10,000+	$1M-$10M	none	Higher	no	no	na	CM-11	11
CU_planned_03	Hilltop Passive Irrigation System	Capture and Use	GOVT LAND		MONTEREY	5-10	$10,000+	$1M-$10M	none	Higher	no	no	na	CM-11	11
CU_planned_04	Library Drainage Stormdrain Retrofit	Capture and Use	GOVT LAND		MONTEREY	0-5	$10,000+	$100k-$1M	none	Lower	no	no	na	CM-11	11
CU_planned_09	Soldier Field Passive Irrigation System	Capture and Use	GOVT LAND		MONTEREY	10-20	$10,000+	$10M+	none	Lower	no	no	na	CM-14	1
DSS_03		Diversion to Sanitary Sewer		Reeside (Pump Station #7)	MONTEREY	10-20	$2,000-$5,000	$100k-$1M	none	Higher	no	no	M1W	na	na
DSS_04	City of Monterey Tunnel & Calle Principal Storm Water Diversion	Diversion to Sanitary Sewer	MONTEREY ONE WATER	Monterey Pump Station	MONTEREY	100+	$2,000-$5,000	$1M-$10M	none	Higher	no	no	M1W	na	na
DSS_planned_51	Hartnell Gulch Creek Restoration and Storm Water Diversion	Diversion to Sanitary Sewer	CITY OF MONTEREY		MONTEREY	20-100	$800-$2,000	$1M-$10M	some	Higher	yes	no	M1W	CM-11	11
DSS_planned_60	Pacific Grove-Monterey ASBS Wet-Dry Weaterth Storm Water Capture and Diversion Project	Diversion to Sanitary Sewer	CITY OF MONTEREY	Pump Station #11	MONTEREY	100+	$800-$2,000	$1M-$10M	some	Higher	no	no	M1W	na	na
INF_099		Infiltration to a Water Supply Aquifer	COMMUNITY HOSPITAL RYAN RANCH		MONTEREY	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_100		Infiltration to a Water Supply Aquifer	COMMUNITY HOSPITAL PROPERTIES		MONTEREY	0-5	$5,000-$10,000	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_101		Infiltration to a Water Supply Aquifer	O DRISCOLL PAUL D & MARGARET M TRS		MONTEREY	0-5	$5,000-$10,000	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_102		Infiltration to a Water Supply Aquifer	HALPERN JAMES A & CHERYL HALPERN TRS		MONTEREY	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_103		Infiltration to a Water Supply Aquifer	HARRIS COURT ASSOCIATES LLC		MONTEREY	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_104		Infiltration to a Water Supply Aquifer	CITY OF MONTEREY		MONTEREY	20-100	$5,000-$10,000	$1M-$10M	none	Medium	no	yes	na	CM-07	41
INF_105		Infiltration to a Water Supply Aquifer	CITY OF MONTEREY		MONTEREY	10-20	$5,000-$10,000	$1M-$10M	none	Medium	no	yes	na	CM-07	41
INF_106		Infiltration to a Water Supply Aquifer	MONTEREY PENINSULA UNIFIED SCHOOL DIST		MONTEREY	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_107		Infiltration to a Water Supply Aquifer	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	<$100k	none	Medium	no	yes	na	CM-07	41
INF_108		Infiltration to a Water Supply Aquifer	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_109		Infiltration to a Water Supply Aquifer	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$1M-$10M	none	Medium	no	yes	na	CM-07	41
INF_110		Infiltration to a Water Supply Aquifer	CITY OF MONTEREY		MONTEREY	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-07	41
LR_03	Lake Del Monte Outflow Diversion; Lake Del Monte Outfall Replacement; Del Monte Lake Storm Water Diversion	Lakes / Reservoirs	na	Lake Del Monte	MONTEREY	100+	<$800	$100k-$1M	Most	Higher	yes	no	M1W	CM-09	9
LR_04	Lake El Estero/Whasherwomen's Pond Storm Water Diversion; Pearl Street/Figurao Box Culvert Diversion; Navy Lake and Washerwomen's Pond Outlet	Lakes / Reservoirs	na	Lake El Estero	MONTEREY	100+	<$800	$100k-$1M	Most	Higher	yes	no	M1W	CM-10	7
LR_12	Laguna Grande Well Upgrades; Laguna Grande Water Recovery	Lakes / Reservoirs	na	Roberts Lakes / Laguna Grande	MONTEREY	100+	<$800	$100k-$1M	Most	Higher	yes	no	M1W	CM-07	41
CU_planned_24	MRSWMP Cistern Rebate Program	Capture and Use	Multiple		na	0-5	$10,000+	$100k-$1M	none	Lower	no	no	na	na	na
CU_planned_31	Monterey Bay-Friendly Landscaping Rebate Program	Capture and Use	Multiple		na	0-5	$10,000+	<$100k	none	Lower	no	no	na	na	na
CU_003		Capture and Use	PACIFIC GROVE UNIFIED SCHOOL		PACIFIC GROVE	0-5	$10,000+	$100k-$1M	none	Medium	no	no	na	CM-35	4
CU_004		Capture and Use	CITY OF PACIFIC GROVE		PACIFIC GROVE	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-35	4
CU_006		Capture and Use	CITY OF PACIFIC GROVE		PACIFIC GROVE	0-5	$10,000+	<$100k	none	Medium	no	no	na	CM-21	6
CU_007		Capture and Use	PACIFIC GROVE HIGH SCHOOL DIST		PACIFIC GROVE	5-10	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-21	6
CU_008		Capture and Use	PACIFIC GROVE SCHOOL DIST		PACIFIC GROVE	5-10	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-21	6
CU_009		Capture and Use	PACIFIC GROVE UNIFIED SCHOOL		PACIFIC GROVE	10-20	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-35	4
CU_010		Capture and Use	CITY OF PACIFIC GROVE		PACIFIC GROVE	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-33	2
CU_011		Capture and Use	PACIFIC GROVE UNIFIED SCHOOL DISTRICT		PACIFIC GROVE	0-5	$10,000+	$100k-$1M	none	Medium	no	no	na	CM-33	2
CU_012		Capture and Use	CITY OF PACIFIC GROVE		PACIFIC GROVE	0-5	$10,000+	$1M-$10M	none	Higher	no	no	na	CM-23	1
CU_013		Capture and Use	CITY OF PACIFIC GROVE		PACIFIC GROVE	0-5	$10,000+	<$100k	none	Higher	no	no	na	CM-22	1
CU_014		Capture and Use	CITY OF PACIFIC GROVE		PACIFIC GROVE	0-5	$10,000+	$1M-$10M	none	Higher	no	no	na	CM-20	1
CU_015		Capture and Use	CITY OF PACIFIC GROVE		PACIFIC GROVE	0-5	$10,000+	$1M-$10M	none	Higher	no	no	na	CM-24	1

						1. WATER SUPPLY	2. PLANNING LEVEL COST	3. EASE OF IMPLEMENTATION							
													Project Coordination		
WRS Project ID/ SWRP db_index[1]	Included Stakeholder Projects[2]	Project Category[3]	Owner[4]	Project Name[5]	Jurisdiction[6]	Net Recovered Water Volume (AFY)[7]	Unit Project Cost ($/AF)[8]	Financial - Total Capital Cost ($)[9]	Portion Diverted to Sanitary Sewer as Wet Weather Runoff (none, some, most)10	Complexity of Location due to Permitting and Land Acquisition (lower, medium, higher)[11]	Potential Water Quality Constraints (yes, no)[12]	Water Loss Considerations Associated with Hydrogeology (yes, no)[13]	Sanitary Sewer Diversion Destination (CAWD or M1W)[14]	Catchment Name[15]	Number of Identified Project Opportunities in Catchment[16]
CU_087		Capture and Use	CITY OF PACIFIC GROVE	Pacific Grove Golf Links	PACIFIC GROVE	5-10	$10,000+	$1M-$10M	none	Higher	no	no	na	CM-29	2
CU_planned_33	Urban Greening Plan	Capture and Use	Multiple		PACIFIC GROVE	10-20	$10,000+	$10M+	none	Higher	no	no	na	CM-21	6
DSS_01		Diversion to Sanitary Sewer	MONTEREY ONE WATER	Pump Station #16	PACIFIC GROVE	10-20	$2,000-$5,000	$100k-$1M	none	Higher	no	no	M1W	na	na
DSS_02		Diversion to Sanitary Sewer	MONTEREY ONE WATER	Pump Station #15.5	PACIFIC GROVE	0-5	$2,000-$5,000	$100k-$1M	none	Higher	no	no	M1W	na	na
LR_02	David Ave Reservoir	Lakes / Reservoirs	na	David Ave Reservoir	PACIFIC GROVE	5-10	$800-$2,000	$100k-$1M	Most	Higher	no	no	M1W	CM-21	6
LR_05		Lakes / Reservoirs	na	Glen of Pacific Grove	PACIFIC GROVE	5-10	$800-$2,000	<$100k	Most	Higher	no	no	M1W	CM-35	4
LR_11		Lakes / Reservoirs	na	Pacific Grove Golf Links	PACIFIC GROVE	5-10	$800-$2,000	$100k-$1M	Most	Higher	no	no	M1W	CM-29	2
CU_073		Capture and Use	CITY OF SAND CITY		SAND CITY	0-5	$10,000+	$100k-$1M	none	Higher	no	no	na	CM-06	69
INF_036		Infiltration to a Water Supply Aquifer	DBO DEVELOPMENT NO 30		SAND CITY	0-5	$10,000+	$100k-$1M	none	Higher	no	yes	na	CM-06	69
INF_037		Infiltration to a Water Supply Aquifer	DBO DEVELOPMENT NO 30		SAND CITY	0-5	$10,000+	$100k-$1M	none	Higher	no	yes	na	CM-06	69
CU_048		Capture and Use	FPG CALIFORNIA INC		SEASIDE	0-5	$10,000+	$100k-$1M	none	Lower	no	no	na	CM-05	11
CU_049	Project "A2" from campus Storm Water Master plan	Capture and Use	CALIFORNIA STATE UNIVERSITY MONTEREY BAY		SEASIDE	10-20	$10,000+	$10M+	none	Medium	no	no	na	CM-03	1
CU_054	Former Fort Ord Stormwater Outfall Closure	Capture and Use	CITY OF SEASIDE		SEASIDE	20-100	$800-$2,000	$1M-$10M	none	Lower	no	no	na	CM-05	11
CU_059		Capture and Use	CITY OF SEASIDE		SEASIDE	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-06	69
CU_067		Capture and Use	MONTEREY PEN UNIFIED SCH DIST		SEASIDE	5-10	$10,000+	$10M+	none	Medium	no	no	na	CM-07	41
CU_068		Capture and Use	CITY OF SEASIDE CITY HALL		SEASIDE	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-07	41
CU_069		Capture and Use	CITY OF SEASIDE		SEASIDE	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-07	41
CU_072		Capture and Use	CITY OF SEASIDE		SEASIDE	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	CM-07	41
CU_074		Capture and Use	MONTEREY PENINSULA REGIONAL PARK DISTRICT		SEASIDE	0-5	$10,000+	$100k-$1M	none	Higher	no	no	na	CM-07	41
DSS_05		Diversion to Sanitary Sewer		Pump Station (adjacent to Laguna Grande)	SEASIDE	0-5	$2,000-$5,000	<$100k	none	Higher	no	no	M1W	na	na
DSS_06	Del Monte Blvd Storm Drain Diversion	Diversion to Sanitary Sewer	MONTEREY ONE WATER	Seaside Pump Station #23	SEASIDE	20-100	$2,000-$5,000	$1M-$10M	none	Higher	no	no	M1W	na	na
INF_001		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE THE		SEASIDE	10-20	$5,000-$10,000	$1M-$10M	none	Medium	no	yes	na	CM-02	1
INF_002	Former Fort Ord Stormwater Outfall Closure	Infiltration to a Water Supply Aquifer	MONTEREY PENINSULA UNIFIED		SEASIDE	10-20	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-04	6
INF_003	Former Fort Ord Stormwater Outfall Closure	Infiltration to a Water Supply Aquifer	MONTEREY PENINSULA UNIFIED		SEASIDE	20-100	$5,000-$10,000	$1M-$10M	none	Medium	no	yes	na	CM-04	6
INF_004	Former Fort Ord Stormwater Outfall Closure	Infiltration to a Water Supply Aquifer	CHARTWELL SCHOOL		SEASIDE	10-20	$5,000-$10,000	$1M-$10M	none	Medium	no	yes	na	CM-04	6
INF_005	Former Fort Ord Stormwater Outfall Closure	Infiltration to a Water Supply Aquifer	CHARTWELL SCHOOL		SEASIDE	5-10	$5,000-$10,000	$1M-$10M	none	Medium	no	yes	na	CM-04	6
INF_006	Former Fort Ord Stormwater Outfall Closure	Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	0-5	$10,000+	<$100k	none	Medium	no	yes	na	CM-04	6
INF_007	Former Fort Ord Stormwater Outfall Closure	Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	0-5	$10,000+	<$100k	none	Medium	no	yes	na	CM-04	6
INF_008		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	10-20	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-05	11
INF_009	Seaside High School Bioretention Project	Infiltration to a Water Supply Aquifer	MONTEREY PENINSULA UNIFIED SCHLDISTRICT		SEASIDE	10-20	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-05	11
INF_010	Seaside High School Bioretention Project	Infiltration to a Water Supply Aquifer	MONTEREY PENINSULA UNIFIED SCHOOL		SEASIDE	0-5	$5,000-$10,000	$100k-$1M	none	Medium	no	yes	na	CM-05	11
INF_011		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-05	11
INF_012		Infiltration to a Water Supply Aquifer	SUNBAY RESORT ASSOCIATES NO 2 LLC		SEASIDE	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-05	11
INF_014		Infiltration to a Water Supply Aquifer	MONTEREY PENINSULA UNIFIED		SEASIDE	10-20	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-05	11
INF_015		Infiltration to a Water Supply Aquifer	MONTEREY PENINSULA UNIFIED		SEASIDE	10-20	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-05	11
INF_016		Infiltration to a Water Supply Aquifer	BBI BUILDING LLC		SEASIDE	0-5	$5,000-$10,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_017		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE THE		SEASIDE	0-5	$10,000+	<$100k	none	Medium	no	yes	na	CM-05	11
INF_018		Infiltration to a Water Supply Aquifer	ORD TERRACE SCHOOL		SEASIDE	0-5	$5,000-$10,000	$100k-$1M	none	Medium	no	yes	na	CM-05	11
INF_019		Infiltration to a Water Supply Aquifer	MAHROOM FAMILY PARTNERSHIP LP		SEASIDE	10-20	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_020		Infiltration to a Water Supply Aquifer	ISHII GALEN H TR ET AL		SEASIDE	10-20	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_021		Infiltration to a Water Supply Aquifer	ISHII GALEN H TR ET AL		SEASIDE	10-20	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_022		Infiltration to a Water Supply Aquifer	SEASIDE SCHOOL DIST		SEASIDE	20-100	$800-$2,000	$1M-$10M	none	Medium	no	yes	na	CM-06	69
INF_023		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	20-100	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-06	69
INF_025		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	5-10	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_026		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	5-10	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_027		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	5-10	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_028		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	10-20	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_029		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	10-20	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_030		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	20-100	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-06	69
INF_031		Infiltration to a Water Supply Aquifer	THE CITY OF SEASIDE		SEASIDE	0-5	$10,000+	<$100k	none	Medium	no	yes	na	CM-06	69
INF_032		Infiltration to a Water Supply Aquifer	BASSETT LINDA LEE TR		SEASIDE	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_033		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	10-20	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_034		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	10-20	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_035		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	5-10	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_038		Infiltration to a Water Supply Aquifer	CALIFORNIA GOLD DEVELOPMENT CORPORATION		SEASIDE	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_039		Infiltration to a Water Supply Aquifer	MADISON TRUST COMPANY CUSTODIAN		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_040		Infiltration to a Water Supply Aquifer	MC ADAMS MICHAEL GENE II		SEASIDE	0-5	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_041		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_042		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_043		Infiltration to a Water Supply Aquifer	CROCKETT SHERYL TURRENTINE ET AL		SEASIDE	10-20	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_044		Infiltration to a Water Supply Aquifer	CROCKETT SHERYL TURRENTINE ET AL		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_045		Infiltration to a Water Supply Aquifer	VALDEZ JOSE ROSARIO & NAZARIO P VALDEZ		SEASIDE	0-5	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_046		Infiltration to a Water Supply Aquifer	BAKER ELIZABETH W & MICHAEL O		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_047		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_048		Infiltration to a Water Supply Aquifer	MONTECRISTO CAPITAL INC		SEASIDE	10-20	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_049		Infiltration to a Water Supply Aquifer	COUNTY OF MONTEREY		SEASIDE	5-10	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_050		Infiltration to a Water Supply Aquifer	COUNTY OF MONTEREY		SEASIDE	5-10	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_051		Infiltration to a Water Supply Aquifer	COUNTY OF MONTEREY		SEASIDE	5-10	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_052		Infiltration to a Water Supply Aquifer	COUNTY OF MONTEREY		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_053		Infiltration to a Water Supply Aquifer	COUNTY OF MONTEREY		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_054		Infiltration to a Water Supply Aquifer	COUNTY OF MONTEREY		SEASIDE	10-20	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_055		Infiltration to a Water Supply Aquifer	COUNTY OF MONTEREY		SEASIDE	10-20	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_056		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	10-20	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_057		Infiltration to a Water Supply Aquifer	HAGENBUCH RICKY C		SEASIDE	0-5	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_058		Infiltration to a Water Supply Aquifer	HAGENBUCH RICKY C		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_059		Infiltration to a Water Supply Aquifer	HAGENBUCH RICKY C		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_060		Infiltration to a Water Supply Aquifer	VEGA NELSON ALVELO TR		SEASIDE	10-20	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-06	69
INF_061		Infiltration to a Water Supply Aquifer	BICKEL WILLIAM TR		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_062		Infiltration to a Water Supply Aquifer	HINDS BROTHERS CALIFORNIA LLC		SEASIDE	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_063		Infiltration to a Water Supply Aquifer	HINDS BROTHERS CALIFORNIA LLC		SEASIDE	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_064		Infiltration to a Water Supply Aquifer	ABRAMONTE MADELINE L ET AL		SEASIDE	10-20	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_065		Infiltration to a Water Supply Aquifer	FLORES PAUL H & LINDA S TRS ET AL		SEASIDE	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_066		Infiltration to a Water Supply Aquifer	CORONA KATHERINE D TR ET AL		SEASIDE	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_067		Infiltration to a Water Supply Aquifer	CORONA RAYMOND K		SEASIDE	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_068		Infiltration to a Water Supply Aquifer	RAY GERALD C TR		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_069		Infiltration to a Water Supply Aquifer	SEASIDE SCHOOL DIST		SEASIDE	20-100	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-06	69
INF_070		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	5-10	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_071		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	5-10	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_072		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	5-10	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_073		Infiltration to a Water Supply Aquifer	NEW HOPE BAPTIST CHURCH OF SEASIDE		SEASIDE	10-20	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_074		Infiltration to a Water Supply Aquifer	AILING HOUSE PEST CONTROL		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-07	41

						1. WATER SUPPLY	2. PLANNING LEVEL COST	3. EASE OF IMPLEMENTATION							
													Project Coordination		
WRS Project ID/ SWRP db_index[1]	Included Stakeholder Projects[2]	Project Category[3]	Owner[4]	Project Name[5]	Jurisdiction[6]	Net Recovered Water Volume (AFY)[7]	Unit Project Cost ($/AF)[8]	Financial - Total Capital Cost ($)[9]	Portion Diverted to Sanitary Sewer as Wet Weather Runoff (none, some, most)10	Complexity of Location due to Permitting and Land Acquisition (lower, medium, higher)[11]	Potential Water Quality Constraints (yes, no)[12]	Water Loss Considerations Associated with Hydrogeology (yes, no)[13]	Sanitary Sewer Diversion Destination (CAWD or M1W)[14]	Catchment Name[15]	Number of Identified Project Opportunities in Catchment[16]
INF_075		Infiltration to a Water Supply Aquifer	AUBURNS HOUSE MONTESSORI SCHOOL LLC		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_076		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	20-100	$800-$2,000	$1M-$10M	none	Medium	no	yes	na	CM-07	41
INF_077		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	0-5	$10,000+	<$100k	none	Medium	no	yes	na	CM-07	41
INF_078		Infiltration to a Water Supply Aquifer	CENTRAL CALIFORNIA CONF ASSOC		SEASIDE	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_079		Infiltration to a Water Supply Aquifer	ABRAMONTE MADELINE L TR		SEASIDE	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_080		Infiltration to a Water Supply Aquifer	1533 KIMBALL AVE LLC		SEASIDE	10-20	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-07	41
INF_081		Infiltration to a Water Supply Aquifer	GUNIA DOLORES TR		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_082		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_083		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE CITY HALL		SEASIDE	10-20	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_084		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	10-20	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-07	41
INF_085		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	5-10	$5,000-$10,000	$100k-$1M	none	Medium	no	yes	na	CM-07	41
INF_086		Infiltration to a Water Supply Aquifer	MONTEREY CITY SCHOOL DIST		SEASIDE	0-5	$5,000-$10,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_087		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	0-5	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_088		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_089		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	0-5	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_090		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	10-20	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-06	69
INF_091		Infiltration to a Water Supply Aquifer	MONTEREY CITY SCHOOL DIST		SEASIDE	20-100	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-06	69
INF_092		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	10-20	$800-$2,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_093		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	10-20	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-06	69
INF_094		Infiltration to a Water Supply Aquifer	MONTEREY CITY SCHOOL DISTRICT		SEASIDE	10-20	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-06	69
INF_095		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	10-20	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-06	69
INF_096		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	10-20	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-06	69
INF_097		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	10-20	$2,000-$5,000	$1M-$10M	none	Medium	no	yes	na	CM-06	69
INF_098		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	CM-06	69
INF_DW_SEA		Infiltration to a Water Supply Aquifer	na	Dry Well Catch Basin Retrofit Program - Seaside Aquifer	SEASIDE	20-100	$5,000-$10,000	$10M+	none	Higher	no	yes	na	na	na
INF_planned_19	Del Monte Manor Park Infiltration	Infiltration to a Water Supply Aquifer	DEL MONTE MANOR INC		SEASIDE	10-20	$2,000-$5,000	$1M-$10M	none	Lower	no	yes	na	CM-06	69
CU_075		Capture and Use	ROBERT LOUIS STEVENSON SCHOOL		UNINCORPORATED	0-5	$10,000+	$1M-$10M	none	Higher	no	no	na	CM-41	2
CU_079		Capture and Use	CARMEL UNIFIED SCHOOL DISTRICT		UNINCORPORATED	20-100	$10,000+	$10M+	none	Medium	no	no	na	Carmel River	36
CU_080		Capture and Use	THE TRUST FOR PUBLIC LAND	Rancho Canada Golf Club	UNINCORPORATED	20-100	$2,000-$5,000	$1M-$10M	none	Lower	no	no	na	Carmel River	36
CU_081		Capture and Use	WEINMAN LOIS TR	Quail Lodge Resort and Golf Club	UNINCORPORATED	20-100	$2,000-$5,000	$1M-$10M	none	Lower	no	no	na	Carmel River	36
CU_082		Capture and Use	HARDING PETER MARTIN & MARGARET LOUIS TRS		UNINCORPORATED	0-5	$10,000+	$1M-$10M	none	Medium	no	no	na	Carmel River	36
CU_083		Capture and Use	CARMEL UNIFIED SCHOOL DIST		UNINCORPORATED	0-5	$10,000+	$100k-$1M	none	Medium	no	no	na	Carmel River	36
CU_planned_01	Pebble Beach Drainage Storm Drain Retrofit	Capture and Use	GOVT LAND		UNINCORPORATED	0-5	$10,000+	$1M-$10M	none	Higher	no	no	na	CM-37	1
DSS_07	Former Fort Ord Stormwater Outfall Closure	Diversion to Sanitary Sewer	MONTEREY ONE WATER	Fort Ord Treatment Plant Pump Station	UNINCORPORATED	20-100	$2,000-$5,000	$1M-$10M	none	Higher	no	no	M1W	na	na
INF_111		Infiltration to a Water Supply Aquifer	NORTH SHORE TOWER COMPANY LLC		UNINCORPORATED	0-5	$10,000+	<$100k	none	Medium	no	yes	na	Carmel River	36
INF_112		Infiltration to a Water Supply Aquifer	NORTH SHORE TOWER COMPANY LLC		UNINCORPORATED	0-5	$10,000+	<$100k	none	Medium	no	yes	na	Carmel River	36
INF_113		Infiltration to a Water Supply Aquifer	SYCAMORE STABLES LLC		UNINCORPORATED	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	Carmel River	36
INF_114		Infiltration to a Water Supply Aquifer	MAINO PATRICIA TR		UNINCORPORATED	10-20	$10,000+	$1M-$10M	none	Medium	no	yes	na	Carmel River	36
INF_115		Infiltration to a Water Supply Aquifer	KAMINSKE ROY TR ET AL		UNINCORPORATED	5-10	$5,000-$10,000	$1M-$10M	none	Medium	no	yes	na	Carmel River	36
INF_116		Infiltration to a Water Supply Aquifer	TAVAKOLIAN MOJTABA & MOHAMADPOUR-JASEM NASSIME		UNINCORPORATED	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	Carmel River	36
INF_117		Infiltration to a Water Supply Aquifer	PICARD JOHN R & RUTH F TRS		UNINCORPORATED	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	Carmel River	36
INF_118		Infiltration to a Water Supply Aquifer	MANNING MARGARET ANN TR		UNINCORPORATED	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	Carmel River	36
INF_119		Infiltration to a Water Supply Aquifer	MANNING MARGARET ANN TR		UNINCORPORATED	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	Carmel River	36
INF_120		Infiltration to a Water Supply Aquifer	MANNING MARGARET ANN TR		UNINCORPORATED	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	Carmel River	36
INF_121		Infiltration to a Water Supply Aquifer	MANNING MARGARET ANN TR		UNINCORPORATED	5-10	$2,000-$5,000	$100k-$1M	none	Medium	no	yes	na	Carmel River	36
INF_122		Infiltration to a Water Supply Aquifer	ONE LANTERN LLC		UNINCORPORATED	0-5	$5,000-$10,000	$100k-$1M	none	Medium	no	yes	na	Carmel River	36
INF_123		Infiltration to a Water Supply Aquifer	CARMEL UNIFIED SCHOOL DIST		UNINCORPORATED	5-10	$5,000-$10,000	$1M-$10M	none	Medium	no	yes	na	Carmel River	36
INF_124		Infiltration to a Water Supply Aquifer	CANADA WOODS LLC		UNINCORPORATED	10-20	$5,000-$10,000	$1M-$10M	none	Medium	no	yes	na	Carmel River	36
INF_125		Infiltration to a Water Supply Aquifer	CANADA WOODS LLC		UNINCORPORATED	5-10	$5,000-$10,000	$1M-$10M	none	Medium	no	yes	na	Carmel River	36
INF_126		Infiltration to a Water Supply Aquifer	WOLTER PROPERTIES LP		UNINCORPORATED	0-5	$5,000-$10,000	$100k-$1M	none	Medium	no	yes	na	Carmel River	36
INF_127		Infiltration to a Water Supply Aquifer	WOLTER PROPERTIES LP		UNINCORPORATED	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	Carmel River	36
INF_128		Infiltration to a Water Supply Aquifer	WOLTER PROPERTIES LP		UNINCORPORATED	0-5	$5,000-$10,000	$100k-$1M	none	Medium	no	yes	na	Carmel River	36
INF_129		Infiltration to a Water Supply Aquifer	WOLTER PROPERTIES LP		UNINCORPORATED	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	Carmel River	36
INF_130		Infiltration to a Water Supply Aquifer	CANADA WOODS LLC		UNINCORPORATED	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	Carmel River	36
INF_131		Infiltration to a Water Supply Aquifer	ALGM LLC		UNINCORPORATED	0-5	$10,000+	$100k-$1M	none	Medium	no	yes	na	Carmel River	36
INF_DW_CV		Infiltration to a Water Supply Aquifer	na	Dry Well Catch Basin Retrofit Program - Carmel Valley Aquifer	UNINCORPORATED	20-100	$2,000-$5,000	$1M-$10M	none	Higher	no	yes	na	na	na
INF_planned_17	Carmel River Floodplain Restoration and Environmental Enhancement (CRFREE)	Infiltration to a Water Supply Aquifer	BIG SUR LAND TRUST THE		UNINCORPORATED	10-20	$10,000+	$10M+	none	Higher	yes	yes	na	Carmel River	36
INF_planned_71	Whalers Cove Parking Lot Stormwater BMP Project	Infiltration to a Water Supply Aquifer	STATE OF CALIFORNIA		UNINCORPORATED	0-5	$10,000+	$100k-$1M	none	Higher	no	yes	na	BP-2	1
INF_TRIB_1		Infiltration to a Water Supply Aquifer	THE TRUST FOR PUBLIC LAND		UNINCORPORATED	10-20	$5,000-$10,000	$1M-$10M	none	Medium	yes	yes	na	Carmel River	36
INF_TRIB_2		Infiltration to a Water Supply Aquifer	ONE LANTERN LLC, WRIGHT RONALD DOUGLAS		UNINCORPORATED	0-5	$10,000+	$100k-$1M	none	Medium	yes	yes	na	Carmel River	36
INF_TRIB_3		Infiltration to a Water Supply Aquifer	LUTES LEO GORDON & KATHLEEN		UNINCORPORATED	10-20	$5,000-$10,000	$1M-$10M	none	Medium	yes	yes	na	Carmel River	36
INF_TRIB_4		Infiltration to a Water Supply Aquifer	KAMINSKE ROY TR ET AL, TAVAKOLIAN MOJTABA & MOHAMADPOUR-JASEM NASSIME		UNINCORPORATED	5-10	$5,000-$10,000	$1M-$10M	none	Medium	yes	yes	na	Carmel River	36
INF_TRIB_5		Infiltration to a Water Supply Aquifer	CANADA WOODS LLC, WOLTER PROPERTIES LP, ALGM LLC		UNINCORPORATED	20-100	$5,000-$10,000	$10M+	none	Medium	yes	yes	na	Carmel River	36
INF_TRIB_6		Infiltration to a Water Supply Aquifer	MAINO PATRICIA TR, MOODY MICHAEL M TR		UNINCORPORATED	5-10	$5,000-$10,000	$1M-$10M	none	Medium	yes	yes	na	Carmel River	36
LR_01		Lakes / Reservoirs	na	County and Private Pond	UNINCORPORATED	20-100	$2,000-$5,000	$1M-$10M	Most	Higher	no	no	M1W	CM-07	41
LR_06		Lakes / Reservoirs	na	Laguna Seca	UNINCORPORATED	20-100	<$800	$100k-$1M	none	Higher	no	yes	na	CM-07	41
LR_07		Lakes / Reservoirs	na	Laguna Seca Golf Ranch	UNINCORPORATED	20-100	<$800	<$100k	none	Higher	no	no	na	CM-07	41
LR_10		Lakes / Reservoirs	na	Nicklaus Club - Monterey	UNINCORPORATED	5-10	<$800	<$100k	none	Higher	no	no	na	CM-07	41
LR_13		Lakes / Reservoirs	na	Santa Lucia Conservancy	UNINCORPORATED	10-20	<$800	<$100k	none	Higher	no	no	na	Carmel River	36
LR_14		Lakes / Reservoirs	na	Los Padres Reservoir	UNINCORPORATED	100+	$10,000+	$10M+	none	Higher	no	no	na	Carmel River	36

Notes:

[1]Unique index key for Water Recovery Study and Stormwater Resource Plan projects using project category as prefix - Capture and Use (CU), Infiltration to a Water Supply Aquifer (INF), Diversion to Sanitary Sewer (DSS), and Lakes and Reservoirs (LR). Used for database management when referring to a specific Water Recovery Study and Stormwater Resouce Plan project.

[2]Named stakeholder project is a part of the project opportunity identified.

[3]Project Category

Capture and Use - includes potential projects that collect and store runoff for irrigation demand onsite.

Infiltration to Water Supply Aquifer - includes opportunities to capture and percolate runoff into groundwater basins used for water supply.

Lake / Reservoir - includes potential projects where existing surface water impoundments with substantial tributary area can detain and recover additional runoff via infiltration to a water supply aquifer, capture and use, and/or diversion to the sanitary sewer system.

Diversion to Sanitary Sewer - includes potential projects where storm drains or streams can be retrofitted to divert runoff into the sanitary sewer system for treatment and reuse.

[4]Parcel owner name, as received from the Monterey County Assessor's Office on November 17, 2017.

[5]Name of the project -- applies only to Lake / Reservoir, Diversion to Sanitary Sewer projects, and golf courses.

[6]Jurisdiction within which project is located (i.e., all projects physically located within the City of Seaside have a "SEASIDE" jurisdiction designation).

[7]The estimated amount of annual runoff that could potentially be recovered at the project site to augment water supply, provided as range (acre-feet per year). Ranges provided include 0 - 5 ac-ft/yr; 5 - 10 ac-ft/yr; 10 - 20 ac-ft/yr; 20 - 100 ac-ft/yr; and 100+ ac-ft/yr. Estimated Net Recovery Volume was calculated assuming there are no other Water Recovery Study projects implemented in the area tributary to the project.

						1. WATER SUPPLY	2. PLANNING LEVEL COST	3. EASE OF IMPLEMENTATION							
													Project Coordination		
WRS Project ID/ SWRP db_index[1]	Included Stakeholder Projects[2]	Project Category[3]	Owner[4]	Project Name[5]	Jurisdiction[6]	Net Recovered Water Volume (AFY)[7]	Unit Project Cost ($/AF)[8]	Financial - Total Capital Cost ($)[9]	Portion Diverted to Sanitary Sewer as Wet Weather Runoff (none, some, most)10	Complexity of Location due to Permitting and Land Acquisition (lower, medium, higher)[11]	Potential Water Quality Constraints (yes, no)[12]	Water Loss Considerations Associated with Hydrogeology (yes, no)[13]	Sanitary Sewer Diversion Destination (CAWD or M1W)[14]	Catchment Name[15]	Number of Identified Project Opportunities in Catchment[16]

[8]Planning level estimate of unit project cost (dollars per acre-foot runoff volume recovered per year) for an assumed design life of 30 years provided as range. Ranges provided include <$800/ac-ft (lower range for traditional water supply); $800 - $2,000/ac-ft (upper range for traditional water supply); $2,000 - $5,000/ac-ft (range for desalination); $5,000 - $10,000/ac-ft; and $10,000+/ac-ft. Planning level cost estimates include capital and operational costs for pre-treatment, storage, pumps, electrical power, purchase/lease of private property, and sewer connection fees, where applicable.

[9]Total estimated planning level capital cost (dollars) for the project, provided as a range, with an assumed design life of 30 years. Ranges provided include <$100k; $100k - $1M; $1M - $10M; and $10M+.

[10]Assumed portion of runoff diverted to the sanitary sewer as wet weather runoff - none, some (less than half), or most (more than half).

[11]Complexity of project implementation at location due to potential permitting and land acquisition (lower, medium, or higher).

[12]Includes projects identified to have potential water quality constraints, such as high salinity or total suspended solids, which would limit the ability to treat stormwater or dry weather runoff at the Regional Treatment Plant. This field may not identify all potential water quality constraints present.

[13]Project includes water loss considerations associated with hydrologeology, identified as infiltration projects that overlie a water supply aquifer.

[14]Final destination of projects with sanitary sewer diversions at either the Carmel Area Wastewater District or Monterey One Water. Applies to Diversion to Sanitary Sewer and Lakes and Reservoir projects. (Projects with the same wastewater treatment plant destination could be combined to create a regional water supply recovery and reclamation system; they were not combined for the purposes of this study).

[15]Name of catchment within which project is located. Catchments were delineated using TELR and NHD+ catchments and are defined based on outlets to the ocean. Projects within the same catchment may be combined to create a regional water supply recovery and reclamation system. *Note that if multiple projects are implemented within the same catchment the estimated Water Supply Volume Recovered could be affected.*

[16]Number of identified project opportunities in the catchment.

APPENDIX D
List of Public Parcel Owners Screened for Potential City Hall Buildings and Schools

Land Use Code	Owner
7A	CALIFORNIA STATE UNIVERSITY MONTEREY BAY
	CALIVORNIA STATE UNIVERSITY MONTEREY BAY
	CARMEL BY THE SEA PUBLIC
	CARMEL SCHOOL DIST
	CARMEL UNIFIED SCHOOL DIST
	CARMEL UNIFIED SCHOOL DISTRICT
	CARMEL UNIFIED SCOOL DISTRICT
	CARMELO SCHOOL DISTRICT
	CITY OF CARMEL
	CITY OF CARMEL BY THE SEA
	CITY OF CARMEL-BY-THE-SEA
	CITY OF DEL REY OAKS
	CITY OF DEL REY OAKS CITY HALL
	CITY OF DEL REY OAKS THE
	CITY OF MARINA
	CITY OF MONTEREY
	CITY OF MONTEREY THE
	CITY OF PACIFIC GROVE
	CITY OF SAND
	CITY OF SAND CITY
	CITY OF SEASIDE
	CITY OF SEASIDE CITY HALL
	CITY OF SEASIDE THE
	COUNTY OF MONTEREY
	COUNTY OF MONTEREY THE
	CSUMB
	MARINA CITY OF
	MONTEREY CITY SCHOOL DIST
	MONTEREY CITY SCHOOL DISTRICT
	MONTEREY COUNTY
	MONTEREY PEN UNIFIED SCH DIST
	MONTEREY PENINSUAL UNIFIED SCHOOL DISTRICT
	MONTEREY PENINSULA COMMUNITY COLLEGE DISTRICT
	MONTEREY PENINSULA UNIFIED
	MONTEREY PENINSULA UNIFIED SCHLDISTRICT
	MONTEREY PENINSULA UNIFIED SCHOOL
	MONTEREY PENINSULA UNIFIED SCHOOL DIST
	MONTEREY SCHOOL DIST
	MONTEREY UNION HIGH SCHOOL
	MTY CITY SCHOOL DIST & MTY
	MTY PENINSULA JR COLLEGE DIST
	ORD TERRACE SCHOOL
	PACIFIC GROVE HIGH SCHOOL DIST
	PACIFIC GROVE SCHOOL DIST
	PACIFIC GROVE UNIFIED SCHOOL
	PACIFIC GROVE UNIFIED SCHOOL DISTRICT
	SAND CITY CITY HALL
	SEASIDE SCHOOL DIST
	THE CITY OF MONTEREY
	THE CITY OF SAND CITY
	THE CITY OF SEASIDE
	TRUSTEES OF THE CALIFORNIA STATE UNIVERSITY
	U S NAVY GENERAL LINE SCHOOL
7B	CITY OF CARMEL-BY-THE-SEA
	CITY OF MONTEREY
	CITY OF MONTEREY & COUNTY OF MONTEREY
	CITY OF SEASIDE

APPENDIX E
Suggested Shortlist of Water Recovery Projects

Appendix E: Suggested shortlist of 26 projects which have the highest estimated net recovered water volume (>20 AFY) and lowest unit project cost (<$5,000/AF).

WRS Project ID	Includes Stakeholder Project	Project Category	Owner	Project Name	Jurisdiction	Net Recovered Water Volume (AFY)	Unit Project Cost ($/AF)	Financial - Total Capital Cost ($)
Net Recovered Water Volume 100+ AFY								
LR_03	Lake Del Monte Outflow Diversion; Lake Del Monte Outfall Replacement; Del Monte Lake Storm Water Diversion	Lake / Reservoir	na	Lake Del Monte	MONTEREY	100+	<$800	$100k-$1M
LR_04	Lake El Estero/Whasherwomen's Pond Storm Water Diversion; Pearl Street/Figurao Box Culvert Diversion; Navy Lake and Washerwomen's Pond Outlet	Lake / Reservoir	na	Lake El Estero	MONTEREY	100+	<$800	$100k-$1M
LR_12	Laguna Grande Well Upgrades; Laguna Grande Water Recovery	Lake / Reservoir	na	Roberts Lakes / Laguna Grande	MONTEREY	100+	<$800	$100k-$1M
DSS_planned_60	Pacific Grove-Monterey ASBS Wet-Dry Weaterth Storm Water Capture and Diversion Project	Diversion to Sanitary Sewer	na	Pump Station #11	MONTEREY	100+	$800-$2,000	$1M-$10M
DSS_04	City of Monterey Tunnel & Calle Principal Storm Water Diversion	Diversion to Sanitary Sewer	MONTEREY ONE WATER	Monterey Pump Station	MONTEREY	100+	$2,000-$5,000	$1M-$10M
Net Recovered Water Volume 20-100 AFY								
LR_06		Lake / Reservoir	na	Laguna Seca	UNINCORPORATED	20-100	<$800	$100k-$1M
LR_07		Lake / Reservoir	na	Laguna Seca Golf Ranch	UNINCORPORATED	20-100	<$800	<$100k
LR_08		Lake / Reservoir	na	Monterey Peninsula Regional	DEL REY OAKS	20-100	<$800	$100k-$1M
LR_planned_79	New Detention Behind Safeway	Lake / Reservoir	CITY OF DEL REY OAKS		DEL REY OAKS	20-100	<$800	$100k-$1M
CU_054		Capture and Use	CITY OF SEASIDE		SEASIDE	20-100	$800-$2,000	$1M-$10M
DSS_08	4th Avenue Dry Weather Diversion Pilot; South Carmel Dry Weather Diversion; Scenic Road Dry-Weather Diversion	Diversion to Sanitary Sewer	na	Scenic & 8th Pump Station	CARMEL BY-THE-SEA	20-100	$2,000-$5,000	$1M-$10M
DSS_planned_51	Hartnell Gulch Creek Restoration and Storm Water Diversion	Diversion to Sanitary Sewer	CITY OF MONTEREY		MONTEREY	20-100	$800-$2,000	$1M-$10M
INF_022		Infiltration to a Water Supply Aquifer	SEASIDE SCHOOL DIST		SEASIDE	20-100	$800-$2,000	$1M-$10M
INF_076		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	20-100	$800-$2,000	$1M-$10M
CU_044		Capture and Use	PEBBLE BEACH COMPANY	Del Monte Golf Course	MONTEREY	20-100	$2,000-$5,000	$1M-$10M
CU_080		Capture and Use	THE TRUST FOR PUBLIC LAND	Rancho Canada Golf Club	UNINCORPORATED	20-100	$2,000-$5,000	$1M-$10M
CU_081		Capture and Use	WEINMAN LOIS TR	Quail Lodge Resort and Golf Club	UNINCORPORATED	20-100	$2,000-$5,000	$1M-$10M
CU_085		Capture and Use	U S A	Monterey Pines Golf Club	MONTEREY	20-100	$2,000-$5,000	$1M-$10M
DSS_06	Del Monte Blvd Storm Drain Diversion	Diversion to Sanitary Sewer	MONTEREY ONE WATER	Seaside Pump Station #23	SEASIDE	20-100	$2,000-$5,000	$1M-$10M
DSS_07		Diversion to Sanitary Sewer	MONTEREY ONE WATER		UNINCORPORATED	20-100	$2,000-$5,000	$1M-$10M
INF_023		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	20-100	$2,000-$5,000	$1M-$10M
INF_030		Infiltration to a Water Supply Aquifer	CITY OF SEASIDE		SEASIDE	20-100	$2,000-$5,000	$1M-$10M
INF_069		Infiltration to a Water Supply Aquifer	SEASIDE SCHOOL DIST		SEASIDE	20-100	$2,000-$5,000	$1M-$10M
INF_091		Infiltration to a Water Supply Aquifer	MONTEREY CITY SCHOOL DIST		SEASIDE	20-100	$2,000-$5,000	$1M-$10M
INF_DW_CV		Infiltration to a Water Supply Aquifer	na	Dry Well Catch Basin Retrofit Program - Carmel Valley Aquifer	UNINCORPORATED	20-100	$2,000-$5,000	$1M-$10M
LR_01		Lake / Reservoir	na	County and Private Pond	UNINCORPORATED	20-100	$2,000-$5,000	$1M-$10M

APPENDIX E
Project Database

APPENDIX E: PROJECT DATABASE

This Appendix includes the Monterey Peninsula SWRP Project Database as a separate Excel file titled, “Appendix E_MontereyPeninsulaSWRP ProjectDatabase (07-22-19).xlsx.”

The project request sent to cooperating entities, interested parties, and stakeholders to identify planned projects in the region is provided on the next page.

* * * *

Required: General Facility Information					Required for Regional Projects: Facility Drainage Area Information - estimate area in acres, as list of APN values, or indicate that a GIS shapefile has been provided					Optional: Additional Project Information				Optional: Facility Sizing Information (If known)					Optional: Facility Benefits (indicate "true" for all that apply)					Optional: Notes
Project Name	Project Jurisdiction or Proponents	Project Location (APN or list of APNs separated by commas; or indicate if provided in GIS file, with file name)	Facility Type (Select)	Facility Type (write in if "other" selected)	Drainage Area (acres)	Drainage Area (as list of APNs, separated by commas)	Drainage Area in GIS Shapefile (T/F)	Drainage Area GIS Shapefile name	Imperviousness of Drainage Area (as %)	Project Description	Planning Stage (select)	Anticipated Completion Date (mm/yy)	Project Scale (select)	Facility Infiltration Information	Underlying Soil Type (select)	Facility Sizing Criteria (select)	Facility Sizing Criteria (description)	Facility Volume (acft)	Water Quality	Water Supply	Flood Management	Environmental	Community	Other Comments/ Notes?

APPENDIX F
Project Concept Designs

APPENDIX F: PROJECT CONCEPT DESIGNS

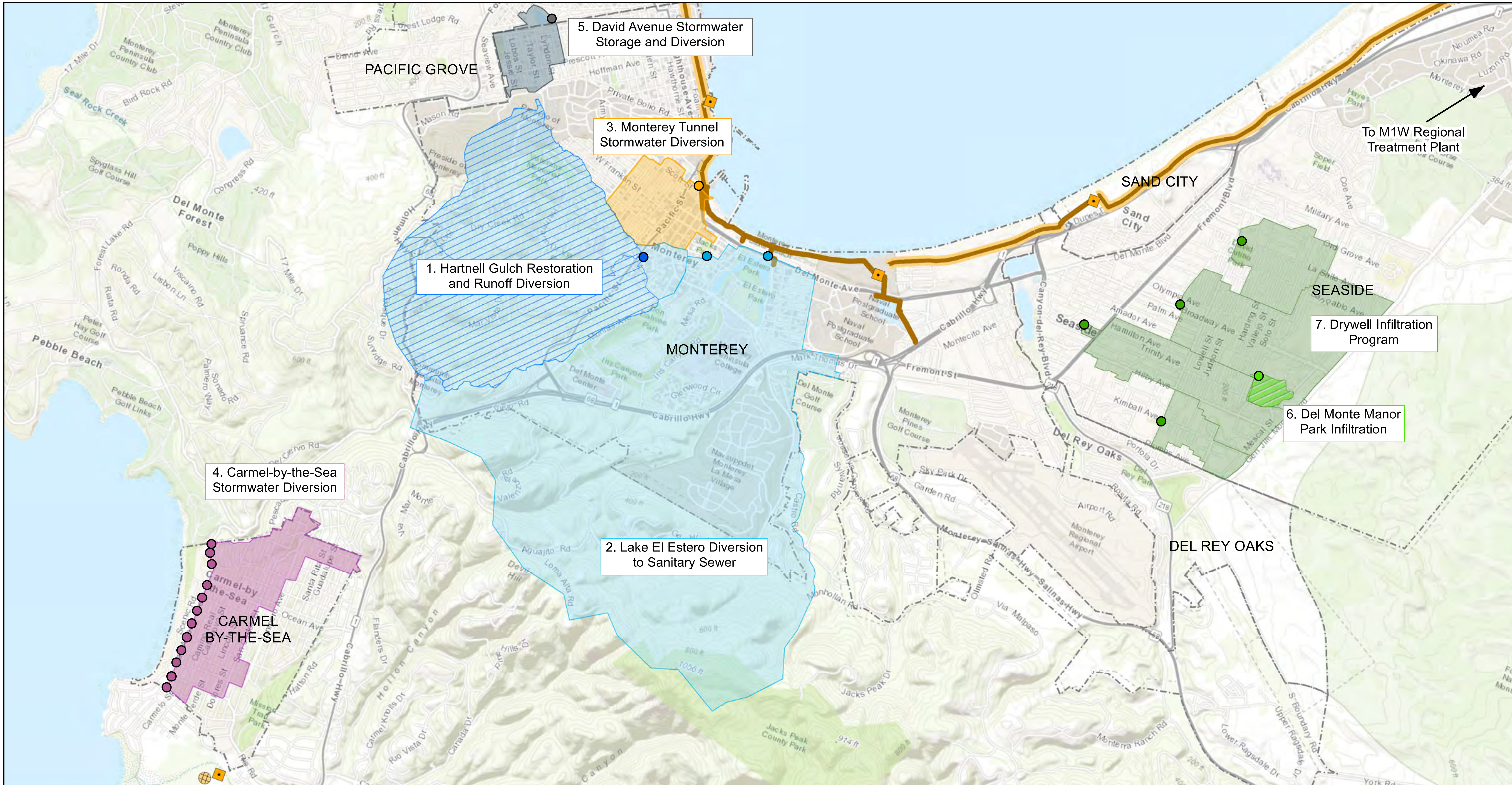
This appendix presents proposed project concept designs for six of the seven project opportunities selected for concept design. Projects were selected as summarized in SWRP section 6.3. All seven selected projects are summarized in Table F-1. The page number of this appendix corresponding to each concept design is also provided.

Table F-1: Monterey Peninsula Stormwater Resource Plan Project Concepts

Permittee	Project Name	Project Type	Page Number
Monterey	1. Hartnell Gulch Restoration and Runoff Diversion	Stream restoration and diversion to the sanitary sewer	App. G
Monterey	2. Lake El Estero Diversion to Sanitary Sewer	Lake capture and diversion to the sanitary sewer	F-3
Monterey	3. Monterey Tunnel Stormwater Diversion	Diversion from the storm drain network to the sanitary sewer	F-10
Carmel-by-the-Sea	4. Carmel-by-the-Sea Stormwater Diversion	Diversion from surface ditches and the storm drain network to the sanitary sewer	F-14
Pacific Grove and Monterey	5. Pacific Grove Monterey ASBS Watershed – David Avenue Stormwater Storage and Diversion	Stormwater capture and storage under a new community park and diversion to the sanitary sewer	F-20
Seaside	6. Del Monte Manor Park Infiltration	Bioswale and a bioretention facility in a housing complex park	F-28
Seaside (with regional partners)	7. Dry Well Aquifer Recharge Program	Distributed dry well program to infiltrate runoff from residential neighborhoods to water supply aquifers in the Seaside Groundwater Basin	F-40

The proposed project concept for project 1, Hartnell Gulch Restoration and Runoff Diversion is provided in Appendix G. Concept designs for projects 2 through 7 are provided in this appendix.

An overview map of the proposed project locations and the drainage areas is provided as Figure 1. A description of the development of the concept project designs, including sizing information and quantification of project benefits, is provided in Section 6.4 of the Monterey Peninsula SWRP.



Proposed Project Locations

- 1. Hartnell Gulch Restoration and Runoff Diversion
- 2. Lake El Estero Diversion to Santiary Sewer
- 3. Monterey Tunnel Stormwater Diversion
- 4. Carmel-by-the-Sea Stormwater Diversion
- 5. David Avenue Stormwater Storage and Diversion
- 6. Del Monte Manor Park Infiltration
- 7. Drywell Infiltration Program

Proposed Project Drainage Area

- 1. Hartnell Gulch Restoration and Runoff Diversion
- 2. Lake El Estero Diversion to Sanitary Sewer
- 3. Monterey Tunnel Stormwater Diversion
- 4. Carmel-by-the-Sea Stormwater Diversion
- 5. David Avenue Stormwater Storage and Diversion
- 6. Del Monte Manor Park Infiltration
- 7. Drywell Infiltration Program
- Pump Station

- Carmel Area Wastewater Treatment Facility
- M1W Interceptor Pipeline - Gravity
- M1W Interceptor Pipeline - Pressurized
- City Limits

N

0 1 Miles

Monterey Peninsula SWRP
Concept Project Locations
Overview Map

Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants

Monterey One Water
Providing Cooperative Water Solutions

Figure 1

Oakland, CA | September 2018

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2. LAKE EL ESTERO DIVERSION TO SANITARY SEWER

SITE DESCRIPTION

Jurisdiction:	City of Monterey
Location:	Northern boundary of Lake El Estero, near the intersection of Del Monte Ave and Camino Aguajito
Land Owner:	City of Monterey
Catchment[1]:	CM-10 and CM-11

PROJECT CONCEPT

The proposed Lake El Estero Diversion Project in the City of Monterey consists of two components: reconnection of a box culvert at Pearl and Figueroa Street (west of the lake) to divert runoff from Hartnell Gulch watershed to Lake El Estero; and diversion of lake water on the north side of Lake El Estero to sanitary sewer. The combined drainage area (i.e., Hartnell Gulch watershed and Lake El Estero watershed), located in the City of Monterey, is shown on Figure 2A. The Lake El Estero watershed (2,418 acres) includes residential, commercial, institutional, and undeveloped areas tributary to Lake El Estero (CM-10) and the Hartnell Gulch watershed (1,186 acres) includes residential and undeveloped areas tributary to Hartnell Gulch (CM-11). Drainage in the Hartnell Gulch watershed flows northeastward toward the City center and borders the western edge of the Lake El Estero watershed along Munras Avenue, which becomes Abrego Street to the north. The Lake El Estero watershed flows northward toward the lake. One of the three primary creek channels in the Lake El Estero watershed flows into Laguna Mirada and the other two primary creek channels flow into Washerwoman's Pond. Laguna Mirada and Washerwoman's Pond flow into Lake El Estero through the City of Monterey's underground storm drain network. Currently, a pump station at the north end of Lake El Estero conveys high flows to Monterey Bay so that the lake does not overtop during the wet season.

The locations of the proposed box culvert connection to divert Hartnell Gulch drainage to the lake and the lake sanitary sewer diversion are shown on Figure 2B. The Project would utilize the existing storage capacity of Lake El Estero to detain both wet and dry weather runoff for diversion when demand for recycled water is greatest. Stored lake water would be diverted to the sanitary sewer from April to October for recycling at the Monterey One Water Regional Treatment Plant (RTP) to augment water supply. A pump is proposed to be installed within the existing pump house on the north side of Lake El Estero to pump lake water to a sanitary sewer manhole, located between Del Monte Avenue and Lake El Estero, which connects to the 21-inch diameter gravity sewer main on Del Monte Ave.

[1] See Monterey Peninsula Water Recovery Study Report, Appendix D, Figure 2A Catchment Detail Map.

The greatest water supply benefit using current infrastructure at the RTP is to treat and recycle runoff from the Project drainage area during the dry season, April to October[2], adding to the current lake water recovery mechanisms. Water is currently recovered from Lake El Estero via capture and use because park space and a cemetery surrounding the lake are irrigated with the lake water. If stormwater runoff could be recovered during the wet season, with prior authorization of M1W, then approximately three times the volume of runoff could potentially be recovered through this project. The proposed pump could be designed to accommodate either dry season or wet and dry season pumping. Payment of an adopted interruptible rate would apply.

Additional information for the Lake El Estero pump configuration, an aerial image, and pump house detail are provided as Figure 2C and 2D.

Proposed project is conceptual and subject to change based on future feasibility assessment, funding availability, and/or other information.

DESIGN INFORMATION

Tributary Drainage Area (TDA):	3,671 acres
TDA Imperviousness:	13.6%
TDA Urbanized Area:	2,384 acres
Average Annual Wet Weather Runoff:	500 to 670 acre-feet
Available Live Storage in Lake:	61 acre-feet
Dry Weather Seepage Runoff:	49 acre-feet (April to October)
Dry Weather Nuisance Runoff:	53 to 76 acre-feet (April to October)
Existing Annual Irrigation Use of Lake Water:	39 acre-feet
Sanitary Sewer Diversion Pump Rate:	2,400 gallons per minute

PROJECT BENEFITS

Net Water Volume Recovered:	110 to 140 acre-feet/year
Water Quality Benefits:	Treatment of pollutants in diverted urban stormwater and dry weather flows that currently discharge to Monterey Bay.
Flood Management Benefits:	None anticipated.
Natural Drainage System Benefits:	Removal of urban stormwater and dry weather flows that currently discharge to Monterey Bay, thereby partially restoring natural drainage patterns.
Habitat or Open Space Benefits:	Diversion to the sanitary sewer is anticipated to reduce overflow volumes from the Lake to the beach.
Community Benefits:	Drainage area within the Hartnell Gulch watershed contains a Disadvantaged Community (DAC).

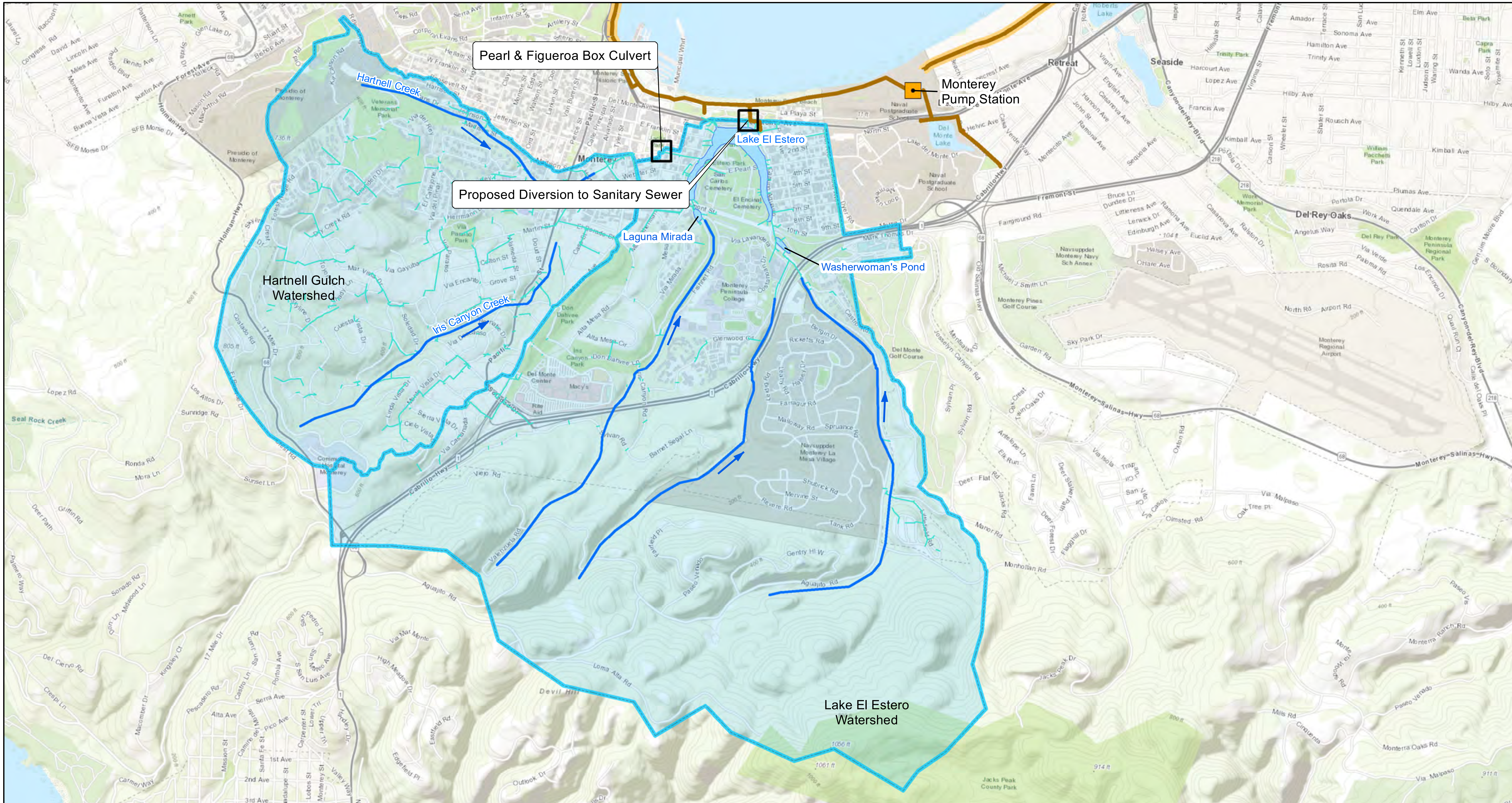
[2] It is less desirable to divert during the wet season with the current infrastructure in place because there are other ample stormwater sources being included into the Pure Water Monterey project.

COST ESTIMATE

Cost estimate is based on the estimated cost of construction for the Lake El Estero Diversion Structure - Pump Option (MRWPCA, 2017)[3] and adjusted to provide costs in 2018 dollars.

DESCRIPTION	COST
Capital Cost	$320,000
Annual Operations and Maintenance Cost[4]	$67,000 per year
Estimated Life Cycle Annual Cost[5]	**$85,000 per year**
Unit Project Cost of Recovered Water	**$620 to $750 per acre-foot**

[3] Monterey Regional Water Pollution Control Agency (MRWPCA). 2017. Pure Water Monterey Groundwater Replenishment Project Consolidated Final Environmental Impact Report. State Clearinghouse No. 2013051094. Addendum No. 3. October 24.
[4] Includes sewer connection fees at the Regional Treatment Plan for the dry season, only.
[5] Assumes 30-year design life at 4% interest rate.



Legend

El Estero Project Drainage Area
Project Map Extent
Stream

Existing Infrastructure

M1W Interceptor Pipeline - Pressurized
M1W Interceptor Pipeline - Gravity
Storm Drain
Pump Station

N

0 4,000 Feet

Lake El Estero Diversion to Sanitary Sewer
Monterey, CA
Catchment Map
Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants
Monterey One Water
Providing Cooperative Water Solutions

Figure
2A

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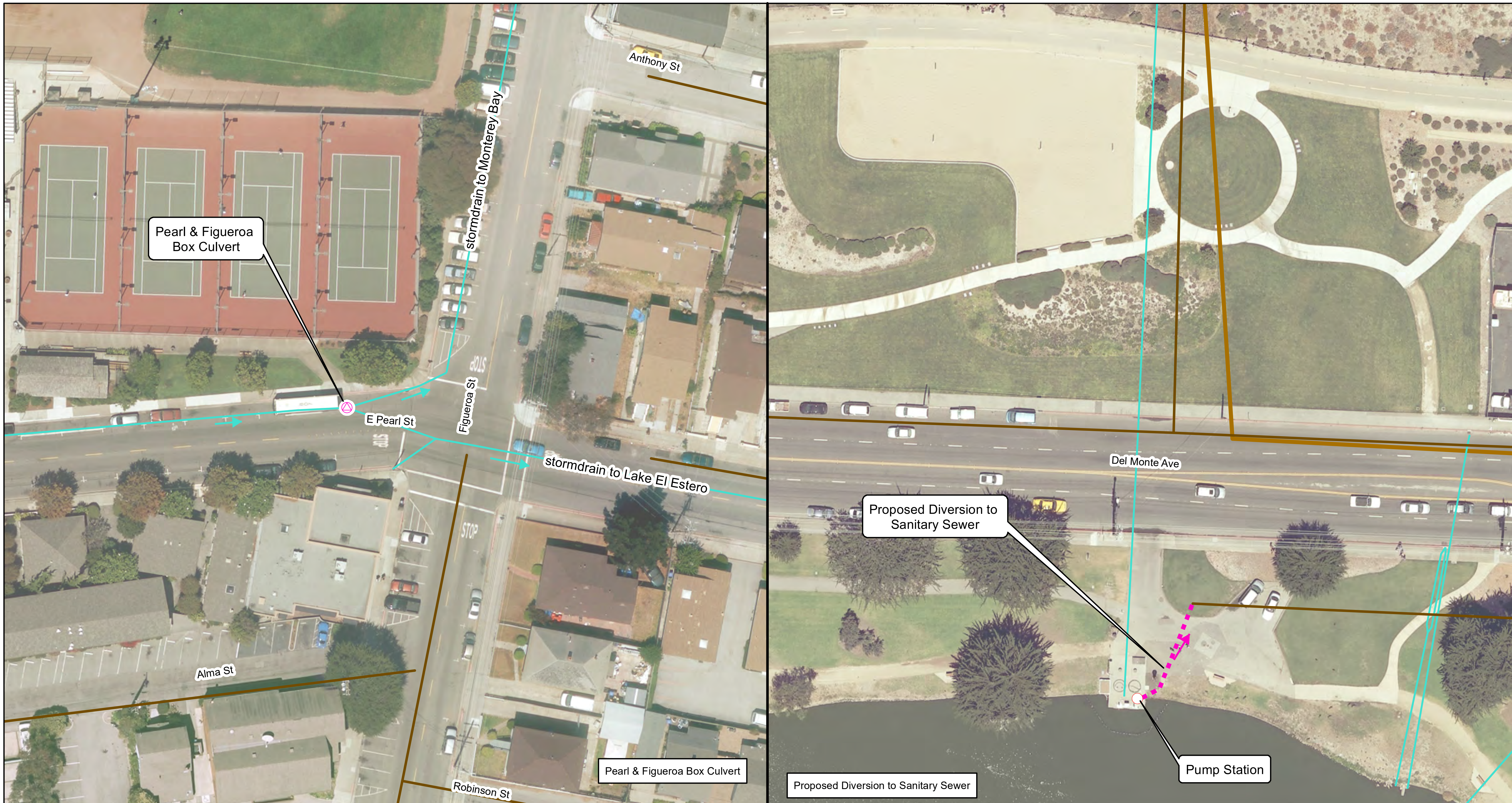

Legend

Existing Infrastructure

- Storm Drain
- Sanitary Sewer
- M1W Interceptor Pipeline - Gravity

Proposed Infrastructure

- Diversion Structure
- Pump
- Discharge to Sanitary Sewer

Lake El Estero Diversion to Sanitary Sewer
Monterey, CA
Project Map
Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants | Monterey One Water Providing Cooperative Water Solutions | **Figure 2B**

Oakland, CA | September 2018

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Figure 3 - Lake El Estero Water Intake Pump Option

Schaaf & Wheeler

Figure 2C
Lake El Estero Pump Option
(Source: Figure 3 from Appendix R of the Pure Water Monterey Groundwater Replenishment Project Consolidated EIR, 2016)

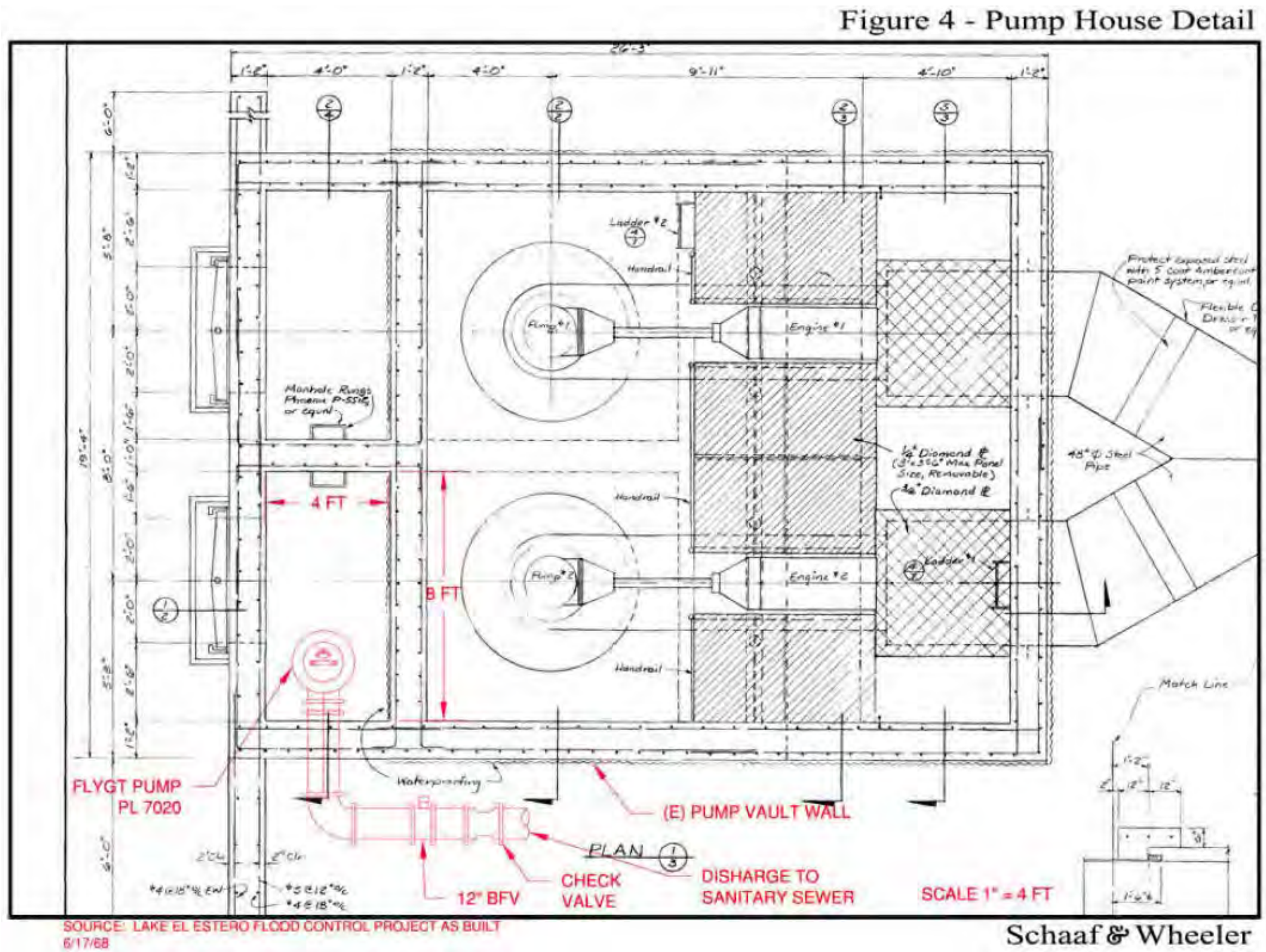


Figure 2D
Lake El Estero Pump House Detail

(Source: Figure 4 from Appendix R of the Pure Water Monterey Groundwater Replenishment Project Consolidated EIR, 2016)

3. MONTEREY TUNNEL STORMWATER DIVERSION PROJECT

SITE DESCRIPTION

Jurisdiction:	City of Monterey
Location:	Northernmost segment of Oliver Street south of Fisherman's Wharf
Land Owner:	City of Monterey right-of-way
Catchment[1]:	CM-13

PROJECT CONCEPT

The proposed Monterey Tunnel Stormwater Diversion Project is located at Oliver Street and Scott Street in the City of Monterey. The drainage catchment to this diversion location is shown on Figure 3A. The catchment includes residential and commercial areas bounded by the Presidio of Monterey to the north, Washington Street to the east, Madison Street and Pearl Street to the south, and Clay Street to the west. Runoff from the upgradient residential area in the western portion of the catchment primarily flows eastward toward Calle Principal and then flows northward toward Fisherman's Wharf. Runoff from the commercial area in the eastern portion of the catchment primarily flows northward toward Fishman's Wharf. Currently, the catchment discharges to Monterey Bay through two ("twin") 51-inch diameters pipes north of Fisherman's Wharf. The project location is on the northernmost segment of Oliver Street, adjacent to Fisherman's Wharf.

The Monterey Tunnel project would involve diverting dry weather flows (April to October), including groundwater seepage (currently not quantified), to the sanitary sewer for recycling at the Monterey One Water Regional Treatment Plant to augment water supply. Dry weather flows from the catchment would be diverted from the 60-inch storm drain system on Oliver Street to the 24-inch sanitary sewer main behind the Custom House Museum, as shown on Figure 3B. A flow diversion structure will redirect dry weather flows via gravity from the storm drain to a proposed new pipe located in the right-of-way along Oliver Street. The proposed pipe would convey flows north and then east to connect with the sanitary sewer main, following the direction of Oliver Street. Because of the coastal location of this project, an assessment of the archeological, cultural, historical, and Native American resources would be completed in future phases of the project.

Proposed project is conceptual and subject to change based on future feasibility assessment, funding availability, and/or other information.

[1] See Monterey Peninsula Water Recovery Study Report, Appendix D, Figure 2A Catchment Detail Map.

DESIGN INFORMATION

Tributary Drainage Area (TDA):	152 acres
TDA Imperviousness:	69%
TDA Urbanized Area:	152 acres
Dry Weather Seepage Runoff:	6 acre-feet (April to October)
Dry Weather Nuisance Runoff:	4 to 6 acre-feet (April to October)
Length of Diversion Pipeline:	230 feet

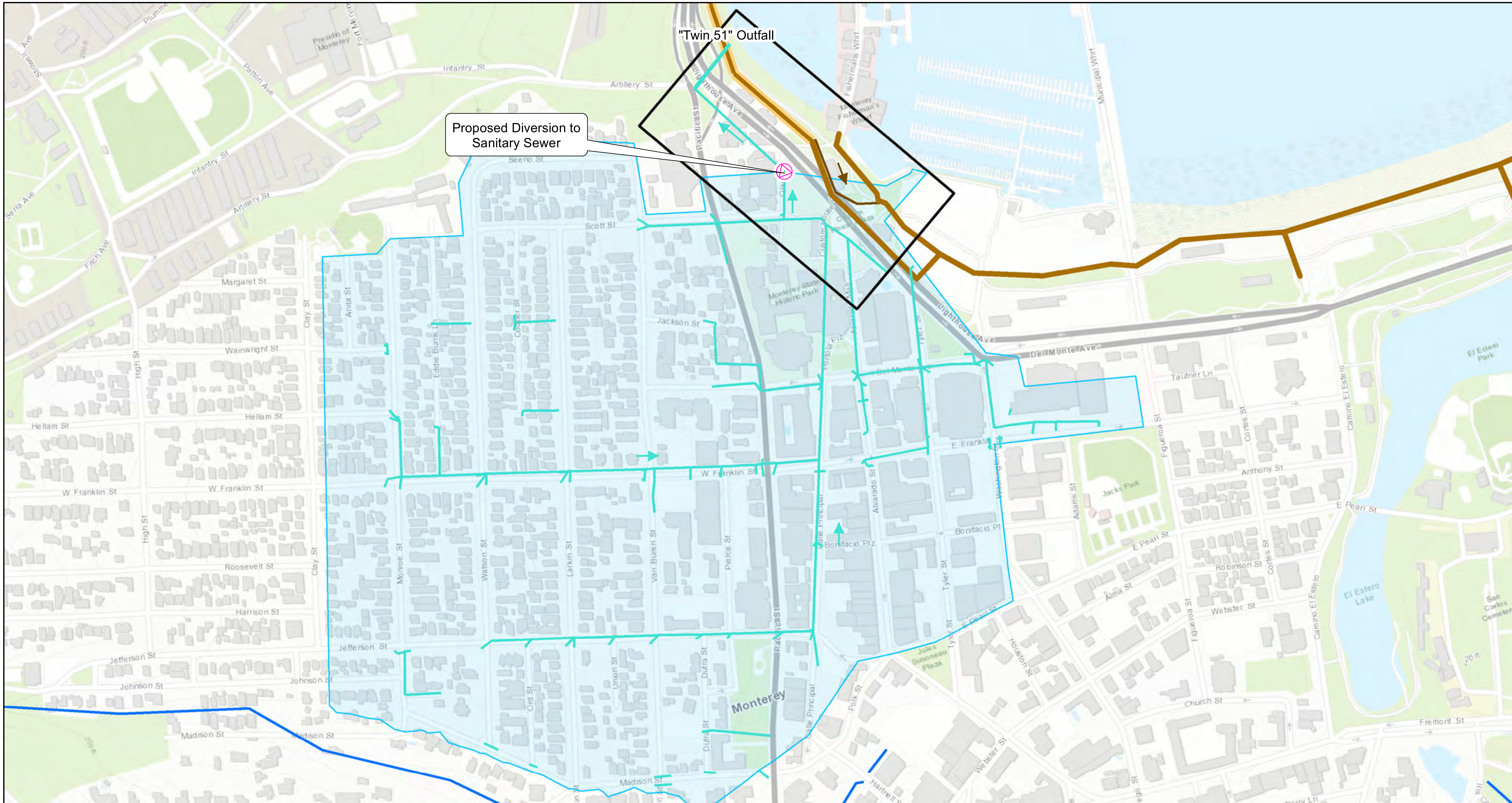
PROJECT BENEFITS

Net Recovered Water Volume:	10 to 12 acre-feet per year (April to October)
Water Quality Benefits	Treatment of pollutants in dry weather flows that currently discharge to Monterey Bay.
Flood Management Benefits:	None anticipated.
Natural Drainage System Benefits:	Removal of dry weather flows that currently discharge to Monterey Bay, thereby partially restoring natural drainage patterns.
Habitat or Open Space Benefits:	Diversion to the sanitary sewer will reduce dry season runoff from the 51-inch outflow pipes that discharge to the beach.
Community Benefits:	Diversion to the sanitary sewer will reduce dry season runoff from the 51-inch outflow pipes that discharge to the beach.

COST ESTIMATE

DESCRIPTION	COST
Capital Cost	$190,000
Annual Operations and Maintenance Cost[2]	$8,000 per year
Estimated Life Cycle Annual Cost[3]	**$19,000 per year**
Unit Project Cost of Recovered Water	**$1,600 to $1,900 per acre-foot**

[2] Includes sewer connection fees at the Regional Treatment Plan for the dry season, only.
[3] Assumes 30-year design life at 4% interest rate.



Legend

- Monterey Tunnel Project Drainage Area
- Project Map Extent

Existing Infrastructure

- M1W Interceptor Pipeline - Pressurized
- M1W Interceptor Pipeline - Gravity
- Sanitary Sewer
- Storm Drain

Proposed Control Measures

- Gravity Diversion Structure

N

0 800 Feet

Monterey Tunnel Stormwater Diversion
Monterey, CA
Catchment Map
Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants | Monterey One Water Providing Cooperative Water Solutions | **Figure 3A**

Oakland, CA | September 2018

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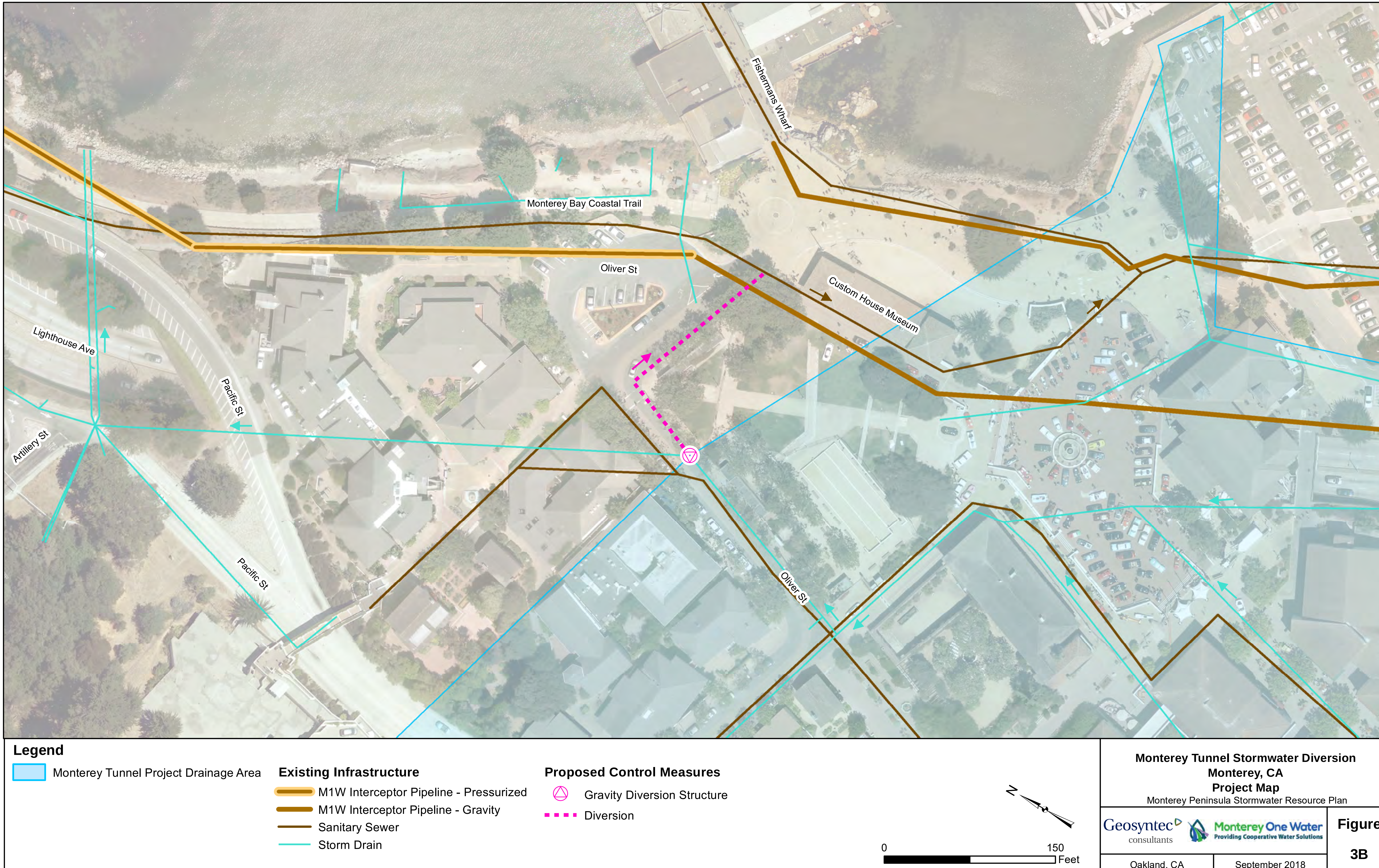

Monterey Tunnel Stormwater Diversion
Monterey, CA
Project Map
Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants | Monterey One Water Providing Cooperative Water Solutions | **Figure 3B**

Oakland, CA | September 2018

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4. CARMEL-BY-THE-SEA STORMWATER DIVERSION PROJECT

SITE DESCRIPTION

Jurisdiction:	City of Carmel-by-the-Sea and Carmel Area Wastewater District
Location:	San Antonio Avenue from Second Avenue south to Santa Lucia Avenue
Land Owner:	City of Carmel-by-the-Sea
Catchment[1]:	CM-42
Numbers of Diversions to Sanitary Sewer:	12

PROJECT CONCEPT

The proposed Carmel-by-the-Sea Stormwater Diversion Project consists of runoff diversions from the existing storm drain located along San Antonio Avenue between Second Avenue south to Santa Lucia Avenue in Carmel-by-the-Sea. The proposed diversion locations and the tributary drainage area is shown on Figure 4A. The drainage area includes residential and commercial areas within the portion of Carmel-by-the-Sea that is bounded by Second Avenue, First Avenue, Vista Avenue and Alta Avenue to the north, San Antonio Avenue to the west, Santa Lucia Avenue to the south, and San Carlos Street, Junipero Avenue, Torres Street, and Monterey Street to the east. Runoff from the tributary catchment area primarily flows westward within surface drainage ditches, shallow pipes at street intersections, and subsurface storm drain pipes within the right-of-way. Currently, collected runoff ultimately discharges into Carmel Bay at multiple locations along Carmel Beach.

The project consists of diverting dry weather runoff (captured between April to October) and the wet weather first flush stormwater runoff event (conservatively estimated as the runoff volume generated from the 85th percentile rainfall event) to the Pebble Beach sanitary sewer main for recycling at the Carmel Area Wastewater District (CAWD) Treatment Plant. The Pebble Beach sanitary sewer main terminates at CAWD Influent Pump Station, which pumps flows directly to the Treatment Plant. Recycled flows are used to augment water supply for irrigation purposes at the Pebble Beach golf courses located in Del Monte Forest (see Figure 1).

Flows would be diverted from the tributary drainage area at intersections along San Antonio Avenue as shown on Figure 4B. Surface runoff would be redirected via gravity from existing storm drains or shallow subsurface pipes using newly installed diversion pipes to the 27-inch diameter sanitary sewer main located below San Antonio Avenue (examples shown on Figure 4C), which discharges to the Pebble Beach sanitary sewer main. Pretreatment for trash and sediment would be installed at each diversion location to address regulatory requirements for trash control and to minimize stormwater solids entering the sewer system. Diversions would occur by installing an automated control system within existing storm drain and/or sanitary sewer manholes. A control

[1] See Monterey Peninsula Water Recovery Study Report, Appendix D, Figure 2A Catchment Detail Map.

valve and check valve would be installed on the diversion pipeline to ensure that the connection to the sewer main is functional only when desired (e.g., seasonally). The system could be adaptively managed based on observations of storm size, runoff volume, and pipe capacity. Any flows which exceed the diversion capacity when the diversion connection is functional would bypass the diversion structure and flow along the current drainage path, discharging to Carmel Bay.

A future expansion to this project could include capture and treatment of additional stormwater runoff for reuse. The potential project expansion would consist of constructing a new dedicated stormwater pipeline under San Antonio Avenue and a new dedicated stormwater holding tank at the CAWD facility at Rio Park (proposed to be located south of Larson Field). The tributary drainage area associated with this potential project expansion is shown on Figure 4A as a dashed gray line.

Proposed project is conceptual and subject to change based on future feasibility assessment, funding availability, and/or other information.

DESIGN INFORMATION

Tributary Drainage Area (TDA):	309 acres
TDA Imperviousness:	18%
TDA Urbanized Area:	303 acres
First Flush Runoff:	3 acre-feet/year (approximately 6% of annual runoff)
Dry Weather Runoff:	8 to 11 acre-feet (April to October)

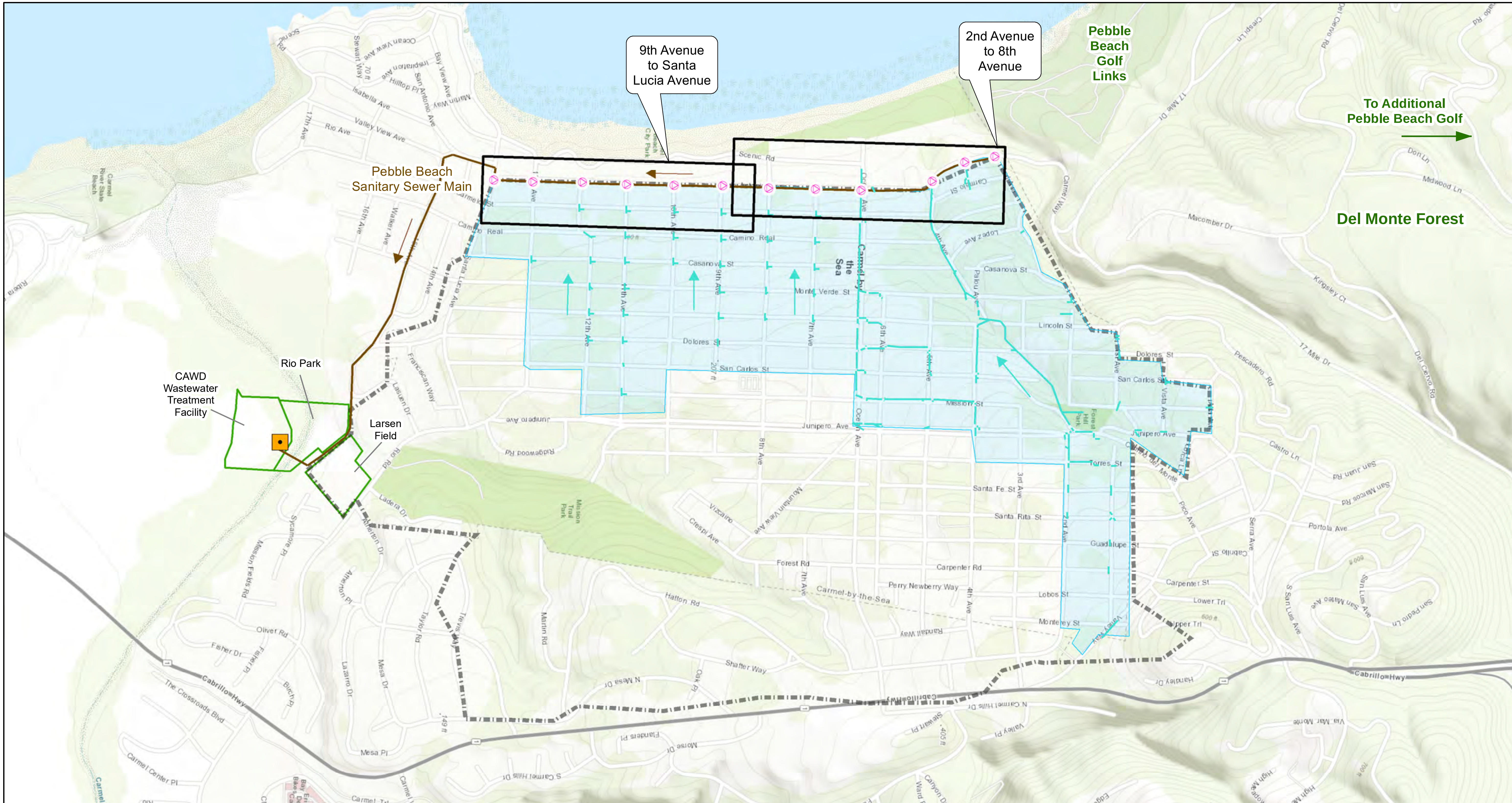
PROJECT BENEFITS

Net Recovered Water Volume:	11 to 14 acre-feet/year
Water Quality Benefits	Treatment of pollutants in urban stormwater and dry weather flows that currently discharge to the Carmel Bay ASBS region.
Flood Management Benefits:	None anticipated.
Natural Drainage System Benefits:	Removal of urban stormwater and dry weather flows that currently discharge to the Carmel Bay ASBS region, thereby partially restoring natural drainage patterns.
Habitat or Open Space Benefits:	Diversion to the sanitary sewer will reduce runoff to the beach and the Carmel Bay ASBS region.
Community Benefits:	Diversion to the sanitary sewer will reduce runoff to the beach and the Carmel Bay ASBS and will augment water supply at the Pebble Beach Golf courses in Del Monte Forest.

COST ESTIMATE

DESCRIPTION	COST
Capital Cost	$750,000
Annual Operations and Maintenance Cost[2]	$32,000 per year
Estimated Life Cycle Annual Cost[3]	**$75,000 per year**
Unit Project Cost of Recovered Water	**$5,300 to $6,900 per acre-foot**

[2] The cost of treatment at the Carmel Area Wastewater Treatment Plant would be paid for by the City of Carmel-by-the-Sea or the Pebble Beach Company, if applicable.
[3] Assumes 30-year design life at 4% interest rate.



Legend

- Carmel-by-the-Sea Project Drainage Area
- Rio Park Project Expansion Drainage Area
- Project Map Extent
- Parcel Boundary

Existing Infrastructure

- Pebble Beach Sanitary Sewer
- Storm Drain
- CAWD Influent Pump Station

Proposed Control Measure

- Gravity Diversion Structure

N

0 1,500 Feet

Carmel-by-the-Sea Stormwater Diversion Project
Carmel-by-the-Sea, CA
Catchment Map

Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants

Monterey One Water
Providing Cooperative Water Solutions

Figure

4A

Oakland, CA | September 2018

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Legend

Carmel-by-the-Sea Project Drainage Area

Existing Infrastructure

Sanitary Sewer

Storm Drain

Proposed Control Measure

Gravity Diversion Structure

N

0 300 Feet

Carmel-by-the-Sea Stormwater Diversion Project
Carmel-by-the-Sea, CA
Project Map

Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants

Monterey One Water Providing Cooperative Water Solutions

Figure 4B

Oakland, CA | September 2018

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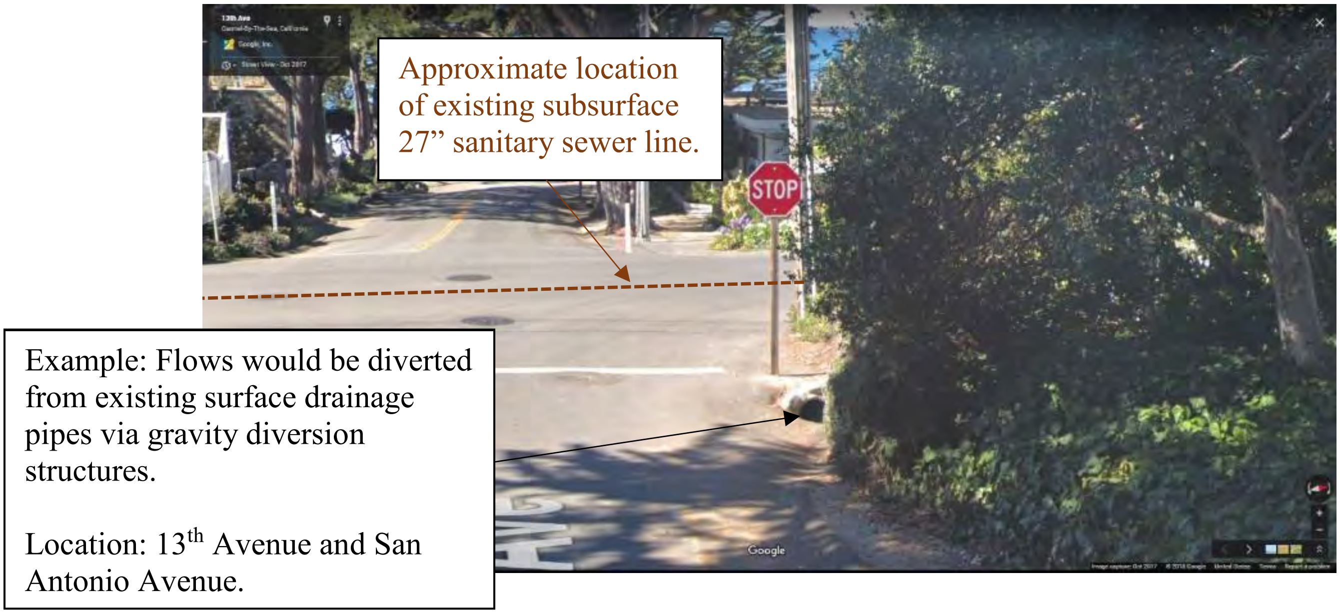


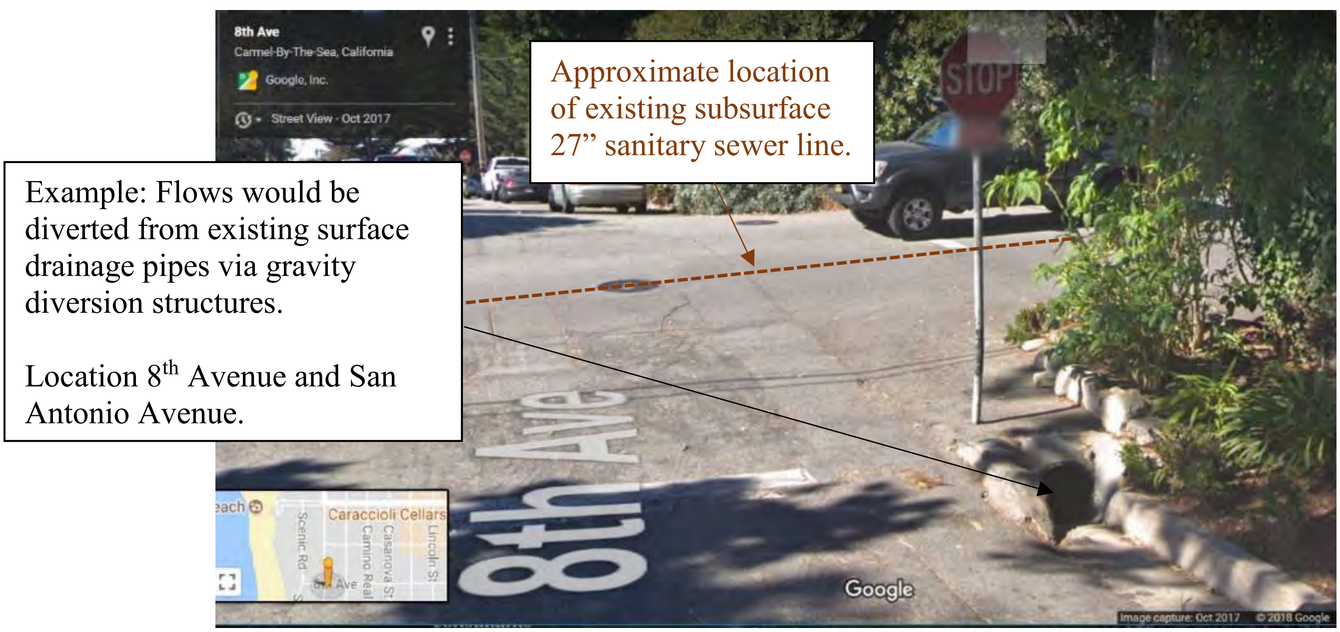


Figure 4C
Carmel-By-The-Sea Existing Diversion Opportunity Examples
(Source: Google Maps Street View)

5. PACIFIC GROVE MONTEREY ASBS WATERSHED – DAVID AVENUE STORMWATER STORAGE AND DIVERSION

SITE DESCRIPTION

Jurisdiction:	City of Pacific Grove
Location:	David Avenue Reservoir, north of David Avenue, south of Hillcrest Avenue, west of Carmel Avenue
Land Owner:	California American Water Company
Catchment[1]:	CM-21

PROJECT CONCEPT

The proposed Pacific Grove Monterey ASBS Watershed-David Avenue Stormwater Storage and Diversion Project is located in Pacific Grove at the Monterey and Pacific Grove City boundary (Terry Street in Monterey and Carmel Avenue in Pacific Grove). The Project's tributary drainage area, shown on Figure 5A, primarily includes an approximately 80-acre residential area south of David Avenue in Monterey, but also includes a small portion of a residential area west of David Avenue Reservoir in Pacific Grove. Stormwater runoff in the tributary drainage area generally flows to the north.

The proposed Project consists of capturing and detaining wet and dry weather runoff in a subsurface storage tank constructed within the existing David Avenue Reservoir in Pacific Grove. The site would be backfilled and brought to grade, providing a publicly-owned surface above the storage tank that could be used for other purposes such as a community park.

The Project would include diversion of runoff by gravity from the storm drain line at the City boundary to the subsurface storage tank within the existing David Avenue Reservoir. Runoff would be detained during the wet season in the subsurface storage tank and metered out during the dry season via one of three potential pipe routes through Pacific Grove or Monterey (selected pipe route to be determined). Piped runoff would be diverted to the Monterey One Water (M1W) Interceptor Pipeline and recycled at the M1W Regional Treatment Plant (RTP) for water supply augmentation. The potential pipe routes, shown on Figure 5A and 5B, have been ranked in order of preference by the Cities of Pacific Grove and Monterey and M1W. The routes include:

1. Discharge via gravity from David Avenue Reservoir to the existing storm drain line in Pacific Grove that flows from Carmel Avenue to Pine Avenue via 14th Street. At Pine Avenue and 14th street, discharge would be diverted via proposed pipe along Pine Avenue to the 19th Street storm drain system. Runoff would reach the M1W Interceptor Pipeline via the Lover's Point Diversion system and M1W Lift Station 13. Evaluation of project benefits for this route are included in the tables provided.

[1] See Monterey Peninsula Water Recovery Study Report, Appendix D, Figure 2A Catchment Detail Map.

2. Discharge from David Avenue Reservoir to the existing 8-inch sewer main on David Avenue at Terry Street in Monterey, if capacity is available. From David Avenue and Pine Street, flows would continue by gravity in the existing sewer system and ultimately flow from north to south down Wave Street to M1W Lift Station 7. Overflows from the underground storage tank would discharge to an existing storm drain at Carmel Avenue. Detailed capacity and feasibility evaluations would be required to determine the viability of this route if it were to become the preferred course.

3. Discharge from David Avenue Reservoir to the existing City of Pacific Grove sewer main system on 2nd Street and Eardley Avenue in Pacific Grove. If capacity is available, flows would flow down Eardley and enter the M1W Interceptor Pipeline at Lift Station 11. Lift Station 11 pumps to Lift Station 12, which then pumps to Lift Station 13. Lift Stations 11 and 12 would cycle more frequently, so there would be no impact to Lift Station 13. Overflows from the underground storage tank would discharge to an existing storm drain at Carmel Avenue, similar to route 2.

The greatest water supply benefit from the Project using current infrastructure at the RTP would be treating and recycling Project discharge during the dry season, April to October[2]. However, if stormwater runoff captured by the Project could be directed to the RTP during the wet season, with prior authorization of M1W, then approximately two to three times the volume of discharge could potentially be recovered for water supply augmentation. Payment of an adopted interruptible rate would apply.

A typical stormwater diversion detail is provided as Figure 5C. A concept of a below grade storage tank is shown as Figure 5D. An example concept of an above grade and a bowl-shaped park is shown as Figure 5E.

DESIGN INFORMATION

Tributary Drainage Area (TDA):	101 acres
TDA Imperviousness:	67%
TDA Urbanized Area:	99 acres
Subsurface Storage Tank Footprint | Depth | Volume:	1.0 acre | 11 feet | 11 acre-feet
Average Annual Wet Weather Runoff:	50 to 63 acre-feet
Dry Weather Runoff:	3 to 4 acre-feet (April to October)
Inflow Diversion Rate to the Subsurface Storage Tank[3]:	3,200 gallons per minute
Outflow Diversion Rate from the Subsurface Storage Tank[4]:	300 gallons per minute
Total Length of Proposed Pipeline[5]:	2,250 feet

[2] It is less desirable to divert during the wet season with the current infrastructure in place because there are other ample stormwater sources being included into the Pure Water Monterey project.
[3] Estimated based on flow from the 85th percentile storm (personal communication, Wallace Group, 5 June 2018).
[4] Diversion rate estimated based on excess capacity of the M1W Interceptor Pipeline with other potential runoff diversions and the dry weather runoff rate.
[5] Includes proposed storm drain on Pine Avenue for Route #1.

PROJECT BENEFITS

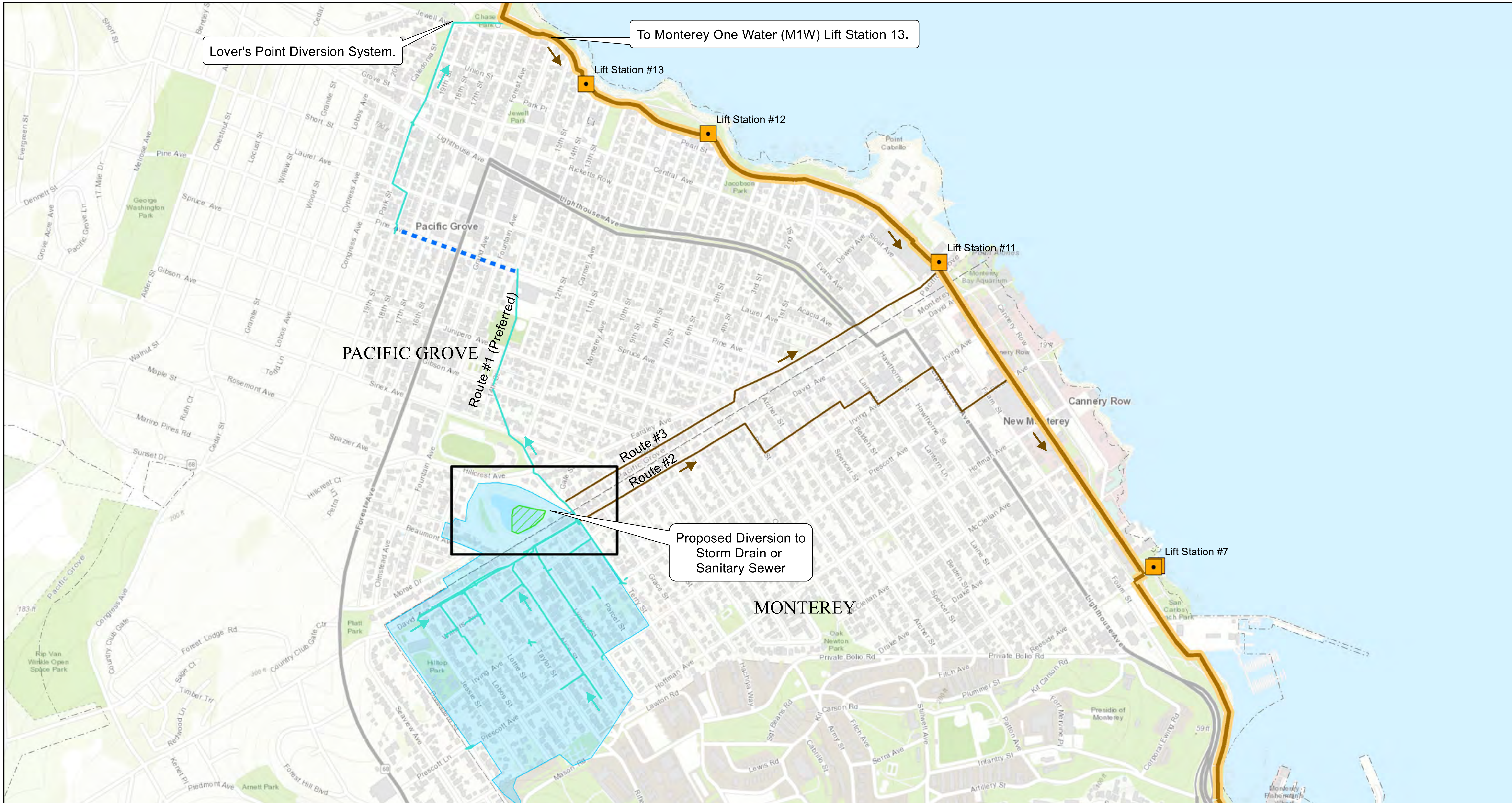
Net Water Volume Recovered[6]:	14 to 29 acre-feet per year
Water Quality Benefits:	Reduction of 2,500 to 5,700 pounds of sediment per year[7] and reduction of dry and wet weather runoff to the Pacific Grove ASBS.
Flood Management Benefits:	Minimal.
Natural Drainage System Benefits:	Removal of urban stormwater and dry weather flows that currently discharges to the Pacific Grove ASBS region, thereby partially restoring natural drainage patterns.
Habitat or Open Space Benefits:	The project would include the development of a new park, increasing the total area of open space in the community.
Community Benefits:	The project would provide access to a new community park.

COST ESTIMATE[8]

DESCRIPTION	COST
Capital Cost	$9,800,000
Annual Operations and Maintenance Cost	$25,000 per year
Estimated Life Cycle Annual Cost[9]	**$590,000 per year**
Unit Project Cost of Recovered Water	**$20,000 to $44,000 per acre-foot**

Proposed project is conceptual and subject to change based on future feasibility assessment, funding availability, and/or other information.

[6] The Pure Water Monterey project is currently able to accept recovered runoff via diversion to the sanitary sewer in the dry season only. If runoff could be recovered during the wet season, then water supply benefits from the project would increase.
[7] Pollutant loading rate calculated from TELR pollutant loading rates for the TELR catchments associated with the project drainage area.
[8] Cost estimate includes the subsurface storage unit, landscaping and park costs, pipeline costs, (including storm drain work on Pine Avenue for Route #1), and associated diversion costs.
[9] Assumes 30-year design life at 4% interest rate.



Legend

- David Avenue Project Drainage Area
- David Avenue Reservoir
- Project Map Extent
- City Limits

Existing Infrastructure

- M1W Interceptor Pipeline - Pressurized
- M1W Lift Station
- Sanitary Sewer
- Storm Drain

- Proposed Storm Drain

N

0 — 2,200 Feet

Pacific Grove Monterey ASBS Watershed
David Avenue Stormwater Storage and Diversion
Pacific Grove, CA
Catchment Map
Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants | Monterey One Water Providing Cooperative Water Solutions | **Figure** **5A**

Oakland, CA | September 2018

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Legend

City Limits

David Avenue Reservoir Rim

Subsurface Storage Facility Footprint

Existing Infrastructure

Sanitary Sewer

Storm Drain

Proposed Control Measure

Inlet Structure

Gravity Diversion Structure

Inlet Pipe

Diversion Pipe

Outflow Pipe

Pacific Grove Monterey ASBS Watershed
David Avenue Stormwater Storage and Diversion
Pacific Grove, CA
Project Map

Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants | Monterey One Water Providing Cooperative Water Solutions | **Figure 5B**

Oakland, CA | September 2018

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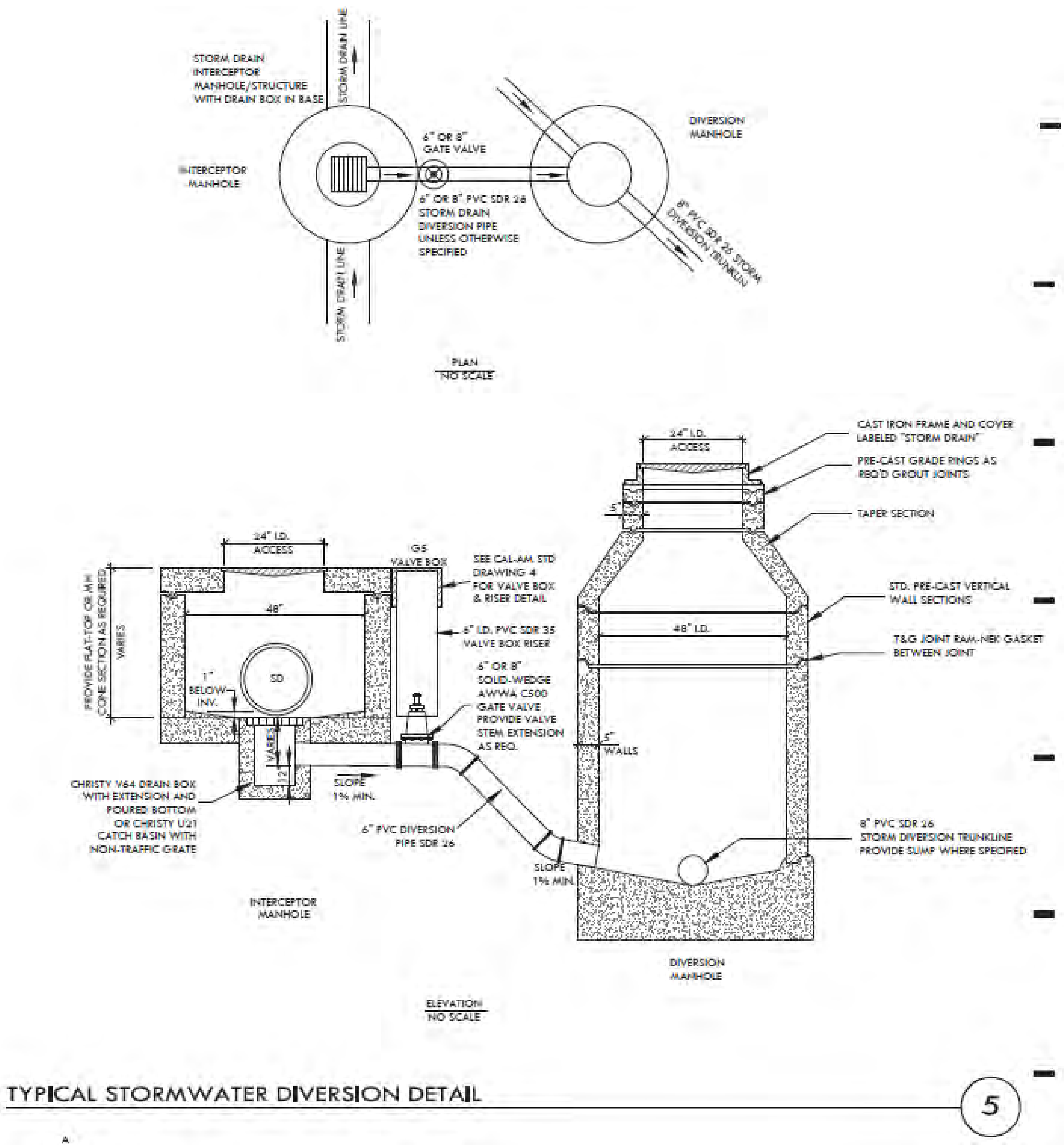

Figure 5C
Typical Stormwater Diversion Detail
Source: Pacific Grove ASBS Stormwater Management, Sheet 3.7, Fall Creek Engineering, 2014.

Figure 5D
Example Subsurface Storage Tank
Source: Personal communication, City of Pacific Grove, 31 May 2018

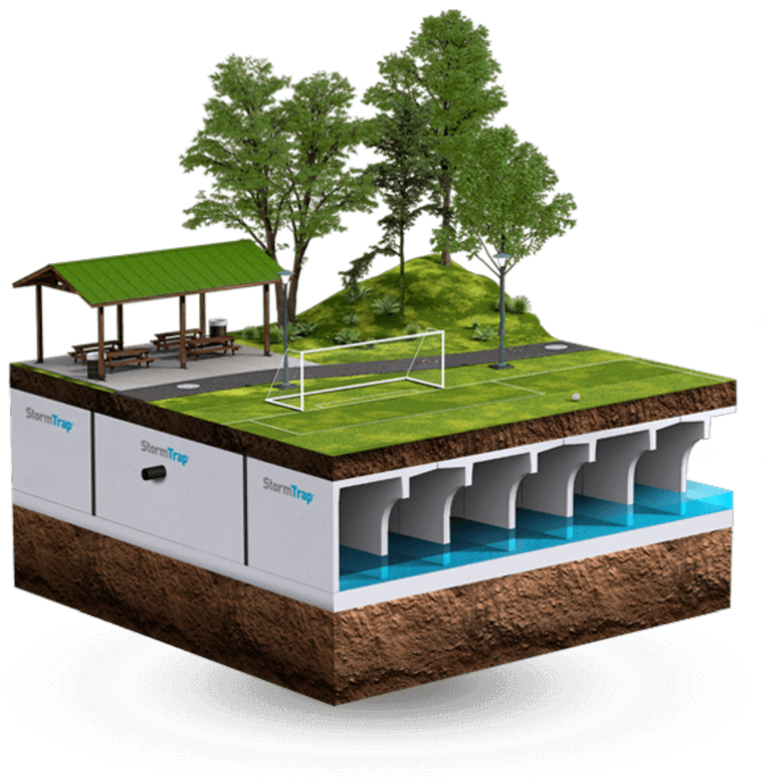

Figure 5E
Concept for Above Grade and Bowl-Shaped Park
(Source: Personal communication, City of Pacific Grove, 31 May 2018 and StormTrap, www.StormTrap.com)

6. DEL MONTE MANOR PARK INFILTRATION PROJECT

SITE DESCRIPTION

Jurisdiction:	City of Seaside
Location:	Del Monte Manor Park
APN(s):	01263601002000
Land Owner:	Del Monte Manor Inc.
Catchment[1]:	CM-06
Parcel Size:	14 acres
Soil Type:	Hydrologic Soil Group (HSG) A

PROJECT CONCEPT

The Del Monte Manor Park Infiltration Project, located within an affordable family rental housing complex in the City of Seaside, will retrofit a portion of the housing complex's park in its southeastern corner with stormwater treatment facilities. The facilities would be installed to help mitigate flooding issues at the intersection of Yosemite Street and Sonoma Avenue in Seaside, treat and infiltrate runoff, and improve the aesthetics of the park. The tributary drainage area consists of a residential area extending north of Wanda Avenue, east of Yosemite Street, west of Skyview Drive and Ancon Street, and the southern portion of Del Monte Manor parcel. Runoff from the Yosemite Street and Sonoma Avenue intersection would also be collected and treated by the facilities, assuming grades allow for it. A catchment map is shown on Figure 6A.

The project would reduce urban runoff pollutant loads by routing runoff from a majority of the catchment from the existing storm drain located within Sonoma Avenue to a proposed pre-treatment swale and bioretention facility treatment train. Smaller flows (up to approximately 50% of the average annual runoff produced from the drainage area) would be diverted from the existing storm drain through a proposed diversion pipe. The proposed pre-treatment swale would be installed adjacent to Sonoma Avenue's northern sidewalk, and the proposed bioretention facility would be installed at the southwestern corner of the Del Monte Manor property. The proposed location of the bioretention is currently a low point which floods frequently during storm events when the existing undersized storm drain surcharges. This configuration is shown on the project map, Figure 6B.

The swale and bioretention facility would utilize native plants providing aesthetic and educational benefits. The swale would function as pre-treatment for the bioretention facility, which would retain and infiltrate stormwater into the underlying fast-draining native dune sand. Overflow from the bioretention facility would be piped to the existing storm drain in Yosemite Street, which drains to the north toward Broadway. The infiltration project could be implemented in conjunction with upsizing of storm drains in the Yosemite Street and Sonoma Avenue intersection, to best alleviate current flood conveyance deficiencies. However, such storm drain improvements are not included

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[1] See Monterey Peninsula Water Recovery Study Report, Appendix D, Figure 2A Catchment Detail Map.

as part of this project at this time. Design of the project will require further investigation due to the absence of soil investigation/percolation testing, utility mapping and field verification.

Street views of the proposed location of the swale and bioretention facility are shown on Figure 6C. Conceptual illustrations and example photographs of vegetated swales are provided on Figures 6D and 6E, respectively. Conceptual illustrations and example photographs of bioretention facilities are provided on Figures 6F and 6G, respectively.

Following the 2006 Adjudication Decision that governs management of the Seaside Groundwater Basin, implementation of this project would require obtaining a permit from the Seaside Basin Watermaster to store water, via recharge, in(to) the Seaside Groundwater Basin. This permit is obtained through filing a Watermaster Storage Application. The Wastermaster has the authority to take the necessary actions to prevent contaminants from entering the groundwater supplies of the Seaside Basin, which present a significant threat to the groundwater quality of the Seaside Basin, whether or not the threat is immediate. A copy of the Watermaster Storage Application to store and recover non-native water from the Seaside Groundwater Basin is provided as Attachment A.

DESIGN INFORMATION

Tributary Drainage Area (TDA):	25 acres
TDA Imperviousness:	56 %
TDA Urbanized Area:	25 acres
Average Annual Wet Weather Runoff:	10 to 13 acre-feet
Dry Weather Runoff:	1 acre-foot
Bioretention Facility Footprint:	2400 square feet
Bioretention Facility Depth:	6 feet
Bioretention Media Depth:	3 feet
Annual Runoff Captured and Treated[2]:	49%

PROJECT BENEFITS

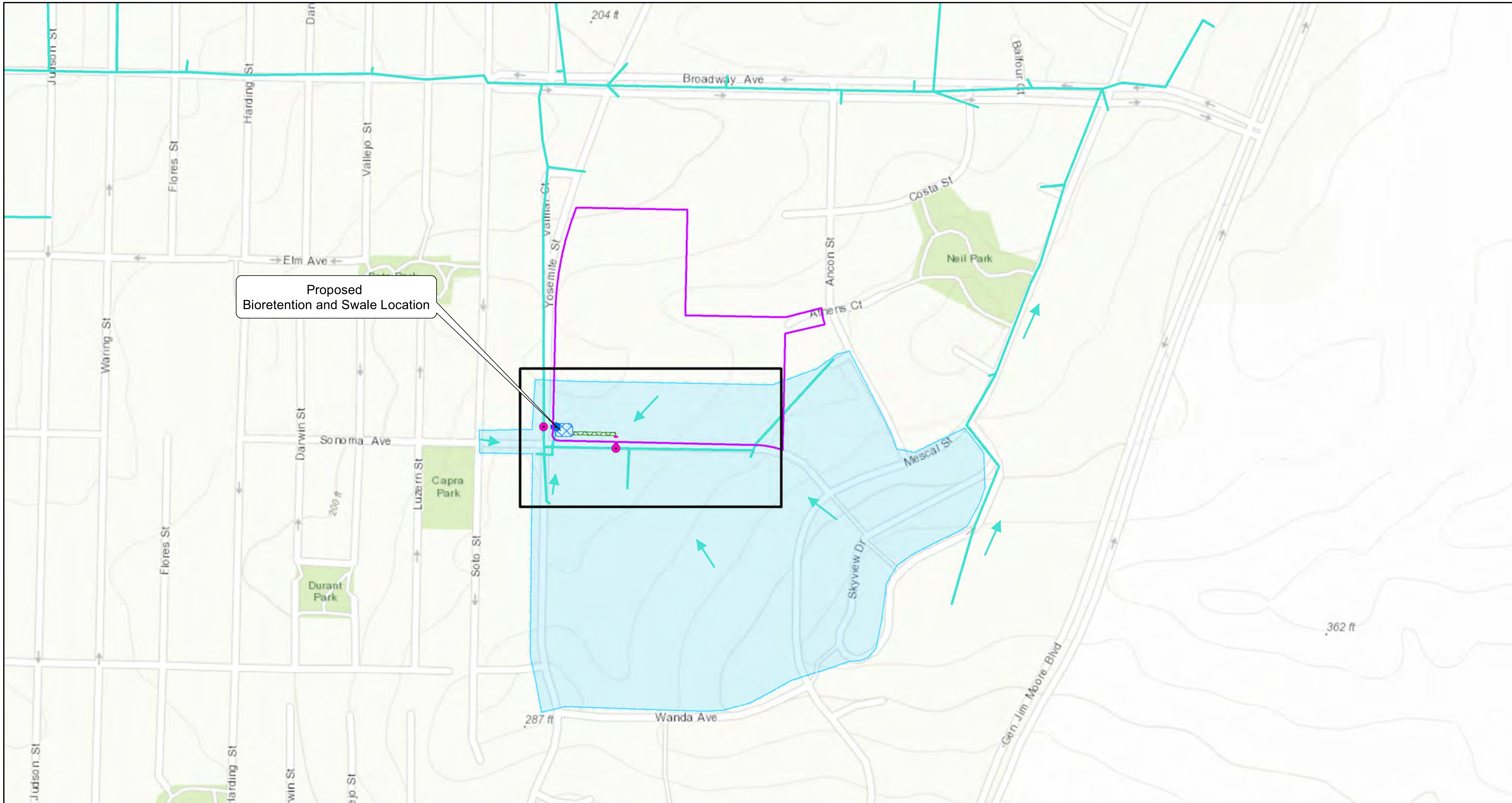
Pollutant Loads Reduced[3]:	930 pounds/year
Water Supply Benefits:	The project provides indirect benefits by infiltrating 7 acre-feet per year of urban runoff above a potable water supply aquifer.
Flood Management Benefits:	Flooding in the area will be improved through the retention and attenuation of runoff during storm events.
Natural Drainage System Benefits:	Removal of urban stormwater and dry weather flows that are currently discharged to the Pacific Ocean, thereby partially restoring natural drainage patterns.
Habitat or Open Space Benefits:	The open space area at the housing complex will be improved as a result of flood management.
Community Benefits:	The facility will be open to the public and will utilize native plants and provide informational signage. The drainage area to the project location contains a Disadvantaged Community (DAC).

[2] Assumed soil percolation rate is 1 inch per hour.
[3] Pollutant loading rate calculated from TELR for the TELR catchment associated with the project drainage area.

COST ESTIMATE

DESCRIPTION	COST
Capital Cost	$330,000
Annual Operations and Maintenance Cost	$4,700 per year[4]
Estimated Life Cycle Annual Cost[5]	**$24,000 per year**
Unit Project Cost of Recovered Water	**$3,300 to $3,500 per acre-foot**

[4] Estimate includes annual operations and maintenance of the pre-treatment swale, bioretention, and storm drain pipe.
[5] Assumes 30-year design life at 4% interest rate.



Legend

Parcel Boundary
Del Monte Manor Project Drainage Area
Project Map Extent

Existing Stormwater Infrastructure

Storm Drain

Proposed Control Measures

Overflow Pipe
Diverson
Bioretention
Swale
Manhole
Outlet Structure

N

0 700 Feet

Del Monte Manor Park Infiltration Project
City of Seaside, CA
Catchment Map
Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants
Monterey One Water
Providing Cooperative Water Solutions

Oakland, CA | September 2018

Figure
6A

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Legend

Del Monte Manor Project Drainage Area

Existing Stormwater Infrastructure

Storm Drain

Proposed Control Measures

Manhole

Outlet Structure

Overflow Pipe

Diverson Pipe

Pre-treatment Swale

Infiltrating Bioretention Facility

N

0 100 Feet

Del Monte Manor Park Infiltration Project
City of Seaside, CA
Project Map

Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants

Monterey One Water Providing Cooperative Water Solutions

Figure 6B

Oakland, CA | June 2018

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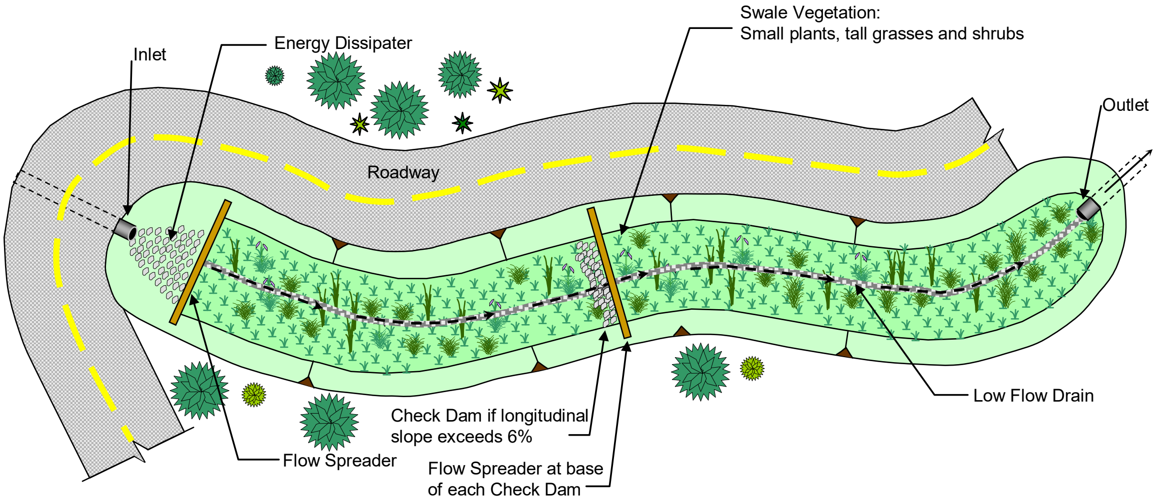
Bioswale Proposed Location

Rain Garden Proposed Location

Figure 6C
Del Monte Manor Proposed Bioswale and Rain Garden Locations
(Source: Google Maps Street View)

September 2018	**Monterey Peninsula Stormwater Resource Plan**	Geosyntec consultants

Plan View



Profile

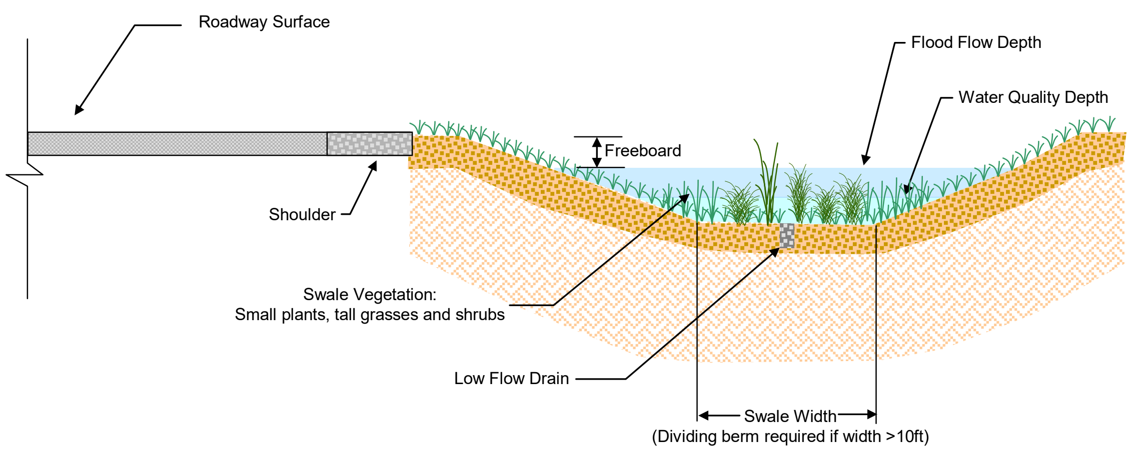


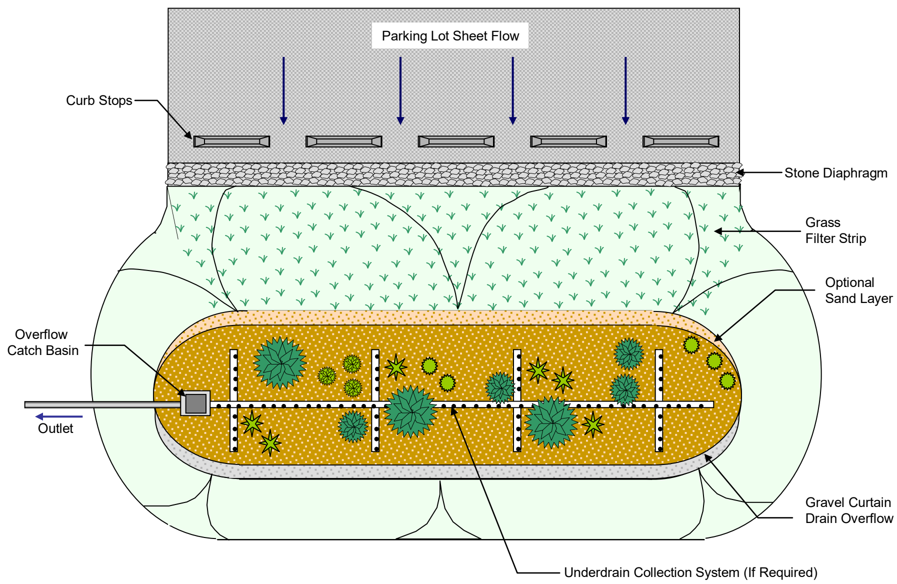
Figure 6D
Conceptual Illustration of a Vegetated Swale

September 2018	Monterey Regional Stormwater Resource Program	Geosyntec consultants

Figure 6E
Examples of Vegetated Swales

September 2018	**Monterey Regional Stormwater Resource Program**	Geosyntec consultants

Plan View



Profile

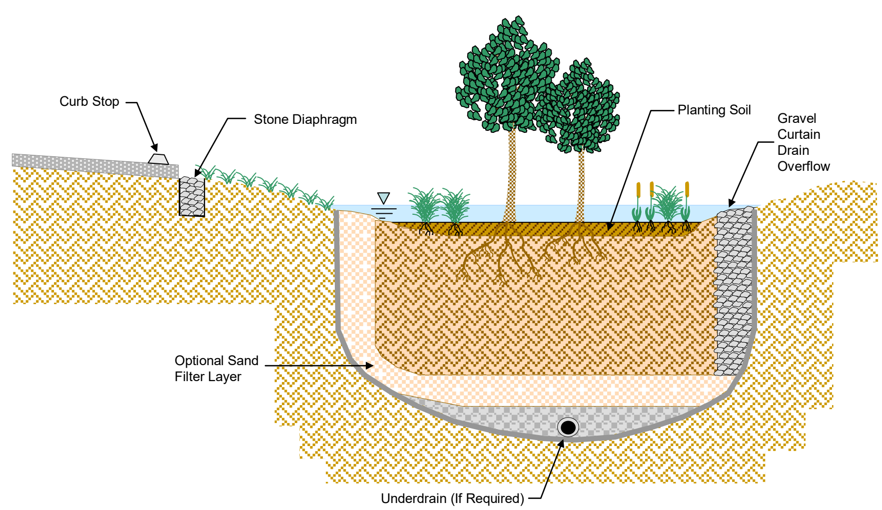


Figure 6F
Conceptual Illustration of a Bioretention Facility

September 2018	Monterey Regional Stormwater Resource Program	Geosyntec consultants

Figure 6G
Example Photos from Bioretention Facilities

September 2018	**Monterey Regional Stormwater Resource Program**	Geosyntec consultants

APPLICATION TO STORE AND RECOVER NON-NATIVE WATER FROM THE SEASIDE GROUNDWATER BASIN

<u>INSTRUCTIONS:</u> This Application form is for use by Standard Producers in the Seaside Groundwater Basin (Seaside Basin) for the purpose of obtaining approval from the Seaside Basin Watermaster (Watermaster) to store Non-Native water in, and to subsequently recover that stored water from, the Seaside Basin. The application process is as described in Section III.L.3.j.xx of the Amended Decision of the Monterey County Superior Court, Case No. M66343, filed February 9, 2007.

____

Name of Standard Producer (Applicant)

Contact Information for Applicant:

Contact Person: ____

Address: ____

Telephone: ____

Proposed quantity of non-native water Applicant seeks to store through spreading or direct injection into the Seaside Basin (acre-feet per year):

____

Proposed location(s) where the spreading or direct injection of non-native water into the Seaside Basin will occur. If injection will be performed using one or more injection wells, provide indentifying information for those wells including the aquifer(s) into which the injection will occur. If spreading will be performed, provide coordinate location information, as well as any physical street address information for the proposed location.

____

____

____

____

Proposed location(s) where the stored water may be recovered. Provide identifying information for each well from which the stored water will be recovered, including the aquifer(s) from which recovery will occur.

____

____

____

____

Water quality characteristics of the non-native water proposed for spreading or direct injection into the Seaside Basin. Provide sufficient physical, chemical, and microbiological information about the water being proposed for storage, so that the Watermaster can determine whether or not storing such water will have any adverse water quality impacts on the Seaside Basin. Provide this information in the form of analytical results from a properly certified water testing laboratory, attached to this Application.

Also provide sufficient information to demonstrate to the Watermaster that the water quality characteristics of the water being proposed for storage will meet all of the requirements imposed on the Applicant by permits and/or approvals issued to the Applicant by the regulatory agency or agencies with jurisdiction.

Permits and approvals from regulatory agencies. Attach copies of all permits and approvals the applicant has received from regulatory agencies, which relate to the storage of water in the Seaside Basin. Such agencies will likely include some or all of the following:

- California Regional Water Quality Control Board
- California Department of Public Health
- County of Monterey Department of Health
- State Water Resources Control Board

7. DRYWELL AQUIFER RECHARGE PROGRAM

SITE DESCRIPTION

Jurisdiction:	City of Seaside
Location:	1. Southwest corner of the Noche Buena Street and Kimball Avenue intersection, adjacent to the entrance to William Pacchetti Park. 2. South central portion of Trinity Park on Trinity Avenue. 3. Right of way on Broadway Avenue, adjacent to the undeveloped parcel on the northwest corner of the San Lucas Street and Broadway Avenue intersection. 4. Western portion of David Cutino Park on La Salle Ave.
Land Owner:	Locations 1, 2, and 4: City of Seaside Location 3: Redevelopment Agency
Catchment[1]:	Locations 1 and 2: CM-07 Locations 3 to 4: CM-06

PROJECT CONCEPT

The Drywell Aquifer Recharge Program in the City of Seaside, with support from regional partners, will focus on using drywells to recharge urban runoff to the Seaside Groundwater Basin. The program focuses on treating and infiltrating runoff from residential areas within the City of Seaside. There are four proposed drywell locations included in this project: (1) Noche Buena Street and Kimball Avenue intersection; (2) South central portion of Trinity Park on Trinity Avenue; (3) San Lucas Street and Broadway Avenue intersection; and (4) Western portion of David Cutino Park on La Salle Ave. The drainage areas associated with each of the four proposed project locations are shown on Figure 7A. Runoff produced within all four drainage areas flows from the upgradient residential areas west of General Jim Moore Boulevard flows westward toward Monterey Bay within surface drainage ditches and/or storm drain pipes. Proposed drywells will infiltrate runoff that currently ultimately discharges to Monterey Bay at locations along Seaside Beach.

Proposed drywell locations were identified based on adequate depth to groundwater and proximity to the downgradient boundary of the residential neighborhoods, to maximize tributary drainage area and potential recovered runoff volume. Identified locations are on or adjacent to publicly-owned parcels where runoff could be diverted from adjacent surface streets (e.g. Location 1) or from the storm drain network via a gravity diversion pipe (e.g. Locations 2 through 4). Pretreatment would occur through a hydrodynamic separator or a subsurface settling chamber at each location. Pretreatment facilities would drain to a series of hydraulically connected drywells. The bottom depth of the drywells would be 10 feet above the groundwater table or higher. Flows that exceed the infiltration capacity of the drywells would bypass the facilities discharge along the current drainage path. Proposed drywells are estimated to capture approximately 8% of the average annual runoff from the combined drainage areas. An example drywell project that diverts runoff

[1] See Monterey Peninsula Water Recovery Study Report, Appendix D, Figure 2A Catchment Detail Map.

from a surface drainage ditch (Location 1) and an example project that diverts runoff from a subsurface storm drain pipe (Location 2) are shown on Figure 7B. The example project that diverts runoff from a subsurface storm drain pipe should be considered similar to the diversions proposed for Locations 3 and 4.

A drywell typical construction detail and specifications for the MaxWell® Plus drainage system by Torrent Resources Incorporated is provided as Figure 7C. The following documents are provided as attachments for additional information and reference regarding drywell typical construction details and drywell permitting and regulations in California:

- Attachment A. Drywell Stormwater BMP – Drywell Information, Detail, and Specifications for Enhanced Infiltration, from Geosyntec Consultants to Darla Inglis, Central Coast Low Impact Development Initiative (LIDI) Memorandum, September 2015.

- Attachment B. Dry Well Fact Sheet: Uses, Regulations, and Guidelines in California and Elsewhere. Office of Environmental Health Hazard Assessment, California Environmental Protection Agency.

Following the 2006 Adjudication Decision that governs management of the Seaside Groundwater Basin, implementation of this project would require obtaining a permit from the Seaside Basin Watermaster to store water, via recharge, in(to) the Seaside Groundwater Basin. This permit is obtained through filing a Watermaster Storage Application. The Wastermaster has the authority to take the necessary actions to prevent contaminants from entering the groundwater supplies of the Seaside Basin, which present a significant threat to the groundwater quality of the Seaside Basin, whether or not the threat is immediate. A copy of the Watermaster Storage Application to store and recover non-native water from the Seaside Groundwater Basin is provided as Attachment C.

Proposed project is conceptual and subject to change based on future feasibility assessment, funding availability, and/or other information.

DESIGN INFORMATION

Tributary Drainage Area (TDA):	860 acres
TDA Imperviousness:	60%
TDA Urbanized Area:	857 acres
Average Annual Wet Weather Runoff:	370 to 470 acre-feet
Dry Weather Runoff:	22 to 31 acre-feet (April to October)
Depth to Groundwater:	25 to 110 feet
Drywell Diameter:	4 feet
Hydraulic Conductivity:	1 inch per hour
Number of Drywells:	62
Estimated Percent Capture:	8%

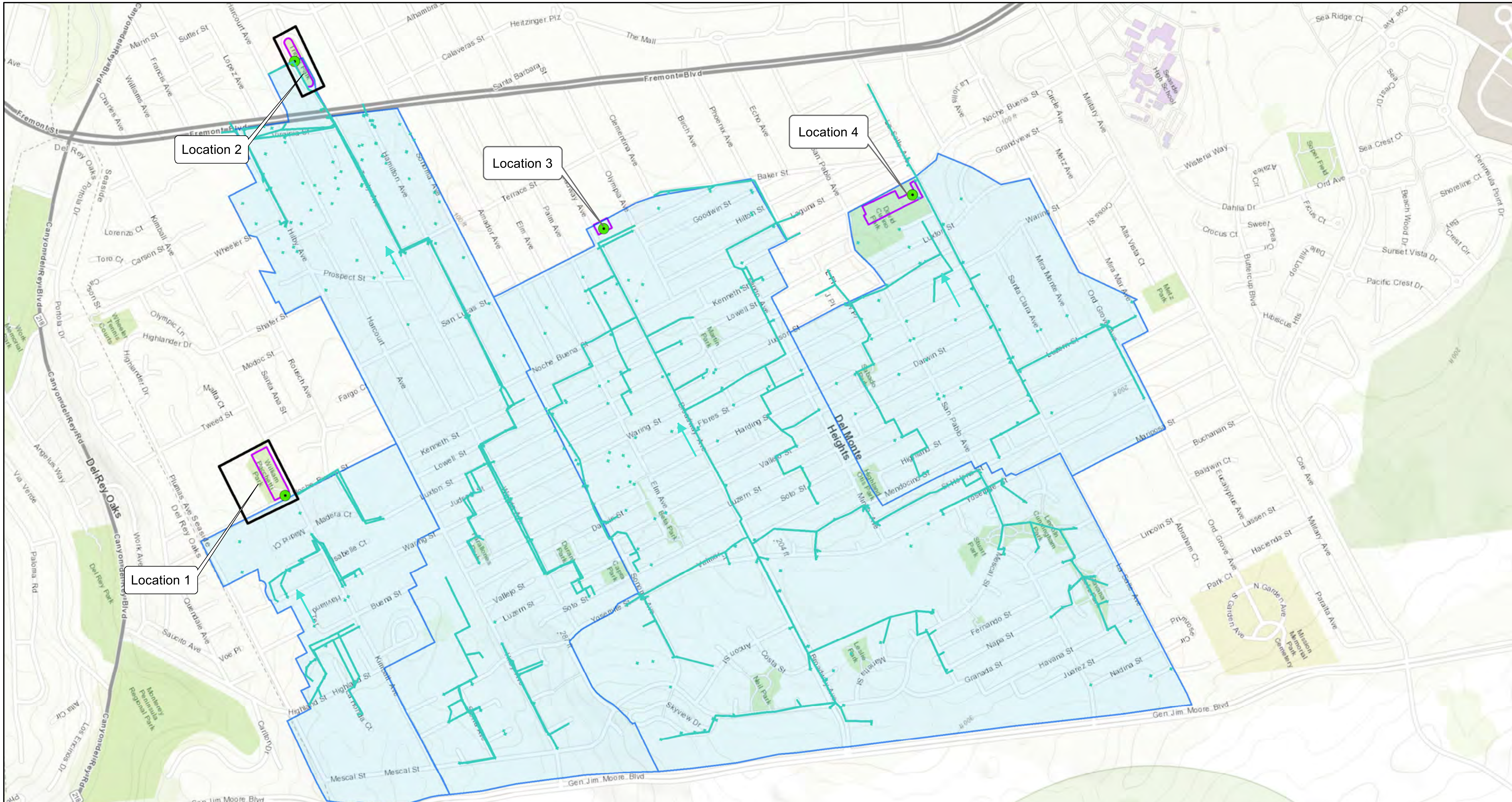
PROJECT BENEFITS

Net Recovered Water Volume:	50 to 67 acre-feet per year
Sediment Load Reduced[2]:	4,800 pounds per year
Flood Management Benefits:	Infiltration at Location 1 would reduce street flooding on Kimball Avenue.
Natural Drainage System Benefits:	Removal of urban stormwater and dry weather flows that are currently discharged to the Pacific Ocean, thereby partially restoring natural drainage patterns.
Habitat or Open Space Benefits:	None anticipated.
Community Benefits:	None anticipated.

COST ESTIMATE

DESCRIPTION	COST
Capital Cost	$4,300,000[3]
Annual Operations and Maintenance Cost	$59,000 per year[4]
Estimated Life Cycle Annual Cost[5]	**$310,000 per year**
Unit Project Cost of Recovered Water	**$4,600 to $6,200 per acre-foot**

[2] Pollutant loading rate calculated from TELR pollutant loading rates for the TELR catchments associated with the project drainage area.
[3] Approximate capital cost per location are as follows: Location #1 = $660,000; Location #2 = $900,000; Location #3 = $480,000; Location #4 = $1,900,000.
[4] Estimate includes annual operations and maintenance of pre-treatment devices (i.e., hydrodynamic separator or a subsurface settling chamber), dry wells, and the pipe that connects the dry wells to one another.
[5] Assumes 30-year design life at 4% interest rate.



Legend

- Parcel Boundary
- Project Map Extent
- Seaside Dry Well Project Drainage Area

Proposed Control Measure

- Drywells with Pretreatment

Drywell Infiltration Program
City of Seaside, CA
Catchment Map
Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants | Monterey One Water Providing Cooperative Water Solutions | Figure 7A
Oakland, CA | September 2018

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Legend

Parcel Boundary

Existing Infrastructure

Storm Drain

Proposed Control Measure

Drywells with Pretreatment

Gravity Diversion Structure

Diversion

Drywell Infiltration Program
City of Seaside, CA
Example Projects Map

Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants

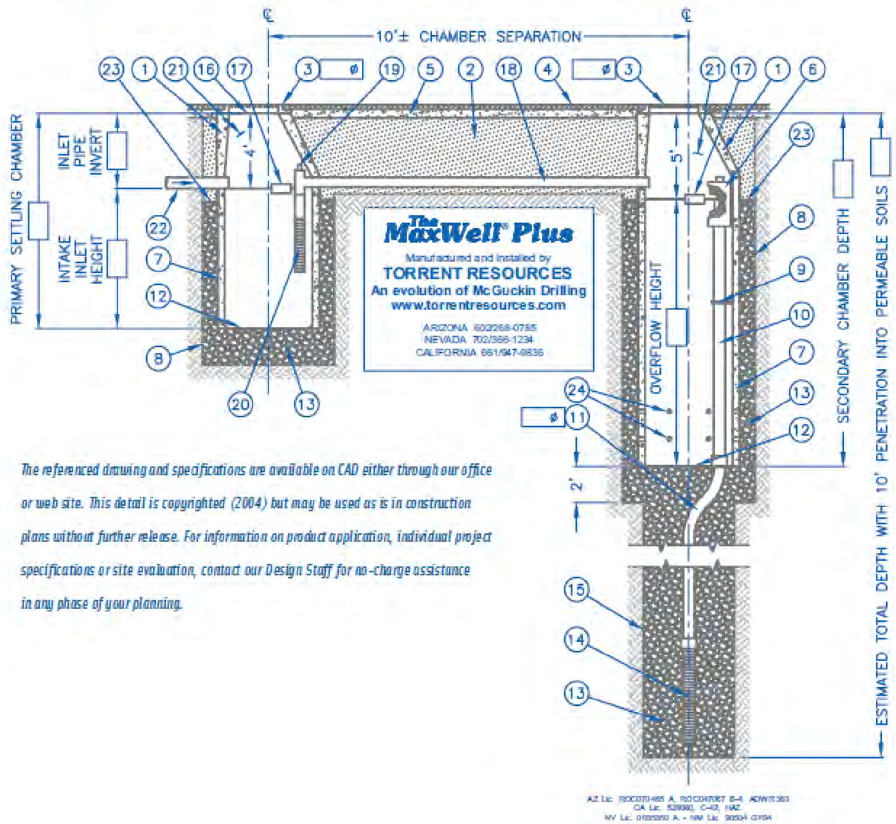
Monterey One Water — Providing Cooperative Water Solutions

Oakland, CA | September 2018

Figure 7B

P:\GIS\MRWPCA\Project\Concept Projects\7. Dry Well- Seaside\Seaside_DryWells_Zoom_Sept2018.mxd 8/29/2018 10:41:43 AM

The MaxWell® Plus Drainage System Detail And Specifications



The referenced drawing and specifications are available on CAD either through our office or web site. This detail is copyrighted (2004) but may be used as is in construction plans without further release. For information on product application, individual project specifications or site evaluation, contact our Design Staff for no-charge assistance in any phase of your planning.

ITEM NUMBERS

1. **Manhole Cone** - Modified flat bottom.
2. **Stabilized Backfill** - 1-Sack Slurry.
3. **Bolted Ring & Grate/Cover** – Diameter as shown. Clean cast iron with wording "Storm Water Only" in raised letters. Bolted in 2 locations and secured to cone with mortar. Rim elevation ±0.02' of plans.
4. **Graded Basin or Paving** (by Others).
5. **Compacted Base Material** (by Others).
6. **PureFlo® Debris Shield** – Rolled 16 Ga. steel X 24" length with vented anti-siphon and internal .265" Max. SWO flattened expanded steel screen X 12" length. **Fusion bonded epoxy coated.**
7. **Pre-cast Liner** - 4000 PSI concrete 48" ID. X 54" OD. **Center in hole** and align sections to **maximize bearing surface.**
8. **Min. 6' Ø Drilled Shaft.**
9. **Support Bracket** - Formed 12 Ga. steel. **Fusion bonded epoxy coated.**
10. **Overflow Pipe** - Sch. 40 PVC mated to drainage pipe at base seal.
11. **Drainage Pipe** - ADS highway grade with TRI-A coupler. **Suspend pipe** during backfill operations to prevent buckling or breakage.. Diameter as noted.
12. **Base Seal** – Geotextile or concrete slurry.
13. **Rock** - Washed, sized between 3/8" and 1-1/2" to **best complement soil conditions.**
14. **FloFast® Drainage Screen** – Sch. 40 PVC 0.120" slotted well screen with 32 slots per row/ft. Diameter varies 120" overall length with TRI-B coupler.
15. **Min. 4' Ø Shaft** - Drilled to **maintain permeability** of drainage soils.
16. **Fabric Seal** – U.V. Resistant Geotextile - **To be removed by customer** at project completion.
17. **Absorbent** – Hydrophobic Petrochemical Sponge. Min 128 oz. capacity.
18. **Connector Pipe** – 4" Ø Sch. 40 PVC.
19. **Anti-Siphon Vent** with flow regulator.
20. **Intake Screen** – Sch. 40 PVC 0.120" modified slotted well screen with 32 slots per row/ft. 48" overall length with TRI-C end cap.
21. **Freeboard Depth Varies** with inlet pipe elevation. Increase primary/secondary settling chamber depths as needed to maintain all inlet pipe elevations above connector pipe overflow.
22. **Optional Inlet Pipe** (by Others).
23. **Moisture Membrane** – 6 mil. Plastic. Place securely against eccentric cone and hole sidewall. Used in lieu of slurry in landscaped areas.
24. **Eight** – (8) **perforations per foot,** 2 row minimum.

Figure 7C
MaxWell® Plus Typical Drainage System Details and Specifications
(Source: Torrent Resources Incorporated, www.torrentresources.com)

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Memorandum

Date: September 2015

To: Darla Inglis, PhD, Central Coast Low Impact Development Initiative (LIDI)

From: Geosyntec Consultants, Inc.

Subject: Drywell Stormwater BMP - Drywell Information, Detail, and Specifications for Enhanced Infiltration
Geosyntec Project: LA0339

INTRODUCTION

This memorandum introduces a combined stormwater "Best Management Practice" (BMP) consisting of a biofiltration system (for flow-through treatment of stormwater, such as where infiltration is restricted) and drywell (to enhance infiltration). It also provides the justification and description for a standard design detail and specification for this type of system. Section 1 of this memorandum explains the need for engineering details and specifications for a system that will enhance the infiltration of captured stormwater, while also ensuring a minimum standard of water quality treatment to protect groundwater sources. This section explains why biofiltration is one of the most effective means of natural passive pretreatment available. Section 2 provides a summary of literature characterizing the risk of groundwater contamination from drywell injection of treated stormwater. Section 3 describes system components to address concerns of groundwater pollution and maintenance. Section 4 lists recommendations for further research to address knowledge gaps highlighted by this assessment.

1. THE NEED/VALUE OF THE ENGINEERING DETAILS AND SPECIFICATIONS

Biofiltration (also referred to as bioretention with underdrains) is a highly effective type of stormwater treatment BMP that is designed to detain, filter, treat and release stormwater. Primarily used to address urban stormwater runoff, biofiltration BMPs can reduce the volumes runoff rates and pollutant loads that can otherwise adversely impact receiving waters such as rivers, lakes, streams and the ocean. Recognizing that stormwater runoff is an underutilized water supply, there is growing interest in furthering the development of stormwater infiltration systems to help replenish groundwater resources (Los Angeles and San Gabriel Rivers Watershed Council, 2010; CASQA, 2015). Biofiltration systems are typically designed to allow infiltration in suitable conditions, however the amount of infiltration achieved by these systems may be limited by the footprint area of the biofiltration system and the infiltration rates of near-surface soils. Excess water is typically discharged through an underdrain into the storm sewer system and not infiltrated. Incorporation of a drywell component provides an opportunity to significantly increase the infiltration capacity of these systems. Drywells are designed to enhance infiltration and are commonly used for runoff management in various landuse settings. Drywells enhance infiltration by penetrating clay and other less permeable soil layers that otherwise limit infiltration at the surface, thus providing the potential for significantly greater stormwater runoff volume reduction and aquifer recharge. The term “injection well” is commonly used to describe both drywells and also mechanically powered injection wells. The engineering details and specifications described herein provide an important reference defining how “enhanced infiltration” configurations differ from injection wells. Most importantly, wells with mechanical injection can include direct injection into an aquifer with no vadose zone treatment, whereas the system described in this memorandum features additional vadose zone treatment. This additional treatment is important for a number of pollutants described below. Current injection well regulations as defined by the Environmental Protection Agency may require users to register and monitor the facilities, which may create a disincentive for use in stormwater management. Evaluation of dry wells for stormwater management may be warranted to better understand their context regulatory context. Having a clearly defined system is particularly important in the context of the California Office of Environmental Health Hazard Assessment’s (OEHHA) ongoing efforts to develop a regulatory framework for this type of work (OEHHA, 2015).

Combining biofiltration BMPs with drywells provides a system which helps optimize the multi-benefits of stormwater management (i.e. improved water quality and increased local water supply). Well-designed biofiltration systems can also provide pre-treatment for drywells, including providing treatment for suspended solids, particulate-bound pollutants, dissolved metals, pathogens, dissolved organics, and other constituents. Other BMPs such as vegetated swales, sediment basins, and permeable pavement also have potential to provide effective pre-treatment in combined BMP/drywell designs. This memorandum however only assesses the opportunities and risks specifically concerning the use of biofiltration systems with a drywell, and specifically within the context of typical pollutant loads found in urban stormwater runoff. It is important to note that other landuses such as heavy industry or agriculture may pose additional risks to groundwater contamination for which this system may not adequately address.

Conversely, in certain watersheds where low pollutant loads have been demonstrated, other BMP types such as vegetated swales may suffice in providing adequate pre-treatment.

Biofiltration alone provides water quality benefits including runoff volume and rate reduction and removal/treatment of common urban pollutants. By combining a biofiltration and dry well design, water resource benefits are optimized. As with any BMP design, the biofiltration/dry well technical details and specifications need to address potential risk. For example, as with any dry well design, care must be taken to limit the amount of sediment that enters the dry well. If media is not adequately retained in the biofilter, particles can wash out of the media and pose a clogging risk to the drywell. Second, removal of nutrients from stormwater is strongly dependent on the properties and sources of biofiltration media, and export of nutrients from media (i.e., negative removal efficiency) is a significant concern if materials are not carefully selected (Geosyntec Consultants and Wright Water Engineers, 2011; Roseen and Stone, 2013; Herrera, 2014, Herrera et al., 2015a, Herrera et al. 2015b). Finally, export of other pollutants, such as dissolved copper, has also been observed but is less common (Geosyntec Consultants and Wright Water Engineers, 2014; Roseen and Stone, 2013; Herrera et al. 2015b). Engineering details and specifications can help limit the potential for export of pollutants and associated impacts to drywell maintenance and groundwater quality.

2. PERCEIVED AND ASSESSED RISK OF GROUNDWATER CONTAMINATION FROM INFILTRATING STORMWATER.

While many stormwater BMPs are designed to infiltrate urban stormwater runoff, concerns have been raised as to whether there is an added risk of groundwater quality impact with drywells which provide a more direct conduit to groundwater. Therefore there is a need to provide a standardized BMP design that specifies pre-drywell treatment components to provide a minimum standard pollutant removal for the pollutants that are typically found in urban stormwater runoff. Priority pollutants in urban stormwater runoff generally include nutrients (i.e., nitrogen and phosphorus), heavy metals (e.g. cadmium, copper, lead and zinc), organics (i.e., petroleum hydrocarbons), pathogens (i.e., fecal coliforms, enterococcus), and suspended solids. The dissolved and colloidal (or planktonic, in the case of bacteria cells) fraction for each of these priority pollutants represents the greatest threat to groundwater quality given the effectiveness of biofiltration for removing particulate bound pollutants. However, typical dissolved concentrations of most urban stormwater pollutants are below drinking water standards (which are typically applicable to the beneficial use of underlying aquifers). An exception to this is bacteria and pathogens, where biofilter effluent concentrations are not expected to consistently meet drinking water standards, therefore vadose zone treatment is required to further mitigate this water quality issue.

Acknowledgment of the contamination risk to groundwater as a potential barrier to using enhanced stormwater infiltration techniques has prompted a number of studies to investigate contamination risks associated with stormwater infiltration BMPs, including drywells. Over all, studies however have found that treated stormwater infiltrated from BMPs does not pose a significant risk to impairment of groundwater quality and in some cases found to improve the quality of groundwater (Jurgens, 2008; Weiss, 2008, Los Angeles and San Gabriel Rivers Watershed Council, 2010). Studies found that nitrates in drinking water can pose human health risks, and tend to be poorly retained in BMPs due to high solubility (Pitt et al., 1999), however the amount of nitrates typically found in stormwater is less than the drinking water standard (U.S. EPA, 1999), and therefore nitrates are not considered a concern as long as nutrient hot spot areas are avoided (e.g., agriculture, nurseries) and sources of nitrates within biofiltration media are limited and controlled. Metals were found to largely be absorbed by BMPs, however there is a potential for breakthrough if the soil becomes saturated with contaminants, and satisfactory treatment depends on soil replacement at set intervals (i.e. a dedicated maintenance regime); typically maintenance intervals will be controlled by surface clogging of the biofilter rather than pollutant accumulation (Pitt and Clark, 2010). BMPs are known to remove bacteria through straining in the soils (Diez and Clausen, 2005; Rusciano and Obropta, 2007), however the treatment efficiency, and migratory potential for pathogens is highly variable (US EPA, 1999), and contamination of groundwater by pathogens has been documented (Pitt, 1999). However, any groundwater consumption as a potable water source requires treatment, and therefore bacteria contamination from stormwater infiltration is not deemed a threat to human health. Organic pollutants such as hydrocarbons are a concern for groundwater contamination since they are found to typically occur in quantities above regulatory levels (Shepp, 1996), have been shown to migrate into groundwater (Pitt et al, 1999), and can cause acute toxicity (U.S. EPA, 1999). Most hydrocarbons will be attenuated by soil in biofiltration systems (Hsieh and Davis, 2005), however, Wilson et al (1990) found that while undetected in stormwater samples, volatile organic sediments were present in dry-well sediments and groundwater samples, though at levels below the EPA human health criteria. Therefore the expected risk of groundwater contamination from stormwater infiltration is considered to be low for typical stormwater pollutants of concern.

3. OVERVIEW/DESCRIPTION OF THE ENGINEERING DETAILS

The following section describes the function of each component of design in terms of either addressing the water quality objective, the groundwater augmentation objective, and a "system fail" risk mitigation objective.

3.1 DESIGN ELEMENTS TO HELP PROTECT GROUNDWATER RESOURCES (BMP)

The biofiltration system consists of "soft infrastructure" and "hard infrastructure" components. The soft infrastructure includes vegetation within a filter media (e.g., bioretention soil media), and storage media (e.g., aggregate). The hard infrastructure includes an underdrain to discharge treated water to the drywell, an overflow control and hard engineered structures defining the boundary between the BMP and adjacent urban infrastructure. Other hard engineered structures such as inlets and curb retrofits relate to the site conditions and catchment hydrology but do not have a significant nexus to how well a BMP performs for protecting groundwater resources. The hard infrastructure elements are governed by local standard specifications and are not detailed in the following discussion.

- Vegetation used in biofiltration systems are typically reed species such as *Juncus* spp. and *Carex* spp. These species can tolerate extended wet and dry periods, help maintain porosity of media, provide uptake of nutrients and some other pollutants, and can play a role in symbiotic role with other organisms in media (i.e., microorganisms, fungus) (Read et al 2008). LIDI biofiltration technical specifications (LIDI 2013a) provides further details on irrigation and planting guidelines.

- The media bed supports plant growth, infiltration and provides treatment. The single media layer, often topped with a specified mulch, provides for planting and filtering. In other designs, a separate layer of planting media is placed in the top of the bed and is underlain by filter media which also provides treatment. Where planting media and filter media are the same layer, this layer should adhere to the more stringent of the LIDI technical standards for planting media and filter media.

    - Filter media, which is placed below the planting media in a layered design, is an engineered filter material known as the biofiltration soil media (BSM). Detailed specifications are contained in the LIDI Biofilter Technical Standards (BTS) (LIDI 2013a). The biofiltration soil media features a ratio of organic and inorganic material which allows suitable infiltration, and also the required chemical, biological and physical pollutant removal processes. The specified combination provides an important filtering function for metals and nutrients. Cation exchange capacity is known to be an important process in metal removal and nutrient retention (Jurries, 2003). Additionally, other treatment processes, such as sorption and precipitation can be provided by the components used in the filter media.

- The abundance and solubility of contaminants in the soil media is a key factor in determining the potential for pollutant export. This can be controlled by utilizing minimum organic material quantities needed for plant survival (typically 5 percent or less), utilizing stable organic materials (a well-aged leaf-based compost or compost alternative such as coco coir pith should be considered), and conducting initial leachate testing on all materials that are used.

- The storage layer is the base layer of the biofiltration system and consists of an open graded aggregate to optimize the porosity of this layer. This layer includes the underdrain which drains treated water to the drywell. Since the system objective is to infiltrate treated water through the drywell, optimizing storage volume in this layer is not required. Therefore this layer only needs to be sized to cover the underdrain and provide the required distance between the drain and BSM as per LIDI specifications. This minimum depth between the drain and BSM has not yet been determined according to the BTS (LIDI 2013a) and warrants further research. A bridging layer of at least 6 inches is preferred. Alternatively, a well screen pipe with very fine slots can be buried directly within the filter media layer to eliminate the need for a bridging layer and storage rock. Connected to the drain are maintenance and ventilation riser pipes which are proposed in this design. These PVC pipes require a bent connection to the under drain to facilitate directional cleaning.

- To achieve lower pollutant concentrations in treated biofilter effluent, an outlet control device attached to the underdrain of the biofiltration system may be desirable to control the rate of flow through the filter media. This has the benefit of increasing the contact time of water in the media pores, reducing the potential for short circuiting, and reducing pore velocities. Most critically, if pore velocities are high through the media or preferential pathways form, export of fine particles from the soil media can result. The conventional way to control filtration rates is to limit the hydraulic conductivity of the media. However, this approach can be challenging to execute reliably in practice given sensitivity of media filtration rate to minor variations in particle size distribution and compaction - a high level of quality control is needed to “dial in” media filtration rates in this manner. This also results in a media that is closer to clogging failure at the time it is place. The preferred outlet control approach allows the media to be specified with a higher initial hydraulic conductivity and wider allowable range that is easier to specify and achieve. The actual rate of flow through the media is then controlled by a more precise hydraulic control structure (i.e., orifice or weir) affixed to the underdrain or outlet pipe rather than the surface of the soil media. This approach can also allow the water level retained in the biofiltration system to be adjusted; for example it may be desirable to pool water within the underdrain or filter media layer of the biofiltration system to improve residence time for small storms and provide a reservoir of water for plant roots.

3.2 DESIGN ELEMENTS TO ENHANCE INFILTRATION OF STORMWATER AND TO LIMIT ADVERSE IMPACTS AND SYSTEM FAILURE

The drywell is a relatively straightforward design and a system commonly used in stormwater management. The drywell typically consists of a gravel and stone backfilled slotted well which accepts treated stormwater for infiltration is drilled to at least 10 feet below any impermeable layers. A number of important design guidelines, design changes, and maintenance routines should be followed to enhance groundwater infiltration function.

Design Guidelines

These guidelines are based on common standards of the Los Angeles County LID Standards Manual (2014), the San Diego County LID Handbook (2014) and the Orange County Technical Guidance Manual (2013). The most important of these are:

- Maintain a 10 foot minimum separation between drywell bottom and seasonal high water table; in constrained hydrogeologic conditions (i.e., limited groundwater gradient; confining layers or faults), an evaluation of potential groundwater mounding may also be needed;
- Do not use in soils with >30% clay or >40% silt because these soils are not conducive to infiltration.
- Penetrate the drywell at least 10 feet into permeable porous soils;

- Conduct facility-specific infiltration testing at the location and depth of the proposed drywell facility, using standardized methods acceptable to the local jurisdiction, to estimate the long term capacity of the drywell;
- Apply appropriate factors of safety to address uncertainty in testing methods, long term operational conditions, and potential for clogging;
- Maintain at least a 100 foot minimum setback from public supply wells and septic systems;
- Maintain a 100 foot minimum separation between drywells unless the interdependency of multiple wells in close proximity has been evaluated to determine the reliable long term drywell capacity (the groundwater dispersion mounds from multiple drywells in close proximity may interact and reduce the rate of each well, if placed in close proximity);
- Maintain at least 250 foot setback from sites of potential soil or groundwater contamination (such as sites found in the Geotracker or EviroStor databases (http://geotracker.swrcb.ca.gov/; http://www.envirostor.dtsc.ca.gov/public/), unless a site specific study demonstrates that infiltration would not adversely impact groundwater conditions. Higher setbacks may be necessary depending on the direction of flow of groundwater and the level of certainty of the contaminant mapping. Consultation with parties responsible for nearby contaminated sites is encouraged, where applicable.
- When past uses of a site indicate potential for contamination, it may be prudent to assess the site for soil or groundwater contaminant levels even if the site is not currently listed on a contaminated sites database. The introduction of stormwater infiltration into an area of contamination can significantly complicate later cleanup efforts.
- Maintain appropriate setbacks from slopes, foundations and other structures; the project geotechnical engineer should provide site-specific criteria that relate to drywells.
- Avoid infiltration from pollutant hot spots, including:
    - Roads greater than 25,000 ADT
    - Heavy and light industrial pollutant source areas,
    - Automotive repair shops
    - Car washes

  - Fleet storage areas
  - Nurseries, agriculture, and heavily managed landscape areas with extensive use of fertilizer
  - Fueling stations

- Projects that propose to infiltrate stormwater are encouraged to consult with the applicable groundwater management agency to the extent necessary to ensure that groundwater quality is protected.
- Drywells[1] must be registered as a Class V injection well through EPA Region 9 (http://www.epa.gov/region9/water/groundwater/uic-classv.html).

Design Modifications
Several important modifications to a typical design are presented here to address system failure risks. Failed systems will achieve neither water quality treatment nor groundwater recharge objectives. At worst, a failed system becomes a public nuisance contributing to increased pollution pathways to groundwater aquifers, impaired surface water bodies, a negative perception of emerging BMP technologies, and wasted capital investment. These design modifications are:

- While a typical drywell used as a stormwater BMP should incorporate a pre-treatment device for sediment control, the coupling of a biofilter to the front end of a drywell, as described in the memorandum, is sufficient to manage and control sediment from reaching the drywell and clogging the infiltration system.
- Include a shut off valve with a manually operated switch or actuator to prevent water from the biofiltration system from entering the drywell in the event of an acute pollutant exposure, such as an oil spill within the BMP's catchment. This feature can be integrated with the outlet control structure that is recommended in biofiltration design.

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[1] Stormwater drywells have a variety of designs and may be referred to by other names including stormwater drainage wells, bored wells, and infiltration galleries. A Class V well by definition is any bored, drilled, or driven shaft, or dug hole that is deeper than its widest surface dimension, or an improved sinkhole, or a subsurface fluid distribution system (an infiltration system with piping to enhance infiltration capabilities).

- Include an alternative backup discharge location for biofiltered water, typically to the storm drain. This would allow the biofilter to continue to treat water and drain completed in the event that the drywell is offline, at capacity, or clogged.
- Route overflow from the biofiltration area directly to the storm drain and not to the drywell. This helps prevent unfiltered water from entering the drywell.
- Locate the drywell at the surface, adjacent to the biofilter, and not directly below it. This allows the inclusion of maintenance access in the form of an access hatch without the need to dismantle the biofilter. This alignment also allows for the inclusion of the shut off valve described above.

Maintenance Suggestions

Aside from the important design elements outlined above, and guidelines for their implementation, adequate maintenance is required to maintain a functioning system:

- Periodic replacement of the soil media is required to ensure that BMP soils feature low metal concentrations. Literature suggests that the soil adsorption of pollutants will eventually be saturated and soil material will need to be replaced. Unmaintained BMPs can result in breakthrough of metals and possible increased risk of groundwater contamination. This risk cannot be eliminated through design, and requires a dedicated life cycle maintenance program to ensure the system continues to project the groundwater resources form contamination risk. In general, biofiltration systems are expected to clog before pollutant accumulation reaches levels of concern (Pitt and Clark, 2010). Scraping the top 3 to 6 inches of media periodically can help extend life and minimize the risk of pollutant accumulation at levels of concern.

- Other common maintenance issues are vegetation die-off, which reduces the biofiltration function since they play an important role in long term permeability and pollutant uptake. Vegetation within a biofilter actively maintains the hydraulic conductivity of the planting media and vegetation die-off increases the risk of the BMP clogging. Vegetation should be maintained and should be actively replaced if it dies off.

- Sediment and debris accumulation which limits hydrologic connectivity to the BMP is another issue that can only be addressed through maintenance. Periodic removal of sediment and debris is recommended. This will also typically require replacement vegetation and the top layer of media if the entire surface of the biofiltration system is excavated.

Sediment capture pretreatment is considered a standard component of typical drywell construction to reduce the risk of clogging. In the proposed standard design, the biofiltration system provides appropriate sediment capture to protect the drywell, provided that export of particles from the biofiltration media itself is controlled with an effective separation layer. On average, biofilters outperform sediment basins because biofiltration BMPs filter much smaller sized particles (Geosyntec and WWE, 2014).

If desired, a sediment capture pretreatment BMP could be a useful component upstream of biofiltration since they protect the engineered biofilter media from excessive sediment fluxes which can affect plant growth and clog biofilters. Therefore, while not incorporated into this standard design, a pretreatment sediment capture system, such as a sedimentation chamber or forebay, is recommended to improve the longevity of the biofilter component of the treatment train. For larger biofiltration systems, an engineered pre-treatment system such as a sedimentation basin or hydrodynamic separator (where space constraints are an issue) could be considered for enhanced protection from clogging.

4 REGULATORY BARRIERS AND TECHNICAL DESIGN GUIDANCE OBSTACLES

The following regulatory and technical issues represent potential existing barriers to widespread implementation of drywells in California. It is recommended that these barriers be addressed to facilitate approval and use of drywell in the state.

- **Statewide drywell pretreatment standards or guidance**. Currently no regulatory framework exists in the State of California for permitting drywells or providing practitioners with guidance on pretreatment needs based on drainage area or soil conditions. For example, heavy industrial land uses with elevated metal and organic concentrations may require more advanced pretreatment or prohibition on drywells. Similarly, shallow groundwater or highly transmissive soils may require the same. Research is required to develop minimum standards (e.g., BMP unit process selection) for drywell implementation based on these site specific conditions. In addition there may be a need for specifications on contact time for pretreatment within the biofilter.

- **Appropriate infiltration test methods and factors of safety for drywells.** Infiltration testing methods are often approximations of full scale infiltration processes. Retrospective analysis of measured or estimated vs. actual infiltration capacity of drywells would be beneficial to evaluate which infiltration testing methods are most reliable and what factor of safety is needed to reliably develop capacity estimates from testing data.

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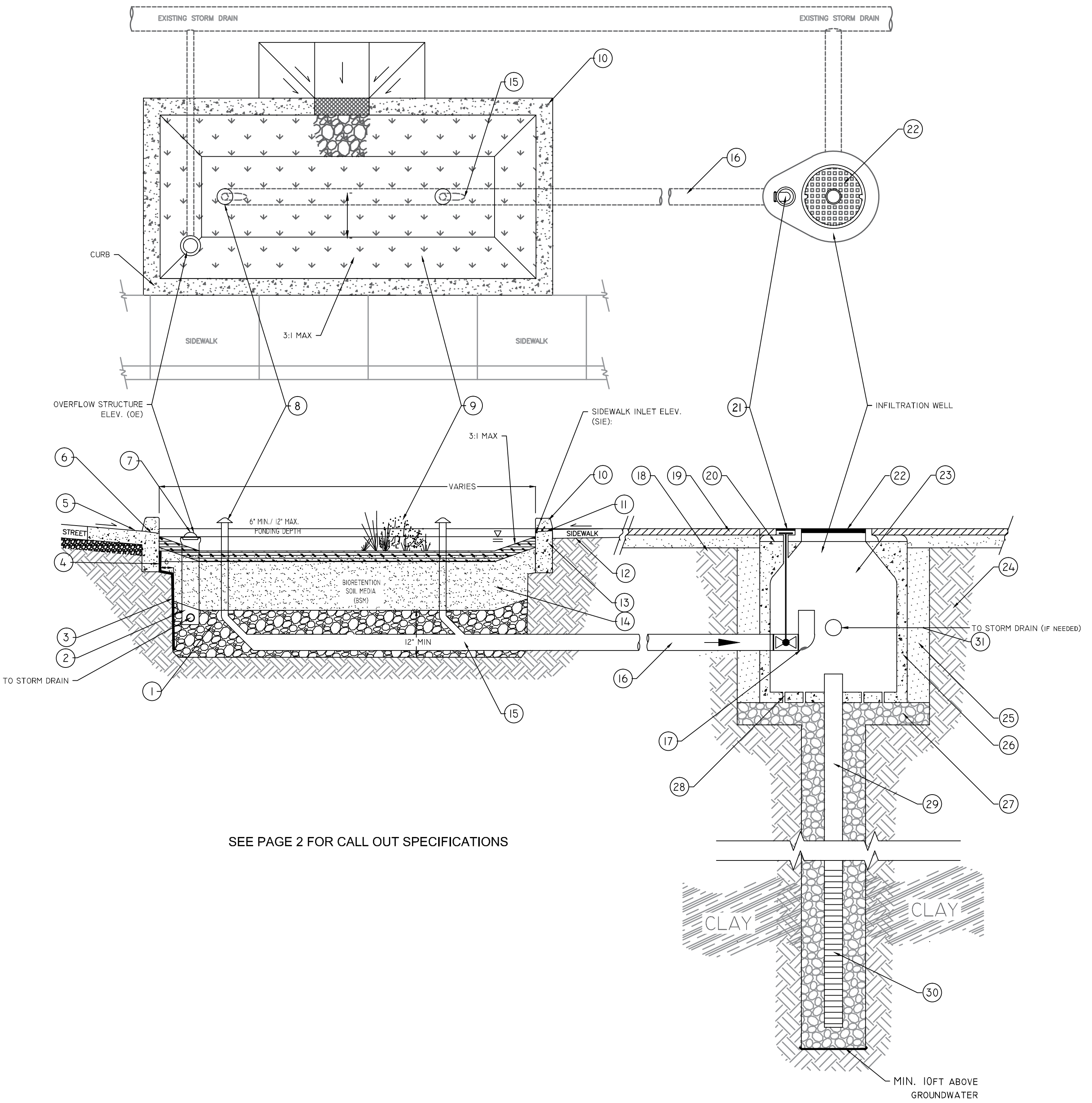


SEE PAGE 2 FOR CALL OUT SPECIFICATIONS

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

Detail number

DRYWELL STORMWATER BMP

(sloped sided, no on-street parking, sidewalk, underdrain, control vault outside of BMP)

XX

Municipality
Department Name

page 1/2

SPECIFICATIONS

1. 12" DEEP OPEN GRADED WASHED STONE (TYPICALLY 3/4" TO 1-1/2" (ASTM #4 STONE) OR 1" TO 2" (ASTM #3 STONE).
2. BRIDGING LAYER(S) PER LIDI BIORETENTION TECHNICAL SPECIFICATIONS (BTS). DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE. DO NOT USE FILTER FABRIC BETWEEN BIOFILTER SOIL MATERIAL (BSM) AND AGGREGATE.
3. 30 ML LINER MAY BE REQUIRED TO AVOID LATERAL INFILTRATION BELOW STREET; SUBJECT TO GEOTECHNICAL RECOMMENDATIONS.
4. MAINTAIN 6" MINIMUM BENCH OF NATIVE SOIL FOR SUPPORT OF ADJACENT SIDEWALK/ROAD (TYPICAL).
5. CURB AND GUTTER DETAIL 110.
6. CURB INLET DETAIL 120, GUTTER INLET ELEV (GIE). LOCATE ENERGY DISSIPATION COBBLE PADS AS SPECIFIED IN INLET DETAILS.
7. OVERFLOW STRUCTURE REQUIRED FOR IN-LINE SYSTEMS WITHOUT OVERFLOW BYPASS, DETAIL 140.
8. MAINTENANCE PIPES - 4" MIN. DIA. VERTICAL PVC PIPES CONNECTED TO UNDERDRAIN. PLACED AT START AND 3 FEET BEFORE END OF UNDERDRAIN. REQUIRES DIRECTIONAL SWEEP BEND. THREADED AND CAPPED
9. VEGETATION - PLANT SELECTION AND MULCH (OPTIONAL) PER BIORETENTION TECHNICAL SPECIFICATIONS.
10. 4" MIN. EXPOSED WALL HEIGHT
11. SIDEWALK DRAINAGE NOTCH 1" LOWER THAN SIDEWALK, SLOPED TO FACILITY
12. SEE PLANS FOR SIDEWALK RESTORATION
13. DEEP CURB DETAIL
14. BIORETENTION SOIL MEDIA (BSM). SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS (BTS). SPECIFICATION SHOULD AVOID COMPOST OR OTHER MATERIAL KNOWN TO LEACH NUTRIENTS.
15. UNDERDRAIN, MIN. 4" DIA. PVC SDR 35 PERFORATED PIPE OR LARGER AS NEEDED TO CONVEY PEAK TREATED FLOWRATE WITH MINIMAL HEAD LOSS, SEE CONSTRUCTION NOTES.
16. 8" INLET PIPE OR OTHER.
17. LOW FLOW ORIFICE. (SEE DESIGN NOTE 11).
18. STABILIZED BACKFILL - TWO-SACK SLURRY MIX.
19. SIDEWALK PER MUNICIPAL STANDARDS.
20. COMPACTED BASE MATERIAL.
21. ACCESS HATCH WITH SHUT OF VALVE SWITCH. CONNECTED TO SHUT OF VALVE IN INLET PIPE.
22. MAINTENANCE HOLE COS TYPE 204-204 MH A OR B. ¾" I.D. MIN OBSERVATION PORT.
23. MANHOLE CONE - MODIFIED FLAT BOTTOM.
24. EXISTING SOILS. (SEE CONSTRUCTION NOTE 4, 8).
25. COMPACTED BACKFILL
26. PRE-CAST OR INSITU CAST CONTROL VAULT (SEE DESIGN NOTE 8)
27. ROCK - WASHED, SIZED BETWEEN 3/8" AND 1-1/2'
28. PERFORATED BASE OF CONTROL VAULT
29. DRILLED SHAFT WITH 6" WELDED STEEL OR THREADED PVC CASING (SEE DESIGN NOTE 13 & CONSTRUCTION NOTE 7,8)
30. 6 - 8" O.D. WELDED WIRE STAINLESS STEEL WELL SCREEN OR THREADED PVC SLOTTED SCREEN. SCREEN LENGTH + LENGTH + SLOT WIDTH TO BE DETERMINED IN ACCORDANCE WITH LOCAL CONSTRAINTS .I.E. DISTANCE BETWEEN CLAY LAYER AND MIN. 10FT ABOVE SEASONAL HIGH GROUNDWATER LEVEL
31. PVC STORMDRAIN CONNECTOR PIPE. SAME DIAMETER AS INFLOW PIPE TO CONTROL VAULT.

DESIGN NOTES

1. ADDITIONAL DESIGN GUIDANCE FOR BIOFILTRATION SYSTEM PROVIDED IN LIDI BIORETENTION TECHNICAL SPECIFICATIONS (BTS) DOCUMENT.
2. BOTTOM WIDTH - PROVIDE 2 FT MINIMUM FLAT BREGENALL
3. OTTOM WITH A MAX 3:1 SLOPE FOR SURFACE FINISHING WITHIN BIOFILTRATION SYSTEM
4. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP LAYER OF ¾" (NO. 4) OPEN-GRADED AGGREGATE.
5. PROVIDE SPOT ELEVATIONS AT INLETS ON CIVIL PLANS (FE, OE, GIE, SIE). SEE DETAIL 120.
6. EDGE CONDITION WILL VARY FOR NEW AND RETROFIT PROJECTS. CURB, WALL, AND SIDEWALK DETAILS MAY BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS.
7. PROVIDE MONITORING WELL IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
8. LONGITUDINAL SLOPE 6% WITH CHECK DAMS.
9. IF CHECK DAMS ARE NEEDED, SEE CONCRETE CHECK DAM DETAIL 121.
10. VARIATIONS IN DRY WELL DESIGN SHOULD BE MADE TO ACCOMMODATE STORAGE VOLUME DESIGN AND TO SUIT LOCAL CONDITIONS AND CONSTRAINTS.
11. IN AREAS WITHOUT A STORMDRAIN, THE SYSTEM SHOULD ONLY BE CONSTRUCTED WHERE THE MAINTENANCE HOLE SURFACE INVERT IS ABOVE THE BIOFILTER OVERFLOW ELEVATION.
12. ALTERNATIVE VAULT LOCATIONS POSSIBLE INCLUDING WITHIN THE BIOFILTER FOOTPRINT.
13. VALVE CAN BE MOVED TO THE BIOFILTER IF DESIRED. REQUIRES STRUCTURAL SUPPORT.
14. ALTERNATIVE PRODUCTS SUCH AS VENDOR-SUPPLIED DRY WELL PRODUCTS MAY BE USED AS A SUBSTITUTE PROVIDED THAT THE ALTERNATIVE PRODUCT IS EQUAL.

DRYWELL STORMWATER BMP

(sloped sided, no on-street parking, sidewalk, underdrain, control vault outside of BMP)

Detail number

XX

Municipality
Department Name

DRY WELLS
USES, REGULATIONS, AND GUIDELINES IN CALIFORNIA AND ELSEWHERE

Dry Well Description and Use

Dry wells are gravity-fed excavated pits lined with perforated casing and backfill d with gravel or stone (Fig. 1). Dry wells penetrate layers of clay soils with poor infi trati n rates to reach more permeable layers of soil, allowing for more rapid infiltra n of stormwater. They can be used in conjunction with low impact development (LID) practices to reduce the harmful eff cts that traditi nal stormwater management practice have had on the aquati ecosystem. Dry wells not only aid in stormwater runo reducti n, but they can also increase groundwater recharge, are economical, and have minimal space requirements.

Figure 1. Idealized drawing of stormwater infiltration using a dry well

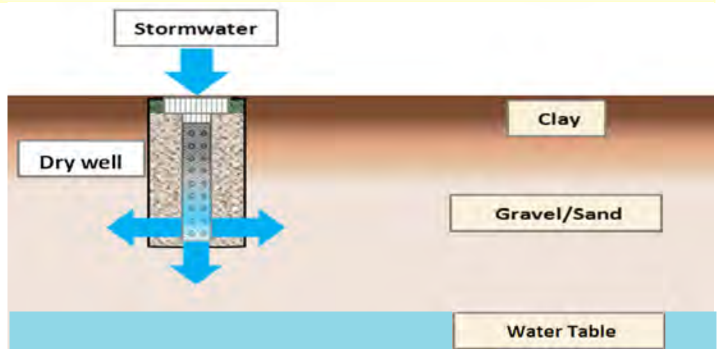


Fig. 2. Dry well installed to receive runoff flowing through a lawn (Source: R. Pitt)

In California, dry wells are used infrequently and with caution due to the concern that they provide a conduit for contaminants to enter the groundwater. In urban environments, scienti c reports show a lack of correla on between the use of dry wells and groundwater contaminati n (Jurgens 2008, Los Angeles 2005). As a consequence, stormwater/LID guidelines o en do not include dry wells. Regional Water Quality Control Boards' Standard Urban Stormwater Management Plans (SUSMP) also differ in technical speci cati ns for dry well construction The California Department of Water Resources' (DWR) well water regulation are interpreted by some to have applicability to stormwater infiltra n through dry wells. Due to the desire to maintain high groundwater quality and the lack of clarity about various technical considerati ns, many are reluctant to incorporate dry wells into stormwater management projects.

U.S. Environmental Protection Agency (EPA) - Region 9 Regulations

Dry wells and other buried infiltrativ devices serving lots other than single-family homes are subject to the U.S. Environmental Protecti n Agency (US EPA) Underground Injection C ntrol (UIC) regulati ns. A dry well is considered a Class V injec on well, which is de ned as a conduit for non-hazardous fluids hat is deeper than it is wide. Dry wells may be authorized to operate as long as they are registered with the US EPA, and only inject uncontaminated stormwater. The US EPA has no design requirements for dry wells; that responsibility is left to l cal authorities. However, the following design prac ces are encouraged:

- Should not be constructed deeper than the seasonal high water table.
- Follow local guidelines for setback distances from the dry well bottom to the water table.
- Go through a thorough site evaluati n to prevent the spread of contaminants.
- Util ze pretreatment to remove sediment and the pollutants that they frequently carry.
- Use backfil to improve dry well column stability.

The US EPA has also set forth the following minimum requirements for Class V wells:

- Register injecti n wells at www.epa.gov/region09/water/groundwater/injec on-wells-register.html
- Operate injecti n wells in a way that will not endanger underground sources of drinking water (USDW).
- Abandoned Class V wells should be properly destroyed, with no fica n to the US EPA, to prevent movement of contaminated flu ds into USDW.

US EPA Regulations (continued)

In California, Class V wells are overseen by the US EPA's Region 9 office Class V wells already in place that are not in the registry must cease use and the operator must contact the Regional office An applicati n and inventory form must be submitted and injectio can resume a er 90 days, if approved. Aft r an inventory form is submitted the UIC Program will determine if the user is authorized to "inject". A well will be prohibited if the user endangers drinking water, fails to submit inventory informati n or an application to the UIC Program, or fails to respond to a written request from the UIC Program. Some dry wells in the State have been constructed without going through this registrati n process while some countie (e.g., Los Angeles) enforce registrati n as part of permitting n development.

The Role of the California Regional Water Quality Control Board

The State Water Resources Control Board and the Regional Water Quality Control Boards in California can prescribe requirements for discharges into California waters, including groundwater. Under California's Porter-Cologne Act, the Water Boards have the authority to require a person wishing to operate an injection well to file a report of the discharge. These requirements must implement the Boards' water quality control plans (Basin Plans). The requirements must take into considerati n the beneficial uses (domesti water, irrigati n, etc.) of the aff cted water and the water quality objective necessary to protect these bene cial uses, as well as the need to prevent a nuisance.

California's Anti-Degradation Policy

When evaluating the risk and bene ts of using dry wells, California's an -degradati n policy (State Water Resources Control Board Resolution No. 68-16) is also considered. The an -degradati n policy protects high quality water (water that is higher in quality than that prescribed by the Water Boards' plans and policies). Degradati n of high quality water is permitted only if the discharge provides a maximum benefi to the people of the State, does not violate the Boards' Basin Plans and policies, and when the discharge is controlled by the best practicab e treatment. The maximum bene t to the State is determined on a case by case basis taking into account the benefici l uses of the water, economic and social costs, the environmental aspects of the proposed discharge, and the implementati n of feasible alternati e treatment or control methods. Factors to be considered when evaluating the use of dry wells for stormwater management could involve determining if they:

- Provide an addition l source of water to augment the water supply,
- Reduce the negative eff cts of runo fl wing to surface waters, and
- Minimally impact groundwater quality.

Considera on and interpretation f these and related factors are the basis on which the state's an -degradati n policy is applied to dry well use and siti g.

Typical Dry Well Guidelines at the Local Level

Dry Wells and Water Well Protection Policy

Throughout California, county environmental management departments are charged with implementing California DWR regula ons (Bulleti s 74-81, 74-90) to protect wells used to supply drinking water. These regulati ns are designed to prevent contaminati n of groundwater through improperly constructed or decommissioned wells. County sta regularly inspect wells and the area around them to evaluate compliance with regulati ns. The very process that dry wells are designed to facilitate, namely the in ltrati n of stormwater, stands in contradictio to the goals of Bulletin 74, which prohibits surface water from entering injection wells. Currently, individual county environmental health departments in California use their best professional judgment to evaluate how to manage this challenge.

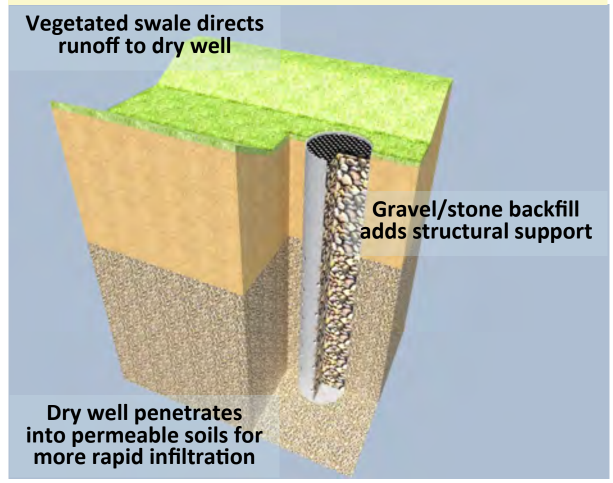
Local Guidelines

Many requirements and design specifi ati ns for dry wells come from guidelines linked to the NPDES (Nati nal Polluti n Discharge Eliminati n System) permits, issued by the State or Regional Water Boards. In a few locales, city or county requirements also exist. In Los Angeles County, for example, informati n on placement and design of dry wells must be submitted as part of the permittin process for new development. Not all citi s and counti s have such requirements.

Local Guidelines (continued)

Design specifica ns di er by city/county, with some standards varying signi cantly. Local authorities should be consulted for specific guidelines. The following lists some of the common standards of the Los Angeles and San Diego SUSMPs as well as the Placer County LID Manual (documents that are linked to NPDES permits):

Figure 3. Example dry well system design



- Building setback: 10 – 20 feet minimum
- Soil: not suitable in soils with >30% clay or >40% silt
- Water table: 3 – 10 feet minimum separati n between dry well botto and seasonal high water table
- Public supply wells: 100 feet minimum setback
- Separati n (center to center): 100 feet minimum
- Penetrati n: 10 feet minimum into permeable porous soils
- Dry well surface inlet: 3 inch minimum above bo om of reten on basin
- Should not be used at sites with a slope >15%. (San Diego does not recommended sites with slopes >40%).

In 1951, the Regional Water Quality Control Board in the Bay Area restricted the use of dry wells in an eff rt to protect groundwater quality. Today, the San Francisco Public Util es Commission recommends construc ng drainage wells that are much wider than deep, therefore, they are not technically dry wells. The City of Modesto is a somewhat unique case in California in that they have been using dry wells for over 50 years as one of their principal runo management tools. Dry wells are carefully scrutini ed under the NPDES/MS4 permit. The Central Valley Regional Board requires the City of Modesto to perform extensive monitoring of stormwater and groundwater. The use of dry wells has not directly resulted in groundwater problems in Modesto (Jurgens 2008).

Dry Well Regulations in Other States

Over a dozen other states have dry well requirements in place. States surrounding California may provide a helpful overview of statewide dry well requirements currently being implemented. Oregon, for example, permits the use of dry wells, but they must be sited and constructed following their guidelines. Dry wells also must be registered with the state prior to constructio and a fee, based on a sliding scale that is propor onal to risk, must be paid. Arizona is another state that has used dry wells for many decades. They too have a registrati n system along with a fee system. The table below compares regulati ns between Arizona and California, both located in US EPA Region 9.

Arizona	California
Falls under USEPA Region 9 UIC program for Class V injection wells.	Falls under USEPA Region 9 UIC program for Class V injectio wells.
Dry wells **must** be registered with the Arizona Department of Environmental Quality (ADEQ). Fee are required when registering.	Regional Water Quality Control Boards **can** prescribe discharge requirements for injection wells.
Requires Aquifer Protection Permit and approval by ADEQ prior to construc on.	No statewide permittin requirements for the use of dry wells.
Requires information on design, pollutant characteristics and closure strategy.	Regional Water Quality Control Boards may require a report of discharge and other informa on. No formal, statewide process for registra on or monitoring.
Requires monitoring, recordkeeping and reporting, con n-gency planning, discharge limitations a compliance schedule, and closure guidelines.	Injec on well requirements must protect beneficial uses (comply with the An -Degrada on policy).
A general permit covers facilities that have obtained a NPDES/MS4 permit and have a stormwater pollu on prevention plan implemented.	Requirements may vary by region and municipality.

Regulations in Other States (continued)

Pennsylvania, New Jersey, Washington, and Hawaii are a few of the others states with dry well regulations and guidelines. In New Jersey, some communities require dry well installation for all new and major remodels related to residential construction. They are typically designed to temporarily store and infiltrate roof runoff. Dry wells in New Jersey are prohibited in industrial or other areas where toxic chemicals might be used. In contrast, in Pennsylvania dry wells are permitted in industrial areas with restrictions, but not along roadways. In Washington, dry wells must be registered and constructed to specifications. The regulations of these states vary with respect to dry well design, use of pretreatment, separation from drinking water sources, distance from the water table, and other factors.

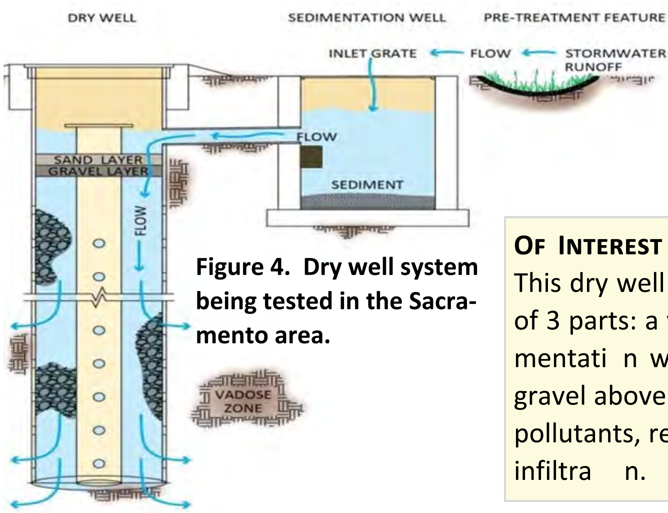


Figure 4. Dry well system being tested in the Sacramento area.

Of Interest Most dry wells are not holes in the ground fille with rocks. This dry well system (left is being tested in the Sacramento area. It consists of 3 parts: a vegetated pretreatment feature, a structural pretreatment sedimentati n well, and the dry well itself, which contains layers of sand and gravel above the rocks. The goal of this design is to maximize the removal of pollutants, reduce clogging of the dry well, and promote e cient stormwater infiltra n.

Conclusions

Currently there are no uniform state regulations or guidelines for dry wells in California. However, the Regional Water Quality Control Boards have the discretion to issue waste discharge requirements and to interpret and apply the Anti-Degradation policy to the construction of new dry wells. Therefore, most regulations and guidelines occur at the city or county level and vary by region. Available information suggests that dry wells can be used safely if careful site evaluations are performed to determine if a dry well is suitable for the location. They can be an alternative to typical storm drainage systems that provide numerous benefits, including reducing localized flooding, recharging the aquifer, supporting the implementation of LID practices in areas with clay soils, thereby minimizing alterations to the hydrologic cycle which have damaging effects on valuable aquatic resources.

Useful Links and References

General Information

US EPA Class V Injection Well Information

http://water.epa.gov/type/groundwater/uic/index.cfmvv

US EPA California Injection Well Guidelines

http://www.epa.gov/region9/water/groundwater/uic-pdfs/calif5d-muniguide.pdf

Forms and Registration

EPA Region 9 Injection Well Registration

http://www.epa.gov/region09/water/groundwater/injection-wells-register.html

Region 9 Injection We l Contact: r9iwells@epa.gov

References

Jurgens, B.C., K.R. Burow, B.A. Dalgish, & J.L. Shelton. 2008. Hydrogeology, water chemistry, and factors affec g the transport of contaminants in the zone of contribu on of a public-supply well in Modesto, eastern San Joaquin Valley, California. National Water Quality Assessment Program, U.S. Geological Survey, Scientific Inve ga on Report 2008-5156.
http:// ubs.usgs.gov/sir/2008/5156/pdf/sir20085156.pdf

The Los Angeles and San Gabriel Rivers Watershed Council. 2005. Los Angeles Basin Water Augmentation Study, Phase II Final Report. Los Angeles, CA. Posted at:
http://wate shedhealth.org/Files/document/265_2005_WAS%20Phase%20II%20Final%20Report_2005.pdf

This factsheet was prepared by the California Office of Environmental Health Hazard Assessment, which is working with the City of Elk Grove on a Proposition 84 funded study of the potential risks to groundwater quality associated with the use of dry wells. Written by Nelson Pi & Ary Ashoor. For more information, contact Barbara Washburn, PhD at barbara.washburn@oehha.ca.gov.

APPLICATION TO STORE AND RECOVER NON-NATIVE WATER FROM THE SEASIDE GROUNDWATER BASIN

INSTRUCTIONS: This Application form is for use by Standard Producers in the Seaside Groundwater Basin (Seaside Basin) for the purpose of obtaining approval from the Seaside Basin Watermaster (Watermaster) to store Non-Native water in, and to subsequently recover that stored water from, the Seaside Basin. The application process is as described in Section III.L.3.j.xx of the Amended Decision of the Monterey County Superior Court, Case No. M66343, filed February 9, 2007.

____

Name of Standard Producer (Applicant)

Contact Information for Applicant:

Contact Person: ____

Address: ____

Telephone: ____

Proposed quantity of non-native water Applicant seeks to store through spreading or direct injection into the Seaside Basin (acre-feet per year):

____

Proposed location(s) where the spreading or direct injection of non-native water into the Seaside Basin will occur. If injection will be performed using one or more injection wells, provide indentifying information for those wells including the aquifer(s) into which the injection will occur. If spreading will be performed, provide coordinate location information, as well as any physical street address information for the proposed location.

____

____

____

____

Proposed location(s) where the stored water may be recovered. Provide identifying information for each well from which the stored water will be recovered, including the aquifer(s) from which recovery will occur.

Water quality characteristics of the non-native water proposed for spreading or direct injection into the Seaside Basin. Provide sufficient physical, chemical, and microbiological information about the water being proposed for storage, so that the Watermaster can determine whether or not storing such water will have any adverse water quality impacts on the Seaside Basin. Provide this information in the form of analytical results from a properly certified water testing laboratory, attached to this Application.

Also provide sufficient information to demonstrate to the Watermaster that the water quality characteristics of the water being proposed for storage will meet all of the requirements imposed on the Applicant by permits and/or approvals issued to the Applicant by the regulatory agency or agencies with jurisdiction.

Permits and approvals from regulatory agencies. Attach copies of all permits and approvals the applicant has received from regulatory agencies, which relate to the storage of water in the Seaside Basin. Such agencies will likely include some or all of the following:

- California Regional Water Quality Control Board
- California Department of Public Health
- County of Monterey Department of Health
- State Water Resources Control Board

APPENDIX G
Hartnell Gulch Project Concept Designs and Preliminary CEQA Checklist

APPENDIX G: HARTNELL GULCH PROJECT DESIGNS AND CEQA CHECKLIST

This appendix contains information developed for the top selected multi-benefit project, Hartnell Gulch, located in the City of Monterey. Appendix components include the project description, 30% design drawings, Project Implementation Plan, and Preliminary CEQA Checklist.

These items are provided on the following pages of this appendix:

* * * *

1. HARTNELL GULCH RESTORATION AND RUNOFF DIVERSION PROJECT

SITE DESCRIPTION

Jurisdiction:	City of Monterey
Location:	Hartnell Gulch from Pacific Street downstream to Hartnell Street and from the southeastern corner of the Pacific Street public parking lot downstream to the confluence with Hartnell Creek.
Land Owner:	City of Monterey
Catchment[1]:	CM-11
Length of Creek Rehabilitation:	616 feet
Area of Vegetation Replacement:	0.70 acres

PROJECT CONCEPT

The project area within the drainage area to the proposed Hartnell Gulch project is shown on Figure 1A. The drainage area primarily includes residential and undeveloped areas includes the tributary catchment areas of two partially daylighted and partially culverted streams, Hartnell Creek's north fork and south fork. The confluence of these streams is located within the proposed project footprint. The catchment area to the north (546 acres) drains to the northern fork of Hartnell Creek and enters the project area at Pacific Street (Figure 1B). The catchment area to the south (557 acres) drains to the southern fork of Hartnell Creek and enters the project area east of the Pacific Street public parking lot (i.e., Cypress Lot) (Figure 1B). Drainage from the upstream residential areas flow to the east and northeastward toward the Monterey City center. Hartnell Creek's north and south fork channels flow into storm drains upstream of the project area. Perennial seepage of groundwater under the Monterey High School football field flows into the project area via the north fork at a rate of approximately 50,000 gallons per day. The project location is in a commercial area adjacent to the Monterey Public Library, where the creeks resurface and converge. Downstream of the project location, the creek is piped to an outfall that discharges to Monterey Bay, although this piped flow could be directed to Lake El Estero as part of the proposed Lake El Estero Diversion to Sanitary Sewer project.

The Hartnell Gulch project is comprised of two components: (1) creek rehabilitation, and (2) dry weather flow diversion to sanitary sewer, as shown on Figure 1B. The upstream boundaries of the project extent is located where the north fork of Hartnell Creek daylights at Pacific Street and where the south fork drains onto city property at the southeastern corner of the Pacific Street public parking lot (i.e., Cypress Lot). The downstream boundary of the project extent is located where Hartnell Creek is culverted at Hartnell Street. The creek rehabilitation is proposed to consist of removal of invasive plants, revegetation with native plants, and stabilization of the existing eroded channel. The grade of the channel bed would be raised several feet throughout the project area and bank stabilization and buried grade controls would be included to limit future instream erosion.

[1] See Monterey Peninsula Water Recovery Study Report, Appendix D, Figure 2A Catchment Detail Map.

Additionally, a drop structure is proposed to be placed at the downstream end of the project area to limit future instream erosion. Elevating the streambed would also provide aesthetic benefits, including increasing public access with construction of a pedestrian walkway alongside the creek bank. Photos of the existing conditions of Hartnell Gulch in Figure 1C. The proposed Hartnell Gulch revegetation plan from Ecological Concerns Incorporated (2016) is shown in Figure 1D and example riparian projects is shown in Figure 1E.

The project dry weather flow (April to October) diversion would entail tie-in and discharge to the sanitary sewer. Flows would be directed to the Monterey One Water Regional Treatment Plant (RTP) for recycling, to augment water supply. Project dry weather flows are proposed to be diverted at the downstream boundary of the project area, as shown on Figure 1B. Flow diversion structures will redirect dry weather flows from the channel to the 8-inch diameter sewer main on Hartnell Street via a proposed in-stream stop log structure, gravity pipe, hydrodynamic separator, pump station, forcemain, and new sanitary sewer manhole.

A preliminary Environmental Checklist has been prepared to evaluate the project based upon the 30% design (DD&A, 2018).

Proposed project is conceptual and subject to change based on future feasibility assessment, funding availability, and/or other information.

DESIGN INFORMATION

Tributary Drainage Area (TDA):	1,103 acres
TDA Imperviousness:	18 %
TDA Urbanized Area:	970 acres
Dry Weather Seepage Runoff:	28 acre-feet per year (April to October)
Dry Weather Nuisance Runoff:	23 to 32 acre-feet per year (April to October)
Sanitary Sewer Diversion Pump Rate[1]:	200 gallons per minute
Length of Diversion Pipeline:	80 feet

[1]Sanitary sewer diversion pump rate estimated based on: excess conveyance capacity of the gravity sewer main; excess capacity of the M1W Interceptor Pipeline with other potential runoff diversions; and the dry weather runoff rate.

PROJECT BENEFITS

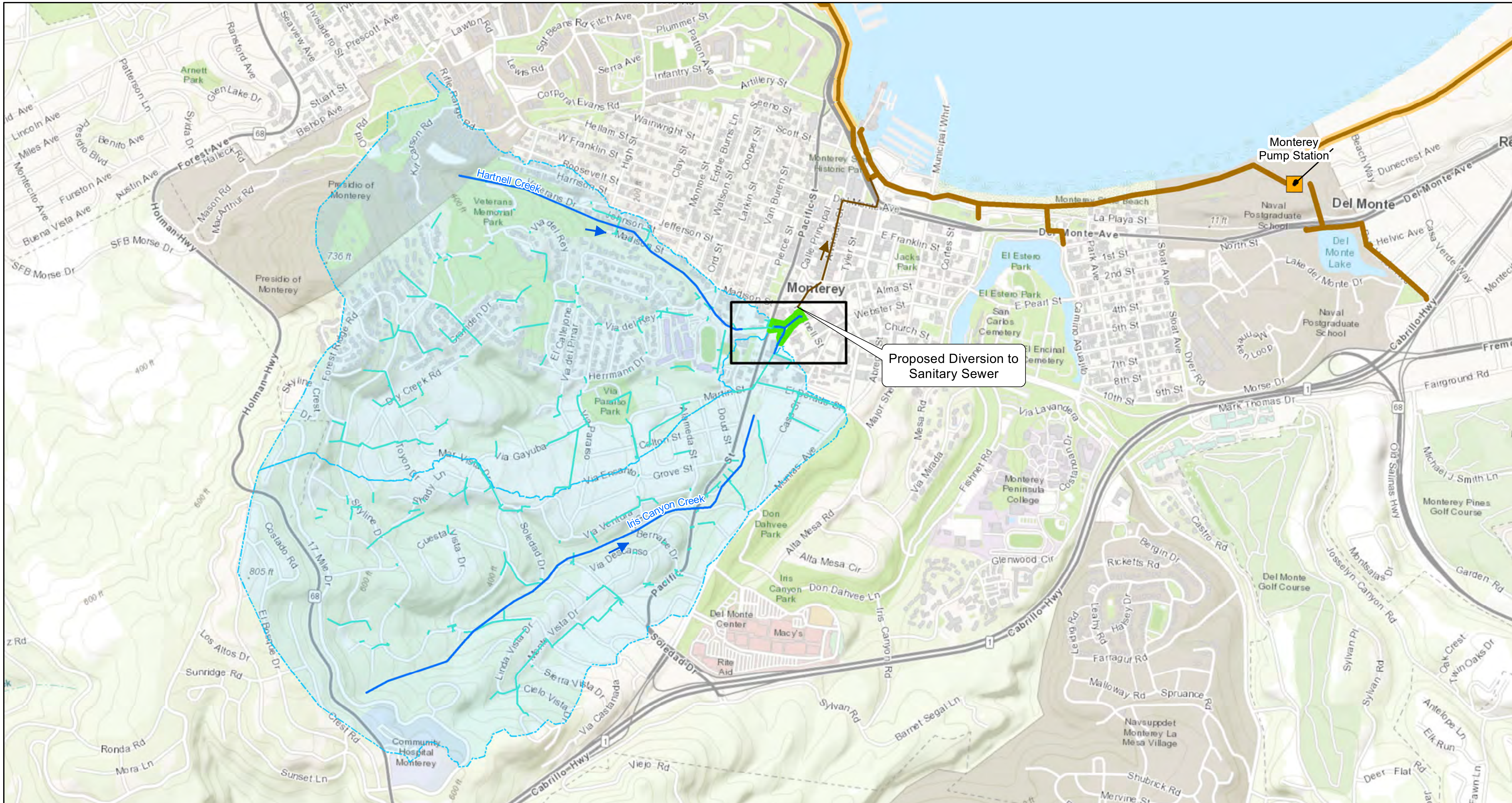
Net Recovered Water Volume:	51 to 60 acre-feet per year (April to October)
Sediment Load Reduced:	The project will reduce discharge of sediment and associated pollutants through diversion of dry weather flows. The stream restoration component of the project is not anticipated to affect sediment loads from the watershed except for sediment loadings associated with in-stream sources of Hartnell Gulch.
Flood Management Benefits:	Stabilization of the bed and banks are anticipated to prevent excess erosion of the creek.
Natural Drainage System Benefits:	Creek rehabilitation will include stabilization of incised creek channel.

Habitat or Open Space Benefits:	Rehabilitation of riparian corridor and re-establishment of native vegetation.
Community Benefits:	Placement of a public walkway along creek channel with informational signage. The drainage area to Hartnell Gulch contains a Disadvantaged Community (DAC).

COST ESTIMATE

DESCRIPTION	PRELIMINARY COST
Capital Cost	$1,300,000
Annual Operations and Maintenance Cost[2]	$35,000 per year
Estimated Life Cycle Annual Cost[3]	**$110,000 per year**
Unit Project Cost of Recovered Water	**$ 1,800 to $2,100 per acre-foot**

[2] Includes sewer connection fees at the Regional Treatment Plant for the dry season, only.
[3] Assumes 30-year design life at 4% interest rate.



Legend

- Hartnell Gulch Project Footprint
- Hartnell Gulch Project Drainage Area
- Project Map Extent
- Stream
- Watershed Delineation

Existing Infrastructure

- M1W Interceptor Pipeline - Pressurized
- M1W Interceptor Pipeline - Gravity
- Sanitary Sewer
- Storm Drain
- Pump Station

N

0 0.5 Miles

Hartnell Gulch
Restoration and Runoff Diversion Project
Monterey, CA
Catchment Map
Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants | Monterey One Water Providing Cooperative Water Solutions

Figure 1A

Oakland, CA | Spetember 2018

P:\GIS\MRWPCA\Project\Concept Projects\1. Hartnell Gulch\Hartnel Gulch.mxd 9/19/2018 11:04:13 PM

Legend

Hartnell Gulch Project Footprint

Existing Infrastructure

- Sanitary Sewer
- Storm Drain
- Open Channel

Proposed Control Measures

- Low-Flow Diversion Structure
- Wet Well Pump
- Buried Grade Control
- Diversion to Sanitary Sewer
- Drop Structure

N

0 200 Feet

Hartnell Gulch
Restoration and Runoff Diversion Project
Monterey, CA
Project Map
Monterey Peninsula Stormwater Resource Plan

Geosyntec consultants | Monterey One Water Providing Cooperative Water Solutions | **Figure** **1B**

Oakland, CA | September 2018

P:\GIS\MRWPCA\Project\Concept Projects\1. Hartnell Gulch\Hartnel Gulch Zoom.mxd 9/19/2018 11:10:20 PM

30% Design Plan Set

HARTNELL GULCH RESTORATION AND RUNOFF DIVERSION PROJECT

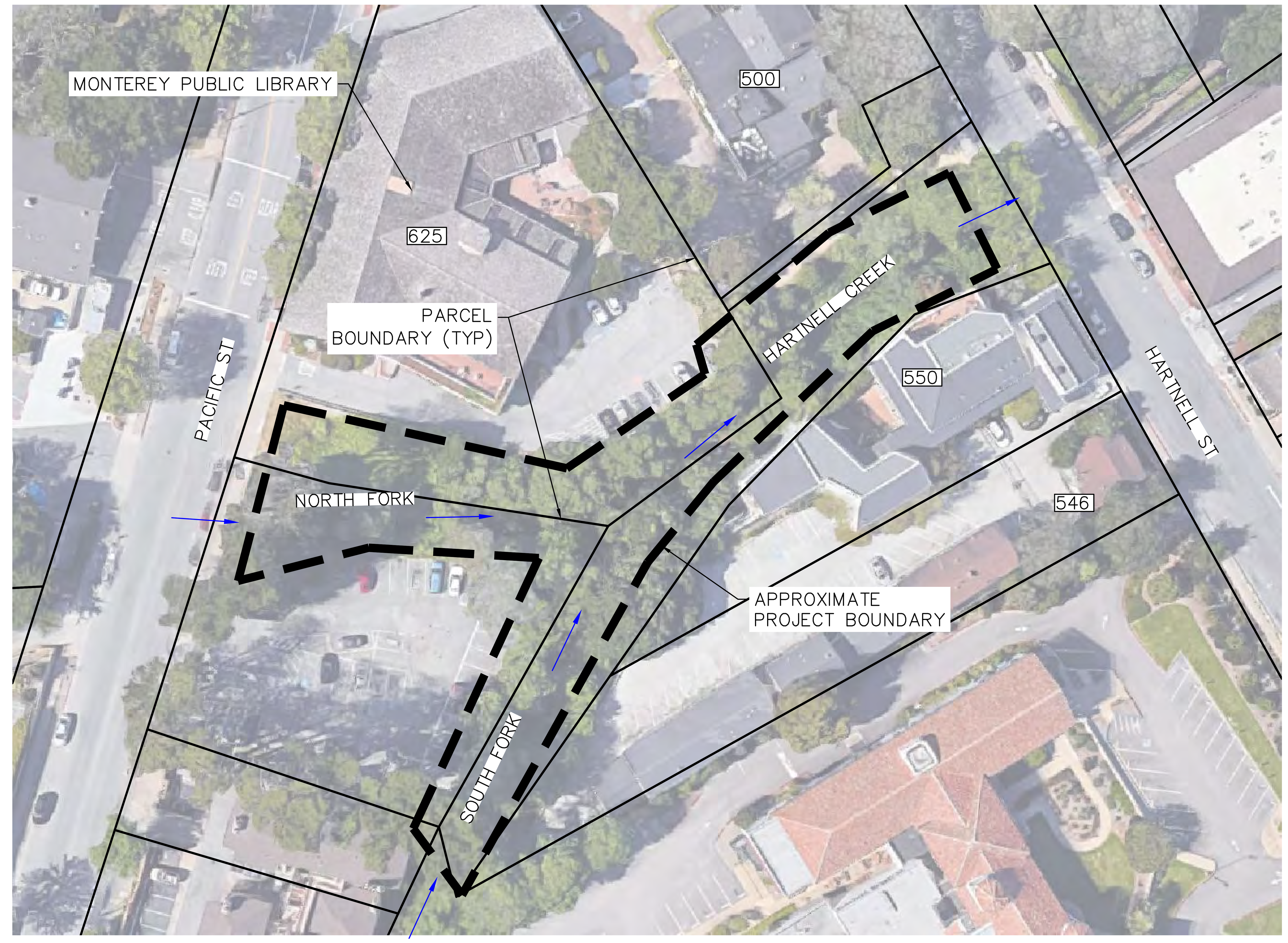
FOR THE

CITY OF MONTEREY

VICINITY MAP

0 1,000' 2,000' 4,000'

N



LOCATION MAP

0 20' 40' 80'

N

SHEET INDEX	
SHEET NO.	TITLE
1	TITLE SHEET
2	SITE AND GRADING PLAN
3	PROFILES
4	SECTIONS
R1	INVASIVE PLANT REMOVAL PLAN
R2	NATIVE PLANTING PLAN

PREPARED IN THE OFFICE OF:

Geosyntec consultants
engineers | scientists | innovators

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TEL: 831.646.3921 WEBSITE: WWW.MONTEREY.ORG

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JEFF KREBS, P.E. 44032 PRINCIPAL ENGINEER	JUDD GOODMAN, P.E. C 73783 SENIOR ENGINEER
DATE	DATE

REGISTERED PROFESSIONAL ENGINEER JUDD A. GOODMAN C 73783 EXP. ____ CIVIL STATE OF CALIFORNIA

DESIGNED BY: J. A. G.
DRAWN BY: J. L. A.
CHECKED BY: D. L.
CAD DWG NAME:

NO.	DATE	REVISION

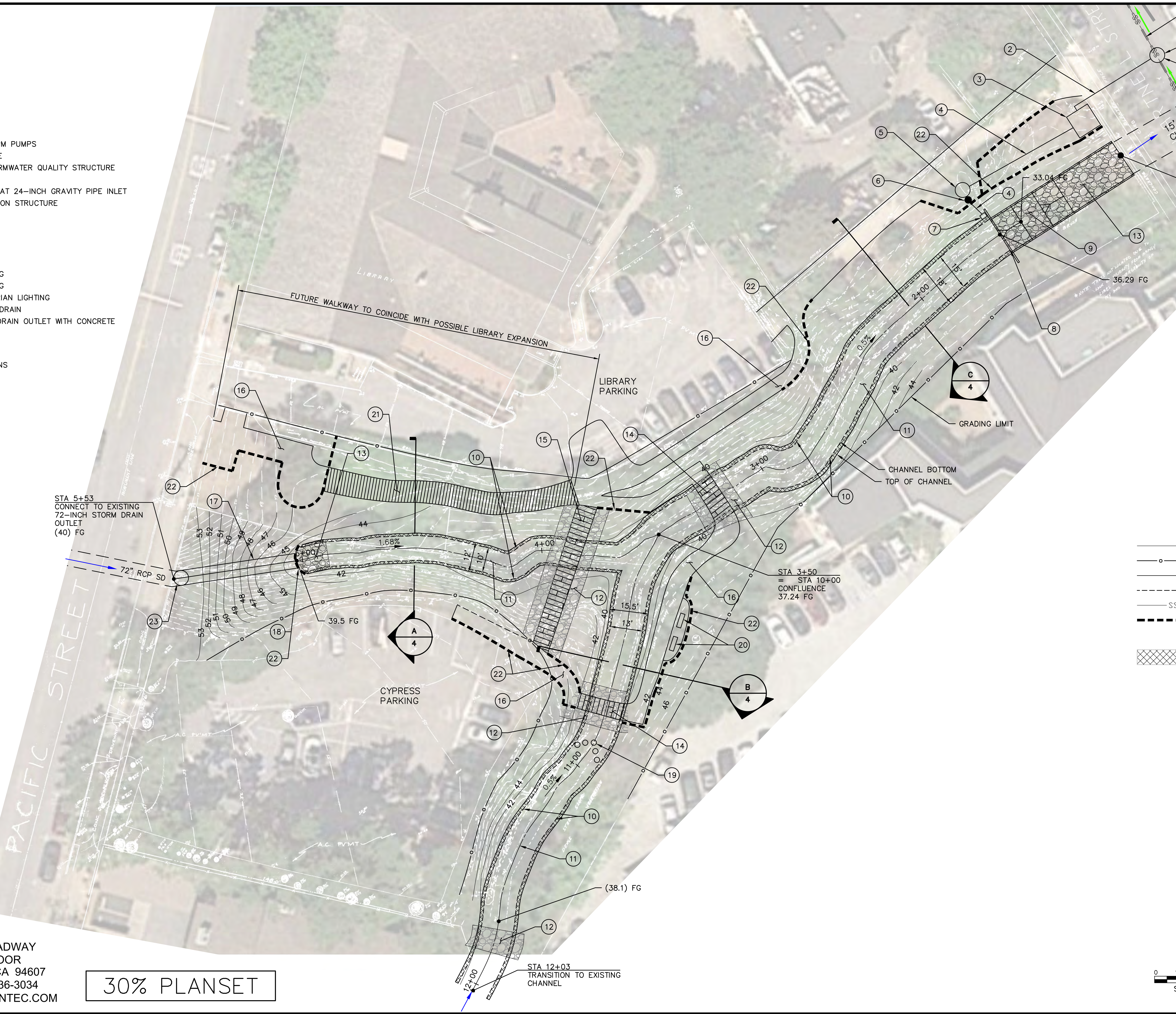
HARTNELL GULCH RESTORATION AND RUNOFF DIVERSION PROJECT

TITLE SHEET

SCALE: AS SHOWN
DATE: SEPTEMBER 2018
SHEET: 1 OF 6

CONSTRUCTION NOTES:

1. CONSTRUCT SANITARY SEWER MANHOLE
2. CONSTRUCT 4-INCH DIAMETER FORCEMAIN
3. CONSTRUCT PUMP STATION FOR 2 – 200 GPM PUMPS
4. CONSTRUCT 24-INCH DIAMETER GRAVITY PIPE
5. CONSTRUCT HYDRODYNAMIC SEPARATOR STORMWATER QUALITY STRUCTURE
6. CONSTRUCT 24-INCH GATE VALVE
7. CONSTRUCT HEADWALL WITH TRASH SCREEN AT 24-INCH GRAVITY PIPE INLET
8. CONSTRUCT REMOVABLE WEIR BOARD DIVERSION STRUCTURE
9. CONSTRUCT IN-STREAM DROP STRUCTURE
10. CONSTRUCT CHANNEL BANK REVETMENT
11. CONSTRUCT CHANNEL BED ARMOR LAYER
12. CONSTRUCT BURIED STONE GRADE CONTROL
13. CONSTRUCT STONE ENERGY DISSIPATION
14. CONSTRUCT 20-FOOT SPAN BRIDGE CROSSING
15. CONSTRUCT 60-FOOT SPAN BRIDGE CROSSING
16. CONSTRUCT ACCESS WALKWAY WITH PEDESTRIAN LIGHTING
17. CONSTRUCT 72-INCH DIAMETER RCP STORM DRAIN
18. CONSTRUCT HEADWALL AT 72-INCH STORM DRAIN OUTLET WITH CONCRETE ENERGY DISSIPATOR
19. CONSTRUCT IN-STREAM TRASH RACK
20. CONSTRUCT BENCH AND SIGNAGE
21. CONSTRUCT ACCESS FOOTBRIDGE ON CAISSONS
22. CONSTRUCT RETAINING WALL
23. CONSTRUCT 6-FOOT STORM DRAIN MANHOLE



LEGEND:

45	PROPOSED CONTOUR
	GRADING LIMIT
	FLOW CENTERLINE
	TOE OF BANK SLOPE
SS	EXISTING SANITARY SEWER
	RETAINING WALL
	FLOW ARROW
	STREAM BANK REINFORCEMENT
	SLOPED GRADE
45 FG	PROPOSED GRADE
(45) FG	EXISTING GRADE

N

0 10' 20' 40'
SCALE IN FEET
1" = 20'

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SENIOR ENGINEER
DATE

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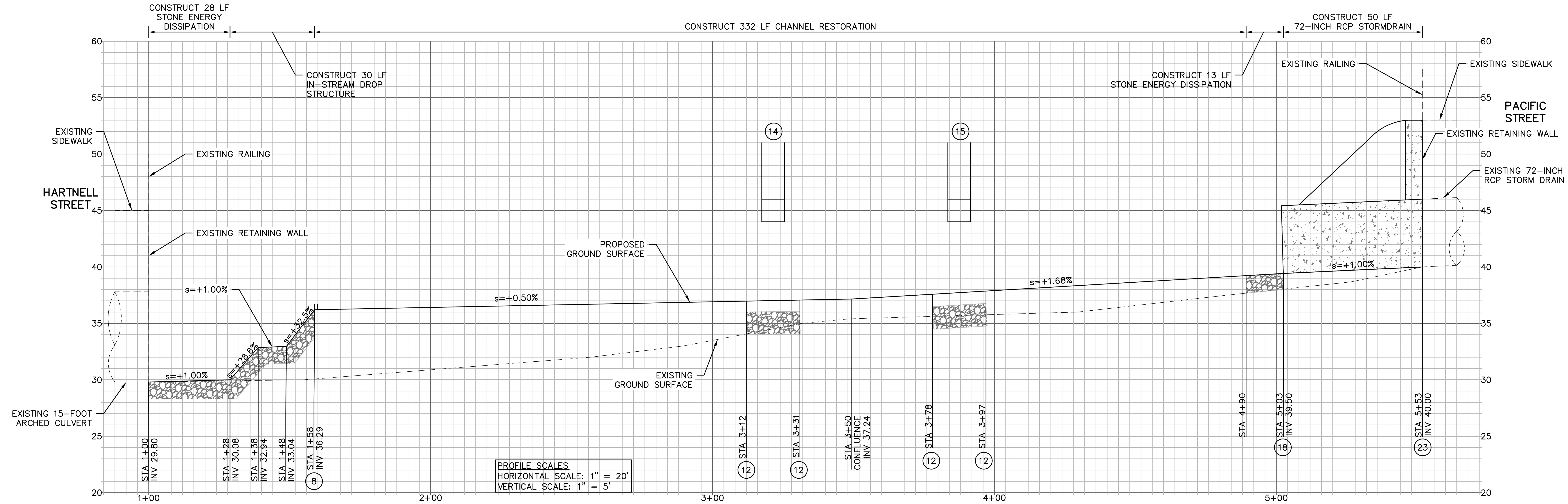
DRAWN BY: J. L. A.
CHECKED BY: D. L.
CAD DWG NAME:

NO.	DATE	REVISION

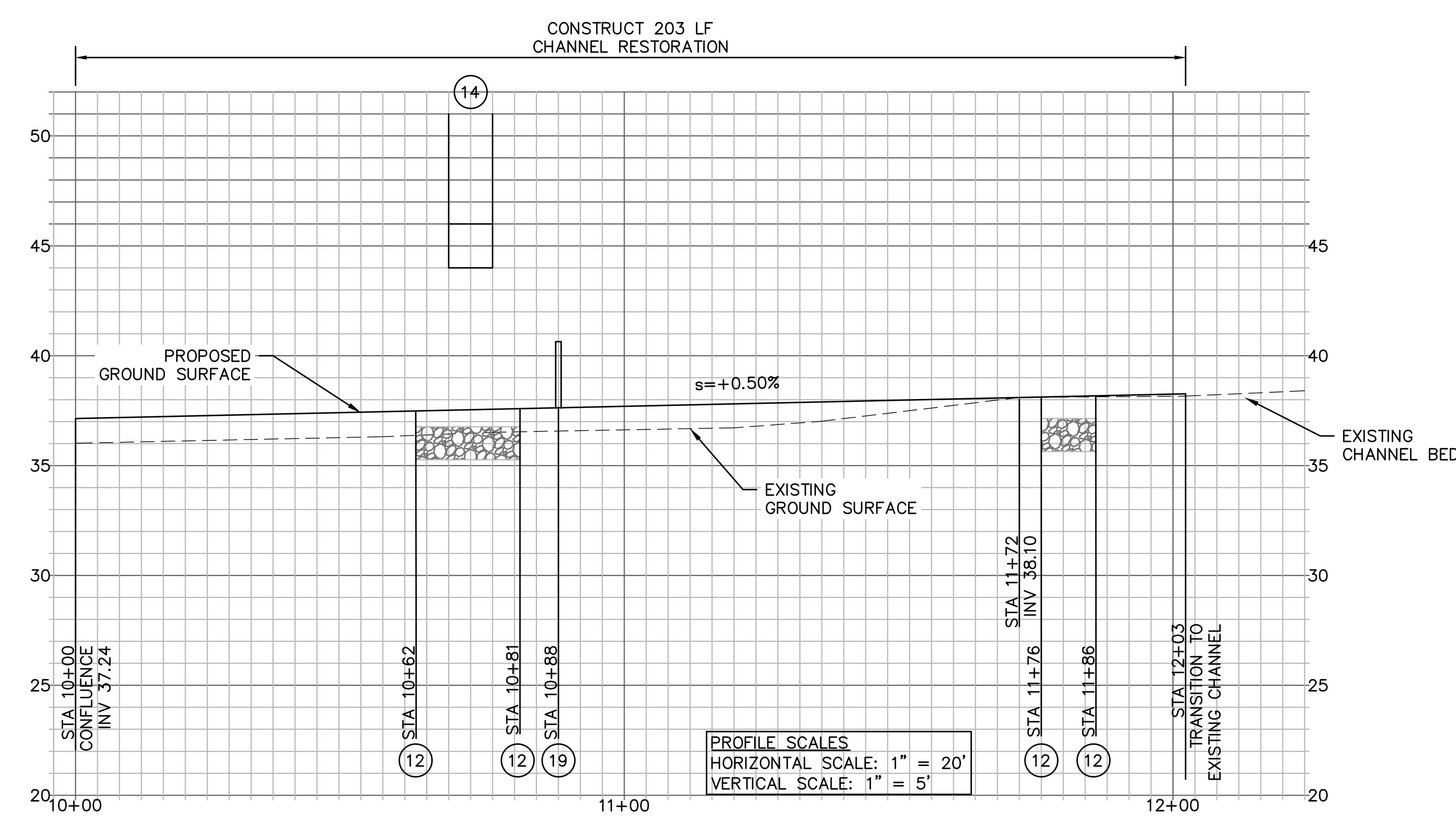
HARTNELL GULCH RESTORATION AND RUNOFF DIVERSION PROJECT

SITE AND GRADING PLAN

SCALE: 1" = 20'
DATE: SEPTEMBER 2018
SHEET: 2 OF 6



HARTNELL CREEK AND NORTH FORK PROFILE



SOUTH FORK PROFILE

CONSTRUCTION NOTES:

8. CONSTRUCT REMOVABLE WEIR BOARD DIVERSION STRUCTURE
12. CONSTRUCT BURIED STONE GRADE CONTROL
14. CONSTRUCT 20–FOOT SPAN BRIDGE CROSSING
15. CONSTRUCT 60–FOOT SPAN BRIDGE CROSSING
18. CONSTRUCT HEADWALL AT 72–INCH STORM DRAIN OUTLET WITH CONCRETE ENERGY DISSIPATOR
19. CONSTRUCT IN–STREAM TRASH RACK
23. CONSTRUCT 6–FOOT STORM DRAIN MANHOLE

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PREPARED UNDER THE SUPERVISION OF: JUDD GOODMAN, P.E. C 73783, SENIOR ENGINEER — DATE

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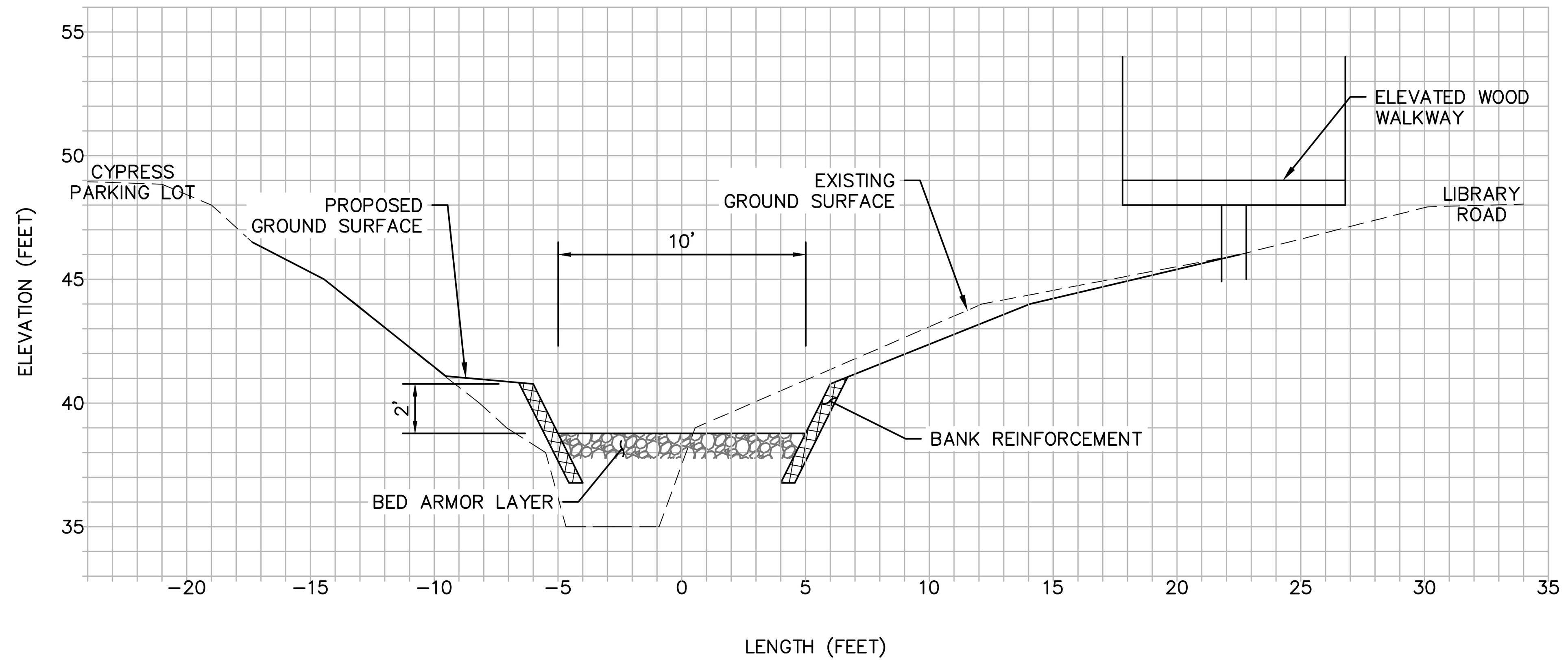
DRAWN BY: J. L. A.
CHECKED BY: D. L.
CAD DWG NAME:

NO.	DATE	REVISION

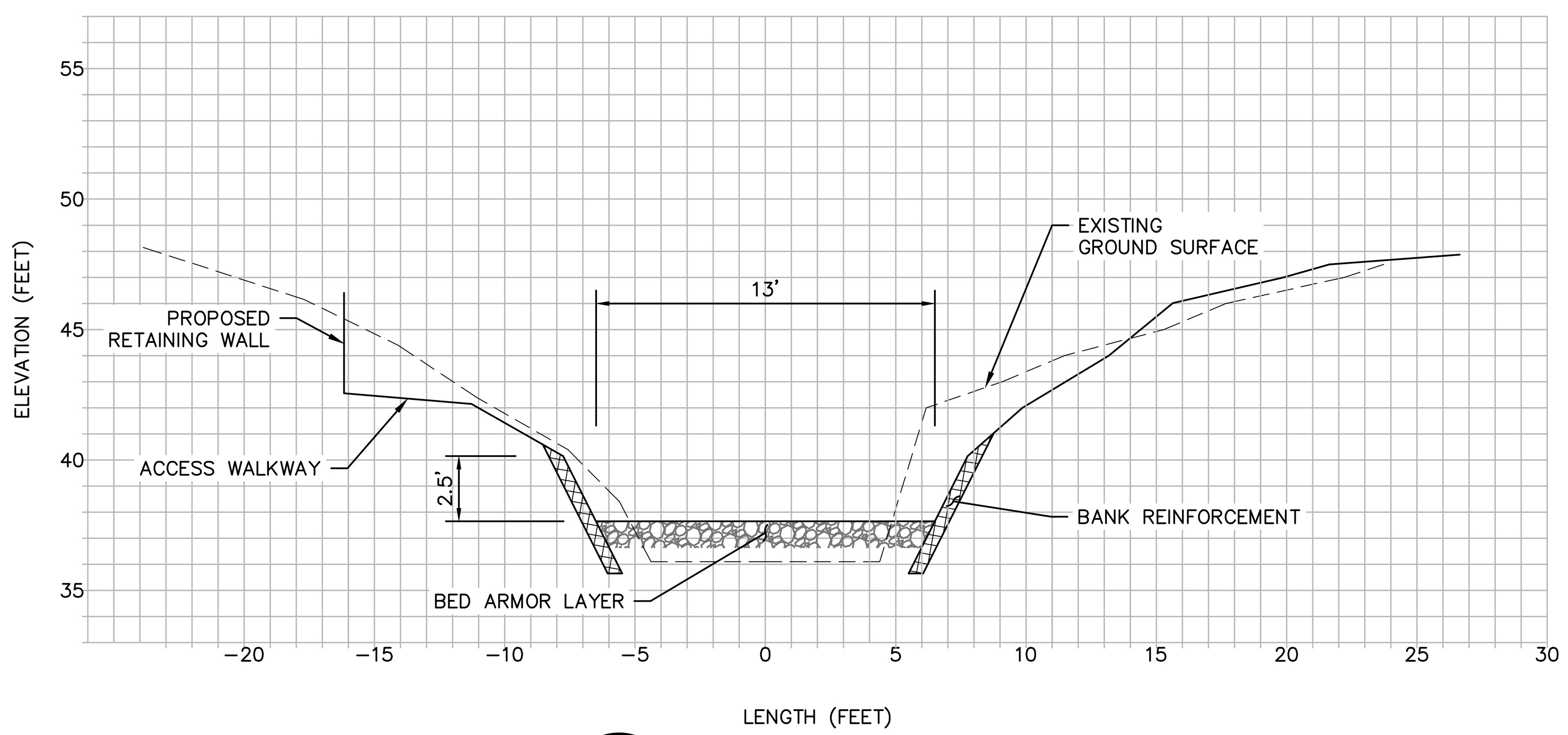
HARTNELL GULCH RESTORATION AND RUNOFF DIVERSION PROJECT

PROFILES

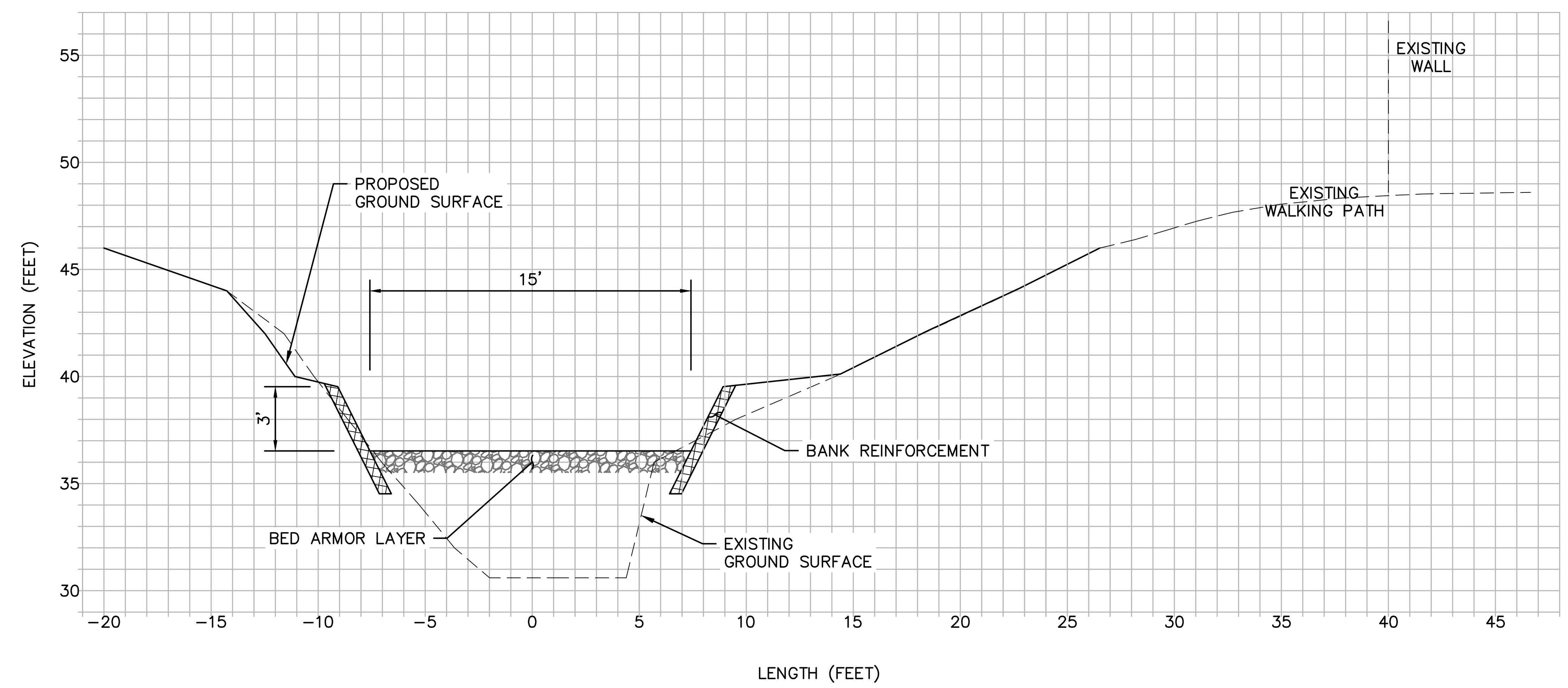
SCALE: AS SHOWN
DATE: SEPTEMBER 2018
SHEET: 3 OF 6



A
2
NORTH FORK SECTION
SCALE: 1" = 5'



B
2
SOUTH FORK SECTION
SCALE: 1" = 5'



C
2
HARTNELL CREEK SECTION
SCALE: 1" = 5'

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CHECKED BY: D. L.
CAD DWG NAME:

NO.	DATE	REVISION

HARTNELL GULCH RESTORATION AND RUNOFF DIVERSION PROJECT

SECTIONS

SCALE: AS SHOWN
DATE: SEPTEMBER 2018
SHEET: 4 OF 6

TREATMENT RECOMMENDATIONS

INVASIVE PLANT TREAMENTS BY SPECIES

Scientific Name	Common Name	Invasive Status (per Cal-IPC)	Treatment Method
Delairia odorata	Cape ivy	Invasive-High	Carefully hand remove, ensuring all roots are fully removed. Take care in removal, handling, and disposal, can resprout from small fragments of tissue.
Foeniculum vulgare	fennel	Invasive-High	Dig up by roots.
Genista monspessulana	French broom	Invasive-High	Hand pull, ensuring all roots are removed. Cut and paint with surfactat free glyphsate if root removal impossible.
Hedera helix	English ivy	Invasive-High	Carefully hand remove, ensuring all roots are fully removed. Cut and paint with surfactat free glyphsate if root removal impossible or to avoid erosion on steep slopes.
Rubus armeniacus	Himalayan blackberry	Invasive-High	Dig up by roots. Cut and paint with surfactat free glyphsate if root removal impossible or to avoid erosion on steep slopes.
Avena barbata	slender oat	Invasive-Moderate	Hand remove in planting areas. Complete control not feasable.
Ehrharta erecta	erect veldtgrass	Invasive-Moderate	Hand remove in planting areas. Complete control not feasable.
Ficus carica	edible fig	Invasive-Moderate	Dig up by roots. Cut and paint with surfactat free glyphsate if root removal impossible.
Holcus lanatus	velvet grass	Invasive-Moderate	Hand remove in planting areas. Complete control not feasable.
Hypochaeris radicata	rough cat's-ear	Invasive-Moderate	Hand remove in planting areas. Complete control not feasable.
Oxalis pes-caprae	Cape sorrel	Invasive-Moderate	Hand remove in planting areas. Complete control not feasable.
Vinca major	periwinkle	Invasive-Moderate	Lightly masticate with weed whip to break waxy cuticle and spray with surfactant free glyphosate.
Crocosmia × crocosmiiflora	montbretia	Invasive-Limited	Dig up by roots.
Eucalyptus globulus	Tasmanian blue gum	Invasive-Limited	Remove in sections by arborist. Paint stump with surfactant free glyphosate to prevent resprouts.
Medicago polymorpha	burclover	Invasive-Limited	Hand remove in planting areas. Complete control not feasable.
Pennisetum clandestinum	Kikuyu grass	Invasive-Limited	Spray with surfactant free glyphosate.
Prunus cerasifera	cherry plum	Invasive-Limited	Dig up by roots. Cut and paint with surfactat free glyphsate if root removal impossible.
Raphanus sativus	wild radish	Invasive-Limited	Hand remove in planting areas. Complete control not feasable.
Rumex crispus	curly dock	Invasive-Limited	Hand remove in planting areas. Complete control not feasable.
Parietaria judaica	spreading pellitory	Invasive-Watchlist	Dig up by roots.
Echium sp.	echium species	Non-native (planted)	Dig up by roots.
Ulmus sp.(*minor?*)	elm (English?)	Non-native (planted)	For mature trees: Remove in sections by arborist. Paint stump with surfactant free glyphosate to prevent resprouts. For suckers forming groundcover: Dig up by roots. Spray with surfactant free glyphosate where root removal impossible or on steep slopes to prevent erosion.
Calystegia (silvatica?)	bindweed (large?)	Non-native	Carefully hand remove, ensuring all roots are fully removed.
Epipactis helleborine	European helleborine	Non-native	Carefully hand remove, ensuring all roots are fully removed.
Erigeron bonariensis	Argentinian horseweed	Non-native	Hand remove in planting areas. Complete control not feasable.
Erigeron karvinskianus	Mexican fleabane	Non-native	Hand pull.
Erodium sp.	stork's bill	Non-native	Hand remove in planting areas. Complete control not feasable.
Geranium molle	soft-leaved geranium	Non-native	Hand remove in planting areas. Complete control not feasable.
Lactuca virosa	bitter lettuce	Non-native	Hand remove in planting areas. Complete control not feasable.
Lysimachia arvensis	scarlet pimpernel	Non-native	Hand remove in planting areas. Complete control not feasable.
Malva parviflora	cheeseweed	Non-native	Hand remove in planting areas. Complete control not feasable.
Polygonum aviculare subsp. *depressum*	common knotweed	Non-native	Hand remove in planting areas. Complete control not feasable.
Pseudognaphalium luteoalbum	weedy cudweed	Non-native	Hand remove in planting areas. Complete control not feasable.
Sonchus oleraceous	common annual sow thistle	Non-native	Hand remove in planting areas. Complete control not feasable.
Taraxacum officinale	common dandelion	Non-native	Hand remove in planting areas. Complete control not feasable.
Tropaeolum majus	garden nasturtium	Non-native	Carefully hand remove, ensuring all roots are fully removed.

ECOLOGICAL CONCERNS INCORPORATED

Drawn by: Dakotah Bertsch
Landscape Designer, Ecological Concerns Inc.
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831-459-0656
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HARTNELL GULCH PARK RESTORATION PLAN

for the CITY OF MONTEREY

ISSUANCES AND REVISIONS

NO.	DATE	DESCRIPTION
1	FEB 4, 2016	PRESENTATION

APPROVAL

SHEET TITLE

INVASIVE PLANT REMOVAL PLAN

SHEET NUMBER

R1

LEGEND OF NATIVE PLANTING AREA SPECIES MIXES

- SPECIAL PLANTING AREA - NATIVE GARDEN
- TOP OF SLOPE / BORDER PLANTING MIX
- MID-SLOPE / BANK STABILIZATION MIX
- SLOPE BOTTOM / CHANNEL EDGE MIX
- EXISTING NATIVE TREE / SHRUB PROTECT IN PLACE WHERE FEASIBLE:
  - *Quercus agrifolia* (some planted)
  - *Salix lasiolepis*
  - *Cupressus macrocarpa* (planted)
  - *Sequoia sempervirens* (planted)
  - *Ribes sanguineum* (planted)
- WILLOW STAKES
  CUTTINGS TO BE SELECTED FROM ONSITE MATERIAL, PER DETAIL TBD
- OAK TREES
  Quercus agrifolia
- BOX ELDER TREE
  Acer negundo

NATIVE PLANT SPECIES LIST BY MIX

TOP OF SLOPE

Latin name	common name	form	OC Spacing
Iris douglasiana	*Douglas' iris*	*forb*	*2'*
Juncus patens	*grey rush*	*rush, bunch*	*1.5-2'*
Ribes sanguineum	*red flowering currant*	*shrub*	*5-6'*
Stachys bullata	*hedge nettle*	*grouncover*	*1-3'*
Holodiscus discolor	*ocean spray*	*shrub*	*5-6'*
Agrostis sp.	*agrostis*	*grass, creeping*	*1-3'*
Elymus glaucus	*blue wild rye*	*grass, bunch*	*1-2'*
Clinopodium douglasii	*yerba buena*	*groundcover*	*1-2'*
Fragaria vesca	*wood strawberry*	*groundcover*	*1'*
Ribes speciosum	*fuschia flowered gooseberry*	*shrub*	*5-6'*
Calystegia sp. (purpuratasubsp. p?)	*morning glory (purple-striped?)*	*vine*	*2-4'*
Mimulus aurantiacus	*stickey monkeyflower*	*small shrub*	*2'*

MID-SLOPE

Latin name	common name	form	OC Spacing
Iris douglasiana	*Douglas' iris*	*forb*	*2'*
Juncus patens	*grey rush*	*rush, bunch*	*1.5-2'*
Stachys bullata	*hedge nettle*	*grouncover*	*1-3'*
Holodiscus discolor	*ocean spray*	*shrub*	*5-6'*
Rosa californica	*California rose*	*shrub*	*6-8'*
Rubus ursinus	*California blackberry*	*shrub*	*5-6'*
Agrostis sp.	*agrostis*	*grass, creeping*	*1-3'*
Elymus glaucus	*blue wild rye*	*grass, bunch*	*1-2'*
Symphoricarpos mollis	*low-growing snowberry*	*groundcover*	*3'*
Phalaris californica	*California canary grass*	*grass, bunch*	*2-3'*
Frangula californica	*coffeeberry*	*large shrub*	*6-8'*
Heteromeles arbutifolia	*toyon*	*large shrub*	*6-8'*
Carex globosa	*round-fruited sedge*	*sedge, bunch*	*1-1.5'*
Lonicera hispidula	*hairy honeysuckle*	*vine, groundcover*	*2-4'*
Ribes speciosum	*fuschia flowered gooseberry*	*shrub*	*5-6'*
Mimulus aurantiacus	*stickey monkeyflower*	*small shrub*	*2'*

SLOPE BOTTOM

Latin name	common name	form	OC Spacing
Juncus patens	*grey rush*	*rush, bunch*	*1.5-2'*
Rosa californica	*California rose*	*shrub*	*6-8'*
Rubus ursinus	*California blackberry*	*shrub*	*5-6'*
Cyperus eragrostis	*tall umbrella sedge*	*sedge, bunch*	*1-2'*
Juncus hesperius	*coast rush*	*rush, bunch*	*1.5-2'*
Juncus phaeocephalus	*brown headed rush*	*rush, creeping*	*1-2'*

SPECIAL AREA

Latin name	common name	form	OC Spacing
Iris douglasiana	*Douglas' iris*	*forb*	*2'*
Juncus patens	*grey rush*	*rush, bunch*	*1.5-2'*
Ribes sanguineum	*red flowering currant*	*shrub*	*5-6'*
Stachys bullata	*hedge nettle*	*grouncover*	*1-3'*
Holodiscus discolor	*ocean spray*	*shrub*	*5-6'*
Elymus glaucus	*blue wild rye*	*grass, bunch*	*1-2'*
Clinopodium douglasii	*yerba buena*	*groundcover*	*1-2'*
Fragaria vesca	*wood strawberry*	*groundcover*	*1'*
Frangula californica	*coffeeberry*	*large shrub*	*6-8'*
Heteromeles arbutifolia	*toyon*	*large shrub*	*6-8'*
Vaccinium ovatum	*California huckleberry*	*shrub*	*5-6'*
Ribes speciosum	*fuschia flowered gooseberry*	*shrub*	*5-6'*
Mimulus aurantiacus	*stickey monkeyflower*	*small shrub*	*2'*
Ceanothus thyrsiflorus	*blueblossom*	*large shrub*	*6'-8'*
Salvia spathacea	*hummingbird sage*	*groundcover*	*1-3'*
Salvia sonomensis	*creeping sage*	*groundcover*	*3-5'*
Ribes speciosum	*fuchsia flowering gooseberry*	*shrub*	*3-5'*
Rhus integrifolia	*lemonade berry*	*large shrub*	*6-8'*
Salvia mellifera	*black sage*	*shrub*	*5-6'*
Garrya elliptica	*wavyleaf silk tassle*	*large shrub*	*6-8'*
Arctostaphylos edmundsii	*little sur manzanita*	*groundcover*	*3-5'*
Lupinus albifrons	*silver lupine*	*shrub*	*4-6'*
Arctostaphylos pajaroensis	*pajaro lupine*	*shrub*	*4-6'*
Eriogonum fasciculatum	*California buckwheat*	*shrub*	*4-6'*
Eriogonum parvifolium	*sea cliff buckwheat*	*shrub*	*1-3'*
Baccarus pilularis	*coyote brush*	*shrub*	*6-8'*

TREES

Latin name	common name	form	OC Spacing
Salix lasiolepis	*arroyo willow*	*tree*	*10-15'*
Acer negundo	*box elder*	*tree*	*15-20'*
Salix lasiandra	*Pacific shining willow*	*tree*	*10-15'*

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HARTNELL GULCH PARK RESTORATION PLAN

for the

CITY OF MONTEREY

ISSUANCES AND REVISIONS

NO.	DATE	DESCRIPTION
1	FEB 4, 2016	PRESENTATION

APPROVAL

SHEET TITLE

NATIVE PLANTING PLAN

SHEET NUMBER

R2

Project Implementation Plan

Geosyntec consultants

engineers | scientists | innovators

Hartnell Gulch Restoration and Runoff Diversion Project

Project Implementation Plan

Prepared for

City of Monterey

Monterey One Water

Prepared by

Geosyntec Consultants, Inc.
1111 Broadway, 6th Floor
Oakland, California 94607

Project Number: WW2405

September 20, 2018

DRAFT

TABLE OF CONTENTS

INTRODUCTION

The Hartnell Gulch Restoration and Runoff Diversion project entails creek rehabilitation and dry weather flow diversion for the daylighted portion of Hartnell Creek from Pacific Street to Hartnell Street. A full description of the project is provided in the project concept description provided in Appendix G of the Monterey Peninsula Stormwater Resource Plan. The project's goals are to: rehabilitate the current creek (i.e., remove invasive plants, revegetate with native plants, and stabilize the existing eroded channel); divert dry weather runoff to the sanitary sewer for treatment and water recovery; and increase public access to the creek for conservation and interpretive enhancement. This Project Implementation Plan is intended to be reviewed accompanying the project concept description and 30% design drawings. This plan describes the next tasks needed to implement (i.e., fully construct) the project.

OVERVIEW OF PLAN

This project implementation plan includes a summary of the major implementation tasks and estimated schedule for each task. Descriptions are provided for sub-tasks needed for each major implementation task. Detailed descriptions of agreements, procurement of funds, hiring contractors, and permitting and grant reporting requirements are not included.

MAJOR IMPLEMENTATION TASKS

Major tasks needed to implement the Hartnell Gulch Restoration and Runoff Diversion project include:

1. Detailed Site Assessment
2. Engineering and Design
3. Agreements and Permitting
4. Construction
5. Ongoing Maintenance, Monitoring, and Evaluation
6. Other Tasks

Each of these major implementation tasks are described in the following sections.

1. Detailed Site Assessment and Vegetation Planning

The remaining detailed site assessment needs are summarized below.

Topographic Survey

A detailed topographic survey of the existing daylighted creek and surrounding area is needed to finalize the grading in the engineering design drawings. It is suggested that the survey include one-foot contour lines, existing structures and utilities, and spot elevations of storm drain inlets and outlets.

Archaeological/Biological Survey

Archaeological and biological surveys are needed as part of completion of recommended CEQA Analysis identified in the CEQA Checklist completed for the project. A preconstruction archaeological survey (surface examination) is needed to ensure no archaeological sites are within the construction area and to inventory the site for the presence of archaeological resources. A biological survey and report would be conducted to analyze potential sensitive, special status, or rare and endangered species, as well as potential impacts to biological resources based on project construction and operation. Based on the findings of these studies, the design may need to be altered and/or construction mitigation measures may need to be implemented to avoid a significant impact.

Utility Locating/ Potholing

The location of utilities within the footprint of the project is needed prior to siting project piping, pumps, and other components. This will include identification of size, material, and elevations of utility lines, as needed. This task will entail location of underground utilities (i.e., storm drain, sanitary sewer, water, gas, electric, cable, communications, etc.), and potholing in specific locations.

Flow and Water Quality Monitoring (Dry Season)

It is recommended that dry weather flow monitoring be conducted to estimate the volume of runoff that can be expected during the dry season and provide a more detailed estimate of the volume that would be diverted to the sanitary sewer for reuse at the Regional Treatment Plant. Dry weather flow monitoring would entail installation of a flow meter in the creek and would ideally be conducted from April through September. Water quality grab samples would be taken during this period to provide information regarding the level of pollutants that may be present in the diverted flow.

Site Reconnaissance and Geotechnical Field Investigation

Site reconnaissance and geotechnical field investigation will be needed to support the design of the proposed bridge abutments, pedestrian walkway piers or caissons, and retaining walls. The geotechnical field investigation is anticipated to include review of existing geotechnical and geological information and literature, advancing geotechnical soil borings and cone penetration tests (CPTs), soil sample collection, laboratory testing, and data evaluation.

Procurement and Starting of Native Plants

Propagation of native plants would begin at least a year prior to fall-season planting and would require a contract grow with a restoration nursery. To ensure local genetics for the restoration plants, propagules would be collected from Monterey County sources as close to the site as feasible. All project plants would be nursery-grown in compliance with CalPhytos Guidelines to Minimize Phytophthora Pathogens in Restoration Nurseries (Working Group for Phytophthoras in Native Habitats, 2016, released by the California Oak Mortality Task Force).

A summary of site assessment tasks and an estimated schedule is provided; planning and reporting for each sub-task is included in the estimated schedule.

Tasks	Description	Time Needed for Completion
1.1	Topographic Survey	2 months
1.2	Archaeological and Biological Surveys	3 months
1.3	Utility Locating/Potholing	2 months
1.4	Flow and Water Quality Monitoring and Reporting	6 months (dry season)
1.5	Geotechnical Assessments	2 months
1.6	Propagation of Native Plants	1 year prior to Fall Season Planting

2. Engineering and Design

This task may be iterative with Agreements and Permitting. A 30% site plan, which includes proposed plan, profile, and cross-section drawings for the existing and proposed conditions, has been completed. Based on findings of the detailed site assessment and permitting constraints (as applicable), it is recommended that 60%, 90%, and 100% design drawings be completed for review by the City of Monterey following completion of additional site assessment. As-Built drawings are recommended to document the project at the conclusion of construction activities. A summary of the analyses needed corresponding with each design phase is provided:

CEQA Analysis

Additional California Environmental Quality Act (CEQA) analysis is needed. Using previously conducted studies or additional findings from the assessments, the technical reports identified in the Preliminary CEQA Checklist would be completed in parallel with the development of the 60% Design. These include a Biological Report and Wetland Delineation, the Archaeological Survey Report and Tribal Consultation, Hydrologic Report, Erosion Control Plan, and Geological Report. Based on the preliminary conclusions of the CEQA Checklist, it is anticipated that an Initial Study/Mitigated Negative Declaration (IS/MND) would be adequate for the project to meet CEQA requirements. However, if significant and unavoidable impacts are identified during the development of the technical reports, an environmental impact report (EIR) may be needed. An IS or EIR would require a 30-day public comment period.

60% Design

The completion of the 60% design will incorporate a hydrologic and hydraulic analysis examining the water surface depth, velocity, and effective shear stress for a range of storm events, including the 2-, 10-, and 100-year return period flowrates. Continuous hydrologic, hydraulic, and geomorphic simulations may be performed if necessary for CEQA impact analysis. The height of bridge decks, material of the channel bed, type of bank reinforcement, and sizing of buried grade controls will be based on the hydraulic analysis. The 60% design will include a refined grading plan, updated vegetation and landscaping plan, site plan, creek profiles, and cross-sections, and standard detail drawings for the creek rehabilitation and runoff diversion components. Completion of the 60% design will include approval from City of Monterey Boards and Commissions.

90% Design

The 90% design will include specific design details of the proposed pump station, bridge abutments, pier or caisson foundations, retaining walls, and walkway lighting. Project component specifications will also be provided. It is anticipated that most permitting applications would be submitted and close to approval prior to completion of the 90% design.

100% Design

The 100% design will include final revisions suggested by the City and/or required per permitting authorities. This 100% design will be included in a bid package for construction contractors. Construction tasks and notes will be included in the 100% design drawing.

As-Builts

As-Built drawings would be developed following completion of construction tasks. As-builts are a revision of the 100% design drawings and include any design changes needed resulting from findings arising during construction.

A summary of each design drawing task and an estimated schedule is provided; the schedule includes the engineering analyses and assumes two drafts and one final for each drawing.

Tasks	Description	Time needed for completion
2.1	CEQA Technical Reports and Initial Study	4 months
2.2	Draft and Final 60% Design Drawings	4 months
2.3	Draft and Final 90% Design Drawings	6 months
2.4	Draft and Final 100% Design Drawings	2 months
2.5	As-Builts	1 month (following construction)

3. Agreements and Permitting

A number of agreements and permits are anticipated to be needed prior to constructing, operating, and maintaining the project. The list below includes the construction permits that may be needed for the project:

1. California Department of Fish and Wildlife – 1602 Streambed Alteration Agreement.
2. US Fish and Wildlife Service – Authorization Under the Endangered Species Act.
3. US Army Corps of Engineers – Clean Water Act Section 404 Permit.
4. Regional Water Quality Control Board – Clean Water Act Section 401 Water Quality Certification.
5. City of Monterey – IS/MND approval, other applicable construction permits.
6. Monterey One Water – Sewer Discharge and Connection Permit.
7. Monterey Bay Air Quality Management District construction permit(s).

Additional permits may be needed for project operation. These are not included in this Project Implementation Plan.

Agreements with other jurisdictional bodies may be needed prior to operating the facility. Institutional agreement may be needed with Monterey One Water and Monterey Peninsula Water Management District.

The estimated time frame for completing permitting and agreements is anticipated to be 6 months.

4. Construction

A detailed timeline for construction would need to be completed following procurement of a contractor. The estimated major construction tasks are listed below:

1. Mobilization
2. Clearing and grubbing
3. Dewatering and temporary diversion of creek
4. Grading
5. Construction of drop structure
6. In-stream stabilization (bed material placement, bank reinforcement, buried grade control)
7. Diversion piping, pump, pre-treatment
8. Bridge and pedestrian access paths
9. Walkway lighting
10. Planting and revegetation
11. Installation public education signage

It is anticipated that construction would take approximately 7 months to complete.

5. Ongoing Maintenance, Monitoring, and Evaluation

Ongoing maintenance, monitoring, and evaluation will be needed following construction of the project. The maintenance, operations, monitoring, and inspection needs should be documented in a detailed operations and maintenance (O&M) and monitoring handbook. This handbook would describe other maintenance, monitoring, and evaluation tasks and needed frequency. These tasks could include but may not be limited to:

- Operation of pumps, weir board, and other diversion appurtenances.
- Project regular inspection and maintenance, including diversion components, vegetation, and trash rack, among other maintenance needs.
- Major maintenance/repair needs.
- Monitoring, including flow, water quality, geomorphic stability, vegetation establishment.
- Ongoing public education and visual monitoring of creek restoration progress.

All of the tasks included in the O&M and monitoring handbook would initiate following construction completion and would be ongoing.

6. Other Tasks

Other tasks not included in the schedule and summary above include but are not limited to:

1. Releasing bids, selection and hiring of contractors to complete work.
2. Procurement of funds to complete work (i.e., grant applications).
3. Other reporting related to grant funds or permitting.
4. Additional community and City approval needs (City of Monterey).
5. Regional approval needs (M1W, water district, IRWMP representatives, MRSWMP representatives, etc.).
6. Public announcements/outreach.

Many of these tasks are difficult to predict and thus the schedule is not included in the above task.

SCHEDULE

A summary of the schedule is provided. The total time estimated to complete each major implementation task is provided. Implementation tasks are difficult to predict and thus these schedule estimates may be shorter or longer than what is ultimately needed. It is assumed that these major tasks will overlap, but it is anticipated that most tasks would need to be fully completed before a subsequent task can be completed (e.g., site assessment tasks must be completed before engineering design can be completed; design must be completed before permitting can be completed, etc.).

1. Detailed Site Assessment – 7 months for assessments; an additional 5+ months for complete propagation of Native Plants.
2. Engineering Design and CEQA – 16 months prior to construction (assumes permits/agreements occur concurrently); 1 month post-construction.
3. Agreements and Permitting – 6 months (anticipated to be conducted following completion of 60% Design and prior to completion of 90% Design).
4. Construction – 7 months.
5. Ongoing Maintenance, Monitoring, and Evaluation – ongoing.
6. Other Tasks – no time prediction provided.

* * * * *

Preliminary CEQA Checklist

Prepared for

Monterey One Water
Providing Cooperative Water Solutions

Monterey One Water
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Monterey, California 93940

PRELIMINARY ENVIRONMENTAL CHECKLIST

HARTNELL GULCH RESTORATION AND RUNOFF DIVERSION PROJECT

Prepared by

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With Assistance from

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September 2018

PREFACE

The following presents a Preliminary Environmental Checklist for the Hartnell Gulch Restoration and Runoff Diversion Project. This document has been prepared as part of the efforts underway for the Stormwater Resources Plan (SWRP) for which the lead entity is Monterey One Water.

The Hartnell Gulch Restoration and Runoff Diversion Project is being proposed by the City of Monterey. This Preliminary Environmental Checklist is an early stage environment document to assist the City of Monterey in scoping and completion of the required future environmental in full compliance with the California Environmental Quality Act (CEQA). The level of project design for the Hartnell Gulch Restoration and Runoff Diversion Project is still preliminary; therefore, this document identifies pending technical analyses and project design documentation that will be required to support final determinations of significance in a future Initial Study to be prepared by the City of Monterey.

TABLE OF CONTENTS

1. PROJECT SUMMARY

A. Project Title

Hartnell Gulch Restoration and Runoff Diversion Project

B. Lead Agency

City of Monterey, 580 Pacific Street, Monterey, CA 93940

C. Contact Person

Jeff Krebs, Senior Engineer, (831) 646-3921

D. Project Location

The proposed project is located with the Hartnell Gulch between Pacific Street and Hartnell Street in the City of Monterey, CA 93940. See **Figure 1.**

E. Project Sponsor

City of Monterey, 580 Pacific Street, Monterey, CA 93940

F. Zoning

Industrial, Commercial, and Planned Community

G. Project Overview

The Hartnell Gulch Restoration and Runoff Diversion Project (proposed project) is comprised of two parts: 1) creek restoration and improvements and, 2) dry weather flow diversion to the sanitary sewer in the Hartnell Gulch area in downtown Monterey.

2. PROJECT PACKGROUND BACKGROUND

The proposed project is a part of the Stormwater Resources Plan (SWRP) for which the lead entity is Monterey One Water. Monterey One Water (through its technical consultant Geosyntec Consultants) has prepared the Monterey Peninsula Region SWRP on behalf of the Monterey Regional Stormwater Management Program (MRSWMP), including the cities of Carmel-by-the-Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, and Seaside, and Monterey County. The purpose of the SWRP is to identify stormwater capture project opportunities that could be utilized as new water supply sources for the Monterey Peninsula and provide additional water quality and environmental benefits. This project is also part of the Monterey Peninsula Water Recovery Study (Water Recovery Study); the Water Recover Study's purpose is to identify and evaluate potential projects to capture sources of wet and dry weather runoff within the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management (IRWM) Region (the Planning Area) for water recovery and use. All components of the SWRP and the Water Recovery Study were discussed and reviewed by the Monterey Peninsula Region SWRP Technical Advisory Committee (TAC), which included cooperating entities, regulators, and other interested parties, and the Monterey Peninsula Technical Stakeholder Group, which included participants familiar with stormwater and wastewater distribution systems, treatment, and/or those with technical knowledge of the local aquifer and groundwater basin. As part of the work conducted for the Water Recovery Study by the Study participants, potential projects were identified that could recover wet and dry weather runoff for water supply and then these were further reviewed for screening criteria. Potential project types included opportunities for use of existing storm drains that receive runoff from substantial tributary areas and that could be conveyed to sanitary sewer pump stations which would divert dry-weather runoff to the sanitary sewer system for treatment and reuse. Additional project types considered include storage and diversion, infiltration, or irrigation from lakes and reservoirs; infiltration into a potable water supply aquifer; and on-site capture and use. In total, 240 projects were identified as part of the study, including 79 planned projects submitted by stakeholders for the SWRP, of which 32 were also Water Recovery Study projects.

The proposed Hartnell Gulch Restoration and Runoff Diversion Project is one of seven projects selected for concept design during a TAC meeting held on February 22, 2018. The selection process considered the preliminary project scores, agency prioritization, input from the Monterey Peninsula Stakeholder Group, and other local and institutional knowledge. Based on Stakeholder and TAC input and comments, the primary factor in project selection was to capture as much usable water as possible to help meet dry weather recycled water demands and augment water supply.

3. LEVEL OF INFORMATION

This preliminary Environmental Checklist evaluates the proposed project based upon the conceptual design developed to 10%. Therefore, the analysis provided below using the Initial Study Checklist from Appendix G of the California Environmental Quality Act (CEQA) Guidelines is preliminary. As noted, there are several Checklist topical areas where additional design-level information or specific technical analysis is needed to complete the analysis. This information will be available in future design phases, at which time the Initial Study Checklist will be completed by the lead agency for the proposed project. The following provides a general description and related analysis based upon project details known to date.

4. PROJECT DESCRIPTION

The project area is within the Hartnell Gulch watershed in the City of Monterey as shown on **Figure 2**. The 1.7 square mile watershed primarily includes residential development as well as undeveloped drainage ravines (also referred to as “gulches”). Drainage from the upstream residential area flows in an incised channel past the Monterey Library at the project area and then northeastward toward the town center. The two primary creek channels in the watershed (the north fork and the south fork of Hartnell Creek) flow into the storm drain system upstream of the project site. The project area is in a commercial area where the creeks resurface and converge, adjacent to the Monterey Public Library. Downstream of the project location, at the Trader Joe’s parking lot, the creek is enclosed in culverts and is piped to the discharge point in Monterey Bay under Wharf #2. The upstream boundaries of the project extent are located where the north fork of Hartnell Creek daylights at Pacific Street and where the south fork drains onto city property at the southeastern corner of the Pacific Street public parking lot (i.e., Cypress Lot).

The downstream boundary of the project extent is where the creek drops back underground at Hartnell Street after the confluence of the norther and south fork (at 550 Hartnell Street).

The proposed project is comprised of two components as shown on **Figure 3**; these include (1) creek rehabilitation, and (2) dry weather flow diversion to sanitary sewer. The creek rehabilitation is proposed to consist of removal of invasive plants, revegetation with native plants, and stabilization of the existing eroded channel. The grade of the channel bed would be raised several feet throughout the project area and bank stabilization and buried grade controls would be included to limit future instream erosion. Additionally, a drop structure is proposed to be placed at the downstream end of the project area to limit future instream erosion. Elevation of the streambed would provide opportunity for increased public access with construction of a pedestrian walkway alongside the creek bank.

The second part of the project consists of diverting dry weather flows (April to October) from the approximately 1,100-acre tributary drainage area to the sanitary sewer for recycling at the Monterey One Water Regional Treatment Plant to augment water supply. Flows will be diverted at the downstream boundary of the project area as shown on **Figure 2** into the gravity sewer main in Hartnell Street. Pump station capacity for accepting additional storm drain diversions was considered as part of the Water Recovery Study. Within the M1W service area, diverted runoff will travel via gravity sewer and then through one of the M1W Interceptor Pipelines (pressurized force mains and/or gravity main) to the Regional Treatment Plant (RTP). At the RTP, wastewater undergoes primary and secondary treatment and then can be reclaimed by either: (1) undergoing tertiary treatment and used as recycled 'purple pipe' water for irrigation, via the Salinas Valley Reclamation Project (SVRP) recycled water plant and the Castroville Seawater Intrusion (CSIP) distribution system; or (2) starting in 2019, undergoing advanced treatment, transport, and injection into the Seaside Groundwater Basin, via the Advanced Water Purification Facility (AWPF) of the Pure Water Monterey Groundwater Replenishment (PWM/GWR) Project currently under construction. An average of 60 percent of M1W wastewater is recycled each year and that percentage will increase when the PWM/GWR Project is operational. M1W currently serves a population of approximately 250,000 people (M1W, 2017) and treats 19.2 million gallons per day (MGD) average dry weather flow (ADWF), with a peak wet weather flow (PWWF) of 36.8 MGD (MRWPCA, 2016). The RTP is permitted for design flows of 29.6 MGD ADWF and 75.6 MGD PWWF, indicating available capacity for future runoff diversions.

At an estimated pump capacity of 200 gallons per minute (gpm), the project is estimated to achieve between 51 to 60 acre-feet/year (AFY) of water supply (Geosyntec 2017). See **Table 1** below for a summary of project characteristics.

Table 1. Design Information	
Tributary Drainage Area (TDA):	1,103 acres
TDA Imperviousness:	18 %
TDA Urbanized Area:	970 acres
Dry Weather Seepage Runoff:	28 acre-feet per year (April to October)
Dry Weather Nuisance Runoff:	23 to 32 acre-feet per year (April to October)
Sanitary Sewer Diversion Pump Rate[1]:	200 gallons per minute
Length of Diversion Pipeline:	80 feet
Source: Hartnell Gulch Restoration and Runoff *Diversion Project Concept Design (Draft August, 2018)*	

5. SURROUNDING LAND USE AND SETTING

The project site is located within a developed urban environment. To the south of the project site are various office buildings and parking lots. To the east of the project site is Hartnell Street. To the north of the project site is the Monterey County Public Library and a historic adobe building which historically has been occupied by various restaurants. To the west of the Project site Colon Inn at 707 Pacific Street and various offices buildings and parking lots bordering the drainages along Pacific Street. Hartnell Gulch is a semi-natural waterway that conveys overland drainage from the hills above Monterey to the Monterey Bay (Monterey 2009). Immediately downstream from the project site Hartnell Gulch is similarly above ground and heavily vegetated. A raised pedestrian walkway was constructed by the City in this area in 2010. The walkway provides direct pedestrian access to the Trader Joes parking lot from Hartnell Street. At this location, the drainage in Hartnell Gulch is conveyed into an underground pipe/culvert system and carried to the Monterey Bay.

6. OTHER PUBLIC AGENCIES WHOSE APPROVAL IS POTENTIALLY REQUIRED

California Department of Fish and Wildlife, U.S. Army Corps of Engineers, State Water Resources Control Board, National Marine Fisheries Service, and U.S. Fish and Wildlife Service.

7. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

This section identifies the environmental impacts of this project by answering questions from Appendix G of the CEQA Guidelines, the Environmental Checklist Form. Impacts are categorized as follows:

- Potentially Significant Impact is appropriate if there is substantial evidence that an effect is significant, or where the established threshold has been exceeded. If there are one or more "Potentially Significant Impact" entries when the determination is made, an Environmental Impact Report (EIR) may be required.
- Less Than Significant with Mitigation Incorporated applies where the incorporation of mitigation measures would reduce an effect from Potentially Significant Impact to a Less Than Significant Impact. Mitigation measures are prescribed to reduce the effect to a less than significant level.

- Less Than Significant applies when the project will affect or is affected by the environment, but based on sources cited in the report, the impact will not have an adverse effect. For the purpose of this report, beneficial impacts are also identified as less than significant. The benefit is identified in the discussion of impacts, which follows each checklist category.
- A No Impact answer is adequately supported if referenced information sources show that the impact simply does not apply to projects like the one involved. A No Impact Answer is explained where it is based on project-specific factors as well as general standards.

For this report, as is noted above, the project has been defined at a conceptual level with limited design details available. Thus, where the potential impacts cannot be identified due to lack of information on the project itself or where further technical analysis is needed to define the impact, this is noted in the checklist below. Based on the available information on the project, the following environmental factors checked below would be potentially affected by this project, as further discussed within the checklist categories on the following pages.

Table 2. Summary of Significance Determination

Topic Area	Potentially Significant Impact Identified	Level of Significance to be Determined Pending Technical Analysis/Design Document
Aesthetics		Landscape Plan, Lighting Plan
Agriculture Resources		
Air Quality		
Biological Resources	X	Biological Report, Wetland Delineation
Cultural Resources	X	Archaeological Survey Report
Geology/Soils		Erosion Control Plan, Geological Report
Greenhouse Gas Emissions		
Hazards & Hazardous Materials		
Hydrology/Water Quality	X	Hydrological Report
Land Use Planning		
Mineral Resources		
Noise	X	
Population/Housing		
Public Services		
Recreation		
Transportation/Traffic		
Tribal Cultural Resources		Archaeological Report, Tribal Consultation
Utilities/Service Systems		Hydrological Report
Mandatory Findings of Significance	X	See Above

8. DISCUSSION OF PRELIMINARY ENVIRONMENTAL CHECKLIST FINDINGS

A determination on the level of significance of environmental effects cannot be made without additional information as detailed in the Preliminary Checklist below due to the preliminary nature of the project design and well as the topical areas requiring additional technical evaluation. The Checklist identifies additional project information on the project design that is needed. The Preliminary Checklist also identifies the project specific technical studies that are needed to complete the CEQA documentation. Once studies are prepared, the next step is the preparation of the Initial Study; this document will incorporate technical conclusions and recommendations into the CEQA analysis. The CEQA Initial Study Checklist will also be circulated for a required 30-day review.

Based on this initial evaluation, and assuming compliance with CEQA analysis above, the Proposed Project may qualify for a Mitigation Negative Declaration. However, this determination can only be made after additional design and technical reports are completed by the City of Monterey as lead agency, as discussed above.

8.1. Aesthetics

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
AESTHETICS – Would the project:					
a) Have a substantial adverse effect on a scenic vista?			X		City of Monterey Planning, Engineering and Environmental Compliance Division (PEEC), General Plan Map 2 Showing Special Places
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?			X		City of Monterey PEEC, General Plan Open Space Element Goals c, d, and h and Policies b.4 and f.6
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	Level of Significance to be Determined, see note below.				City of Monterey PEEC, General Plan Urban Design Element City of Monterey PEEC, General Plan Open Space Element, Policies a.3 and b.4 City of Monterey City Code, Chapter 37, Preservation of Trees
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	Level of Significance to be Determined, see note below.				City of Monterey PEEC, Monterey City Code (M.C.C.)
Note: As described in sections c) and d) below, a Landscape Plan and a Lighting Plan will be prepared by the City during the design phase of the proposed project. Upon completion of these documents, the level of significance can be determined.					

Existing Setting

The Monterey Peninsula consists of approximately 10 square miles of coastal lands and forested hills. Much of the City is urbanized; however, its coastline and wooded ridges are devoted primarily to open space and recreational uses. Located an hour away from San Jose and an hour and a half from San Francisco, Monterey is frequently a vacation destination for inland and city residents. The Monterey region is well known for its scenic visual character. The City’s coastal areas provide expansive views of the Pacific Ocean (Monterey Bay). The adjacent beach and coastal bluff areas are visually intriguing and offer a variety of passive and active recreational opportunities. Fisherman's Wharf and Cannery Row provide a variety of shops, art and craft galleries, boutiques, and restaurants in an historic seaport setting.

As identified in the City's General Plan, all major roads leading to Monterey are scenic highways. Highway 1, south of the City, is a State designated scenic highway. State Highway 68 from Highway 1 to the Salinas River is a State and County designated scenic highway. Primary features of the site are shown on **Figure 4**, Hartnell Gulch Site inventory.

Discussion

a) Less Than Significant Impact. The City's General Plan identifies "special places" which are considered to have significant visual resources. The project site is identified as a "canyon special place" in the General Plan. However, the project is proposed, in part, to restore the canyon habitat of the creek, therefore enhancing and maintaining the native vegetation and distinct natural features. Also, a scenic vista is normally defined as a viewpoint that provides expansive views of a highly valued landscape for the benefit of the general public for the purposes of CEQA analysis. Although the area is defined as a special place by the City of Monterey, due to the vegetated nature of the existing site, there does not appear to be a scenic vista associated with the project area.

Based upon the intent of the project for restoration of the area, and the limited scenic vista available at the site due to topography and vegetation, adverse visual impacts to scenic vistas are considered less than significant.

b) Less Than Significant Impact. The site does not contain any rock outcroppings and is not located within a State scenic highway. The property bordering the project site on the north along Hartnell Street is zoned as a H1 historic building. This building was constructed in 1833 and is locally referred to as the Stokes Adobe. As currently proposed, above ground features would be limited to a pedestrian trail with possible benches and retaining walls if needed and would be designed to blend with the existing environment. This project would have a less than significant effect on scenic resources.

c) Level of Significance to be Determined. The project will require the removal of trees and vegetation that presently contribute to the natural appearance of the area. The removal of these trees and vegetation could degrade the existing visual character or quality of the site and its surroundings. More specific information is needed on potential removal of trees and grading that could potentially impact the visual quality of the site. Due to the nature of the project, the design would include replacement and replanting of any removed trees as well as restoration of riparian habitat impacted to mitigate for visual impacts. Therefore, a determination on the level of significance cannot be made without the completion of a Landscape Plan, as described below. Further documentation is needed to confirm determination that this impact can be reduced to less than significant with mitigation.

PENDING DESIGN PRODUCT: LANDSCAPE PLAN

During the project design process, the City shall confer with the City Forester to ensure that the proposed project is in compliance with Chapter 37 of the Monterey City Code (Tree Preservation Ordinance), which regulates and mitigates the removal of trees. The

City shall develop an updated Landscape Plan that incorporates recommendations of the City Forester.[1] The Landscape Plan should specify that native vegetation, planting and a monitoring program consistent with the Biological Report identified in **Section IV,** below. The Landscape Plan will ensure that trees and riparian vegetation removed or lost as a result of construction will be replaced or restored in place and in kind, subject to the requirements of a native plant list to be included in the Biological Report.

<u>d) Level of Significance to be Determined.</u> There is currently no proposed Lighting Plan for the proposed project. Typically, similar projects would include installation of small, downward-facing, light fixtures installed along the pathway. Lighting would need to provide enough illumination required to prevent trip hazards and provide security. The new source of light or glare would likely not adversely affect day or nighttime views in the area and the potential impact is considered less than significant, however, further design details including a Lighting Plan, as described below will be needed to confirm the determination that this impact can be reduced to less than significant.

PENDING DESIGN PRODUCT: LIGHTING PLAN

During project design, the City shall develop a Lighting Plan for the proposed project. The Lighting Plan will ensure that lighting standards such that all artificial outdoor lighting will be limited to safety and security requirements, designed using Illuminating Engineering Society's design guidelines, and in compliance with International Dark-Sky Association approved fixtures, are complied with. In addition, the Lighting Plan will include lighting that is designed to have minimum impact on the surrounding environment and will use downcast, cut-off type fixtures that are shielded and direct the light only towards objects requiring illumination for safety and security.

[1] A Restoration Plan dated February 4, 2016 was prepared by Ecological Concern, Inc. on behalf of the City of Monterey for the proposed project, it is included as **Figure 6** to this Preliminary Environmental Checklist. Since that time, changes have been made to the project design. This Restoration Plan would need to be revised and expanded to meet the requirements of the Landscape Plan described above.

8.2. Agriculture and Forestry Resources

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
AGRICULTURE AND FOREST RESOURCES – In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:					
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X	City of Monterey PEEC, General Plan Conservation Element City of Monterey General Plan Update Initial Study 2003 City of Monterey Zoning Ordinance California Department of Conservation 2014
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X	City of Monterey PEEC, General Plan Conservation Element City of Monterey General Plan Update Initial Study 2003 City of Monterey Zoning Ordinance
c) Conflict with existing zoning for, or cause rezoning of forest land (as defined in Public Resources Code Section 12220g), timberland (as defined by Public Resources Code Section 4526) or timberland zoned Timberland Production (as defined by Government Code Section 51104g)?				X	City of Monterey PEEC, General Plan Conservation Element
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X	City of Monterey PEEC, General Plan Conservation Element
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?				X	City of Monterey PEEC, General Plan Conservation Element City of Monterey General Plan Update Initial Study 2003 City of Monterey Zoning Ordinance

Existing Setting

While much of Monterey County is known for, and associated with, an abundance of agricultural operations, the City of Monterey itself has no agricultural operations or potential for future agriculture resources or activities. The project site is mapped as “Urban and Built-Up Land” by the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP). The California Department of Conservation, Conservation Program Support also makes prepares maps of the parcels under Williamson Act contract. The project site is not under a Williamson Act contract (California Department of Conservation 2016).

Discussion

<u>a-e) No Impact.</u> The project site does not contain any identified agriculture resources, land identified for potential agricultural production, lands zoned for agricultural use, or lands under a Williamson Act contract. Agriculture operations are not an allowable use in the Zoning Code. No forest land or timberland are identified in the City General Plan and the City does not include any forest zoning classifications.

The project involves restoration of riparian area and limited improvements including a trail and runoff diversion within an urban area, which would not remove a barrier to population growth. Because the project would not induce population growth, the project would not result in an indirect impact from the conversion of agricultural lands to non-agricultural use or conversion of forest land to non-forest use. Therefore, no impact would occur to agriculture resources.

8.3. <u>Air Quality</u>

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
AIR QUALITY – Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:					
a) Conflict with or obstruct implementation of the applicable air quality plan?				X	City of Monterey PEEC, General Plan Conservation Element, Policy c.2 2008 Air Quality Management Plan (AQMP) for the Monterey Bay Region (Monterey Bay Unified Air Pollution Control District (MBUAPCD)) 2008 CEQA Air Quality Guidelines (MBUAPCD) 2005 Report on Attainment of the California Particulate Matter Standards in the Monterey Bay Region (MBUAPCD)
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			X		City of Monterey PEEC, General Plan Conservation Element Goal c and Policies c.1–c.3 2008 AQMP for the Monterey Bay Region (MBUAPCD)

					2008 CEQA Air Quality Guidelines (MBUAPCD) 2005 Report on Attainment of the California Particulate Matter Standards in the Monterey Bay Region (MBUAPCD)
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?			X		City of Monterey PEEC, General Plan Conservation Element Goal c and Policies c.1–c.3 2008 AQMP for the Monterey Bay Region (MBUAPCD) 2008 CEQA Air Quality Guidelines (MBUAPCD) 2005 Report on Attainment of the California Particulate Matter Standards in the Monterey Bay Region (MBUAPCD)
d) Expose sensitive receptors to substantial pollutant concentrations?			X		City of Monterey PEEC
e) Create objectionable odors affecting a substantial number of people?			X		City of Monterey PEEC

Existing Setting

The project area is within the North Central Coast Air Basin (NCCAB), which is comprised of Santa Cruz, San Benito and Monterey counties. A semi-permanent high-pressure system in the eastern Pacific is the controlling factor of the climate in the air basin. In late spring and summer, the high-pressure system is dominant and causes persistent west and northwesterly winds over the entire California coast. The onshore air currents pass over cool ocean waters to bring fog and relatively cool air into the coastal valleys. Warmer air aloft creates elevated inversions that restrict dilution of pollutants vertically, and mountains forming the valleys restrict dilution horizontally.

In the fall, the surface winds become weak, and the marine layer grows shallow, dissipating altogether on some days. The airflow is occasionally reversed in a weak offshore movement, and the relatively stagnant conditions allow pollutants to accumulate over a period of days. It is during this season that the north or east winds develop that transport pollutants from either the San Francisco Bay Area or the Central Valley into the NCCAB. During winter and early spring, the Pacific high–pressure system migrates southward and has less influence on the air basin. Wind direction is more variable, but northwest winds still dominate. The general absence of deep, persistent inversions and occasional storm passages usually result in good air quality for the basin. The City of Monterey is bounded by pine-wooded hills to the south and by the crescent-shaped southerly end of the Monterey Bay to the north. Persistent sea breezes ventilate the area with respect to other metropolitan areas, and the City generally enjoys good air quality throughout the year.

The Federal Clean Air Act (FCAA) requires that the United States Environmental Protection Agency (EPA) establish National Ambient Air Quality Standards (NAAQS) for various criteria pollutants. NAAQS defines the maximum amount of an air pollutant that can be present in ambient air. A NAAQS is generally specified as a concentration averaged over a specific time period, such as 1-hour, 8-hours, 24-hours, or 1-year. The different averaging times and concentrations are meant to protect against different exposure effects. AAQS established for the protection of human health are referred to as primary standards, while standards established for the prevention of environmental and property damage are called secondary standards. The FCAA allows States to adopt additional or more health-protective standards. The State of California has established air quality standards (CAAQS) for some pollutants not addressed by NAAQS. The California Air Resources Board (ARB) has established CAAQS for H_2S, SO_4^{2-}, VCM, and visibility reducing particles.

The ARB designates a status for regional air basins as being in attainment or nonattainment with State air quality standards. The EPA provides the designation for National standards. State designations are reviewed annually while the National designations are reviewed when either the standards change, or when an area requests that they be re-designated due to changes in the area's air quality. Most designations are made by regional air basin, but in some cases, designations are made at the county level.

Designations are made by pollutant according to the following categories:

Attainment – Air quality in the area meets the standard.

Nonattainment – Air quality in the area fails to the applicable standard.

Unclassified – Insufficient data to designate area, or designations have yet to be made.

Attainment/Unclassified - An EPA designation which, in terms of planning implications, is essentially the same as Attainment.

Nonattainment designations are of most concern because they indicate that unhealthy levels of the pollutant exist in the area, which typically triggers a need to develop a plan to achieve the applicable standard. Current State and National designations are shown below:

Table 3. North Central Coast Air Basin Attainment Status Summary as of January 2015

Pollutant	State Standards[1]	National Standards
Ozone (O_3)	Nonattainment[2]	Attainment / Unclassified[3]
Inhalable Particulates (PM_{10})	Nonattainment	Attainment
Fine Particulates ($PM_{2.5}$)	Attainment	Attainment / Unclassified[4]
Carbon Monoxide (CO)	Attainment	Attainment / Unclassified
Nitrogen Dioxide (NO_2)	Attainment	Attainment / Unclassified[5]
Sulfur Dioxide (SO_2)	Attainment	Attainment[6]
Lead	Attainment	Attainment / Unclassified[7]

Notes:
1) State designations based on 2010 to 2012 air monitoring data.
2) Effective July 26, 2007, the ARB designated the NCCAB a nonattainment area for the State ozone standard, which was revised in 2006 to include an 8-hour standard of 0.070 ppm.
3) On March 12, 2008, EPA adopted a new 8-hour ozone standard of 0.075 ppm. In April 2012, EPA designated the NCCAB attainment/unclassified based on 2009-2011 data.
4) This includes the 2006 24-hour standard of 35 µg/m3 and the 2012 annual standard of 12 µg/m3 .
5) In 2012, EPA designated the entire state as attainment/unclassified for the 2010 NO2 standard.
6) In June 2011, the ARB recommended to EPA that the entire state be designated as attainment for the 2010 primary SO2 standard. Final designations to be addressed in future EPA actions.
7) On October 15, 2008 EPA substantially strengthened the national ambient air quality standard for lead by lowering the level of the primary standard from 1.5 µg/m3 to 0.15 µg/m3 . Final designations were made by EPA in November 2011.
8) Nonattainment designations are highlighted in Bold.

The Monterey Bay Air Resources District (MBARD) is the regional agency tasked with managing air quality in the region. The MBARD, which is overseen by the ARB, has published CEQA Air Quality Guidelines that also are used in this assessment to evaluate air quality impacts of projects (MBARD, 2008). In an attempt to achieve NAAQS and CAAQS and maintain air quality, the MBUAPCD has most recently completed the 2008 Air Quality Management Plan (2008 AQMP) for achieving the O3 CAAQS and the 2007 Federal Maintenance Plan for Maintaining the National Ozone Standard in the Monterey Bay Region (MBARD, 2007).

Although the North Central Coast Air Basin is in attainment of all federal air quality standards, it is designated as nonattainment with respect to the more stringent state PM_{10} standard and the state eight-hour ozone standard. See **Table 3** for a summary of the North Central Coast Air Basin attainment status.

CEQA Guidelines §15125(b) requires that a project is evaluated for consistency with applicable regional plans, including the Air Quality Management Plan (AQMP). The MBARD is required to update their AQMP once every three years; the most recent update (MBARD, 2017) was approved in March of 2017. This plan addresses attainment of the State ozone standard and federal air quality standard. AQMP accommodates growth by projecting growth in emissions based on population forecasts prepared by the Association of Monterey Bay Area Governments (AMBAG) and other indicators. Consistency determinations are issued for commercial, industrial, residential, and infrastructure related projects that have the potential to induce population growth. A project is considered inconsistent with the AQMP if it has not been accommodated in the forecast projections considered in the AQMP.

Discussion

a) No Impact. A project would conflict with or obstruct implementation of the AQMP for the Monterey Bay Region if it is inconsistent with the growth assumptions in the AQMPs, in terms of population, employment, or regional growth in vehicle miles traveled. These population forecasts are developed, in part, on data obtained from local jurisdictions and projected land uses and population projections identified in community plans. Projects that result in an increase in population growth that is inconsistent with local community plans would be considered inconsistent with the AQMP. As the proposed project would not affect population growth, no impact would occur as a result of the proposed project.

b) Less Than Significant Impact. The project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. Under the Federal Clean Air Act, the NCCAB is designated for attainment status as shown above in **Table 3**. The long-term and short-term impacts of the project to air quality are discussed below. Greenhouse gas emissions are discussed in **Section VII** of this document.

Long-term air emissions impacts are associated with any change in permanent use of the project site by on-site stationary and off-site mobile sources that substantially increase vehicle trip emissions. Construction activities, such as grading and vehicle/equipment use, that would result in air pollutant emissions are considered short-term.

The proposed project would include short-term, temporary impacts to air quality which may occur from the generation of air pollutant emissions during construction. The use of vehicles and heavy equipment as part of construction of the proposed project would result in the temporary generation of emissions resulting from site grading and excavation, vegetation removal, dredging, and construction-related vehicle traffic. These activities would be the primary emissions sources at the project site. Dust generated daily during construction would vary substantially, depending on the level of activity, the specific operations, and weather conditions. Vehicles and heavy equipment that may be required for construction and maintenance would not operate continuously, thereby producing intermittent and temporary emissions, depending on the construction duration and schedule. Construction and maintenance activities of the proposed project may also require worker commute trips.

The sources of emissions associated with the proposed project have the potential to generate a small amount of fugitive particles and diesel exhaust that could result in an increase in criteria pollutants during maintenance activities and could also contribute to the existing nonattainment status of the NCCAB for ozone and PM_{10}. As stated in the MBUAPCD 2008 CEQA Air Quality Guidelines (Section 5.3), emissions from construction activities represent temporary impacts that are typically short in duration, depending on the size, phasing, and type of project. Air quality impacts can nevertheless be acute during construction periods, resulting in significant localized impacts to air quality. Emissions of concern related to construction and maintenance activities are PM_{10} and ozone.

As stated above, as the extent and duration of construction and maintenance activities are not defined yet, further environmental analysis will need to be completed to determine the impacts of construction and maintenance on air quality. However, the following provides standards for evaluating significant impact and preliminary assessment based upon level of project details known.

<u>Inhalable Particulates (PM_{10})</u>

Construction activities (e.g., excavation, grading, on-site vehicles) which directly generate 82 pounds per day or more of PM_{10} would have a significant impact on local air quality when they are located nearby and upwind of sensitive receptors. If ambient air quality in the project area already exceeds the State AAQS, a project would contribute substantially to this violation if it would emit 82 lb/day or more. As indicated above, assuming the proposed project would not exceed 82 lb/day, this impact is less than significant.

<u>Ozone</u>

Construction activities using typical construction equipment that temporarily emit precursors of ozone (i.e., volatile organic compounds (VOC) or oxides of nitrogen (NO_X)) are accommodated in the emissions inventories of State- and federally-required air plans and will have a less than significant impact on the attainment and maintenance of ozone AAQS.

Due to the limited area of construction, earthmoving maintenance activities associated with the proposed project would likely not exceed 2.2 acres per day air quality consistent with Air District standards. Given the limited extent of the work area, and due to the temporary nature of the activities, the proposed project is not expected to exceed the impact significance criteria. Therefore, impacts to air quality will be less than significant.

To further minimize air quality impacts, consistent with guidance from MBARD and City construction standards, the following "Best Management" construction practices shall be implemented at the construction site to control emissions:

- Water all active construction areas as required with non-potable sources to the extent feasible; frequency should be based on the type of operation, soil, and wind exposure and minimized to prevent wasteful use of water.
- Prohibit grading activities during periods of high wind (over 15 mph).
- Cover all trucks hauling soil, sand, and other loose materials and require trucks to maintain at least 2 feet of freeboard.
- Hand sweep daily within paved areas.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets;
- Enclose, cover, or water daily exposed stockpiles (dirt, sand, etc.);
- Replant vegetation in disturbed areas as quickly as possible.
- Provide stabilized construction entrance/exit to limit sediment tracking from the site.

With the implementation of Best Management Practices described above, short-term construction period air quality impacts associated with the proposed project would be less than significant.

Long-term air emissions impacts are associated with any change in permanent use of the project site by on-site stationary and off-site mobile sources that substantially increase vehicle trip emissions. No stationary sources are associated with the project. The project involves restoration of riparian area and limited improvements including a trail and runoff diversion, which once completed, would not generate vehicle or other mobile emissions. Therefore, long-term operation of the project would not contribute to an existing or projected air quality violation.

c) Less Than Significant Impact. The project is not expected to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard. As described above in (b), the project would result in temporary increases in air pollutants (e.g., fugitive dust). However, implementation of Best Management Practices, described above, would reduce impacts to a less than significant level. Therefore, temporary increases in air pollutants would not be cumulatively considerable.

d-e) Less Than Significant Impact. Generally, residences, as well as schools, are considered to be "sensitive receptors" in relation to air quality issues. There are a limited number of residences located along Pacific Street near the project area. Monterey High School facilities are located across Pacific Street near the site. As stated in b-c above, the project, during construction, may generate odors or pollutant concentrations that are objectionable to some persons. Construction activities may expose surrounding land uses to airborne particulates and fugitive dust, as well as a small quantity of pollutants associated with the use of construction equipment (e.g., diesel-fueled vehicles and equipment). On a limited basis, sensitive receptors in the vicinity and on-site workers may be exposed to blowing dust, depending on the prevailing wind. However, implementation of the Best Management Practices described above, and the temporary nature of the impacts, would reduce short-term construction period air quality impacts and prevent nuisances to residents and workers. Thus, the impact is less than significant.

8.4. Biological Resources

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
BIOLOGICAL RESOURCES – Would the project:					
a) Has a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	Level of Significance to be Determined, see note below.				City of Monterey PEEC, General Plan Conservation Element Goal d, Policies d.1–d-6 and Programs d.1.1–d.6.6 City of Monterey PEEC, Monterey City Code (M.C.C.), Chapter 37, Preservation of Trees and Shrubs
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	Level of Significance to be Determined, see note below.				City of Monterey PEEC, General Plan Conservation Element Policy b.4 and Program d.6.3
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	Level of Significance to be Determined, see note below.				City of Monterey PEEC, General Plan Conservation Element Policy b.4 and Program d.6.3
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		X			City of Monterey PEEC

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	Level of Significance to be Determined, see note below.				City of Monterey PEEC, Monterey City Code (M.C.C.), Chapter 37, Preservation of Trees and Shrubs City of Monterey, Forest Management Plan, August 2008
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X	City of Monterey PEEC Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California, 1997 City of Monterey General Plan Update EIR 2004
Note: As described in sections a), b), c), and e) below, a Biological Report, a Wetland Delineation, and a Landscape Plan will be prepared by the City during the design phase of the proposed project. Upon completion of these documents, the level of significance can be determined.					

Existing Setting

Monterey County consists of more than 3,324 square miles of land (over two million acres) with a variety of habitats from rocky Pacific shores to open grasslands to high mountains at elevations exceeding 5,000 feet. The Monterey Bay area, located in northern Monterey County, is home to a diverse population of animal, bird, and plant species. The waters of Monterey Bay and the adjacent Pacific Ocean off the central California coast have been designated and protected as the Monterey Bay National Marine Sanctuary since 1992. The climate of the site is typical of the California central coast with mild year-round and morning coastal fog, generally cleared by afternoon breezes. Monterey typically experiences cool summer months, with temperatures averaging in the high 50s to low 60s, and warm "Indian Summer" weather in the fall. The average yearly rainfall is approximately 18 inches and is concentrated in the winter and early spring months.

<u>Monterey Tree Protection Ordinance</u>

Monterey's image is that of a small-scale residential community beside the bay, framed by a forested hill backdrop and drawing its charm from a rich historical background, certain commercial enterprises, and natural scenic beauty. Trees within the City significantly contribute to this image. The Preservation of Trees and Shrubs Ordinance is intended to assure preservation of trees and replacement of trees that are six inches in diameter or greater when removal is unavoidable. The Ordinance also establishes a Landmark Tree Program.

<u>General Plan Conservation Element</u>

The City's Conservation Element contains a variety of goals, policies and programs to: protect the character and composition of existing native vegetative communities.

The project site is located within a natural area called Hartnell Gulch, which is surrounded by development. Stormwater runoff drains into a small stream that runs through the center of the project site. Vegetation on the project site is "ruderal", a habitat type dominated by non-native, invasive species due to previous or ongoing disturbance, as shown on **Figures 5 and 6.** Existing trees and shrubs are proposed to be protected where feasible; these include oak and cypress trees as shown on **Figure 5**. **Figure 6** also identifies the project area plantings and proposed restoration plans (conceptual draft).

Discussion

a) Level of Significance to be Determined. The project site has the potential for candidate, sensitive, special status, or rare and endangered species and marine animals. A determination on the level of significance cannot be made without a Biological Report, as described below. Once this information is available, the determination whether this impact can be reduced to less than significant with mitigation can be made.

> **PENDING TECHNICAL ANALYSIS: BIOLOGICAL REPORT**
>
> A biological survey and report shall be conducted to analyze the potential or candidate, sensitive, special status, or rare and endangered species or marine animals and potential impacts to biological resource impacts based on the operation and construction of the proposed project. The recommendations contained in said report shall incorporated into project construction and design.

b), c) Level of Significance to be Determined. The creek that runs through the project site will be graded and the creek bed will be raised by several feet. Natural drainage channels and wetlands are considered Waters of the United States. The U.S. Army Corps of Engineers (ACOE) regulates the filling or grading of such Waters by authority of Section 404 of the Clean Water Act. Additionally, the California Department of Fish and Wildlife (CDFW) has jurisdiction over the bed and bank of natural drainages according to the provisions of Section 1601 and 1603 of the California Fish and Game Code. Impacts to waters of the U.S. are considered potentially significant. A determination on the level of significance cannot be made without a Wetland Delineation, as described below. Riparian areas, wetlands, other waters of the U.S., waters of the state are considered sensitive biological resources that fall under the jurisdiction of the above regulatory agencies. Coordination, the approval of various permits could reduce any potential effects on these habitats. The proposed project may result in potentially significant but mitigatable impacts related to effects on sensitive habitats. Additional environmental analysis is required once the project is further defined to identify and confirm biological resources on the site as well as determine potential impacts and mitigations to reduce the level of biological impacts from the proposed project. After the Wetland Determination is complete, a determination of whether this impact can be reduced to less than significant with mitigation can be made.

> **PENDING TECHNICAL ANALYSIS: WETLAND DELINEATION**
>
> Prior to commencement of construction, the City will conduct a jurisdiction waters delineation to document the extent of potentially jurisdictional waters of the U.S. within the project area which may be regulated by the ACOE. The delineation report will also contain a determination of the extent of potential impacts to jurisdictional area resulting from project implementation. Pursuant to Clean Water Act Section 404 Nationwide Permit

(NWP) 14; if the discharge causes the loss of less than 1/10-acre to waters of the U.S., no further action is required. If impacts to jurisdictional areas are less than 1/3 acre but greater than 1/10 acre, the City will notify the ACOE District Engineer in accordance with requirements specified in NWP 14. If impacts to jurisdictional areas are greater than 1/3 acre, or if the proposed activity would not otherwise quality for NWP 14, the City will proceed with obtaining an Individual Permit from the ACOE. In addition to Section 404 permit from the ACOE, a Streambed Alteration Agreement from the CDFW and a Water Quality Certification (Section 401 of the Clean Water Act) from the Central Coast Regional Water Quality Control Board will be obtained.

d) Less Than Significant with Mitigation. The proposed project area has the potential to support avian populations that are protected under both the Migratory Bird Treaty Act and Fish and Game Code Section 3503. Construction-related activities (e.g., trimming and removal of trees and vegetation, and equipment noise, vibration, and lighting) that result in harm, injury, or death of individuals, or abandonment of an active nest would be considered a significant impact. The proposed project site provides potential nesting habitat for protected avian species. If a raptor or other migratory birds were to nest on or adjacent to the site prior to or during proposed construction activities, such activities may result in the abandonment of active nests or direct mortality to these birds. This is considered a potentially significant impact that can be reduced to a less-than-significant level with implementation of **Mitigation Measure 1** identified below.

MITIGATION MEASURE 1: CONDUCT PRE-CONSTRUCTION SURVEYS FOR NESTING BIRDS

Construction activities that may affect nesting birds shall be timed to avoid the nesting season. Specifically, tree removal shall be scheduled after September 1 and before February 28. Alternatively, if construction activities or tree removal are to occur during the breeding season (February 28 through September 1), surveys for active nests shall be conducted by a qualified biologist no more than 30 days prior to the start of construction. If nesting birds are identified during the preconstruction surveys, CDFW shall be contacted and an appropriate buffer shall be imposed within which no construction activities or disturbance shall take place (generally 300 feet in all directions for raptors) until the young of the year have fledged and are no longer reliant upon the nest or parental care for survival, as determined by a qualified biologist or CDFG.

e) Level of Significance to be Determined. The project is located within a designated habitat management area according the City of Monterey General Plan Map 9. Additionally, the project will require the removal of trees. The City's Tree Ordinance defines preservation and replacement of trees that are six inches in diameter or greater when removal is unavoidable. The Ordinance also establishes a Landmark Tree Program. The project will result in the loss of trees and vegetation within a habitat management area. The project is a restoration project and preliminary plans indicate tree removal will be avoided where feasible. Coordination with the City Forester and compliance with the Tree Ordinance will occur through the review and approval of an updated Landscape Plan, as described **Section I**, above. Therefore, related potential impacts cannot be determined at this time.

f) No Impact. The City does not have an adopted Habitat Conservation Plan or Natural Community Conservation Plan that addresses the proposed project site. Therefore, no impact will result.

8.5. Cultural Resources

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
CULTURAL RESOURCES – Would the project:					
a) Cause a substantial adverse change in the significance of a historical resource as defined in 15064.5? (Intent is to address impact to onsite historic resources and adjacent historic resources.)		X			City of Monterey PEEC, Monterey City Code (M.C.C.), Chapter 38, Zoning Code, Article 15 H Historic Overlay District City of Monterey PEEC, Historic Preservation Program City of Monterey PEEC, Historic Master Plan City of Monterey PEEC, Historic Ordinance
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to 15064.5?	Level of Significance to be Determined, see note below.				Archaeological Sensitivity Map, Figure 8, Draft EIR, City of Monterey General Plan Update, July 2004
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X			Archaeological Sensitivity Map, Figure 8, Draft EIR, City of Monterey General Plan Update, July 2004
d) Disturb any human remains, including those interred outside of formal cemeteries?		X			City of Monterey PEEC
Note: As described in section b) below, an Archaeological Survey Report will be prepared by the City during the design phase of the proposed project. Upon completion of this document, the level of significance can be determined.					

Existing Setting

According to the City's General Plan, the City of Monterey is one of the most historic cities in the United States, and preservation of historic resources has long been a concern of Monterey citizens. Over the past three centuries, the City has served, at various times, as a Spanish mission, a center of government, a major commercial port, and a cultural center. There are numerous historic sites in the City, including two National Historic Landmark Districts. Monterey is recognized as a Preserve America Community and the National Trust designated Monterey as one of its Twelve Distinctive Destinations.

The City of Monterey updated its Historic Preservation Ordinance in March 2000. Historic zoning within the City is defined as follows: Landmark Zoning (H-1) may be applied to properties which meet the National Register criteria defined in National Register Bulletin 15 and the property is the first, last, only, rare, or most significant resource of its type in the region. Notwithstanding the foregoing, the H-1 Landmark zoning district may be applied to adobe resources built prior to 1879 and other previously “H” zoned resources as of the date of the ordinance adoption which may not meet National Register integrity standards. City Historic Resource Zoning (H-2) may be applied to properties that meet National Register criteria.

An archaeological report was prepared by Pacific Legacy for the nearby Hartnell Gulch Pedestrian Walkway Project. The report found there were ten recorded cultural resources situated within one quarter-mile including four prehistoric sites. Near to the Hartnell Gulch proposed project area, a substantial 19th and early 20th century historic refuse dump was discovered near the eastern end of Hartnell Gulch. In addition, eleven historic properties have been identified within or near the block in which the project area is situated. (Pacific Legacy Report, October 2008 included as an attachment to the IS/ND for the City of Monterey Hartnell Gulch Pedestrian Walkway Project.)

Discussion

<u>a) Less Than Significant with Mitigation.</u> According to the Archaeological Sensitivity Map, Figure 8 of the Draft General Plan EIR, the project site is in an area of “High Probability of Prehistoric Artifacts.” During project construction archaeological or paleontological resources may be encountered. This would be considered a potentially significant impact. Due to the projects location in an archaeological sensitive area, **Mitigation Measures 2 and 3** below is required to reduce this impact to a less than significant level.

MITIGATION MEASURE 2: VIBRATION MONITORING

To reduce impacts from construction vibration the City shall monitor for vibration during project construction, especially during the use of jackhammers and vibratory rollers, if applicable. If construction vibration levels exceed 0.12 in/sec PPV, construction shall be halted, and other construction methods shall be employed to reduce the vibration levels below the standard threshold. Alternative construction methods may include using concrete saws instead of jackhammers or hoe-rams to open excavation trenches, the use of non-vibratory rollers, and hand excavation. If impact sheet pile installation is needed (i.e., for horizontal directional drilling or jack-and-bore)

MITIGATION MEASURE 3: ARCHAEOLOGICAL MONITORING

A qualified archaeologist shall be retained on site during all excavation work and shall examine all excavations for evidence of any archaeological or paleontological resources. If any prehistoric subsurface, archaeological features or deposits including locally darkened soil (“midden”), that could conceal cultural deposits, animal bone, obsidian and/or mortar are discovered during construction-related earth-moving activities, all work within 50 meters of the resources shall be halted and the qualified archaeologist shall assess the significance of the find. Archaeological test excavations shall be conducted by the qualified archaeologist to aid in determining the nature and integrity of the find. If the find is determined to be significant by the qualified archaeologist, then representatives of the City and the qualified archaeologist shall meet to determine the appropriate course of action. All significant cultural materials recovered shall be subject to scientific analysis, professional museum curation, and a report shall be prepared by the qualified archaeologist according to current professional standards.

If a Native American site is discovered, then the evaluation process shall include consultation with the appropriate Native American(s). When Native American archaeological, ethnographic, or spiritual resources are involved, all identification and treatment shall be conducted by qualified archaeologists who are either certified by the Register of Professional Archaeologists (RPA) or meet the federal standards as stated in the Code of Federal Regulations (36 C.F.R. 61), and Native American representatives who are approved by the local Native American community as scholars of the cultural traditions. If no such Native American is available, persons who represent tribal governments and/or organizations in the locale in which resources could be affected shall be consulted.

A qualified archaeologist shall be present at the preconstruction meeting to educate all construction workers for the proposed project on the identification of subsurface cultural resources. The preconstruction meeting shall be completed prior to the commencement of any earth work or other construction activities and verification of compliance shall be provided to the City. Each contractor and all employees involved with earth moving activities including, but not limited to grading, scraping, drilling, and trenching, shall be required to participate in this preconstruction meeting. If subsequent contractors are hired who did not participate in this preconstruction meeting, they shall be required by the City to meet independently with the qualified archaeological consultant to review and discuss the potential for discovery of archaeological resources and the proper treatment of these materials to meet the spirit and the intent of this mitigation measure. They too shall provide verification to the City.

b) Level of Significance to be Determined. The property bordering the project site on the north along Hartnell Street is zoned as a H1 historic building. No other identified historic resources are in the immediate vicinity of the project site. Project engineering or project construction details are not fully defined; however, there is the potential for construction activities to either be near historical resources or create vibrations that could have a negative effect on the foundation of the historic structure. A determination on the level of significance cannot be made without the completion of an archaeological report, as described below.

PENDING TECHNICAL ANALYSIS: ARCHAEOLOGICAL SURVEY REPORT

The project proponent shall conduct a preconstruction archaeological survey to ensure no archaeological sites are within the construction area. The site must be inventoried for the presence of archaeological resources. This would include surface examination within the project site. After field studies are completed, an Archaeological Survey Report will be prepared, as appropriate, for documenting the type(s) of resources encountered.

c) Less Than Significant with Mitigation. Impacts to paleontological resources are significant when a project is determined to disturb or destroy scientifically important fossil remains, as defined by the Society of Vertebrate Paleontology. Excavations associated with construction of the proposed project could potentially impact such resources. Mitigation is necessary to ensure that resources discovered during project construction will be appropriately protected and curated. Due to the projects location in an archaeological sensitive area, this would be considered a potentially significant impact. implementation of **Mitigation Measure 3** above will reduce the impact to a less than significant level.

d) Less Than Significant with Mitigation. The proposed project could have the potential to disturb undiscovered human remains. While no prehistoric archaeological material has been previously identified, there is a remote possibility human remains could be uncovered during grading, excavation, and other earthmoving activities. If encountered, such resources could be damaged or destroyed. This would be considered a potentially significant impact. Implementation of **Mitigation Measure 4** below will reduce this impact to a less than significant-level.

MITIGATION MEASURE 4: DISCOVERY OF ARCHEOLOGICAL RESOURCES OR HUMAN REMAINS

If archaeological resources or human remains are unexpectedly discovered during any construction, work shall be halted within 50 meters (±160 feet) of the find until it can be evaluated by a qualified professional archaeologist. If the find is determined to be significant, appropriate mitigation measures shall be formulated and implemented, with the concurrence of the Lead Agency (MRWPCA). The County Coroner shall be notified in accordance with provisions of Public Resources Code 5097.98-99 in the event human remains are found and the Native American Heritage Commission shall be notified in accordance with the provisions of Public Resources Code section 5097 if the remains are determined to be of Native American origin.

8.6. Geology and Soils

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
GEOLOGY AND SOILS – Would the project:					
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.			X		City of Monterey PEEC, General Plan Safety Element Goal a, Policies a.1–a.7 City of Monterey PEEC, General Plan, Map 11-Showing Seismic Hazards

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
ii) Strong seismic ground shaking?			X		City of Monterey PEEC, General Plan Safety Element Goal a, Policies a.1–a.7
iii) Seismic-related ground failure, including liquefaction?			X		City of Monterey PEEC, General Plan Safety Element Goal a, Policies a.1–a.7
iv) Landslides?			X		City of Monterey PEEC, General Plan Safety Element Goal a, Policies a.1–a.7 City of Monterey PEEC, General Plan Safety Element Policies b.1–b.6 City of Monterey PEEC, General Plan, General Plan Map 12-Showing Steep Slopes
b) Result in substantial soil erosion or the loss of topsoil?	Level of Significance to be Determined, see note below.				City of Monterey PEEC, General Plan Safety Element Goal a, Policies a.1–a.7 City of Monterey PEEC Phillip Williams Associates, October 1997. Hartnell Gulch: Watershed Analysis and Management
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	Level of Significance to be Determined, see note below.				City of Monterey PEEC, General Plan Safety Element Goal a, Policies a.1–a.7 City of Monterey PEEC, General Plan, General Plan Map 12-Showing Steep Slopes
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	Level of Significance to be Determined, see note below.				City of Monterey PEEC
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				X	City of Monterey PEEC
Note: As described in sections b), c), and d) below, an Erosion Control Plan and a Geotechnical Report will be prepared by the City during the design phase of the proposed project. Upon completion of these documents, the level of significance can be determined.					

Existing Setting

The City of Monterey is underlain by a major geologic feature, the Salinian Block, which in turn is underlain by granitic basement rock. The Salinian Block is bounded on the northeast by the San

Andreas Fault and on the southwest by the Palo Colorado-San Gregorio Fault. The block is approximately 50 miles wide and 300 miles long. The types of soils and geologic formations that underlie the City are varied, ranging from unconsolidated dune sands along the Monterey Bay to exposed granite and sandstone. Each has unique characteristics and potential development limitations and erosion characteristics. Generally, the erosion potential of soils and their expansion properties (soil expansion and contraction can result in damage to building foundations, roads, etc.) are of greatest interest from a development impact perspective.

Coastal areas along Monterey Bay, especially dune deposits, are highly susceptible to coastal erosion from waves and tidal events. Erosion potential varies along the length of the coast. Variability in erosion rates is caused by several factors including sea level, wave patterns influenced by the form of the ocean floor, storm patterns, and the structure and character of dunes in localized areas. Historic average coastal bluff retreat rates have been highest in the former Fort Ord area, averaging up to eight feet per year. Average erosion rates decrease down coast to about three to five feet per year in Sand City. Further south, within the City, average erosion rates are believed to be about one to two feet per year (Coastal Regional Sediment Management Plan for Southern Monterey Bay, November, 2008). Coastal erosion would be a significant factor for any development proposed along the margin of Monterey Bay.

California is one of the most active seismic regions in the United States. The City lies adjacent to the boundary zone between the North American and Pacific tectonic plates. The faults associated with this zone are predominantly northwest-trending strike-slip faults that have a right-lateral slip. The General Plan identifies three faults that traverse the City, including the Chupines Fault, the Navy Fault, and the Berwick Fault. Information available on the activity of these faults is generally not conclusive, but each is assumed to be potentially active.

Topography and slope within the City is quite variable. Lands along the margin on Monterey Bay tend to be relatively flat but sloped towards the bay. Much of the upland portion of the City is incised by a series of intermittent stream channels that have cut into surface soil and subsurface geologic formations, leaving a series of mesas that trend towards the bay. Much of the City is built on these mesas and on the more level margins of the bay. The northern terminus of the Santa Lucia Mountains is the major regional landform that forms the backdrop to the City. Due to slope and access constraints, development within this area tends to be less dense. Steep slopes within the City tend to be located along stream channels and within the hillside areas.

Discussion

a i-iv) Less Than Significant Impact. The proposed project is not located within a fault zone but could increase the exposure of people and structures to seismic hazards including strong seismic ground shaking and seismic-related ground failure. The project is in a seismically active part of California which is subject to strong seismic ground shaking. Ground shaking is a general term referring to all aspects of motion of the earth's surface resulting from an earthquake and is typically the major cause of damage in seismic events. The extent of ground-shaking is controlled by the magnitude and intensity of the earthquake, distance from the epicenter, and local geologic conditions. Construction will be subject to the California Building Code, which has incorporated the most recent seismic design parameters that mitigate the potential for drainage to structures subject to seismic accelerations.

With the requirement that the project is constructed using the standards and requirements of the current applicable codes in place to minimize any geophysical risks associated with construction of the project, and in accordance with the recommendations of a geotechnical engineer, potential impacts associated with the exposure of people or structures to substantial adverse effects of seismic activity or landslides would be considered less than significant.

b) Level of Significance to be Determined. The proposed project will restore the creek channel, and in part help mitigate for the increased erosion in the Hartnell Gulch. An erosion study in the Hartnell Gulch watershed identified erosion concerns within the project site. Per the report (Citation below), the Hartnell Street Channel bed in this short reach shows evidence of significant past erosion (the channel is about 16 feet deep) and widening (channel top width is 40 to 50 feet). However, there was not extensive recent incision, with only a small (2- to 6-foot deep) inner low flow channel, and mature trees within a couple feet of the channel bed. The banks in most of the reach appear moderate (1:1 to 1:5:1 Horizontal to Vertical). However, erosion on the outside of the meander bend appears to represent a potentially severe hazard to the Paseo Zabala building (at the farthest point of the project site downstream; building location is at 550 Hartnell Street). The vertical, 15-foot high bank at this location is only 10 feet from the building." It is not known if this concern regarding potential for future bank erosion impacting the building foundation at this location has been ameliorated. The recommendations from the report cited a need for "prompt investigation by a geotechnical engineer regarding the specific bank problems in relation to the building foundation… Based on our preliminary observations, some form of bank protection (vegetated rock slope, stepped retaining walls, crib walls, etc.) may be necessary to protect the building from future meander migration/bank erosion…". (Phillip Williams Associates, October 1997. Hartnell Gulch: Watershed Analysis and Management Recommendations. Prepared for the City of Monterey).

The project site is part of an established natural drainage corridor and disruption of the site may induce soil erosion into the adjacent stream. It is currently unknown whether or not the proposed project will have a significant impact related to soil erosion. An Erosion Control Plan, as described below is required to make this determination.

PENDING DESIGN PRODUCT: EROSION CONTROL PLAN

The City shall prepare and Erosion Control Plan for the proposed project. The plan will include, at a minimum, the installation of "waddles" or other containment devices if the project is to occur between the months of October and April (the normal period of rain), to prevent the immediate erosion of soils on the southern streambank into the adjacent stream. Upon completion of the project, the applicant shall ensure that the project site is sufficiently secure by planting non-invasive species in those areas disturbed by the construction project

c), d) Level of Significance to be Determined. The site-specific geotechnical conditions of the project site are unknown. The Hartnell Gulch location has steep slopes (in excess of 25%) within areas of the creek channel which is highly incised. Due to the unknown project conditions there is the potential the project could cause landslide, lateral spreading, subsidence, liquefaction, or collapse. A determination on the level of significance cannot be made without the completion of a Geotechnical Report, as described below. A geotechnical engineering evaluation is needed to review the geotechnical aspects of the project plans and structural calculations, as appropriate to evaluate if they are in general conformance with the intent of the geotechnical conditions on site. A geotechnical engineer will provide requirements and standards for the geotechnical aspects of construction, particularly grading, footing excavations, subsurface drainage installation, over excavations and placement and compaction of select fill or backfill, and to perform appropriate field and laboratory testing, as applicable. Additionally, the geotechnical report should assess foundations of the building at 550 Hartnell Street would not be impacted by construction.

PENDING TECHNICAL ANALYSIS: GEOTECHNICAL REPORT

A geotechnical report shall be prepared to provide specific recommendations for design and construction of the project based on the existing geologic conditions at the project sites. Construction of the proposed project will be required to adhere to the building and safety requirements in the City's Building Code as well as the site-specific recommendations in the geotechnical report. The geotechnical report shall be prepared as part of the project design, prior to construction and any recommendations made in the geotechnical report shall be incorporated into project design and construction.

e) No Impact. The project does not require a septic system or any other sewer connection. As such, there will be no impact.

8.7. Greenhouse Gas Emissions

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
GREENHOUSE GAS EMISSIONS – Would the project:					
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X		Project Description; California Air Resources Board; MBUAPCD
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?				X	Project Description; California Air Resources Board

Existing Setting

Greenhouse gases (GHGs) are emitted by both natural processes and human activities. Of these gases, carbon dioxide (CO_2) and methane (CH_4) are emitted in the greatest quantities from human activities. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results from off-gassing associated with agricultural practices and landfills. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century.

According to the Air Resources Board (ARB), some of the potential impacts in California of global warming may include loss of snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (ARB, October 2007).

Potential impacts resulting from flooding caused by sea level rise is addressed in **Section IX** (Hydrology and Water Quality) below.

The greenhouse effect is a natural process by which some of the radiant heat from the sun is captured in the lower atmosphere of the earth, thus maintaining the temperature and making the earth habitable. The gases that help capture the heat are called greenhouse gases. Some GHGs occur naturally in the atmosphere, while others result from human activities. Naturally occurring GHGs include water vapor, carbon dioxide, methane, nitrous oxide, and ozone. Certain human activities, however, add to the levels of most of these naturally occurring gases as describe below:

- Carbon dioxide (CO_2) is released to the atmosphere when solid waste, fossil fuels (oil, natural gas, and coal), and wood and wood products are burned.
- Methane (CH_4) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from the decomposition of organic waste in solid waste landfills and from the raising of livestock.
- Nitrous oxide (N_2O) is emitted during agricultural and industrial activities, as well as during combustion of solid waste and fossil fuels.
- High global warning potential (GWP) gases that are not naturally occurring, including hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6), are generated in a variety of industrial processes.

Each GHG differs in its ability to absorb heat in the atmosphere. High GWP gases such as HFCs, PFCs, and SF_6 are the most heat-absorbent. Methane traps over 21 times more heat per molecule than CO_2, and N_2O absorbs 310 times more heat per molecule than CO_2. Often, estimates of GHG emissions are presented in carbon dioxide equivalents (CO_2e), which weight each gas by its GWP.

Projects which are not consistent with the AQMP, described in more detail in **Section III** (Air Quality), have not been accommodated in the AQMP and will have a significant cumulative impact on regional air quality unless emissions are totally offset. A project that is inconsistent with the AQMP has not been accommodated in the emissions budget and will have a significant cumulative impact on attainment of the state's ozone ambient air quality standards (AAQS) unless project emissions are totally offset.

Discussion

<u>a) Less Than Significant Impact.</u> The proposed project would involve creek restoration and water diversion. Therefore, the project will not generate new vehicle trips or otherwise generate a new permanent stationary or mobile source of greenhouse gas emissions from operations. The proposed project would include an undefined number of construction truck trips during construction and would generate GHG emissions during construction. Operations of the proposed

project, which includes infrastructure and landscape improvements to the site, would not result in the generation of additional GHG emissions. Therefore, a net increase in GHG emissions during the operational phase is not anticipated. An unquantified amount of emissions will result from construction activities; however, more detailed construction information is needed to assess the proposed project's contribution of GHG emissions during construction. Construction will be contained to the project site and construction GHG emission levels would be anticipated to be below the thresholds of significance; therefore, potential impacts are considered less than significant. This issue will require further analysis to confirm this preliminary conclusion once details are available.

b) No Impact. The proposed project would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases, since the proposed project will not substantially increase GHG emissions, therefore the project would not result in an impact related to conflicts with applicable plans.

8.8. Hazards and Hazardous Materials

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
HAZARDS AND HAZARDOUS MATERIALS – Would the project:					
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X		City of Monterey PEEC, General Plan Safety Element Goal G
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			X		City of Monterey PEEC
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?			X		City of Monterey PEEC
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X	California Department of Toxic Substances, EnviroStor Database City of Monterey Fire Department

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?			X		City of Monterey PEEC
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?			X		City of Monterey PEEC
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X		City of Monterey PEEC, General Plan Safety Element Goal h and Policies h.1–h-6 City of Monterey Police and Fire Departments
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or when residences are intermixed with wildlands?				X	California Department of Forestry and Fire Protection, Monterey County Natural Hazard Disclosure (Fire) map http://www.fire.ca.gov/ab6/nhd27.pdf Monterey City Code (M.C.C.), Chapter 13, Fire Protection General Plan Map 14, Showing Fire Hazard Severity Zones

Existing Setting

The setting information provided below is based on information from the City's General Plan and General Plan Environmental Impact Report (EIR).

Hazardous Materials

In terms of hazardous materials usage, many types of hazardous wastes are used throughout the City in residential, commercial, and industrial applications. The Monterey County Environmental Health Division is responsible for managing the use, storage, and disposal of hazardous materials in amounts over a specific threshold (the threshold varies among uses and types of materials). The Environmental Health Division keeps an inventory of hazardous materials users and is responsible for working with users to develop plans that ensure the materials are safely used, stored, transported, and disposed.

Fire

Fire hazards can generally be divided into two main types: (1) fires within urban areas that primarily involve specific sites and structures; and (2) fires within undeveloped or minimally developed areas, commonly called wildland fires. Most of the land within the present city limits is developed with urban uses. The City of Monterey Fire Department responds to both structure and wildland fires within the City. The City of Monterey Fire Department maintains three stations and operates several fire prevention programs. If the City does not have the capacity to safely handle a structural or wildland fire, it can request additional firefighting resources through the Monterey County Mutual Aid Plan. The Monterey County Mutual Aid Plan enables any jurisdiction that participates in the plan to receive support from fire protection services of other jurisdictions that participate in implementing the plan. Response times to nearly all areas of the City are within the Department's recommended range of five to seven minutes. Response time to Ryan Ranch is on the threshold of being longer than seven minutes.

The Monterey City Code (M.C.C.) Chapter 13, Fire Protection, adopted the 2007 California Fire Code pursuant to Monterey City Ordinance No. 3398 (effective January 1, 2008). Amendments to this chapter of the code, as well as amendments to the City's General Plan Map 14, Showing Fire Hazard Severity Zones, were adopted by the City Council on June 2, 2009, to be in compliance with legislation (Government Code Section 51175). This legislation calls for the California Department of Forestry and Fire Protection (CAL FIRE) Director to evaluate fire hazard severity in Local Responsibility Areas and make a recommendation to the local jurisdiction when the Very High Fire Hazard Severity Zone (VHFHSZ) exists. Based on the findings of the CAL FIRE Director, there are both High and Very High Fire Hazard Severity Zone within the City of Monterey City limits (See Map 14 at the City's website: http://www.monterey.org/fire/news/fhszforgenplanmap090428.pdf)

Airport Safety

Monterey Peninsula Airport operations have the potential to create safety issues related to safe operation of approaching and departing aircraft. The Monterey Peninsula Airport District's 1992 Monterey Peninsula Airport Master Plan Update shows "runway protection zones" at each end of the main airport runway. These zones are areas 2,500 feet wide and 5,000 feet long. Within these areas, land use controls are exercised to minimize potential safety conflicts with activities that take place within the zones. Such controls and guidelines include the prohibition or limitation of uses that involve large assemblages of people, limitations on building heights and heights of other potential obstructions, and prohibition of new structures. Existing land uses that are within the western approach safety zone include much of the U.S. Navy Golf Course, the Monterey County Fairgrounds, and a small section of residential development. Uses within the eastern protection zone include commercial and residential development at the Highway 218/Highway 68 intersection. Smaller additional safety areas extend beyond the primary protection zone wherein specific development standards apply to minimize conflicts with airport operations.

Emergency Preparedness/Emergency Response

The City of Monterey Fire Department and City of Monterey Police Department coordinate emergency response within the City. The City operates its Emergency Operations Center (EOC) as the center of emergency response coordination and actions. During an emergency, all response activities are managed by the EOC, including information, equipment, volunteers, and other resources. Plans for responses to emergency situations are formulated by fire and police officials, and actions to implement those plans are communicated to emergency response teams that operate out of the EOC and throughout the City. The City also operates the Citizens Emergency Response Training (CERT). The main goal of the CERT program is to help the citizens of Monterey to be self-sufficient in a major disaster by developing multifunctional teams that are cross-trained in basic skills. The City's emergency response efforts are coordinated under the broader umbrella of the State of California Office of Emergency Services. The County of Monterey also has an emergency response office, but the City is not a participating jurisdiction in the County's response program. The County Environmental Health Division Hazardous Materials Branch and the City of Seaside Hazardous Materials Team would likely be the first agencies to provide support to the City in the event that the City does not have the capacity or capability to fully address a hazard. Both agencies are fully trained and equipped to respond to a variety of hazardous materials related incidents.

Discussion

a) Less Than Significant Impact. Construction equipment would require the use of petroleum products. Except for the materials required to operate the construction equipment, no other storage, use, transport, or disposal of any hazardous materials would be required. The proposed project will comply with all pollution and environmental control rules, regulations, ordinances, and statutes that apply to the project. As such, this potential impact is considered less than significant.

b) Less Than Significant Impact. Construction activities have the potential to release petroleum products and other substances into the environment. These materials will be stored properly within the staging area, in accordance with BMPs and applicable regulations, and the staging area will be secured from public access and identified per City requirements. Runoff controls will be implemented to prevent water quality impacts, and a spill plan will be developed to address any accidental spills. Any waste products resulting from construction operations will be stored, handled, and recycled or disposed of in accordance with federal, state, and local laws, including any wood that has been treated with potentially hazardous preservation chemicals. Therefore, this is considered a less than significant impact.

c) Less Than Significant Impact. Multiple schools are located within one-quarter mile of the project site. As indicated above, the proposed project will comply with all pollution and environmental control rules, regulations, ordinances, and statutes that apply to the project. As such, this potential impact is considered less than significant.

d) No Impact. The project site is not included on the Cortese list of hazardous sites compiled pursuant to Section 65962.5 of the California Government Code.

e-f) Less Than Significant Impact. The project site is located within two miles of the Monterey Peninsula Airport. However, the project will not create a safety hazard due to its height, location and function. This impact will be less than significant.

g) Less Than Significant Impact. Pacific Street which borders the site is identified as an access road to Hwy 1 evacuation route. The proposed project would not result in any conditions that are not already assumed in the emergency response or emergency evacuation plans. Therefore, this would be a less than significant impact.

h) No Impact. The proposed project will not expose people or structures to significant risk of loss, injury, or death involving wildland fire hazards. While the General Plan Map 14 shows that there are both High and Very High Fire Hazard Severity Zone within the City of Monterey City limits, the project site is not within either of these zones. In addition, the Monterey City Code (M.C.C.) Chapter 13, Fire Protection, adopted the 2007 California Fire Code pursuant to Monterey City Ordinance No. 3398 (effective January 1, 2008). Therefore, no impacts regarding wildland fire are anticipated.

8.9. Hydrology and Water Quality

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
HYDROLOGY AND WATER QUALITY – Would the project:					
a) Violate any water quality standards or waste discharge requirements?		X			Monterey City Code (M.C.C.) Chapter 31.5, Stormwater Management City of Monterey PEEC, General Plan Public Facilities Element Policy 1.2 City of Monterey Plans & Public Works Department Central Coast Regional Water Quality Control Board Monterey Regional Stormwater Management Program (MRSWMP)
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?			X		City of Monterey Plans & Public Works Department Monterey Peninsula Water Management District City of Monterey PEEC, General Plan Conservation Element
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result	Level of Significance to be Determined, see note below.				Monterey City Code (M.C.C.) Chapter 31.5, Stormwater Management General Plan Public Facilities Element Policy l.2 City of Monterey Plans & Public Works Department

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
in substantial erosion or siltation on- or off-site?					
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site?	Level of Significance to be Determined, see note below.				Monterey City Code (M.C.C.) Chapter 31.5, Stormwater Management General Plan Public Facilities Element Policy l.2 City of Monterey Plans & Public Works Department
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?			X		Monterey City Code (M.C.C.) Chapter 31.5, Stormwater Management General Plan Public Facilities Element Policy l.2 City of Monterey Plans & Public Works Department Monterey Regional Stormwater Management Program (MRSWMP)
f) Otherwise substantially degrade water quality?		X			Monterey City Code (M.C.C.) Chapter 31.5, Stormwater Management General Plan Public Facilities Element Policy l.2 City of Monterey Plans & Public Works Department Central Coast Regional Water Quality Control Board Monterey Regional Stormwater Management Program (MRSWMP)
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X	General Plan Map 13-Showing Flood Zones General Plan Safety Element Program c.1.a Monterey City Code (M.C.C.) Chapter 9, Building Regulations, Article 7, Flood Damage Prevention FEMA Flood Insurance Rate Maps for County of Monterey, City of Monterey, April 2, 2009
h) Place within a 100-year flood hazard area structure, which would impede or redirect flood flows?				X	General Plan Map 13-Showing Flood Zones General Plan Safety Element Program c.1.a Monterey City Code (M.C.C.) Chapter 9, Building Regulations,

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
					Article 7, Flood Damage Prevention FEMA Flood Insurance Rate Maps for County of Monterey, City of Monterey, April 2, 2009
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X	General Plan Safety Element Policy c.1 City of Monterey Plans & Public Works Department FEMA Flood Insurance Rate Maps for County of Monterey, City of Monterey, April 2, 2009
j) Cause inundation by seiche, tsunami, or mudflow?				X	General Plan Safety Element Policy c.1
Note: As described in sections c) and d) below, a Hydrological Report will be prepared by the City during the design phase of the proposed project. Upon completion of this document, the level of significance can be determined.					

Existing Setting

The setting information provided below is based on information provided in the City's General Plan and General Plan EIR.

Drainage Patterns

The City owns and maintains a storm drainage system that collects and transports stormwater to the Monterey Bay. The system includes over 10 miles of pipelines and drainage channels. Stormwater runoff is collected through catch basins and stormwater inlets that direct runoff into the pipelines and channels. A series of stormwater outfalls are located along the margin of the Bay through which stormwater is discharged.

Flooding

Areas of the City of Monterey are in 100-year and 500-year flood zones, as shown on Map 13-Showing Flood Zones of the General Plan and FEMA Flood Insurance Rate Maps for Monterey County (April 2009), and are subject to significant storm wave inundation that causes erosion of coastal bluffs and potential damage to property. Because California and the west coast of the United States are seismically active, the site is also subject to flood hazard from tsunamis, or seismic sea waves, which are generated by submarine earthquakes, volcanic eruptions, and landslides. California has numerous potentially active submarine faults offshore and therefore is at risk for a tsunami. **Section VI**, Geology and Soils, of this Initial Study provides a comprehensive discussion regarding coastal flooding, wave action, storm surge and seismic effects, and related issues.

Water Quality and Stormwater Regulation

The City maintains approximately 10 miles of storm drainage infrastructure – drainage channels, storm drains, pipelines, culverts, pump stations, and outfalls - within the City of Monterey. The existing drainage system collects non-point surface water runoff and conveys it through channels, pipelines, and culverts that, in most instances, eventually terminate at the Monterey Bay.

Monterey's stormwater collection system is not tied into the sanitary sewer collection system. Therefore, stormwater flows are, for the most part, not treated prior discharge. Stormwater flows are discharged to local waterways including the Monterey Bay at multiple drainage outfalls located throughout Monterey's coastal area.

Monterey's discharge of stormwater to local surface waters is regulated by the federal Clean Water Act, National Pollutant Discharge Elimination System (NPDES) Permit Program, and the California Porter-Cologne Act, and permitted through the Central Coast Regional Water Quality Control Board. The City stormwater permit and ordinance require local regulation of water pollution and prevention through the mandated implementation of best management practices (BMPs) to protect the water quality of local waterways.

To address regional urban runoff issues and develop innovative approaches to stormwater management, the City collaborates with other local permittees in the Monterey Regional Stormwater Management Program (MRSWMP). The MRSWMP is a regional stormwater management, implementation, and education program that assists the City and region with permit compliance. By Ordinance and permit implementation, the City regulates applicable new and redevelopment projects for stormwater control; construction activities for erosion, sediment, and discharge control; identifies and enforces illicit connections and illicit discharges; and implements good housekeeping practices for municipal operations to protect local water quality, including the protections identified below:

<u>Section 31.5-18. Watercourse Protection, City of Monterey</u>

(a) Every person or entity owning property through which a watercourse passes, or such owner's lessee, shall keep and maintain that part of the watercourse within the property reasonably free of trash, debris, excessive vegetation, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse. In addition, the owner or lessee shall maintain existing privately-owned structures within or adjacent to a watercourse, so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse. The owner or lessee shall not remove healthy bank vegetation beyond that actually necessary for maintenance or remove said vegetation in such a manner as to increase the vulnerability of the watercourse to erosion. The property owner or such owner's lessee shall be responsible for maintaining and stabilizing that portion of the watercourse that is within their property lines in order to protect against erosion and degradation of the watercourse originating or contributed from their property.

(b) Watercourse protection shall be identified in the development planning stage of real property by the person or entity owning the property through which a watercourse passes, in order to retain creeks, wetlands, and riparian areas that provide habitat, and to remediate degraded water quality. Such considerations include, but are not limited to, preservation and setbacks from creeks, wetlands, and riparian habitats in compliance with applicable local, state, and federal laws and regulatory permit authorities, such as U.S. Army Corps of Engineers, Regional Board, SWRCB, California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Association (NOAA) Monterey Bay National Marine Sanctuary, and in conformance with low impact development site assessment and design standards of the NPDES General Permit and Regional Board Resolution No. R3-2013-0032, and as amended thereto. (Ord. 3519 § 7, 2015)

Discussion

a, f) Less Than Significant with Mitigation. The proposed project would disrupt the existing stream channel in Hartnell Gulch and potentially generate unacceptable rates of erosion into the stream during construction. The implementation of **Mitigation Measure 5** below would reduce this impact to a less than significant level.

MITIGATION MEASURE 5: CONSTRUCTION CONTRACT REQUIREMENT

The applicant shall require the following provision in any contract related to this project: The Contractor shall comply with all air pollution and environmental control rules, regulations, ordinances and statutes which apply to the project and any work performed pursuant to the contract. City Code Chapter 31.5 states, "No person shall discharge or cause to be discharged into the municipal storm drain system or watercourses any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than stormwater." This water quality protection clause means that nothing, but clean water shall enter the storm drain system. All persons conducting construction activities shall employ erosion prevention and construction site management practices which ensure the following outcomes:

- No deposit or discharge of sediment from a site onto adjacent properties or into waterways and related natural resources in excess of those that occur through natural processes;
- No deposit of mud, soil, sediment, concrete washout, trash, or other similar construction-related material onto public rights-of-way and private streets, and into the City's stormwater system and related natural resources, either by direct deposit, dropping, discharge, erosion, or tracking by construction vehicles, in excess of those that occur through natural processes. Any such discharge shall be cleaned up at the end of the current work shift in which the deposit occurred, or at the end of the current work day, whichever comes first;
- No exposure of soils and stockpile areas to stormwater runoff without secondary containment and treatment measures;
- No discharge of runoff containing construction-related contaminants into the City's stormwater system or related natural resources; and,
- No release onto the site of hazardous substances, such as oils, paints, thinners, fuels and other chemicals.

Typical minimum measures that a contractor would be expected to take include: spill prevention and control measures; solid waste containment; concrete waste management; proper vehicle and equipment cleaning, fueling, and maintenance; and erosion control measures. Detailed procedures for each of these activities can be found in the California Stormwater Best Management Practice Handbooks or the Caltrans Stormwater Quality Handbooks, both of which are available for reference in the City of Monterey Public Works Office at City Hall.

b) Less Than Significant Impact. The proposed project would not affect groundwater or interfere significantly with groundwater recharge, as the project area does not overly a groundwater basin. The project site is in the Hartnell Gulch watershed. The two primary creek channels in the watershed flow into the storm drain system directly downstream of the project area, where it is piped to the discharge point in Monterey Bay. Construction of the diversion may require temporary dewatering during construction and shallow groundwater may be encountered. Dewatering activities during construction will be temporary and limited to the proposed project construction site. Dewatering activities will not affect the local aquifers, as those aquifers are substantially below the ground surface. Construction of the proposed project will not increase the amount of impermeable surface area in the project area and will not substantially interfere with groundwater recharge. Therefore, the proposed project will not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. Hartnell Gulch is not considered a resource for groundwater supply or recharge and dewatering of the downstream system would be considered a less than significant impact.

c), d) Level of Significance to be Determined. The proposed project includes creek restoration and dry weather flow diversion to sanitary sewer as shown on **Figure 2**. The proposed project will restore the creek channel, and in part help mitigate for the past erosion in the Hartnell Gulch. An erosion study in the Hartnell Gulch watershed identified erosion concerns in the area of the project site. Per the report (Citation below), the Hartnell Street Channel bed in this short reach shows evidence of significant past erosion (the channel is about 16 feet deep) and widening (channel top width is 40 to 50 feet), which is the impetus for this project. Operation of the proposed project will alter drainage patterns during the dry weather season (April – October). Creek flows will be captured and diverted to the sanitary sewer system for treatment and eventual reuse. Additionally, the creek bed elevation will be raised to provide aesthetic benefits, including the possibility of increasing public access with construction of a pedestrian walkway alongside the creek bank. As such, the proposed project would change the existing flow patterns in the creek. Although the intention of the project is to repair existing channel erosion and to prevent further erosion in the future, at this time, it is unknown if this change in the drainage pattern would result in erosion and/or surface runoff. A determination on the level of significance cannot be made without additional bed and bank stabilization and diversion structural design information, analysis and documentation.

PENDING TECHNICAL ANALYSIS: HYDROLOGICAL REPORT

The project proponent will conduct hydrologic analyses as part of final project design. The analysis will include, at a minimum: an assessment of the existing stream flows; effects of raising the creek bed elevation; downstream effects of diversion, such as potential changes to the natural or historic flow regime, biological resources, and channel morphology; and further refinement of the bed and bank stabilization and and dry weather flows diverted into the sanitary sewer. The results of this analysis will be compiled into a report or technical memorandum which makes conclusions on hydrologic impacts based on the existing setting and includes recommendations to minimize impacts, if necessary. The hydrologic report will be used to support other technical studies prepared for this project.

e) Less Than Significant Impact. Neither construction nor operation of the proposed project would create or contribute runoff that would exceed the capacity of the stormwater drainage system. The proposed project would not provide substantial additional sources of polluted runoff. The project will decrease the amount of urban runoff discharged to the Monterey Bay. Therefore, the proposed project would not provide any additional source of polluted runoff. The impact of the proposed project would be less than significant.

g-j) No Impact. The proposed project does not include housing and is not located within a 100-year flood area. Furthermore, the project site is not located in an area influenced by levees or dams or prone to seiche, tsunami, or mudflow. Therefore, no impacts related to these topics are anticipated.

8.10. Land Use and Planning

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
LAND USE AND PLANNING – Would the project:					
a) Physically divide an established community?				X	City of Monterey PEEC
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X	City of Monterey PEEC, General Plan and Area Plans City of Monterey Local Coastal Program City of Monterey PEEC, Monterey City Code (M.C.C.) Chapter 38, Zoning Ordinance California Coastal Act
c) Conflict with any applicable habitat conservation or natural community conservation plan?				X	City of Monterey PEEC

Existing Setting

The City of Monterey is a small-scale community that is largely residential and visitor serving in nature. The majority of land in the City already contains some development. Primary land uses include residential development at low to moderate density and visitor-serving, professional office, and retail commercial uses. A number of small, vacant parcels do exist within the City. Most are designated for single-family residential development.

The Hartnell Gulch area is on the southern border of the City's Old Town Neighborhood, which occupies 170 acres on the hillside above downtown Monterey. The neighborhood consists of a residential core, with the Defense Language Institute as the northern and western boundary, the downtown as the eastern boundary, and Hartnell Gulch, Monterey Library, and nearby Monterey High School as the southern boundary. To the north of the project site, on the hillside above the site, the land uses are primarily within a residential core area. Nearby uses include institutional and non-residential development. The project site is near the Downtown area and the Hartnell Gulch provides a pedestrian access to the downtown.

Land development proposals that fall within the Coastal Zone in the City must obtain development review and approval by the California Coastal Commission in addition to necessary City approvals. California has no designated Coastal Barrier Resources System per the federal Coastal Barriers Resources Act.

Discussion

<u>a-c) No Impact.</u> The proposed project will improve pedestrian connectivity between Pacific Street and Hartnell Street by improving the conditions along the existing path. It will not divide an established community or conflict with any applicable land use plan, policy or regulation. The site is located outside of the coast zone and there are no habitat conservation or natural community conservation plans affecting the site. As such, there will be no impact.

8.11. <u>Mineral Resources</u>

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
MINERAL RESOURCES – Would the project:					
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X	City of Monterey PEEC, General Plan Conservation Element City of Monterey PEEC, General Plan Initial Study, Page 11
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X	City of Monterey PEEC, General Plan Conservation Element City of Monterey PEEC, General Plan Initial Study, Page 11

Existing Setting

While there are, at present, small-scale mineral extraction operations around the City of Monterey, limited to commercial sand removal operations in the Sand City/Marina area, there are no mineral resources within the City of Monterey city limits.

Discussion

a-b) No Impact. No mineral resources exist within the project site and no impacts are anticipated.

8.12. Noise

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
NOISE – Would the project result in:					
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		X			City of Monterey PEEC, General Plan Noise Element goals, policies, and programs
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?		X			City of Monterey PEEC, General Plan Noise Element goals, policies, and programs
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			X		City of Monterey PEEC, General Plan Noise Element goals, policies, and programs
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			X		City of Monterey PEEC, General Plan Noise Element goals, policies, and programs
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?			X		City of Monterey PEEC, General Plan Noise Element Policies b.1–b-5 City of Monterey PEEC, General Plan Map 17-Showing Airport Noise Contours Monterey Peninsula Airport, 14 CFR Part 150 Airport Noise Exposure Map Update, Exhibits 4B-4D (April 2008)
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X	City of Monterey PEEC

Existing Setting

The major noise sources affecting the City of Monterey include motor vehicles (autos, trucks, buses, motorcycles) and aircraft. Motor vehicles and aircraft continued to be the primary noise sources in 2003. No stationary source, such as an industrial plant, is known to create noise at an unacceptable level.

The existing noise environment in the project vicinity is dominated by traffic noise on Pacific Street, Hartnell Street and other nearby streets, as well as nearby commercial and civic activities.

Discussion

a), b) Less Than Significant with Mitigation. The closest sensitive noise receptors in the vicinity of the proposed project sites include residences, schools, and parks and playgrounds. The proposed project will result in temporary increased noise levels that may be considered unpleasant. Construction noise is a temporary noise source that is generated from a variety of construction activities that occur both on-site and off-site. Although the extent of construction is still not defined, generally, construction equipment that may be used to complete maintenance activities can generate noise levels in the range of 70 to 90 decibels at a distance of 50 feet. Existing sensitive uses within the vicinity of the proposed project sites could experience temporary elevated noise levels during construction activities. Although these noise and vibration sources would be temporary as the equipment and construction vehicles would operate intermittently over the duration of the proposed project, these are potentially significant impacts that can be reduced to a less than significant level by the **Mitigation Measure 6** identified below.

MITIGATION MEASURE 6: NOISE REDUCTION

Construction will be limited to weekdays between the hours of 7 a.m. and 7 p.m. During construction, the project contractor shall implement the following measures to minimize construction noise impacts:

- Place construction equipment and equipment staging areas to be located at the furthest distance as possible from nearby noise-sensitive receptors.
- Choose construction equipment that is of quiet design, has a high-quality muffler system, and is well-maintained.
- Install superior intake and exhaust mufflers and engine enclosure panels wherever possible on gas diesel or pneumatic impact machines.
- Limit construction to 7 a.m. to 7 p.m. Monday through Friday, and 8 a.m. to 6 p.m. Saturday.
- Eliminate unnecessary idling of machines when not in use.
- Locate all stationary noise-generating construction equipment, such as portable power generators, as far as possible from nearby noise-sensitive receptors.
- Utilize the quickest equipment options to accomplish the tasks, in accordance with local, state, and federal regulatory requirements.

c) Less Than Significant Impact. Operation of the proposed project will not have a significant effect on the project vicinity. Operation of the proposed project will generate minimal vehicle trips. The noise that is anticipated to occur from operation of the proposed project will be nominal and consisting of vehicle-related mobile sources during inspection and repair activities. Therefore, noise impacts will be less than significant.

d) Less Than Significant Impact. Implementation of the proposed project will result in limited and short-term construction noise. Noise from construction will be in conformance with the City Noise Ordinance. The operation of the proposed project will not generate a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels. Therefore, impacts will be less than significant.

e) Less Than Significant Impact. The proposed project includes creek restoration and dry weather flow diversion to sanitary sewer. While the site is within two miles of a public airport, the site would retain its current uses and the nature of the proposed project itself would not cause people to be exposed to excessive noise levels. Therefore, the impacts are considered less than significant.

f) No Impact. The project site is not located within the vicinity of a private airstrip. Therefore, no impact would result.

8.13. Population and Housing

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
POPULATION AND HOUSING – Would the project:					
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X	City of Monterey PEEC, General Plan
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X	City of Monterey PEEC, General Plan
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X	City of Monterey PEEC, General Plan

Existing Setting

The total population of Monterey in 2016 was 28,454, showing a 3.5% increase in total population from 2010 when the population was at 27,492. According to the 2009 - 2014 General Plan Housing Element, the Regional Housing Needs Assessment (RHNA) prepared by the Association of Monterey Bay Area Governments (AMBAG) identified a future housing need in Monterey of 657 new dwelling units for the period of 2007 - 2014. The City’s General Plan is required to show adequate sites for the 657 units to be in compliance with state law requirements. The City's goal is to provide this housing in the proposed Mixed-Use Neighborhoods, which can accommodate higher-density housing due to transit, recreation, and commercial opportunities.

Discussion

a-c) No Impact. The proposed project includes creek restoration and dry weather flow diversion to sanitary sewer and will not affect population numbers, induce growth or displace residents. As such, there will be no impact.

8.14. Public Services

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
PUBLIC SERVICES – Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:					
a) Fire protection?				X	City of Monterey PEEC, General Plan Public Facilities Element Goal c, Policies c.1–c.5 City of Monterey Fire Department
b) Police protection?				X	City of Monterey PEEC, General Plan Public Facilities Element Goal b, Policies b.1–b.3 City of Monterey Police Department Project Plans
c) Schools?				X	City of Monterey PEEC, General Plan Public Facilities Element Goal d, Policies d.1–d.6 Monterey Peninsula Unified School District
d) Parks?				X	City of Monterey PEEC, General Plan Public Facilities Element Goal j, Policies j.1–j.6 City of Monterey Recreation & Community Services Department City of Monterey Maintenance Division-Parks & Beaches
e) Other public facilities?				X	City of Monterey PEEC, General Plan Public Facilities Element Goals a, e, f–i, k–p ; Policies f.1–f.7, i.1–i.3, k.1–p.2 ; Programs m.1.1–m.2.1 City of Monterey Public Works Department City of Monterey Maintenance Division-Streets & Utilities City of Monterey Recreation and Community Services Department City of Monterey Office of the Harbormaster

Existing Setting

The major public facilities in the City of Monterey are police and fire, park and recreation facilities, schools, military, cultural, conference center, health care, civic center, cemeteries, harbor, sewage treatment, storm drain system, water supply, and reduction and recycling of waste.

Discussion

a-e) No Impact. The proposed project would involve creek restoration and dry weather flow diversion to sanitary sewer and would not result in an increased demand on fire or police protection, schools, or other public facilities. As a result, there will be no impact.

8.15. Recreation

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
RECREATION					
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?			X		City of Monterey PEEC, General Plan Public Facilities Element Goal j, Policies j.1–j.6 Monterey City Code (M.C.C.) Chapter 38, Zoning Ordinance, Article 9, Open Space District Monterey City Code (M.C.C.) Chapter 33, Subdivision, Article 3, §33-29(c) Park and Recreation dedication and fees
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?			X		City of Monterey Recreation and Community Services Department

Existing Setting

The City of Monterey Recreation and Community Services Department manages a wide range of park and recreation facilities. The Open Space Element provides background information and goals and policies regarding the City's open space and park resources implemented by the Parks Master Plan. Significant recreation facilities include the Monterey Sports Center, community centers, neighborhood park facilities, and beach parks. Neighborhood parks also include various athletic fields, tennis courts, and other park facilities.

Discussion

a–b) Less Than Significant Impact. The proposed project consists of creek restoration and dry weather flow diversion to sanitary sewer and includes aesthetic improvements to an existing path that connects Pacific Street to Hartnell Street, which may be considered a City recreation facility. While the project constitutes an improvement to a recreation facility, use of this facility may increase. However, physical deterioration of the facility is not expected beyond normal wear and tear. No further expansion of recreational facilities will be required. Therefore, the potential impact of parks and recreation facilities is considered less than significant.

8.16. Transportation and Traffic

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
TRANSPORTATION/TRAFFIC – Would the project:					
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulations system, including but not limited to intersections, streets, highways, and freeways, pedestrian and bicycle paths, and mass transit?				X	City of Monterey Plans & Public Works Department, Traffic Engineering Division
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standard established by the county congestion management agency for designated roads or highways?				X	City of Monterey PEEC, General Plan Circulation Element Program j.1.1 City of Monterey Plans & Public Works Department, Traffic Engineering Division
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?				X	Monterey Peninsula Airport District
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X	City of Monterey PEEC, General Plan, Circulation Element City of Monterey Plans & Public Works Department, Traffic Engineering Division Monterey City Code (M.C.C.) Chapter 20, Motor Vehicles and Traffic, Chapter 33,

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
					Subdivisions, Article 3, several sections related to circulation
e) Result in inadequate emergency access?				X	City of Monterey PEEC, General Plan, Circulation Element City of Monterey Fire and Police Departments
f) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				X	City of Monterey PEEC, General Plan, Circulation Element

Existing Setting

The setting information provided below is based on information provided in the City's General Plan and General Plan EIR.

Roadway Classification

The City has a roadway classification system, which includes freeways, major arterials, minor arterials, collectors, and local streets.

Transit Service

The Monterey-Salinas Transit District (MST) is the principal transit service for the City of Monterey and the surrounding communities. MST is a joint powers agency with a board of directors that includes a representative from the City of Monterey. Thirteen MST routes currently serve the citizens of the community. The Simoneau Plaza located in downtown Monterey is the transfer center for all routes serving the City. Senior and disabled citizens can use the MST fixed-route and Direct Area Response Transit (DART). MST also operates the RIDES program for disabled citizens.

Existing Bikeway and Pedestrian Facilities

The City of Monterey maintains an extensive network of Class 1, 2, and 3 bicycle paths and pedestrian sidewalks. The most notable bicycle and pedestrian path is the City's Recreational Trail that is located along the coastal side of the City. The Recreational Trail is a dual use facility that offers people destination opportunities, such as the restaurants or retail stores along Cannery Row or Fisherman's Wharf, or one of many parks for relaxing or wildlife viewing and sightseeing. The City maintains sidewalks on almost all City roadways, and some roadways have bicycle lanes.

Discussion

a-f) No Impact. The proposed project would not conflict with any transportation performance plans, ordinances, or policies or applicable congestion management program as it will not. Presently, there is an unimproved pathway that links Pacific Street to Hartnell Street, the proposed project includes upgrades to this pathway. The project will not affect air traffic patterns or emergency access and is consistent with all adopted policies that support alternative transportation. Therefore, there will be no impact on transportation/traffic.

8.17. Tribal Cultural Resources

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
TRIBAL CULTURAL RESOURCES – Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California native American tribe, and that is:					
a) Listed or eligible for listing in the California Register of Historic Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k) or	Level of Significance to be Determined, see note below.				City of Monterey PEEC, Monterey City Code (M.C.C.), Chapter 38, Zoning Code, Article 15 H Historic Overlay District City of Monterey PEEC, Historic Preservation Program City of Monterey PEEC, Historic Master Plan City of Monterey PEEC, Historic Ordinance
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	Level of Significance to be Determined, see note below.				City of Monterey PEEC, Monterey City Code (M.C.C.), Chapter 38, Zoning Code, Article 15 H Historic Overlay District City of Monterey PEEC, Historic Preservation Program City of Monterey PEEC, Historic Master Plan City of Monterey PEEC, Historic Ordinance
Note: As described in sections a) and b) below, a Archeological Report and Tribal Consultation will be completed by the City during the design phase of the proposed project. Upon completion of these, the level of significance can be determined.					

Existing Setting

Archaeological evidence and radiocarbon dates establish human occupation of the California coast dating back at least 10,000 years. Evidence from coastal areas of Monterey County suggests settlement of this area by at least 7,000 years ago and possibly earlier (Jones & Stokes, 2006). The project area lies within the currently recognized ethnographic territory of the Costanoan (Ohlone) linguistic group. Historically, the Ohlone were called the *Costanoan Indians*. Costanoan is the name assigned to the group by the Spaniards and is derived from the word *costaños*, meaning "people of the coast;" the term *Ohlone* is referred by the group themselves (Jones & Stokes, 2006).

The Ohlone are believed to have inhabited the area 1,500 years ago, and their territory extended along the coast from San Francisco Bay in the north to just beyond Carmel in the south, and as much as 60 miles inland. The Ohlone are a linguistically defined group speaking eight different yet related languages and composed of several autonomous tribelets (Jones & Stokes, 2006). The Monterey Peninsula and the current location of the former Fort Ord were inhabited by the Rumsen group of Ohlone Indians; the Rumsen territory encompassed the Carmel River Valley and the Monterey Peninsula (Jones & Stokes, 2006).

In brief, the Ohlone followed a general hunting and gathering subsistence pattern with partial dependence on the natural acorn crop. Habitation is considered to have been semisedentary, and occupation sites can be expected most often at the confluence of streams, other areas of similar topography along streams, or in the vicinity of springs, although the original sources of water may no longer be present or adequate. Also, resource gathering and processing areas and associated temporary campsites are frequently found on the coast and in other locations containing resources utilized by the group. Factors that influence the location of these sites include the presence of suitable exposures of rock for bedrock mortars or other milling activities, the presence of specific resources (oak groves, marshes, quarries, game trails, trade routes, etc.), proximity to water, and the availability of shelter. Temporary camps or other activity areas can also be found along ridges or other travel corridors (Archaeological Consulting, 2014).

Discussion

a) Level of Significance to be Determined. As described above in the Cultural Resources Section, the property bordering the project site on the north along Hartnell Street is zoned as a H1 historic building. The project site is located within an area of high archeological sensitivity. The level of significance cannot be determined without addition analysis and documentation, completed of an Archeological Survey Report, as described in **Section V** (Cultural Resources) will reduce impacts.

b) Level of Significance to be Determined. Pursuant California AB 52 and Section 106 of the National Historic Preservation Act tribal consultation will need to be initiated by the City. Without the results of this tribal consultation the potential impacts to tribal cultural resources cannot be determined at this time and subsequent environmental analysis will need to be performed to analyze the extent of these impacts.

PENDING TECHNICAL ANALYSIS: TRIBAL CONSULTATION

The City must complete Tribal Consolation with all tribes that have requested notification, pursuant to Assembly Bill 52. Consultation will include communication with Tribal Representative(s) to determine if the proposed project will negatively impact cultural resources and to agree on measures to mitigate or avoid significant effects, should they arise from project implementation.

8.18. Utilities and Service Systems

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
UTILITIES AND SERVICE SYSTEMS – Would the project:					
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?			X		City of Monterey Plans and Public Works Department City of Monterey PEEC Monterey Regional Water Pollution Control Agency
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X		City of Monterey Plans and Public Works Department City of Monterey PEEC Water Management District California American Water Company Monterey Regional Water Pollution Control Agency
c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	Level of Significance to be Determined, see note below.				City of Monterey Plans and Public Works Department Monterey City Code (M.C.C.) Chapter 31.5, Stormwater Management City of Monterey PEEC, General Plan Public Facilities Element subsection l. Storm Drain
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				X	City of Monterey PEEC, General Plan Public Facilities Element subsection m. Water
e) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			X		City of Monterey Plans and Public Works Department Monterey Regional Water Pollution Control Agency City of Monterey PEEC, General Plan Public Facilities Element subsection k. Sewer
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				X	City of Monterey Solid Waste & Recycling Division Monterey Regional Waste Management District City of Monterey PEEC, General Plan Public Facilities Element subsection n. Reduction and Recycling of Waste
g) Comply with federal, state, and local statutes and regulations related to solid waste?				X	City of Monterey Solid Waste & Recycling Division Monterey Regional Waste Management District

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
					City of Monterey PEEC, General Plan Public Facilities Element subsection n. Reduction and Recycling of Waste
Note: As described in section c) below, a Hydrological Report will be prepared by the City during the design phase of the proposed project. Upon completion of this documents, the level of significance can be determined.					

Existing Setting

The setting information provided below is based on information provided in the City's General Plan and General Plan EIR.

Wastewater

The City maintains the sanitary sewer collection system within its jurisdictional boundaries. The existing sanitary sewer collection system conveys sewage from sewer point sources within the City, such as homes, businesses, and public facilities, to a regional wastewater treatment plant for treatment and disposal. The sanitary sewer collection system operated by the City consists of approximately 102 miles of sewer pipeline maintained by City personnel and seven sewer lift stations.

Monterey's sewage is conveyed through pipelines to the Monterey One Water (M1W) regional treatment plant for treatment, reuse, and disposal. At the RTP, wastewater undergoes primary and secondary treatment and then can be reclaimed by either: (1) undergoing tertiary treatment and used as recycled 'purple pipe' water for irrigation, via the Salinas Valley Reclamation Project (SVRP) recycled water plant and the Castroville Seawater Intrusion (CSIP) distribution system; or (2) starting in 2019, undergoing advanced treatment, transport, and injection into the Seaside Groundwater Basin, via the Advanced Water Purification Facility (AWPF) of the Pure water Monterey Groundwater Replenishment Project (PWM/GWR) currently under construction. An average of 60 percent of M1W wastewater is recycled each year and that percentage will increase when the PWM/GWR Project is operational. M1W currently serves a population of approximately 250,000 people (M1W, 2017) and treats 17.2 million gallons per day (MGD) average dry weather flow (ADWF) for the 2014-2016 period (SWRP, April 2018), with a peak wet weather flow (PWWF) of 36.8 MGD (M1W,2016). The RTP is permitted for design flows of 29.6 MGD ADWF and 75.6 MGD PWWF, indicating available capacity for future runoff diversions. Any remaining secondary treated wastewater that is not used for CSIP or PWM/GWR uses above is discharged though an ocean outfall two miles into Monterey Bay. M1W pump station capacity for accepting diversions from lakes and reservoirs as well as additional storm drain diversions was considered as part of the Water Recovery Study.

Local sewer collection pipelines of various capacities exist underground within the City and eventually flow to larger sewer mains that feed into the M1W interceptor pipeline. The interceptor pipeline receives sewer flows from both Pacific Grove and Monterey and carries those flows to the wastewater treatment plant.

The existing capacity of the local City system is adequate to convey the sewer loads generated, but the infrastructure needs repair and is planned to undergo rehabilitation in the near future upon funding availability. Rehabilitation of the City's aged sewer collection system is an important factor in mitigating sewer spills locally and into Monterey Bay. As a result, the rehabilitation of this system is a priority project for the City's Plans and Public Works Department.

Water

California American Water Company (CalAm) Cal-Am supplies water to the residential, municipal, and commercial needs of the Monterey Peninsula area communities. Cal-Am's water distribution system distributes water from two main sources: the Carmel River and the Seaside Basin coastal subarea. The MPWMD regulates and manages water supplies for the area within its boundaries, which extend from Seaside to Carmel River and easterly covering the Carmel Valley watershed. As of the 2005 General Plan, the City had reached the limits of its allocation under the MPWMD allocation program and still has very little water available to meet the City's goals. The City of Monterey has established an internal allocation system, whereby water allotments are established for residential, commercial, and industrial uses. The City also maintains a portion of the total allocation as a citywide reserve.

Stormwater

The City maintains storm drainage infrastructure – drainage channels, storm drains, pipelines, culverts, pump stations, and outfalls - within the City of Monterey. The existing drainage system collects non-point surface water runoff and conveys it through channels, pipelines, and culverts that, in most instances, eventually terminate at the Monterey Bay. Monterey's stormwater collection system is not tied into the sanitary sewer collection system. Therefore, stormwater flows are, for the most part, not treated prior discharge. Stormwater flows are discharged to local waterways including the Monterey Bay at multiple outfalls located throughout Monterey's coastal area.

Monterey's discharge of stormwater to local surface waters is regulated by the Federal Clean Water Act, National Pollutant Discharge Elimination System (NPDES) Permit Program, and the California Porter-Cologne Act, and permitted through the State Water Resources Control Board and Central Coast Regional Water Quality Control Board. The City stormwater permit and ordinance control water pollution through the implementation of best management practices and local regulation of pollutant discharges into waters of the United States. To address regional urban runoff issues and develop innovative approaches to stormwater management, the City collaborates with local entities in the Monterey Regional Stormwater Management Program (MRSWMP), a regional stormwater management, implementation, and education program to accomplish permit compliance and water quality protection.

Solid Waste

The regional waste collection facility operated by the Monterey Regional Waste Management District.

Discussion

a), b) Less Than Significant Impact. The project includes diverting dry weather flows (April to October) to the sanitary sewer for recycling at the M1W RTP to augment water supply. The additional supply of water to the Regional Treatment Plant will not exceed wastewater treatment requirements nor require construction of new water or wastewater treatment facilities. Therefore, this is considered a less than significant impact.

c) Level of Significance to be Determined. The project includes the construction of diversion facilities to capture to capture and divert dry weather flows (April to October) to the sanitary sewer for recycling at the M1W RTP to augment water supply. The project will construct new storm drain infrastructure just upstream of Hartnell Street. The project will also construct a low flow diversion structure within the channel, just upstream of Hartnell Street, that will flow to a wet well pump station and new sanitary diversion pipe line which will connect to the existing sanitary sewer in Hartnell Street. The potential level of significance of these new facilities will be determined after preparation of the Hydrological Report, as described in **Section IX**.

d) No Impact. The proposed project would not include the use of water service connections. As such, there will not be an increased demand for these public utilities or service systems and there will be no impact.

e) Less Than Significant Impact. The project includes construction of diversion facilities to divert dry weather flows from the Hartnell watershed to the sanitary sewer, of which these flows would normally be captured by the storm drain system. The proposed project was selected as a part of the Stormwater Resource Plan for which M1W is the lead agency. The project will be subject to stormwater drainage requirements and erosion control measures that would prohibit negative impacts resulting from substantial erosion or siltation or flooding on- or off-site or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems, provide substantial additional sources of polluted runoff, or otherwise substantially degrade water quality. Therefore, this is considered a less than significant impact.

f), g) No Impact. The project will not generate solid waste. Therefore, there will be no impact.

8.19. Mandatory Findings of Significance

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
MANDATORY FINDINGS OF SIGNIFICANCE					
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant	Level of Significance to be Determined, see note below.				City of Monterey PEEC

SUBJECT AREA	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact	SUPPORTING INFORMATION
or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?					
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)			X		City of Monterey PEEC California Air Resources Board (CARB) California Air Pollution Control Officers' Association (CAPCOA) MBUAPCD
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?		X			City of Monterey PEEC
Note: As described throughout this Preliminary Environmental Checklist, additional supporting documentation will be prepared by the City during the design phase of the proposed project. Upon completion of this documentation, the level of significance can be determined.					

Discussion

a) Level of Significance to be Determined. The project is a creek restoration including removal of invasive plants, erosion control and revegetation of native plants as well as diversion of Hartnell Creek. The project proposes to restore native vegetation and habitats. As noted in this Preliminary Environmental Checklist, additional technical analysis and design documentation will be required in order to determine the level of impact to wildlife species. In addition to pending analysis and documentation, **Mitigation Measures 1-6** would be required to reduce impacts to less than significant levels.

b) Less Than Significant Impact. Cumulative impacts related to development accommodated by the City's General Plan over the next 15+ years were found to be less than significant in the General Plan EIR, As described above, the proposed project is a restoration and runoff diversion project and would not include housing or development areas that could induce growth and would also not remove any barriers that could result in population growth that would result in increased traffic. The proposed project would result in less than significant impacts to aesthetics, air quality, biological resources, cultural resources, geology/soils, greenhouse gas emissions, hazards and hazardous materials, hydrology/water quality, noise, recreation, and utilities/service systems.

When considered cumulatively along with past, current, and probable future projects that may occur in the area, the proposed project's contribution is considered negligible and would not be cumulatively considerable.

c) Less Than Significant with Mitigation. The proposed project will not result in substantial adverse effects on human beings, directly or indirectly. Implementation of the mitigation measures recommended in this document would ensure that the proposed project would not result in environmental effects that would cause substantial adverse effects on human beings. Impacts would be less than significant after mitigation. Potential adverse effects on human beings through impacts to aesthetics, biological resources, cultural resources, geology and soils, hydrology/water quality, and noise have been addressed through proposed **Mitigation Measures 1-6**. With implementation of these mitigation measures, the proposed project's potentially significant impacts would be less than significant.

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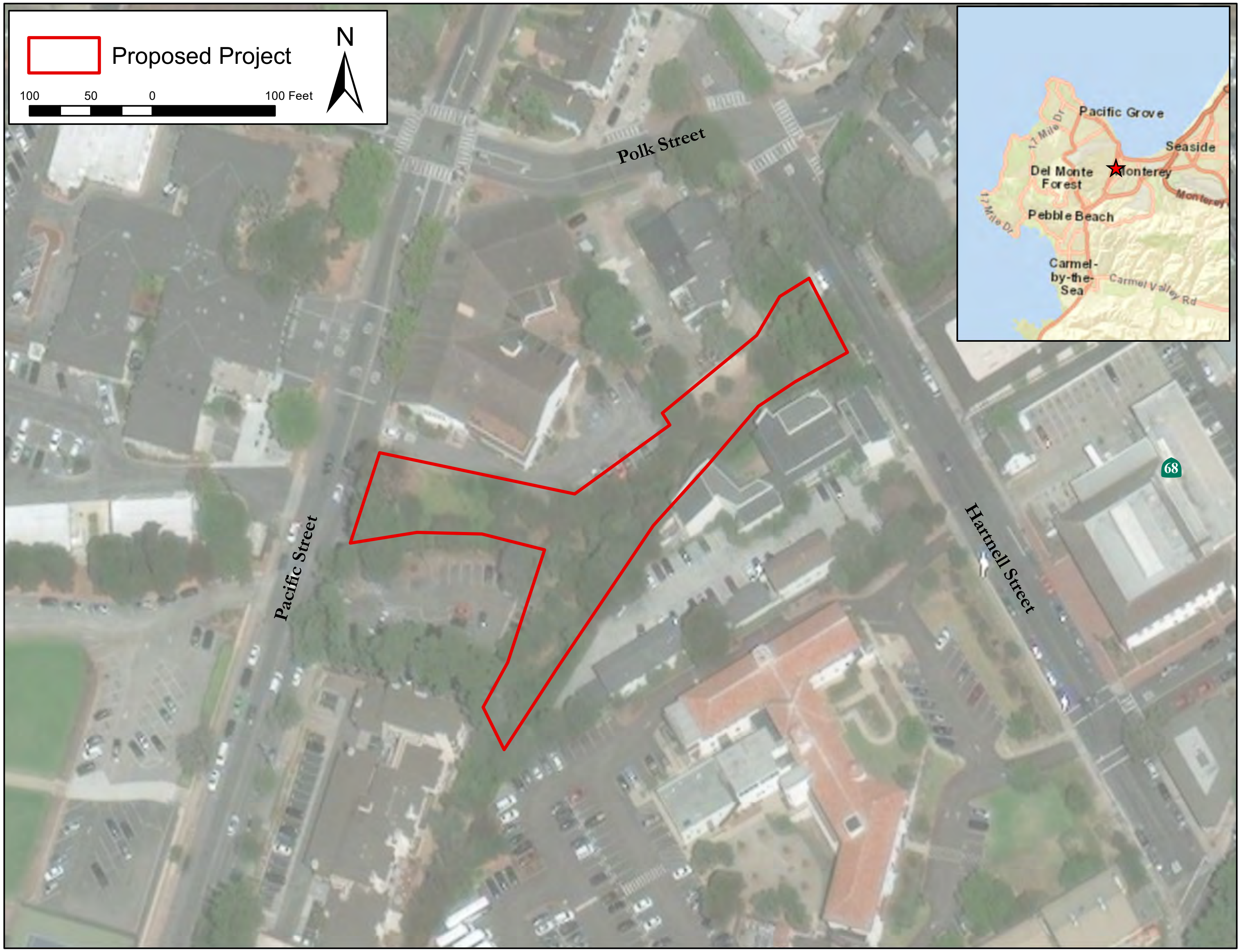


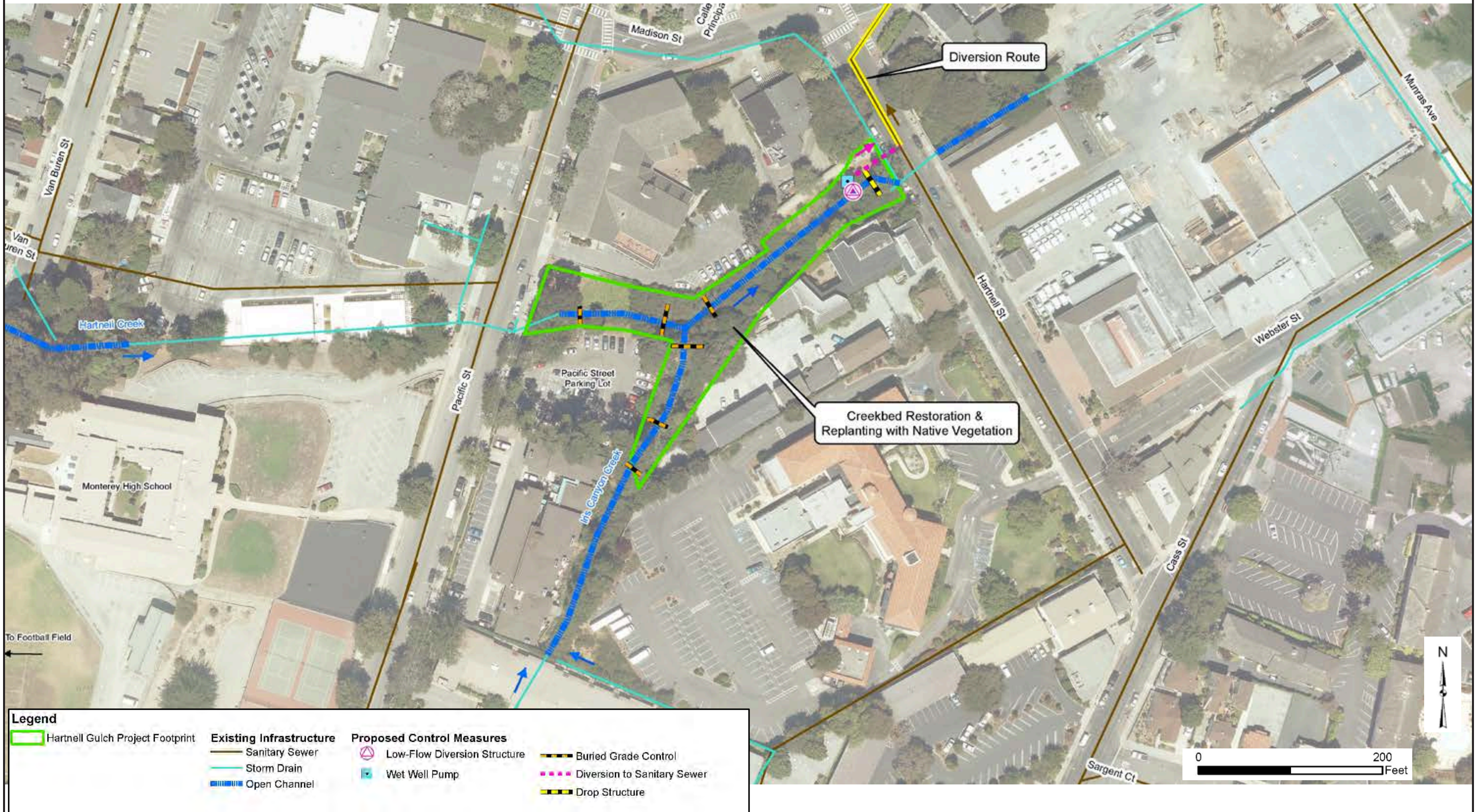
Document Path: D:\GIS\GIS_Projects\2017-30 Monterey Peninsula Stormwater Resource Plan\Final Products\Project Location.mxd

DD&A

Project Location

Preliminary Environmental Checklist
Hartnell Gulch Restoration and Stormwater Diversion Project

Figure
1



Source: Geosyntec, September, 2018

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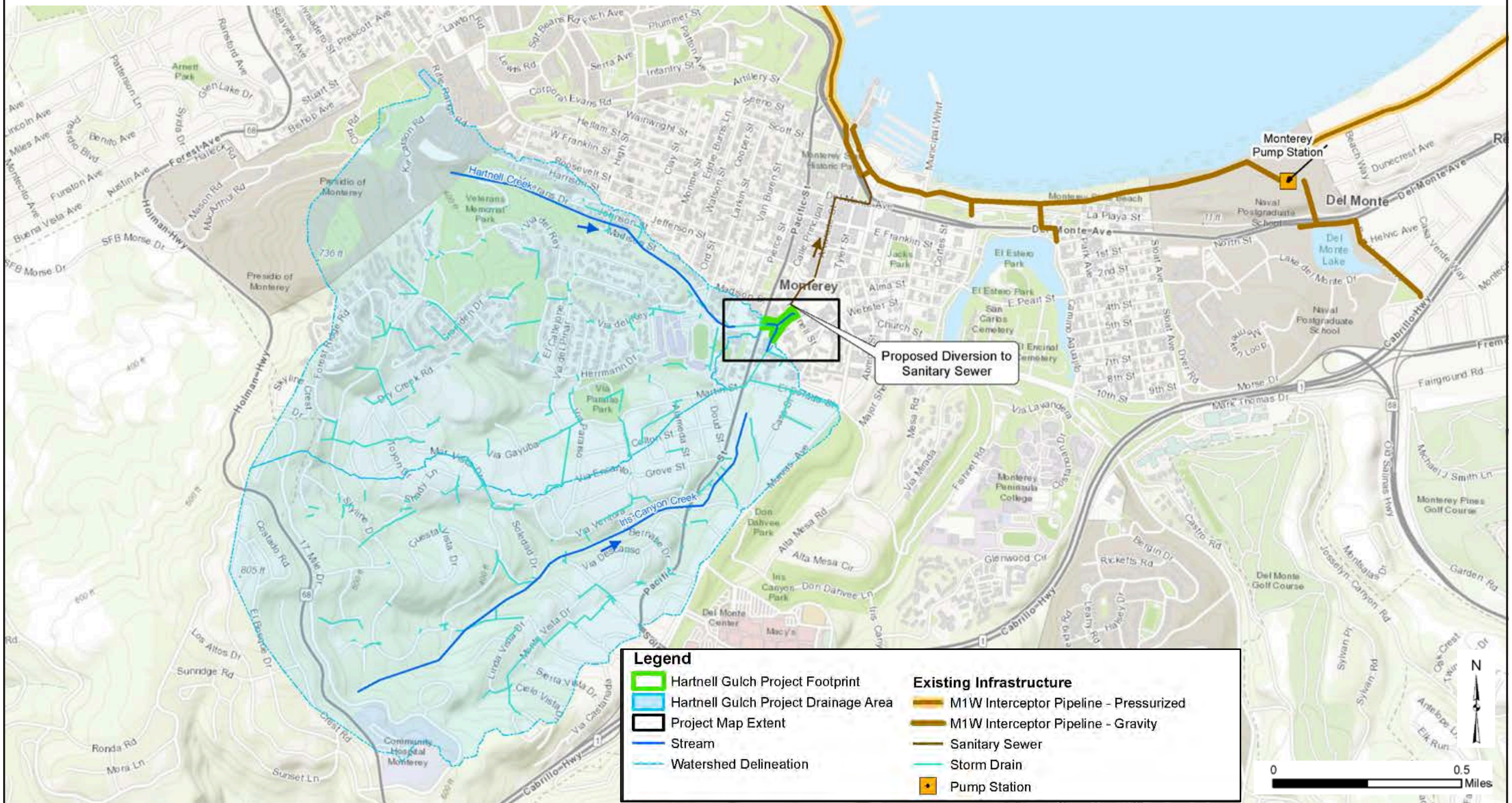
Hartnell Gulch Concept Design

Preliminary Environmental Checklist
Hartnell Gulch Restoration and Stormwater Diversion Project

Figure 2

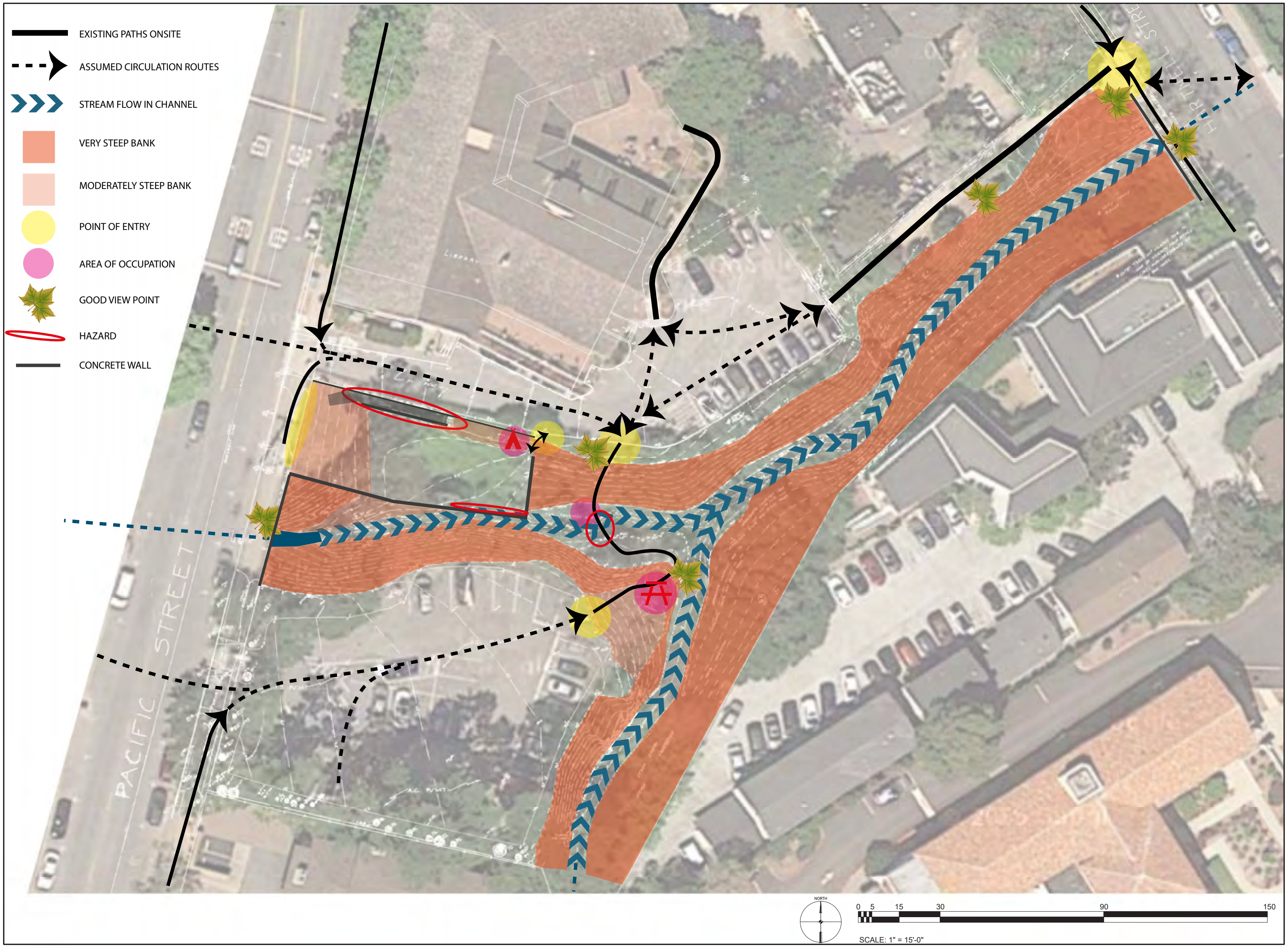


Source: Geosyntec, September, 2018

Hartnell Gulch Watershed

Preliminary Environmental Checklist
Hartnell Gulch Restoration and Stormwater Diversion Project

Figure
3



Source: Ecological Concerns, Inc, Feb. 4, 2016

Hartnell Gulch Site Inventory

Preliminary Environmental Checklist
Hartnell Gulch Restoration and Stormwater Diversion Project

Figure 4

Source: Ecological Concerns, Inc, Feb. 4, 2016

Hartnell Gulch Existing Vegetation

Preliminary Environmental Checklist
Hartnell Gulch Restoration and Stormwater Diversion Project

Figure 5

Source: Ecological Concerns, Inc, Feb. 4, 2016

DD&A

Hartnell Gulch Restoration Plan

Preliminary Environmental Checklist
Hartnell Gulch Restoration and Stormwater Diversion Project

Figure
6

Figure 1. Standing on Hartnell Street facing west looking down at Hartnell Gulch

Figure 2. Facing east on the walking path boardering Hartnell Gulch

Figure 3. Unimporved walking path that traverses Hartnell Gulch.

Figure 4. Standing on Pacific Street facing East, looking down at Hartnell Gulch

DD&A

Hartnell Gulch Site Photos

Preliminary Environmental Checklist
Hartnell Gulch Restoration and Stormwater Diversion Project

Figure
7

APPENDIX H
Summary of Stakeholder Meetings

APPENDIX H: STAKEHOLDER OUTREACH

This Appendix includes Stakeholder Outreach, Education, and Engagement Plan, along with summaries of the Stakeholder Meetings and Public Meeting. A summary of public comments received during the Public Meeting and during the public comment period, along with responses to comments, is also provided.

These items are provided on the following pages of this appendix:

* * * *

Stakeholder Outreach, Education, and Engagement Plan

Stormwater Resource Plan (SWRP) for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Stakeholder Outreach, Education, and Engagement Plan **(Grant Task 6.1.1)**

Prepared for:
Monterey One Water

Prepared by:
EOA, Inc.
1021 S. Wolfe Rd.
Sunnyvale, CA 94086

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LIST OF ATTACHMENTS

LIST OF ABBREVIATIONS

DAC	Disadvantaged Community
SWRP	Stormwater Resource Plan
TAC	Technical Advisory Committee
RWMG	Regional Water Management Group
IRWMP	Monterey Peninsula Integrated Regional Water Management Plan

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1.0 INTRODUCTION

Monterey One Water[1] was awarded a Prop 1 Stormwater Planning Grant to develop a Stormwater Resource Plan (SWRP) for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region[2]. The SWRP will use a metrics-based approach to identify distributed and regional stormwater capture and treatment projects that can be implemented to augment water supply, improve surface water quality, and provide other benefits through enhanced stormwater management. The SWRP will include conceptual design and cost estimates for at least seven of the identified stormwater capture and treatment projects. A Technical Advisory Committee (TAC) with participants from local municipalities, community groups, State Water Resources Control Board, and the Regional Water Quality Control Board will provide input on the SWRP development.

The SWRP will build upon the work done by the Monterey Peninsula Regional Water Management Group[3] (RWMG) to develop the Monterey Peninsula Integrated Regional Water Management Plan (IRWMP). The IRWMP seeks to coordinate the actions of more than 40 stakeholder entities involved in water resource protection, enhancement, and management in the planning Region. A stakeholder may be a public, private, or non-profit agency or organization in the area with an interest in water resources management within the Region/project area.

The SWRP Stakeholder Outreach, Education, and Engagement Plan (Plan) identifies the goals of stakeholder involvement, and describes the tasks that will be implemented to conduct outreach to stakeholders.

Interaction with Monterey Regional Water Recovery Study

The SWRP project will also include conducting the Monterey Regional Water Recovery Study, which will examine the feasibility of establishing a Peninsula-wide water recovery and reclamation system throughout the planning area. The funding for the Water Recovery Study portion of the project serves as local matching funds for the State Prop 1 grant funded Stormwater Resource Plan. The Study will identify stormwater capture opportunities, and will also look at transport and treatment options for the water recovery project opportunities identified. The Water Recovery Study will be heavily integrated into the Stormwater Resource Plan, with all project opportunities identified for the Water Recovery Study included in the project list developed for the Stormwater Resource Plan. A Technical Stakeholder Group, consisting of participants in the region that are familiar with stormwater and wastewater distribution systems, treatment, and/or have technical knowledge of the Carmel River and groundwater basin or the Seaside groundwater basin, will provide input on the methodology used to conduct the Water Recovery Study.

[1] Formerly known as the Monterey Regional Water Pollution Control Agency (MRWPCA).

[2] The 347 square-mile (sq. mi.) planning region includes the political boundaries of coastal cities, including Carmel-by-the-Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, and Seaside, and several unincorporated portions of Monterey County, including Carmel Valley, Pebble Beach, the Carmel Highlands, the Laguna Seca area, and the Ord Community.

[3] The RWMG includes Big Sur Land Trust, City of Monterey, Monterey Peninsula Water Management District, Monterey County Water Resources Agency, Monterey One Water, Marina Coast Water District, and Resource Conservation District of Monterey County.

2.0 GOALS OF STAKEHOLDER OUTREACH, EDUCATION, AND ENGAGEMENT

Meaningful public participation goals, objectives, and strategies are critical to involving the public in the process of recommending and pursuing projects and programs in their communities. This Plan was prepared to coordinate and guide outreach activities to reach and involve stakeholders, by meaningful dialog, to communicate water resource issues that are important to them. Active stakeholder involvement during the development and implementation of the SWRP and associated stormwater capture and treatment projects will help ensure the desired environmental outcomes. Stakeholder outreach for the SWRP will be conducted to meet the following goals:

1. Inform stakeholders on the SWRP process and the need for stormwater capture and treatment projects.
2. Obtain stakeholder input in identifying locations and types of stormwater capture and treatment projects.
3. Obtain feedback on the initial prioritized list of potential projects.
4. Obtain comments on and support for the SWRP.
5. Obtain feedback on environmental justice needs and concerns associated with SWRP implementation.

3.0 KEY MESSAGES

The following key messages will be conveyed to stakeholders:

- Benefits of using stormwater as a resource;
- Purpose and content of the SWRP;
- Need for stormwater capture and treatment projects;
- Process for identifying, assessing, and prioritizing stormwater capture and treatment projects.

4.0 STAKEHOLDER OUTREACH, EDUCATION, AND ENGAGEMENT TASKS

The following tasks will be implemented to meet the goals of stakeholder outreach:

Task 1 – Stakeholder Group Formation

As part of developing the Monterey Peninsula IRWMP, the RWMG identified and contacted 130 stakeholders, representing public agencies, local municipalities and special districts, environmental non-profits, community groups, academic educational institutions, private companies, landowners, and individuals. The SWRP project team and TAC updated the IRWMP stakeholder contact list to develop the potential stakeholders list included in Attachment A.

The RWMG wants to ensure that the water resource management needs and interests of disadvantaged communities (DACs)[4] are fully addressed in the SWRP and that DACs are provided ample opportunities for involvement in plan development. To ensure that DACs are well represented on the Stakeholder Group, additional outreach will be conducted to disadvantaged community advocates. The following four census tracts within the SWRP area are considered DACs:

- Tract 127 (Monterey)
- Tract 136 (Seaside)
- Tract 137 (Seaside)
- Tract 140 (Seaside/Sand City)

The City of Seaside provided a list of potential DAC stakeholders (Attachment B). Contacts have also been requested from the City of Monterey. Anticipated additional outreach to the DACs may include follow up emails, targeted hard copy notice mailings, and phone calls, if needed. A map showing the DAC census tract boundaries is provided as Attachment C.

In addition to the above, participants on the Technical Stakeholder Group for the Water Recovery Study will also be invited to participate on the SWRP Stakeholder Group. The Technical Stakeholder Group is currently being formed.

Schedule – Potential stakeholders will be contacted in September 2017, and the Stakeholder Group will be established in early October 2017.

Task 2 – Quarterly Updates

Beginning November 2017, quarterly updates will be sent via e-mail to the SWRP Stakeholder Group to provide information to them on the progress toward the completion of the SWRP. Informational materials (e.g., flyers, fact sheets) will be developed and distributed to stakeholders as part of the quarterly update. In addition, information pertaining to the SWRP will be regularly posted on the Monterey Regional Stormwater Management Program website.

Schedule: Quarterly, beginning November 2017.

Task 3 – Stakeholder Group Information Requests and Meetings

As described below, Monterey One Water plans to hold two Stakeholder Group meetings to share information and solicit input on the SWRP:

- The first meeting will introduce the Stakeholder Group to the SWRP planning process, provide information on the metrics and methodology for identifying, assessing and prioritizing potential projects, present preliminary findings from the Water Recovery Project Feasibility Study, and provide opportunities for stakeholders to submit project ideas.
- The second meeting will be held to obtain feedback from stakeholders on the preliminary ranked project list and follow up actions.

At least a month prior to the first meeting, the SWRP Stakeholder Group will be contacted and requested to provide the information regarding stakeholder planned projects relevant to the SWRP.

[4] A DAC is a community with an annual median household income that is less than 80 percent of the Statewide annual median household income (Water Code §79505.5).

This will allow engagement from stakeholders in identification of project opportunities. The project identification request will be sent in the form of an e-mail, with an attached spreadsheet form that stakeholders may fill out with potential project opportunities. The project identification request will be discussed at the first Stakeholder Group meeting and will be due shortly afterward.

Stakeholders will be provided project lists with the rankings of their identified projects per the metrics-based project evaluation method used. Following the second SWRP Stakeholder Group meeting, input will be requested from stakeholders regarding the project ranking and prioritization. For those stakeholders that are also cooperating entities or interested parties, input will also be requested for project opportunities identified through additional geospatial analysis conducted by the project team, which fall within the entities' jurisdiction. The stakeholders will have two weeks to provide input on the project prioritization.

<u>Schedule:</u>

- Project Solicitation Request – September 2017
- First meeting – October 2017
- Second meeting – January 2018
- Project Prioritization Input Request – January 2018

Task 4 – Public Workshop

One public workshop will be held to present the draft SWRP to stakeholders and the general public to obtain their feedback. A bilingual flyer (English and Spanish) will be developed and distributed via email and community center postings.

<u>Schedule:</u> June 2018.

Task 5 - Stakeholder Involvement in the Implementation of the SWRP and Completion of Projects

Following completion of the final SWRP, further input will be sought from stakeholders in affected communities. This step will increase stakeholder involvement in the project design and develop partnerships needed for implementation and operation and maintenance.

<u>Schedule:</u> TBD.

5.0 SUMMARY OF TASKS AND SCHEDULE

Table 5-1 summarizes the stakeholder outreach, education and engagement tasks and the schedule for implementation.

Table 5-1. Summary of Tasks and Schedule

Task	Description	Schedule
1	Stakeholder Group Formation	• Contact potential stakeholders – September 2017 • Establish Stakeholder Group – October 2017
2	Quarterly Updates	• Quarterly, beginning November 2017
3	Stakeholder Group Information Requests and Meetings	• Project Solicitation Request – September 2017 • First meeting – October 2017 • Second meeting – January 2018 • Project Prioritization Input Request – January 2018
4	Public Workshop	• June 2018
5	Stakeholder Involvement in Implementation of SWRP and Completion of Projects	• TBD

Attachment A
Monterey SWRP
Potential Stakeholders Contact List

Contact	E-mail Address	Organization
FEDERAL AGENCIES		
Bridget Hoover	Bridget.Hoover@noaa.gov	Monterey Bay National Marine Sanctuary
Frank Schwing	franklin.schwing@noaa.gov	National Oceanic and Atmospheric Administration Fisheries
Dan Martel	daniel.j.martel@usace.army.mil	U.S. Army Corps of Engineers
Jacob Martin	jacob_martin@fws.gov	U.S. Fish and Wildlife Service
Larry Freeman	lfreeman@usgs.gov	US Geological Survey
John Warner	john.warner@ks.usda.gov	USDA Natural Resources Conservation Service
Shawn Milar	shawn_milar@fws.gov	USFWS Coastal Program
Jeff Kwasny	jkwasny@fs.fed.us	US Forest Service
Gail Youngblood	gail.j.youngblood.civ@mail.mil	U.S. Army Corps of Engineers
David Eisen	david.eisen@usace.army.mil	U.S. Army Corps of Engineers
Joel Casagrande	joel.casagrande@noaa.gov	NOAA
Amanda Morrison	amanda.morrison@noaa.gov	NOAA
Tim Jensen	tjensen@mprpd.org	Monterey Peninsula Regional Park District
Robert Guidi	robert.g.guidi.civ@mail.mil	US Army, Department of Public works
Joelle Lobo	joelle.l.lobo.civ@mail.mil	Presidio of Monterey
Jay Tulley	jay.h.tulley.civ@mail.mil	Presidio of Monterey
Robert Henderson	robert.k.henderson@navy.mil	Naval Postgraduate School
Vicki Taber	victoria.l.taber@navy.mil	Naval Support Activity Monterey
Chad Mitcham	chad_mitcham@fws.gov	U.S. Fish and Wildlife Service
STATE AGENCIES		
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Mike Watson	mwatson@coastal.ca.gov	California Coastal Commission
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Attachment A
Monterey SWRP
Potential Stakeholders Contact List

Contact	E-mail Address	Organization
REGIONAL AND COUNTY GOVERNMENT/LOCAL AGENCIES, COUNCILS, DISTRICTS, & ADVISORY COMMITTEES (BESIDES WATER)		
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Attachment A
Monterey SWRP
Potential Stakeholders Contact List

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Attachment A
Monterey SWRP
Potential Stakeholders Contact List

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Attachment A
Monterey SWRP
Potential Stakeholders Contact List

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Attachment B
Monterey SWRP
Potential Disadvantaged Communities Stakeholders Contact List

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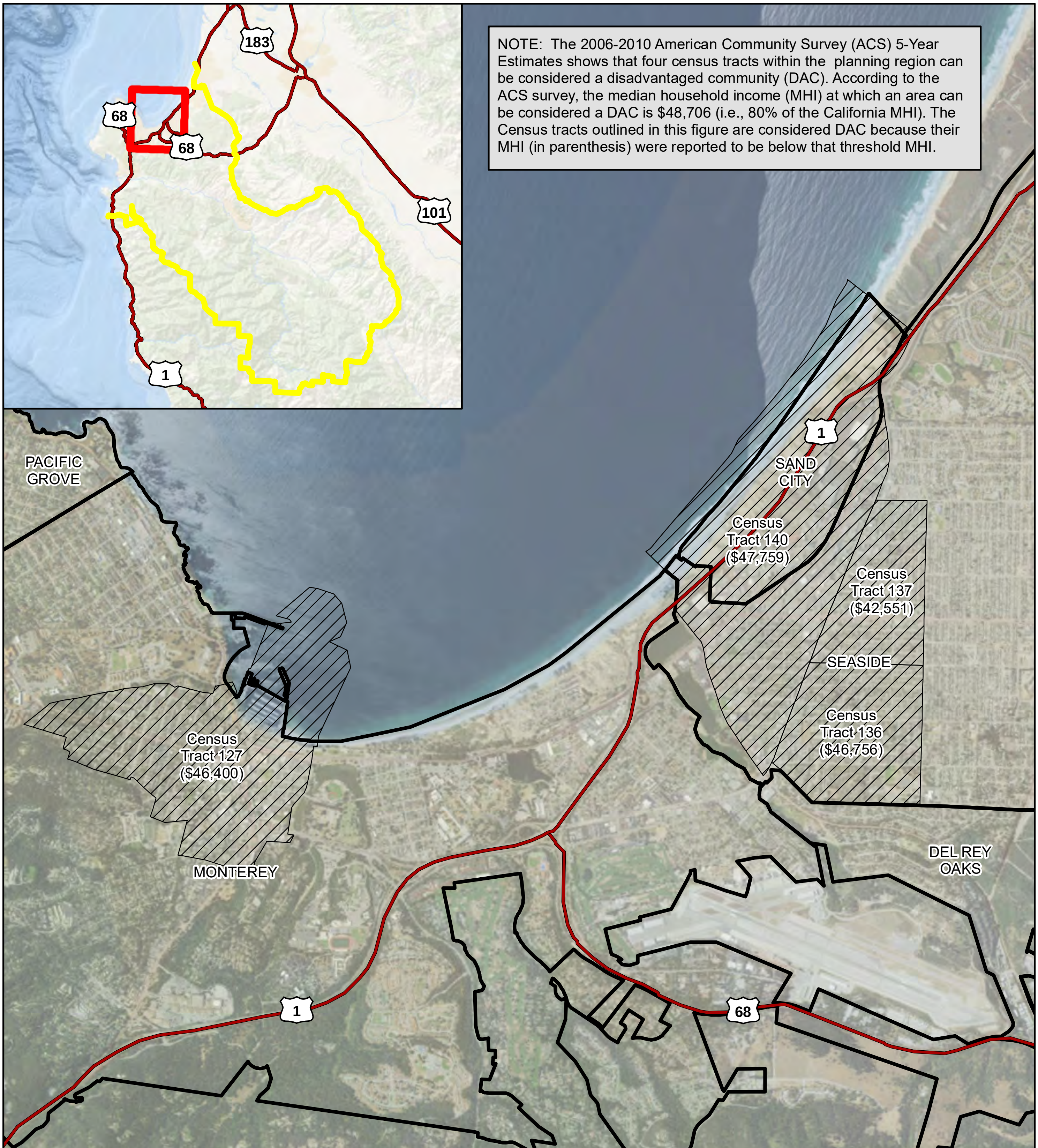
Alliance on Aging		280 Dickman Avenue	Monterey	CA	93940
City of Del Rey Oaks	Daniel Dawson	650 Canyon Del Rey	Del Rey Oaks	CA	93940
Del Monte Manor Villa Del Monte Senior Housing	Low Cost Housing	1466 Yosemite Street	Seaside	CA	93955
Alliance on Aging		570 Lighthouse Avenue	Pacific Grove	CA	93950
City of Marina	Community	209 Cypress Avenue	Marina	CA	93933
Del Rey Woods School	Principal	1281 Plumas Avenue	Seaside	CA	93955
Association of Monterey Bay Area Governments		PO Box 2453	Seaside	CA	93955
City of Monterey		580 Pacific Street	Monterey	CA	93940
Disabled Veterans	James Bogan	PO Box 1452	Seaside	CA	93955
Disabled Veterans	James Bogan	1633 Highland Street	Seaside	CA	93955
American Legion		1000 Playa Avenue	Seaside	CA	93955
City of Pacific Grove		300 Forest Avenue	Pacific Grove	CA	93950
El Sol		123 West Alisal Street	Salinas	CA	93901
Blind and Visually Impaired		225 Laurel Avenue	Pacific Grove	CA	93950
City of Sand City		1 Sylvan Park	Sand City	CA	93955
Emmanuel Church of God in Christ		1450 Sonoma Avenue	Seaside	CA	93955
CSUMB	Rebecca Moreno, Coodinator of Community	100 Campus Center	Seaside	CA	93955
County of Monterey Department of Social		1000 South Main St., Ste 209-A	Salinas	CA	93901
County of Monterey Department of Social	Branch Director,Henry Espinosa	1000 South Main St., Ste 211	Salinas	CA	93901
County of Monterey Department of Social Services	Margarita Zarraga	1000 South Main St., Ste 301	Salinas	CA	93901
County of Monterey Department of Social Services	Robert Taniguchi, Branch Director	1000 South Main St., Ste 205	Salinas	CA	93901
Faith Luthern Church		1460 Hilby Avenue	Seaside	CA	93955
CHISPA, Inc.		295 Main Street, Ste 100	Salinas	CA	93901
Friends of the Seaside	Alicia O'Neill, President	550 Harcourt Avenue	Seaside	CA	93955
Christian Memorial Community Church		2699 Colonel Durham St.	Seaside	CA	93955
Hilltop United Methodist Church of Seaside		1340 Hilby Avenue	Seaside	CA	93955
Christian Methodist Episcopal Church		625 Elm Avenue	Seaside	CA	93955
Housing Resource Center		201 John Street	Salinas	CA	93901
Citizens League for Progress	Ewalker James	PO Box 1272	Seaside	CA	93955
Citizens League for Progress	Ewalker James	1399 Darwin Street	Seaside	CA	93955
Interim, Inc.		PO Box 3222	Monterey	CA	93942
International School		1720 Yosemite Street	Seaside	CA	93955
KAZU Radio (Public Radio)		100 Campus Center	Seaside	CA	93955

Attachment B
Monterey SWRP
Potential Disadvantaged Communities Stakeholders Contact List

Group	Contact Person	Address	City	State	ZIP
KION-TV (Chanel 46)		1550 Moffett Street	Salinas	CA	93905
KSBW-TV (Chanel 8)		PO Box 81651	Salinas	CA	93912
KSBW-TV (Chanel 8)		238 John Street,	Salinas	CA	93901
KSMS-TV (Chanel 67)		67 Garden Court	Monterey	CA	93940
Monterey Bay LINKS, Inc.	Ruthie Watts	PO Box 1699	Seaside	CA	93955
Monterey Bay LINKS, Inc.	Ruthie Watts	9 Stowe Court	Seaside	CA	93955
LULAC		PO Box 1396	Salinas	CA	93902
Martin Luther King School	Principal	1713 Broadway Avenue	Seaside	CA	93955
Monterey County Advocacy Housing Council		34 E. Rossi Street	Salinas	CA	93907
Monterey County Herald	Newsroom	PO Box 271	Monterey	CA	93940
Monterey County Housing Authority		123 Rico Street	Salinas	CA	93907
Monterey County Office of Education		PO Box 80851	Salinas	CA	93912
Monterey County Office of Education		901 Blanco Circle	Salinas	CA	93901
Monterey County Weekly		668 Williams Avenue	Seaside	CA	93955
Monterey Peninsula College	Student Services	980 Fremont Street	Monterey	CA	93940
MPUSD	Board of Education	1295 La Salle Avenue	Seaside	CA	93955
MPUSD		700 Pacific Street	Monterey	CA	93940
NAACP		1104 Broadway Avenue	Seaside	CA	93955
Del Monte Manor	Neighborhood Network Center	1466 Yosemite Street	Seaside	CA	93955
Parade of Champions	Jerry Thorne	PO Box 811	Seaside	CA	93955
Salvation Army	Monterey Peninsula Corps	1491 Contra Costa Street	Seaside	CA	93955
Seaside High School Robotics Club	Principal	2200 Noche Buena Street	Seaside	CA	93955
Seaside Middle School	Principal	999 Coe Avenue	Seaside	CA	93955
Seaside Lions Club		PO Box 874	Seaside	CA	93955
Seaside Raiders		PO Box 813	Seaside	CA	93955
Seaside City Chamber of Commerce		505 Broadway Avenue	Seaside	CA	93955
Shelter Outreach Plus		PO Box 1340	Marina	CA	93933
Shelter Outreach Plus		3087 Wittenmyer Court	Marina	CA	93933
St. Francis Xavier Church		1475 La Salle Avenue	Seaside	CA	93955



Legend

Integrated Regional Water Management Plan Area

Highways

DAC Census Tracts

City Limits

Notes:

Shapefiles and maps received from the Association of Monterey Bay Area Governments and the Monterey Peninsula Water Management Agency.

N

0 0.75 Miles

Attachment C - Map of Disadvantaged Communities in the Proposed Stormwater Resource Plan Area

Monterey Peninsula SWRP Stakeholder Outreach Plan

Geosyntec consultants

Monterey One Water Providing Cooperative Water Solutions

Figure 1

Oakland, CA | March 2016

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Stakeholder Meeting #1 Summary

Stormwater Resource Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Stakeholder Group
Meeting #1

Tuesday, October 17, 2017, 9:45 am – 12:00 pm

MEETING SUMMARY

Participants – Attendance list attached.

1. Welcome/Introductions

   Jeff Condit (Monterey One Water) welcomed stakeholders to the meeting.

2. Background

   Jeff updated attendees on the purpose of the Stormwater Resource Plan (SWRP) and the role of Monterey One Water, MRSWMP, consultant team, and stakeholders.

3. Overview of Project

   Kelly Havens (Geosyntec) described the project area watersheds, outline of the SWRP report, and provided an overview of the methodology for identifying, evaluating, and prioritizing local and regional stormwater capture projects. She also updated attendees on the spreadsheet that was sent to them for collecting information on potential projects. Attendees asked clarifying questions and provided the following feedback:

   - Ensure that the SWRP development is a collaborative effort. Identified projects should not be in conflict with each other. For example, someone proposing a project upstream could adversely impact another project downstream.
   - Consider including a regulatory evaluation in the project ranking process.
   - Consider informing Monterey County supervisors about the SWRP development process to ensure that permitting is easier for prioritized projects.
   - Add a discussion of permitting requirements to the SWRP (Implementation Section).
   - During project prioritization, provide more points to projects that increase water supply and/or reduce water consumption.
   - Identify opportunities for combining smaller projects into a regional project during the project prioritization process. Scoring criteria should consider this coordination with projects.
   - Consider providing more points for projects that positively impact more miles of an impaired water body.

Kelly provided the following clarifications based on questions from attendees:

- Projects that are not fully developed in terms of budget/approval can be submitted. Inclusion in the SWRP does not commit an agency to constructing the project.
- Even projects that appear to have lower environmental benefits should be submitted. To be eligible for future grant funding, the projects should be included in the SWRP.
- Google map files can be submitted if the exact project address/parcel number is not known.
- Only projects that have a project proponent should be submitted.
- There may be opportunities to submit projects later through updates to the SWRP and IRWMP.

4. Summary and Schedule of Stakeholder Input Requested throughout the Project

Vishakha Atre (EOA) provided an overview of the main SWRP products that will be sent to the stakeholders for review and input. These products and due dates for comments/input are described below:

- Data on potential projects and comments on the project prioritizing methodology - October 31, 2017.
- Feedback on the prioritized list of projects - January 2018
- Feedback on draft SWRP - May/June 2018.

Action Items:

- The consultant team will send today's presentation and the spreadsheet for submitting potential projects to stakeholders.
- Stakeholders will submit comments and potential projects by October 31, 2017.

Monterey Pennisula Stakeholder Group Meeting #1
List of Attendees
Tuesday, October 17, 2017

Name	Organization
Agnes Topp	City of Carmel
Alison Imamura	Monterey One Water
Andrew Racz	Marina Coast Water District
Andy Magnasco	Carmel River Task Force
Barbara Buikema	Carmel Wastewater
Catherine Stedman	California American Water Company
Chris Cook	American Water Company
Denise Duffy	Denise Duffy & Associates
Diana Staines	Denise Duffy & Associates
Drew Lander	Carmel Area Wastewater District
Eric Sand	Carmel Valley Association
Frank Pierce	
Gail Morton	Fort Ord Recreation Users
Gary Conley	Second Nature
Jeff Condit	Monterey One Water
Jill Bicknell	EOA, Inc.
Jody Hansen	Monterey Peninsula College
Joelle Lobo	Presidio of Monterey
Karen Riley-Olms	County of Monterey
Kelly Havens	Geosyntec
Laura Dadiw	Watermaster
Laurie Williamson	City of Monterey
Leah MacCarter	Carmel River Task Force
Leif Utegaard	Santa Lucia Preserve Community Services District
Lisa Austin	Geosyntec
Lisa Emanuelson	Monterey Bay Citizen Watershed Monitoring Network
Lorin Letendre	Carmel River Watershed Conservancy
MaryBeth Dreusike	Naval Support Activity Monterey
Maureen Hamilton	Monterey Peninsula Water Management District
Mike McCullough	Monterey One Water
Milas Smith	City of Pacific Grove
Nick Becker	Pebble Beach Community- Service District
Paul Robins	Monterey County Resource Conservation District
Rick Boggs	California State University Monterey Bay
Sarah Hardgrave	Big Sur Land Trust
Scott Ottmar	City of Seaside
Shelley Glennon	Monterey Airport
Tom Harty	Monterey County Resource Management Agency
Tom Reeves	Big Sur Land Trust
Tricia Wotan	City of Monterey
Vicki Taber	Naval Support Activity Monterey
Vishakha Atre	EOA, Inc.

Stakeholder Meeting #2 Summary

Stormwater Resource Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Stakeholder Group
Meeting #2

Thursday, February 8, 2018, 10:00 am – 12:00 pm

MEETING SUMMARY

Participants – Attendance list attached.

1) Welcome/Introductions

Jeff Condit (Monterey One Water) welcomed stakeholders to the meeting. Stakeholders introduced themselves.

2) Background

Jeff updated attendees on the purpose of the Stormwater Resource Plan (SWRP) and the role of Monterey One Water, MRSWMP, Technical Advisory Committee (TAC), consultant team, and stakeholders.

3) Purpose of Stakeholder Meeting #2

Vishakha Atre (EOA) informed stakeholders that the purpose of this meeting is to: 1) present the prioritized list of multi-benefit stormwater capture projects to stakeholders; 2) obtain stakeholder input for identifying the top seven projects for which designs will be developed; and 3) obtain stakeholder input on project characteristics that should be considered for identifying top projects.

4) SWRP Status

Vishakha provided the following overview of the methodology for identifying, evaluating, and prioritizing local and regional stormwater capture projects:

- Over 2,000 planned and potential project opportunities were identified using the list of planned projects submitted by stakeholders, projects identified in the Water Recovery Study, and a GIS-based opportunity analysis.
- The identified project opportunities were preliminarily scored using a metrics-based multi-benefit evaluation consistent with the requirements of the State's SWRP Guidance.
- The scored project lists were submitted to jurisdictions for ranking based on their local priorities.
- A spreadsheet summarizing the overall list of 2,000+ projects, the top 2% of project opportunities identified by each jurisdiction, and the feedback from the jurisdictions was sent to the stakeholders for review.

Vishakha described the prioritized projects spreadsheet in detail and showed attendees a Google Earth map identifying the top 2% projects. Attendees provided the following feedback:

- Consider simplifying the list of prioritized projects so it is easier for the general public to understand. For the SWRP Public Workshop, the list could include the project name/location, type, name of the project owner (jurisdiction), rank/score, and the reason for the ranking.
- Ensure that project implementation is a collaborative effort. Identified projects should not be in conflict with each other.
- The focus of project prioritization should be water supply augmentation, not stormwater infiltration. Lisa noted that grant guidelines require the projects to have multiple benefits. The project list includes over 200 water recovery opportunities identified through the Water Recovery Study.
- Identify State Parks as a separate project owner. Currently, land owned by State Parks is identified under unincorporated County.
- The analysis should include consideration of the geologic feasibility for infiltration.

Lisa Welsh (Geosyntec) and Vishakha provided the following clarifications based on questions from attendees:

- The metrics-based scoring does not take local factors (e.g., a jurisdiction's local planning priorities, funding availability, etc.) into account; therefore, ranking based on local factors is important.
- Project ranks can be elevated based on feedback received from local communities and stakeholders.
- Ability to provide match funds can be a criteria considered during project ranking.
- The Water Recovery Study will be attached to the SWRP. It will be available for public review and comment along with the draft SWRP.
- All identified project opportunities will be included in the SWRP and be eligible to receive future grant funds.
- Project descriptions are not included in the spreadsheet because most of the projects are opportunities identified through GIS-based analysis, or planned projects in preliminary stages.
- The draft SWRP will be posted online for review by the public.

5) Stakeholder Activity to Identify Top Project Characteristics

Attendees participated in an activity to identify the top three project characteristics important to them. Ten poster boards listing project characteristics were placed on a table. Attendees were given three dot stickers each and asked to place one sticker on each project characteristic important to them. The project characteristics are listed below in the order of preference, with #1 being the characteristic that received most votes:

1. Water supply benefits.
2. Synergy of project with upcoming projects.
3. Project is part of larger restoration or watershed improvement plans.
4. Water quality benefits.
5. Location of project in a disadvantaged community, and cost of long-term project maintenance (both received the same number of votes).
6. Cost of project construction.
7. Community support or opposition, and potential for public education (both received the same number of votes).

Action Items:

- Stakeholders will submit comments on the prioritized project list by February 16, 2018.

Monterey Pennisula Stakeholder Group Meeting #2
List of Attendees

	Name	Organization
1	Agnes Topp	City of Carmel
2	Alexander Wade	Presidio of Monterey – Directorate of Public Works/ Military Personnel Division
3	Alison Imamura	Monterey One Water
4	Andrew Racz	Marina Coast Water District
5	Chris Morello	Monterey Airport
6	Diana Staines	Denise Duffy & Associates
7	Drew Lander	Carmel Area Wastewater District
8	Elai Fresco	Geosyntec
9	Elizabeth Payne	State Water Board
10	Frank Pierce	Pacific Grove Resident
11	George T. Riley	Citizen for Public Water
12	Jay Tulley	Presidio of Monterey
13	Jeff Condit	Monterey One Water
14	Jeff Krebs	City of Monterey
15	Joelle Lobo	Presidio of Monterey
16	Leon D. Gomez	CD Engineers
17	Lisa Emanuelson	Monterey Bay Citizen Watershed Monitoring Network
18	Lisa Welsh	Geosyntec
19	Lorin Letendre	Carmel River Watershed Conservancy
20	MaryBeth Dreusike	Naval Support Activity Monterey
21	Mike McCullough	Monterey One Water
22	Milas Smith	City of Pacific Grove
23	Nick Becker	Pebble Beach Community- Service District
24	Rick Boggs	California State University Monterey Bay
25	Sarah Hardgrave	Big Sur Land Trust
26	Scott Ottmar	City of Seaside
27	Tom Harty	Monterey County Resource Management Agency
28	Tom Reeves	Big Sur Land Trust
29	Vishakha Atre	EOA, Inc.

Public Meeting Summary

NOTICE OF PUBLIC MEETING

Monterey Peninsula Region Stormwater Resource Plan

The Monterey Regional Stormwater Management Program (MRSWMP) invites you to provide feedback on the Draft Stormwater Resource Plan (SWRP) for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region.

The SWRP is a planning document that identifies public lands (i.e., streets, parks, and municipal properties) where stormwater capture projects could potentially be located to provide the most benefit. Stormwater capture projects collect, store, and treat stormwater runoff as well as dry weather flows such as excess irrigation runoff. Potential environmental and community benefits include:

- Providing water for other uses, such as irrigation,
- Recharging groundwater,
- Reducing local flooding, and
- Improving water quality in local creeks.

The Draft SWRP will be posted for public review on June 25, 2018 at www.montereySEA.org. A 30-day comment period will be provided.

Public Meeting Agenda

- Update on the SWRP development process and its relationship to other regional water management planning efforts.
- Overview of the process used to identify, evaluate, and prioritize local and regional stormwater capture projects.
- Presentation of conceptual designs for high priority projects.

RSVP: www.montereyswrp.eventbrite.com

Wednesday,

June 27, 2018

5:30 pm – 7:00 pm

Venue

Colton Room,

Monterey Conference Center,

1 Portola Plaza,

Monterey

MONTEREY REGIONAL Stormwater Management PROGRAM

CALIFORNIA Water Boards

CITY OF Monterey CALIFORNIA

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

Monterey One Water
Providing Cooperative Water Solutions

Aviso de reunión pública

Monterey Peninsula Region Stormwater Resource Plan

El Monterey Regional Stormwater Management Program (MRSWMP) lo invita a enviar comentarios el Draft Stormwater Resource Plan (SWRP) para la Región de Planificación del Manejo Integrado del Agua de la Península de Monterey, Carmel Bay y South Monterey Bay.

El SWRP es un documento de planificación que identifica tierras públicas (es decir, calles, parques y propiedades municipales) donde los proyectos de captura de aguas pluviales podrían ubicarse para proporcionar el mayor beneficio. Los proyectos de captura de aguas pluviales recolectan, guardan y tratan la escorrentía de aguas pluviales, así como los flujos de clima seco como el exceso de agua que se escurre cuando uno riega. Los posibles beneficios ambientales y comunitarios incluyen:

- Proporcionar agua para otros usos, como el riego,
- Recargar agua subterránea,
- Reducir las inundaciones locales, y
- Mejorar la calidad del agua en arroyos locales.

El Draft SWRP se publicará para revisión pública el 25 de junio de 2018 en www.montereySEA.org. Se proporcionará un período de comentarios de 30 días.

Agenda de reuniones públicas

- Actualización sobre el proceso de desarrollo de SWRP y su relación con otros esfuerzos regionales de planificación de la administración del agua.
- Descripción general del proceso utilizado para identificar, evaluar y priorizar proyectos locales y regionales de captura de aguas pluviales.
- Presentación de diseños conceptuales para proyectos de alta prioridad

Miércoles,

27 de junio de 2018

5:30 p.m. - 7:00 p.m.

Colton Room,
Monterey Conference Center,
1 Portola Plaza,
Monterey

RSVP: www.montereyswrp.eventbrite.com

Nota: La reunión se llevará a cabo en inglés. Un traductor no estará disponible.

MONTEREY COUNTY
WEEKLY

668 Williams Ave
(831) 394-5656
Seaside, CA 93955

Proof of publication

State of California
County of Monterey
I am a citizen of the United States and a resident of the State of California. I am over the age of 18 years and not party to or interested in the above-entitled matter.

I am the principal clerk of *Monterey County Weekly,* a newspaper of general circulation, published weekly by Milestone Communications, Inc. in the City of Seaside, County of Monterey, and which newspaper has been adjudicated a newspaper of general circulation by the Superior Court of the County of Monterey, State of California; that the notice of which the annexed is a printed copy has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates to wit.

June 14, 2018

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Name.....Linda S. Maceira.........................

Signature....Linda S. Maceira

Dated:..June 14, 2018..Monterey, California

Notice of Public Meeting

Monterey Peninsula Region Stormwater Resource Plan

The Monterey Regional Stormwater Management Program (MRSWMP) will hold a public meeting to present the Draft Stormwater Resource Plan (SWRP) for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region.

The meeting will be held on **Wednesday, June 27, from 5:30 pm – 7:00 pm** in the **Colton Room, Monterey Conference Center, 1 Portola Plaza, Monterey, CA.** All interested parties are encouraged to attend and participate.

The SWRP is a planning document that identifies public lands (i.e., streets, parks, and municipal properties) where stormwater capture projects could potentially be located to provide the most benefit. Stormwater capture projects collect, store, and treat stormwater runoff, as well as dry weather flows such as excess irrigation runoff.

The Draft SWRP will be posted for public review on June 25, 2018 at www.montereySEA.org. A 30-day comment period will be provided.

Public Meeting Agenda

- Update on the SWRP development process and its relationship to other regional water management planning efforts.
- Overview of the process used to identify, evaluate, and prioritize local and regional stormwater capture projects.
- Presentation of conceptual designs for high priority projects.

RSVP: www.montereyswrp.eventbrite.com

Participating Agencies – Monterey Regional Stormwater Management Program, California State Water Resources Control Board, City of Monterey, Monterey Peninsula Water Management District, and Monterey One Water.

SPECIAL MEETING

NOTICE AND AGENDA

MANAGEMENT COMMITTEE for the MONTEREY REGIONAL STORM WATER MANAGEMENT PROGRAM (MRSWMP)

DATE: June 27, 2018
TIME: 5:30 p.m.
LOCATION: Monterey Conference Center, Colton Room, 1 Portola Plaza, Monterey, California

NOTE: Under the terms and conditions of the Memorandum of Understanding for the Monterey Regional Storm Water Pollution Prevention Program {*also referred to as the Monterey Regional Storm Water Management Program, (MRSWMP)*}, the Management Committee (*MC*) was created to provide overall Program coordination, review, and budget oversight with respect to the NPDES permit. The MC is to consider permit compliance, with majority concurrence of the Permittees (*listed below as Participating Entities*), as the primary objective in approving Program tasks and corresponding budgets. The MC is comprised of one representative from each of the Permittees. None of the representatives are elected officials or policy makers for the entities they represent.

Stakeholder feedback may either be provided during the "Public Comment" agenda item or the Program Manager may be contacted regarding any questions or feedback for the Management Committee. Responses to these items will be reported in the Management Committee Meeting Minutes. Should an interested stakeholder or a member of the public wish to make a presentation to the Group, the Program Manager should be contacted to schedule the presentation for a subsequent meeting.

Officers: Chairperson: Milas Smith, City of Pacific Grove
Vice-Chairperson: Agnes Topp, City of Carmel-by-the-Sea

Participating Entities:
City of Carmel-by-the-Sea
City of Del Rey Oaks
City of Monterey
City of Pacific Grove
City of Sand City
City of Seaside
County of Monterey

Other Coordinating Entities:
Carmel Unified School District
Pacific Grove Unified School District
Monterey Peninsula Unified School District
Pebble Beach Company

Ex-Officio Members:
Association of Monterey Bay Governments
Monterey Bay National Marine Sanctuary

CALL TO ORDER

AGENDA ITEMS

1. **Presentation on the Monterey Peninsula Region Stormwater Resource Plan (SWRP) and Meeting to Receive Public Comment on SWRP**

ADJOURNMENT

Stormwater Resource Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Wednesday, June 27, 2018

5:30 pm – 7:00 pm

Colton Room, Monterey Conference Center,

1 Portola Plaza, Monterey

PRESENTATION

5:30 pm	1.	Registration	
5:35 pm	2.	Welcome	*Milas Smith, Chair, MRSWMP*
5:40 pm	2.	Introduction • What is the Stormwater Resource Plan (SWRP)? • Why was it prepared? • Who was involved? • Purpose of public meeting	*Jeff Condit,* *Monterey One Water / MRSWMP*
5:50 pm	3.	Overview of the SWRP • Goals and Objectives • Content Overview	*Vishakha Atre,* *EOA, Inc.*
6:10 pm	4.	Integrated Regional Water Management Plan and Relationship to the SWRP	*Sarah Hardgrave,* *Big Sur Land Trust*
6:25 pm	5.	Overview of Conceptual Project Designs	*Lisa Welsh* *Geosyntec Consultants*
6:35 pm	6.	View and Discuss Conceptual Project Designs	*All attendees*
6:55 pm	7.	Closing Remarks	*Jeff Condit*
7:00 pm	8.	Adjourn	*Milas Smith*

Monterey Pennisula SWRP
Public Meeting
Wednesday, June 27, 2018
Attendance List

Name	Organization
Agnes Topp	City of Carmel by the Sea
Alison Imamura	Monterey One Water
Diana Staines	Denise Duffy and Associates
Elizabeth Geisler	Dudek
Jeff Condit	Monterey One Water
John Mukhar	MNS Engineers
Lisa Welsh	Geosyntec Consultants
Michael Johnson	MNS Engineers
Robert Jaques	Seaside Basin Watermaster
Sarah Hardgrave	Big Sur Land Trust
Tricia Wotan	City of Monterey
Vishakha Atre	EOA, Inc.
Bob Siegfried	Carmel Valley Association
Robert Guidi	Department of Defense
Scott Ottmar	City of Seaside
Tom Reeves	Interested Party
Frank Pierce	Carmel River Task Force
Gina Schmidt	AMBAG
Bob Bourke	Interested Party
Milas Smith	City of Pacific Grove
Tom Harty	Monterey County Resource Management
Nathan	Watson Engineers
John Hunt	UC Davis
Riley Imamura	Interested Party
Nathaniel M	Watson Engineers

Stormwater Resource Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

Public Meeting

Wednesday, June 27, 2018, 5:30 pm – 7:00 pm

MEETING SUMMARY

Participants – Attendance list attached.

1) Welcome
Milas Smith (Chair, MRSWMP) welcomed attendees to the meeting.

2) Background

Jeff (Monterey One Water) updated attendees on the purpose of the Stormwater Resource Plan (SWRP) and the role of Monterey One Water, MRSWMP, Technical Advisory Committee (TAC), consultant team, and stakeholders. He informed attendees that the purpose of the meeting is to provide an overview of the Draft SWRP, present conceptual project designs, and obtain initial feedback. Final comments are due to him by July 25, 2018.

3) Overview of the SWRP

Vishakha Atre (EOA) provided an overview of the SWRP chapters, and explained the methodology for identifying, evaluating, and prioritizing local and regional stormwater capture projects. The SWRP includes the following eight chapters that address the elements required by the State Board's Storm Water Resource Plan Guidelines:

1. Introduction
2. Organization, Coordination, Collaboration
3. Watershed Identification
4. Water Quality Compliance
5. Quantitative Methods
6. Identification and Prioritization of Projects
7. Implementation Strategy and Schedule
8. Education, Outreach, Public Participation

The prioritization process identified approximately 2,200 project opportunities. A spreadsheet listing these potential projects as well as ranking feedback from the participating municipalities is included in Appendix E of the Public Draft SWRP. Appendix E is available as a separate link at www.MontereySea.org.

4) Integrated Regional Water Management Plan and Relationship to the SWRP

Sarah Hardgrave (Big Sur Land Trust) informed attendees about the Monterey Peninsula, Carmel Bay, and Southern Monterey Bay Integrated Regional Water Management (IRWM) Plan update and project solicitation process. The Monterey Peninsula Regional Water Management Group (RWMG) has initiated the process for the IRWM Plan update and will begin soliciting projects for the Proposition 1 IRWM Implementation Grant in July 2018. To receive grant funding, projects need to be either listed in the IRWM Plan project list, or applicants need to describe how the project has been vetted through the RWMG. The SWRP will be included in the IRWM plan and all potential projects identified in the SWRP will be eligible for grant funding.

5) SWRP Status

Lisa Welsh (Geosyntec) provided an overview of following seven projects selected by the TAC for conceptual design:

1. Hartnell Gulch Restoration and Stormwater Diversion
2. Lake El Estero Diversion to Sanitary Sewer
3. Monterey Tunnel Stormwater Diversion
4. Carmel-by-the-Sea Stormwater Diversion
5. David Avenue Stormwater Storage and Diversion
6. Del Monte Manor Park Infiltration
7. Drywell Aquifer Recharge Program

Attendees provided the following feedback:

- Ensure that project implementation is a collaborative effort. Identified projects should not be in conflict with each other.
- As other projects are designed, consider on-site runoff capture instead of off-site capture.
- Consider including Phase II Permit requirements while designing projects.

Lisa provided the following clarifications based on questions from attendees:

- The conceptual project designs include information on construction, operation and maintenance costs.
- The conceptual project designs also include information on sizing treatment and capture facilities.

5) View and Discuss Conceptual Project Designs

Lisa informed attendees that the seven conceptual project designs are placed around the room on poster boards. Project proponents are also available to answer questions on specific projects. Attendees viewed the project designs and discussed them with project proponents.

6) Adjourn

Jeff reminded attendees to send comments by July 25, 2018. The public meeting adjourned at 7:15 pm.

Monterey Peninsula Stormwater Resource Plan

Public Meeting

June 27, 2018

Presenters:
Jeff Condit, Monterey One Water / MRSWMP
Vishakha Atre, EOA
Sarah Hardgrave, Big Sur Land Trust
Lisa Welsh, Geosyntec

Presentation Agenda

- Stormwater Resource Plan (SWRP) Background
- Purpose of Public Meeting
- SWRP Overview
  - Goals and Objectives
  - Content
- Integrated Regional Water Management Plan and Relationship to the SWRP
- Conceptual Project Designs

Background

- Monterey One Water was awarded a Prop 1 Stormwater Planning Grant to develop a Stormwater Resource Plan (SWRP) on behalf of the Monterey Regional Stormwater Management Program
- The SWRP was developed for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region
- Start Date: July 2017
- Completion Date: December 2018

Monterey Peninsula SWRP Public Meeting 6/27/18 3

Project Team

- Monterey Regional Storm Water Management Program (MRSWMP) Sub-Committee
- Technical Advisory Committee
- Stakeholders
- Consultants:
  - Geosyntec
  - EOA, Inc.
  - Denise Duffy & Associates

Monterey Peninsula SWRP Public Meeting 6/27/18 4

Monterey One Water
Providing Cooperative Water Solutions

What is a SWRP?

- A planning document that:
  - Describes the local watershed
  - Identifies water quality issues
  - Identifies public lands (i.e., streets, parks, and municipal properties) where stormwater capture projects could potentially be located
  - Evaluates and prioritizes potential projects to provide the most benefits
- Stormwater capture projects must be part of a SWRP to be eligible for grant funds from any State bond approved by voters (SB985).

Monterey Peninsula SWRP Public Meeting

Monterey One Water
Providing Cooperative Water Solutions

Stormwater Capture and Treatment Projects

- Projects that collect, store, and treat stormwater runoff and dry weather flows (e.g., excess irrigation runoff):
  - Use vegetation, soils, and natural processes that allow stormwater to soak into the soil, or
  - Collect and divert stormwater and dry weather runoff to the sanitary sewer system for reuse (e.g., landscape irrigation)
- These projects provide multiple benefits, such as:
  - Providing water for other uses, such as irrigation,
  - Recharging groundwater,
  - Reducing local flooding, and
  - Improving water quality in local creeks.

Monterey Peninsula SWRP Public Meeting

6

Monterey SWRP Purpose

- Following State-approved guidelines, develop a list of stormwater capture projects eligible for future State grant funds
  - Provide 10% Conceptual Designs for seven selected projects
  - Provide 30% design and CEQA Checklist for top project
- Conduct the Monterey Regional Water Recovery Study – Examine the feasibility of establishing a Peninsula-wide water recovery and reclamation system

Monterey Peninsula SWRP Public Meeting 6/27/18 7

Purpose of Public Meeting

- Provide an overview of the Draft SWRP
- Present conceptual project designs
- Answer questions; obtain initial feedback
- Comments due by July 25, 2018 to Jeff Condit
  jeff@my1water.org

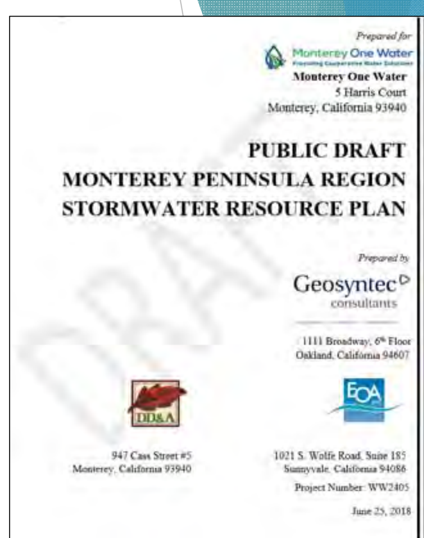
Monterey Peninsula SWRP Public Meeting 6/27/18 8

SWRP Goals and Objectives

- Conduct regional watershed-based planning to address challenges and opportunities for managing stormwater and dry weather runoff
- Assist in the identification of new water supply sources for the Monterey Peninsula.
- Identify projects that use stormwater and dry weather runoff as a resource, and provide multiple benefits, such as:
  - Improving water supply
  - Improving water quality
  - Flood control
  - Environmental and community benefits

Overview of the SWRP

- Elements Required by the State Board's Storm Water Resource Plan Guidelines
  - Organization, Coordination, Collaboration
  - Watershed Identification
  - Water Quality Compliance
  - Quantitative Methods
  - Identification and Prioritization of Projects
  - Implementation Strategy and Schedule
  - Education, Outreach, Public Participation


Prepared for
Monterey One Water
5 Harris Court
Monterey, California 93940

PUBLIC DRAFT
MONTEREY PENINSULA REGION
STORMWATER RESOURCE PLAN

Prepared by
Geosyntec consultants
1111 Broadway, 6th Floor
Oakland, California 94607

947 Cass Street #5
Monterey, California 93940

1021 S. Wolfe Road, Suite 185
Sunnyvale, California 94086

Project Number: WW2405
June 25, 2018

Organization, Coordination, Collaboration

- Summary and role of the cooperating entities, interested parties, Technical Advisory Committee, and Stakeholder Group
- Coordination with regulatory authorities
- Coordination with the Integrated Regional Water Management Group

Monterey Peninsula SWRP Public Meeting 6/27/18 11

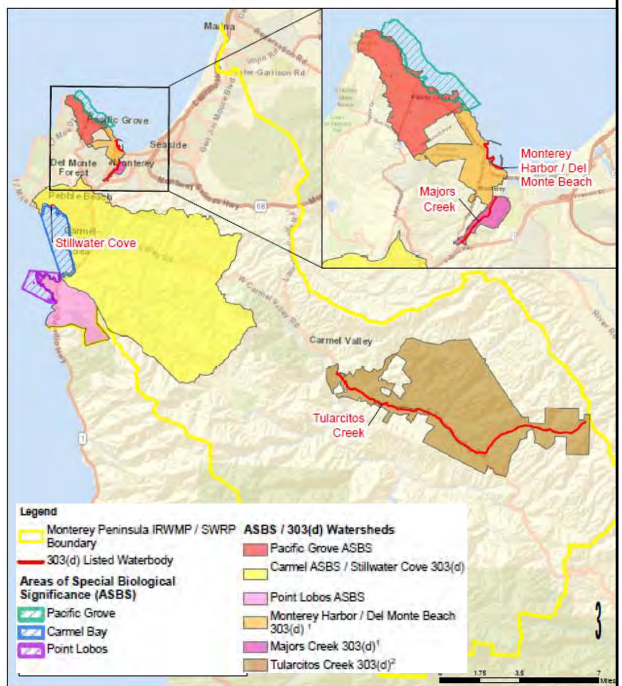
Watershed Identification

- Overview of watersheds
  - Carmel River Basin
  - Canyon Del Rey/Frontal Monterey Bay
  - Small Portion of Big Sur River
  - Small Portion of El Toro/Salinas River
- Associated water quality and quantity issues

Monterey Peninsula SWRP Public Meeting 12

Water Quality Issues

- Water bodies with water quality concerns
  - Monterey Harbor
  - Majors Creek
  - Tularcitos Creek
  - Monterey State Beach
  - Pacific Ocean at Stillwater Cove
- Stormwater pollutants of concern
  - metals, bacteria, trash, etc.
- Previous actions towards water quality protection
- SWRP water quality compliance strategies



Monterey Peninsula SWRP Public Meeting

Methodology for Identifying Stormwater Capture Projects

- Projects identified throughout the region by:
  - Stakeholder Planned Projects
  - Geospatial Project Opportunity Analysis
  - Water Recovery Study
- Projects classified by:
  - Project scale (parcel based, regional, right-of-way
  - Facility type – water recovery, bioretention, etc.
  - Infiltration feasibility

Planned Projects | GIS Analysis | Water Recovery Study
→ Identified Potential Projects
→ Project Classification
→ Project Multi-Benefit Evaluation

Monterey Peninsula SWRP Public Meeting

6/27/18

14

Monterey One Water
Providing Cooperative Water Solutions

Methodology for Evaluating Stormwater Capture Projects

- Evaluation of potential for project to provide multiple benefits (Table 10):
  - Parcel Area or Street Type/Length
  - Majority Land Use in Drainage Area
  - Catchment Runoff Rate
  - Catchment Slope
  - Infiltration Feasibility
  - Project Type
- Preliminary project 'scores' developed based on the criteria

Monterey Peninsula SWRP Public Meeting 6/27/18 15

Monterey One Water
Providing Cooperative Water Solutions

Methodology for Prioritizing Stormwater Capture Projects

- Project scores used to preliminarily rank projects
- Proponents/jurisdictions provided input on prioritization using additional institutional knowledge, such as:
  - Funding availability
  - Areas of proposed redevelopment
  - Other local factors
- Project assigned ranks based on input
- Projects for conceptual design selected by TAC

Monterey Peninsula SWRP Public Meeting 6/27/18 16

Prioritized Project List

- Prioritized Project List included in Appendix E
  - Water Recovery Study projects - 241
  - GIS analysis -377 parcel-based, 61 regional, and 1,609 right-of-way
  - Planned projects received from cooperating entities, interested parties, and stakeholders - 82
- All projects on the list are eligible for grant funding

Implementation Strategy and Schedule

- Potential funding sources for project implementation
- Entities responsible for project Implementation
- Community participation strategy
- Procedure for updating the SWRP

Education, Outreach, Public Participation

- Stakeholder Outreach, Education, and Engagement Plan
- Two Stakeholder Group meetings
  - October 17, 2017
  - February 8, 2018
- One Public meeting
- All materials are included in Appendix H

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List of Appendices

- Appendix A: SWRP Self-Certification Checklist
- Appendix B: TAC Meeting Summaries
- Appendix C: Annotated List of Reviewed Data and Reports
- Appendix D: Water Recovery Study Report
- Appendix E: Project Database
- Appendix F: Project Concept Designs
- Appendix G: 30% Design and CEQA Checklist for Hartnell Gulch
- Appendix H: Summary of Stakeholder Meetings

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Providing Cooperative Water Solutions

Concept Project Designs

- 1. Hartnell Gulch Restoration and Stormwater Diversion
- 2. Lake El Estero Diversion to Sanitary Sewer
- 3. Monterey Tunnel Stormwater Diversion
- 4. Carmel-by-the-Sea Stormwater Diversion
- 5. David Avenue Stormwater Storage and Diversion
- 6. Del Monte Manor Park Infiltration
- 7. Drywell Aquifer Recharge Program

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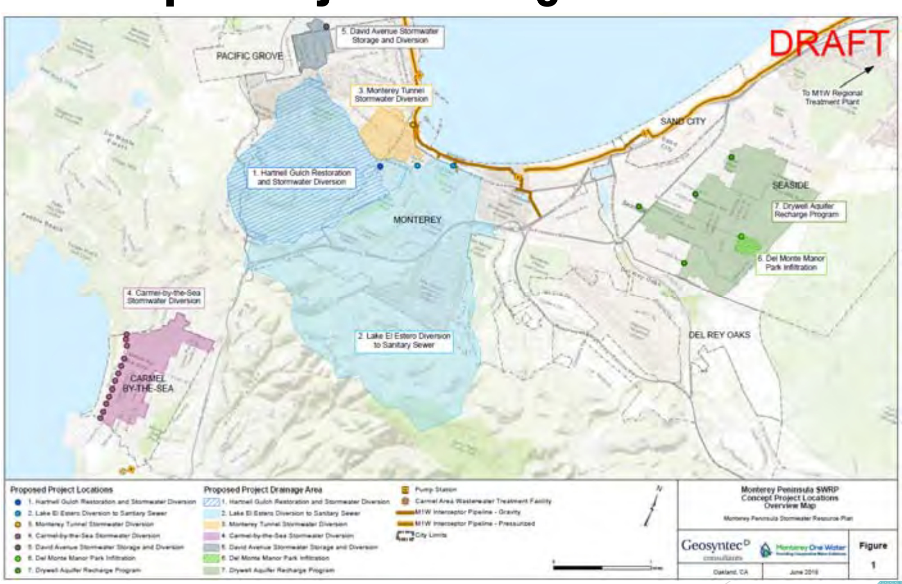
Concept Project Designs



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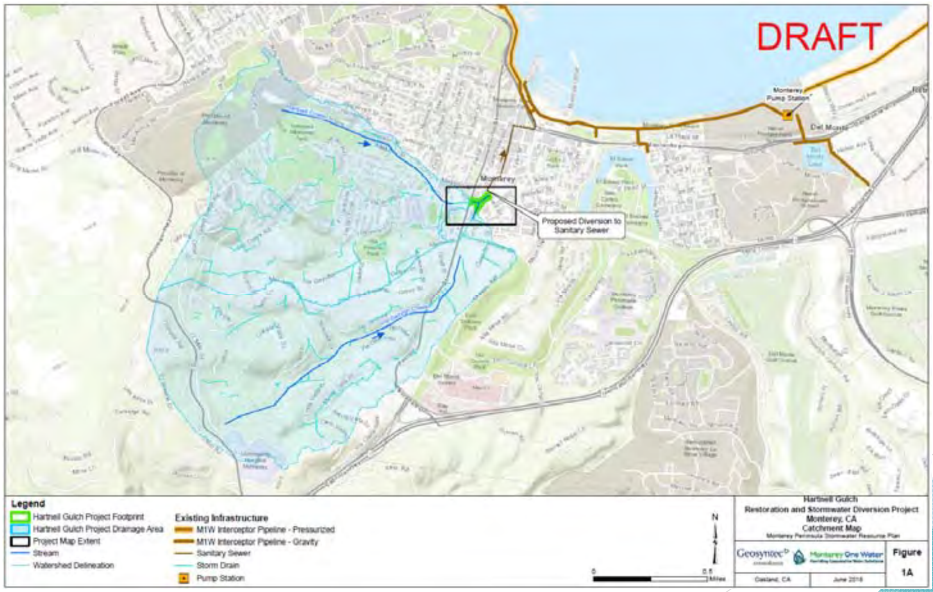
1. Hartnell Gulch Restoration and Stormwater Diversion



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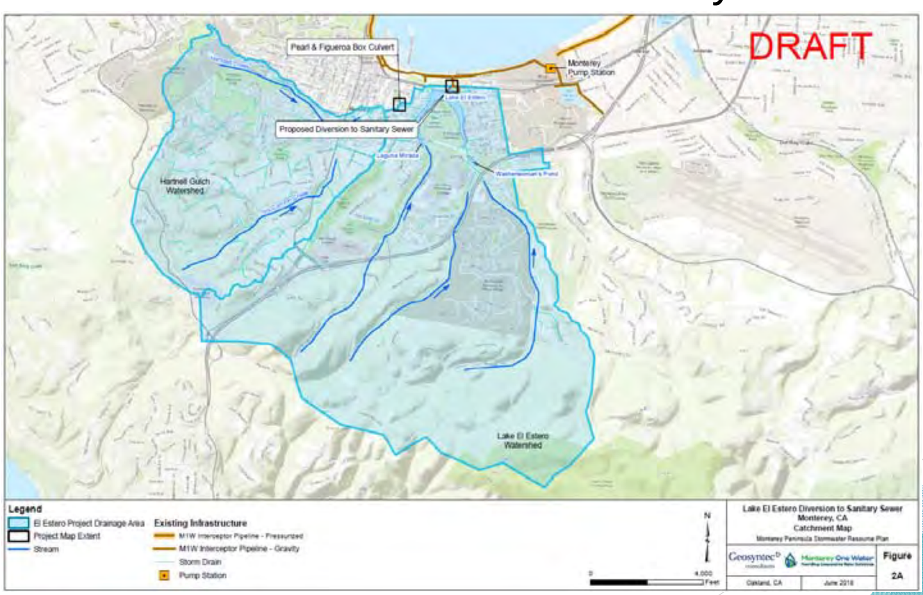
2. Lake El Estero Diversion to Sanitary Sewer



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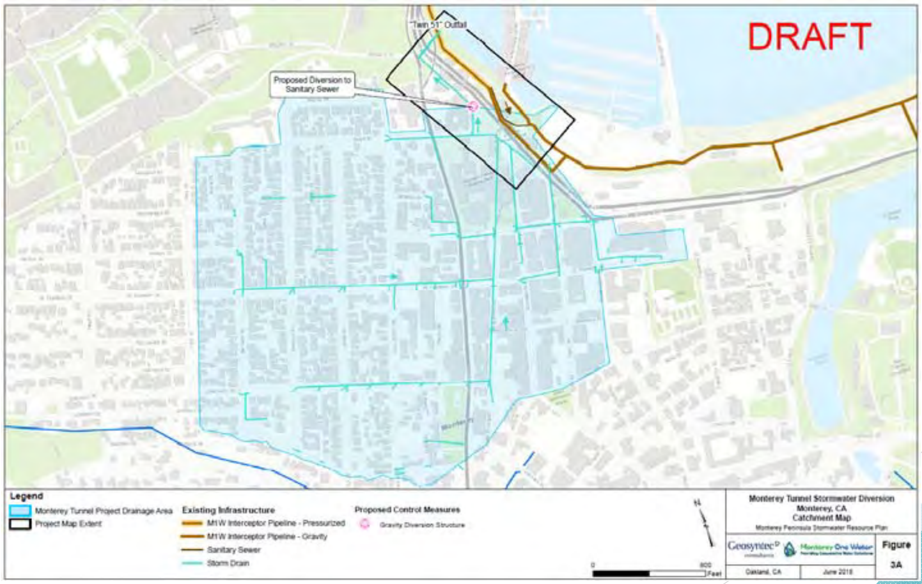
3. Monterey Tunnel Stormwater Diversion



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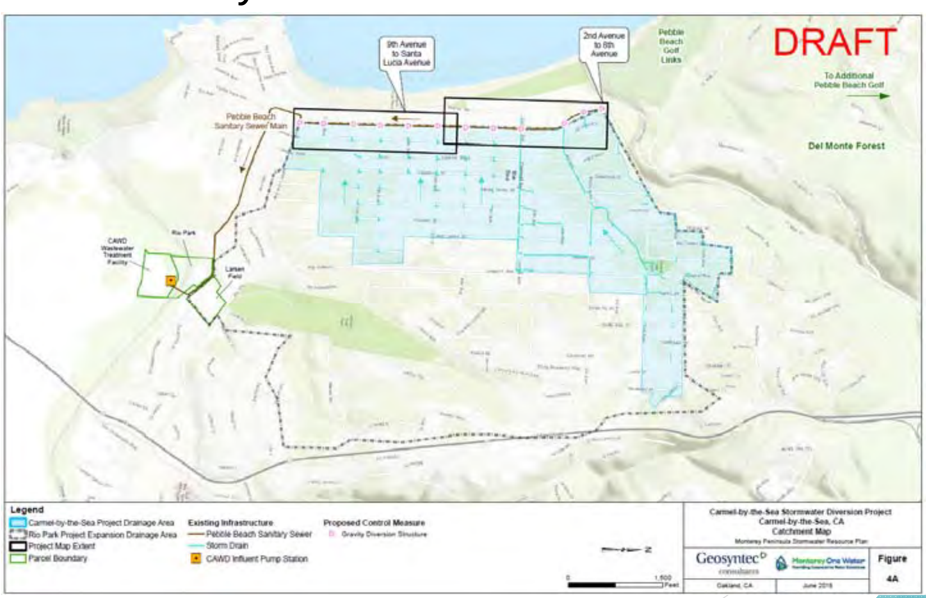
4. Carmel-by-the-Sea Stormwater Diversion



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5. David Avenue Stormwater Storage and Diversion

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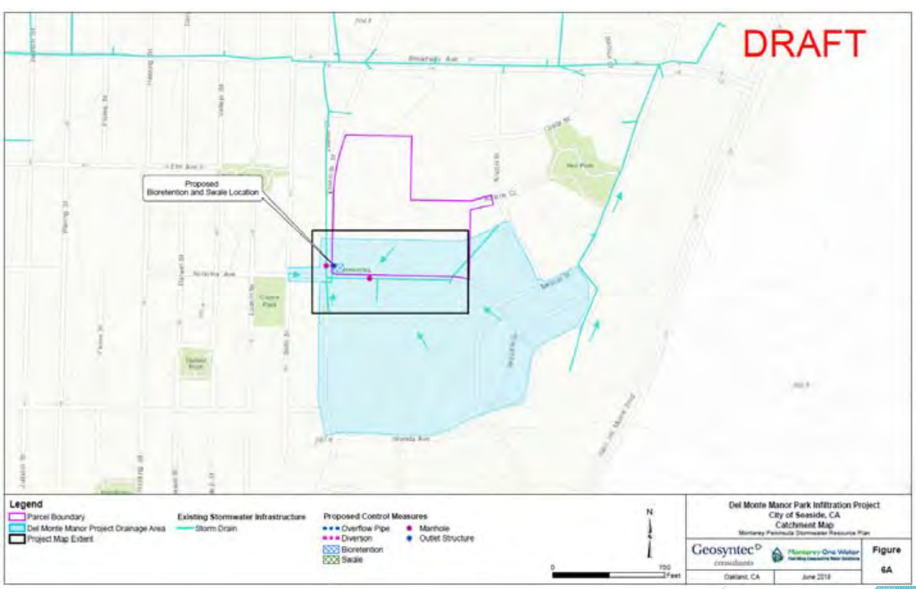
6. Del Monte Manor Park Infiltration



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7. Drywell Aquifer Recharge Program

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Thank you for your participation!

- Public Draft SWRP posted at www.MontereySea.org
- Comments due by July 25, 2018 to Jeff Condit jeff@my1water.org

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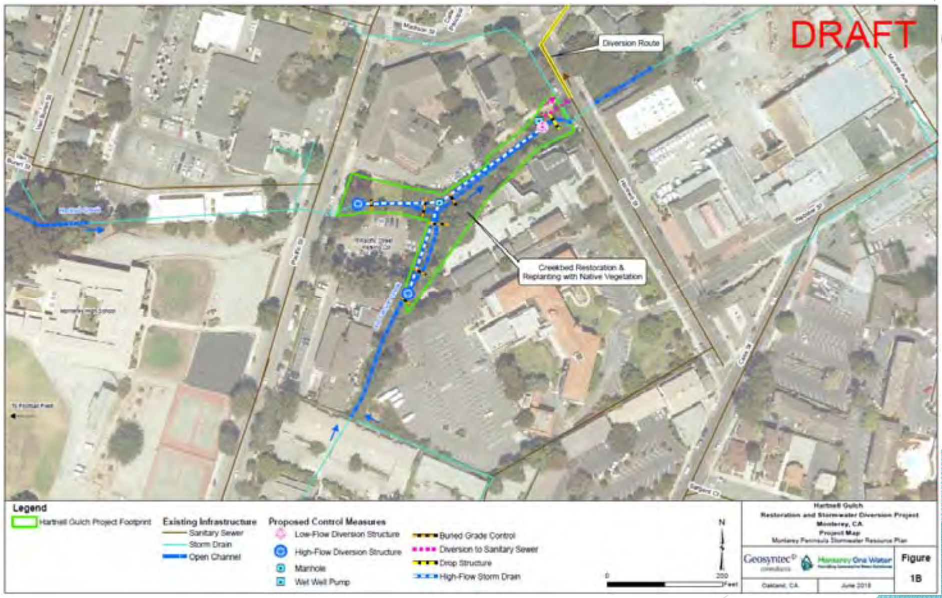
1. Hartnell Gulch Restoration and Stormwater Diversion



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2. Lake El Estero Diversion to Sanitary Sewer

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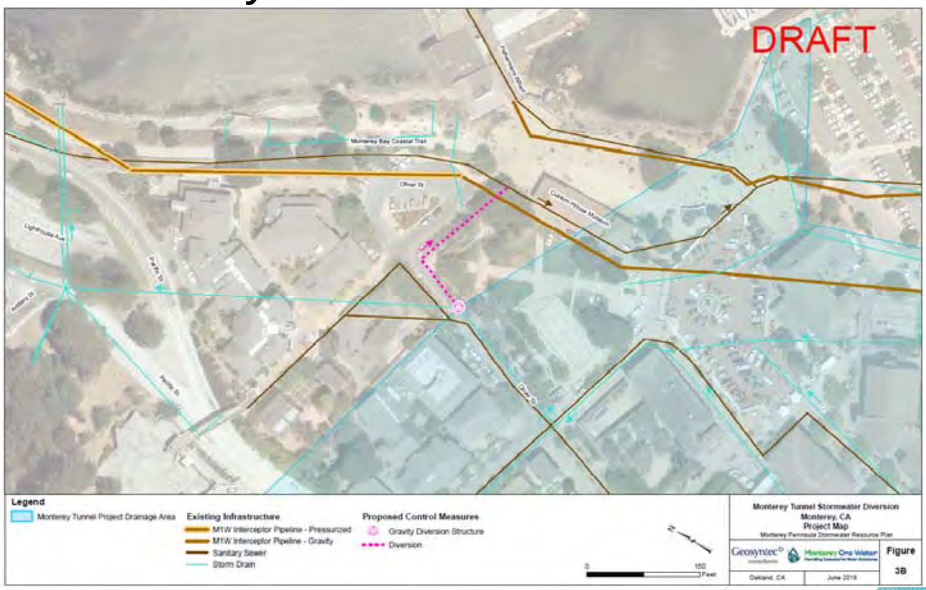
3. Monterey Tunnel Stormwater Diversion



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4. Carmel-by-the-Sea Stormwater Diversion

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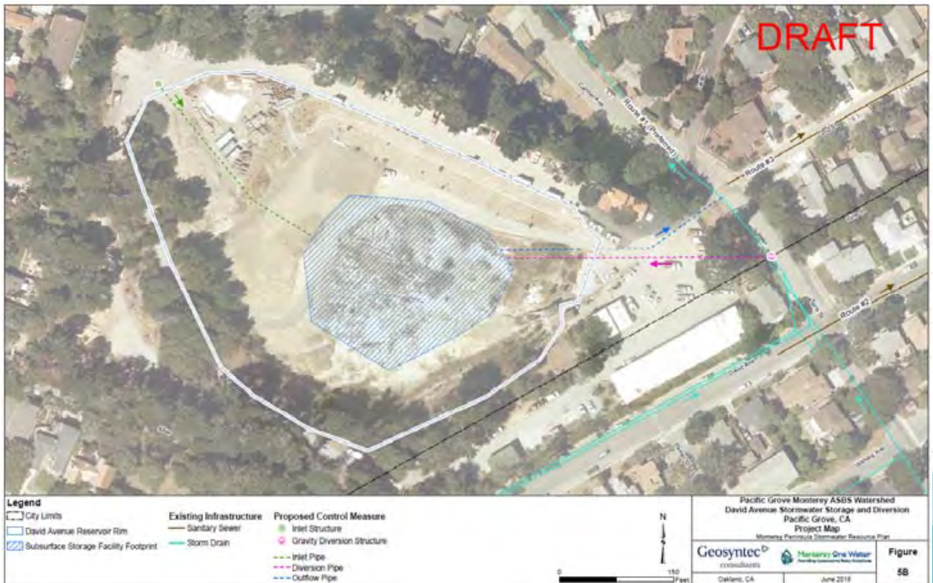
5. David Avenue Stormwater Storage and Diversion



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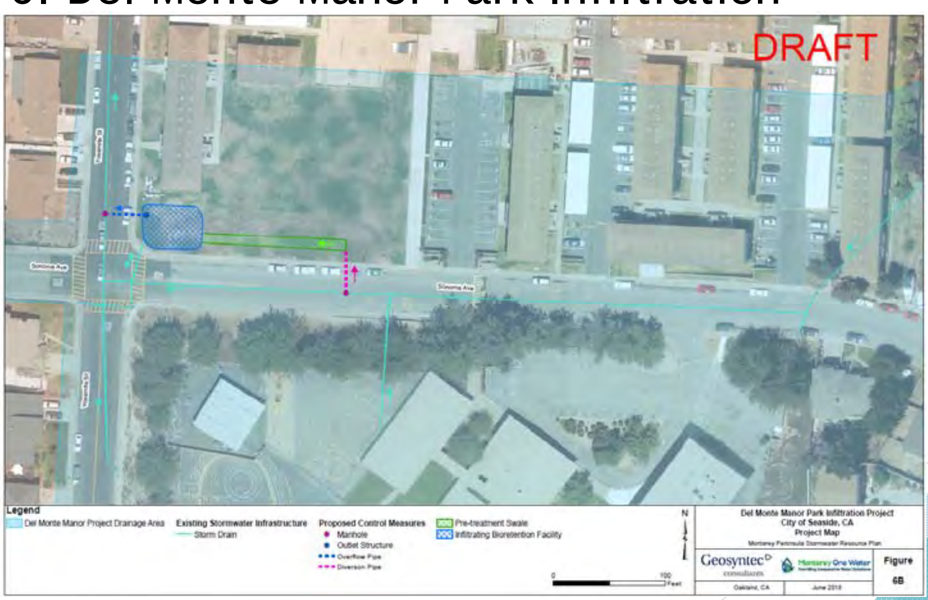
6. Del Monte Manor Park Infiltration



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7. Drywell Aquifer Recharge Program

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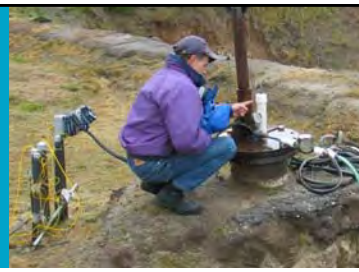
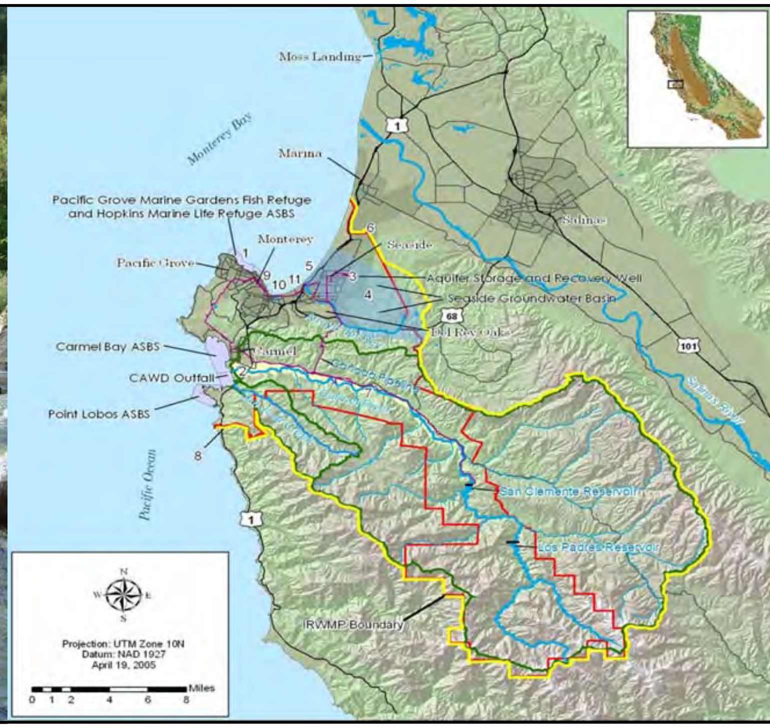


Monterey Peninsula, Carmel Bay and South Monterey Bay Integrated Regional Water Management

What is IRWM?

Integrated Regional Water Management (IRWM) is a collaborative effort to manage all aspects of water resources in a region. IRWM crosses jurisdictional, watershed, and political boundaries; involves multiple agencies, stakeholders, individuals, and groups; and attempts to address the issues and differing perspectives of all the entities involved through mutually beneficial solutions.



Monterey Peninsula, Carmel Bay & Southern Monterey Bay IRWM

- Group formed in 2005
- 2007 Plan
- 2014 Plan Update
  - $1M grant managed by MPWMD
- RWMG hasn't been meeting since 2014

Current Regional Water Management Group

- Monterey Peninsula Water Management District
- Monterey One Water
- Monterey County Water Resources Agency
- Marina Coast Water District
- City of Monterey
- Resource Conservation District of Monterey County
- Big Sur Land Trust

Proposition 1, Water Quality, Supply, and Infrastructure Improvement Act of 2014

- Prop 1 authorized $510M for IRWM
- Disadvantaged Community Involvement Program
  - Not less than $51 million
  - Awarded on non-competitive basis or direct expenditures
- IRWM Implementation Grant Program
  - Approximately $418 million for Implementation programs and projects
    - $51 million to projects directly benefiting DACs)

Central Coast Prop 1 Funding

Total Available $43M

- $39.99M excluding 7% administration costs.
- $4.3M Disadvantaged Community Involvement
- $4.3M Disadvantaged Community Implementation
- **$31.39M Implementation**

Monterey Peninsula IRWM Prop 1 Funding

- Central Coast Funding Area, Funding Agreement
  - 50% divided equally
  - 25% divided by population
  - 25% divided by acreage
- **$4.33M to Monterey Peninsula RWMG**
  - **10% DAC Involvement & 10% DAC Projects**
    - City of Monterey Franklin Street Storm Drain
    - MPWMD regional needs assessment
    - MPWMD disadvantaged community water conservation outreach

DWR's Proposition 1 IRWM Implementation Grant Schedule

- June/July 2018: Draft Project Solicitation Package (PSP) released
- Fall 2018: Final PSP released
- (Likely) April 2019 - DWR Central Coast Funding Area Workshop
- May 2019 - DWR follow up & comments on proposed projects
- Summer 2019 - Application deadline 4-6 weeks after DWR comments

2018 IRWM Project Solicitation and Plan Update Schedule

May:	Kick off meeting & information request
June:	Review of Goals and Objectives, Project Priorities
July to Aug:	Project concept proposals and/or more detailed proposals for grant application
August:	Review of project submittals, prioritization process
Fall (tbd):	Focused meeting with Native American Tribal representatives
October:	Stakeholder meeting for input on recommended prioritized projects
November:	Finalize project priorities for Prop 1 Grant application, begin review of IRWMP updates
Dec – Feb:	RWMG approval of IRWMP update, incorporation of Stormwater Resource Plan
February:	Submittal of IRWM Plan Update to DWR
April:	DWR Central Coast Funding Area Workshop

How Does the Stormwater Resource Plan Relate to IRWM?

- M1W coordinating with IRWM to incorporate the SWRP into the IRWM plan
- Draft & Final SWRP to be received by the RWMG in late summer/fall 2018
- RWMG to approve/accept SWRP into the IRWMP no later than December 2018 (required for SWRP)
- M1W and MRSWMP will facilitate implementation of the SWRP over time

Public Comments Matrix

SWRP-Focused Comments

Comment	Author	Comment	Section	Topic	Project Team Recommended Response
1	Jeff Krebs	Please make sure the list of projects in the SRP includes Tom Reeves' "Peninsula-wide integrated water augmentation study".	Section 6.1 and Project Database, Appendix E	Proposed/Planned Projects	Project will be added to the Project Database, Appendix E. Number of total projects will be updated in Section 6.1.
2	Jeff Krebs	Please make sure the list of projects in the SRP includes Ramona Av (W side) Stormwater Runoff Infiltration. Install high flow tree box catch basin storm water filter in the Ramona curb and gutter, and connect it to an adjacent seepage pit. See this year's NIP project submittal request that was funded. My goal will be to use my NIP money as a grant match and construct 5 of them, instead of just one.	Section 6.1 and Project Database, Appendix E	Proposed/Planned Projects	Project will be added to the Project Database, Appendix E. Number of total projects will be updated in Section 6.1.
3	Bob Siegfried	You did not explain how the pollutants will be removed from the Carmel Bay ASBS, only restating the process description. The issue is that the project description states that the process removes "any urban pollutants that are associated with the urban flows." This statement is correct only to the point that the pollutants are removed from the water that is delivered to Pebble Beach for golf course irrigation. The pollutants do not disappear following removal. They are discharged to the Carmel Bay ASBS through CAWD's outfall. The ASBS is the same destination at which the pollutants arrive if they are not sent to CAWD. The water supply aspects of the project benefit the community, and the loading to the ASBS remains unchanged. This project description error should be corrected so it does not claim benefits falsely.	Section 6.2/6.3 and Appendix F	Project Concepts	Statements referring to removal of urban pollutants associated with urban flows will be revised to replace "removal" with "treatment". CAWD and RTP end-of-pipe discharge analyses/review is not part of the SWRP scope and will not be discussed in the SWRP.
4	Robert Jaques	Three of the seven projects for which Conceptual Designs were prepared propose to use urban stormwater runoff to help recharge the Seaside Groundwater Basin. Aquifers in that Basin are a domestic water supply source. The Seaside Basin Watermaster is an arm of the Superior Court of Monterey County, created by the 2006 Adjudication Decision that governs the management of the Basin. One of the Watermaster's principle roles is to ensure that the Basin is managed such that there is no degradation in water quality. Specifically, the Adjudication Decision contains this language with regard to water quality: The Watermaster will take any action within the Seaside Basin, including, but not limited to, capital expenditures and legal actions, which in the discretion of Watermaster is necessary or desirable to accomplish any of the following: • Prevent contaminants from entering the Groundwater supplies of the Seaside Basin, which present a significant threat to the Groundwater quality of the Seaside Basin, whether or not the threat is immediate; Urban stormwater runoff typically contains numerous constituents that could be harmful to water quality. For this reason, the Watermaster would require that any such recharge project obtain from the Watermaster a permit to store water, via recharge, into the Basin. Obtaining a permit requires filing a storage application using the attached Storage Application template. The template was prepared for use by parties that are pumping (these are referred to as "Producers" in the Adjudication Decision), but I expect that the Watermaster Board would direct that we use the same application template for proposed recharge projects. If the Watermaster Board approves the application then the Watermaster would issue a permit to authorize the recharge to be performed. Please have this language added to the description of those three projects so that project proponents will be aware of this requirement if they decide to proceed with any of those projects.	Section 6.3 and Del Monte Manor Park and Drywell Project Concepts, Appendix F	Project Concepts	The following language will be added to the project concepts for projects that propose to infiltrate treated stormwater into the Seaside Groundwater Basin (two projects, three proposed locations). "Following the 2006 Adjudication Decision that governs management of the Seaside Groundwater Basin, implementation of this project would require filing a storage application and obtaining a permit from the Seaside Basin Watermaster to store water, via recharge, in(to) the Seaside Groundwater Basin. This permit is obtained through filing a Watermaster Storage Application. The Wastermaster has the authority to take the necessary actions to prevent contaminants from entering the Groundwater supplies of the Seaside Basin, which present a significant threat to the Groundwater quality of the Seaside Basin, whether or not the threat is immediate." A copy of the Watermaster Storage Application will also be included as an attachment to the project concepts in Appendix F.

Comment	Author	Comment	Section	Topic	Project Team Recommended Response
5	Agnes Topp	One thing I did notice on the project description for the Carmel stormwater diversion, which I'd missed earlier, is that the watershed on the northeast side of the project extends out beyond the limits of the City. Do you have access to TELR to see the limits of the watershed on the County side of the City limit? It's not a huge amount of additional acreage, but something like 30 or 40 acres of residential area though. If that part of the County isn't covered by TELR, let me know and I can give you a rough outline.	Carmel Stormwater Diversion Project Concept, Appendix F	Project Concepts	The TELR catchments are available for the City of Carmel and unincorporated Monterey County within the Carmel stormwater diversion project Rio Park Expansion watershed and were reviewed for the SWRP. No revision needed.
6	Patrick Treanor	Jurisdiction listed should be City of Carmel-by-the-Sea *and* Carmel Area Wastewater District.	Section 6.3 and Carmel Stormwater Diversion Project Concept, Appendix F	Project Concepts	The jurisdiction for the Carmel stormwater diversion project will be listed as, "City of Carmel-by-the-Sea *and* Carmel Area Wastewater District."
7	Patrick Treanor	Dry weather runoff is probably minor and would occur when the system has lots of capacity; so I would say that would be feasible.	-	Project Concepts	We thank the commenter for the input. No revision needed.
8	Patrick Treanor	"First flush" flows would need to be calculated as instantaneous flows using Time of Concentration to determine Intensity to determine Runoff Flow. Because the flow criteria is determined on an annual volume basis (not instantaneous flow) I am not able to tell you what percent of the "first flush" flows could be diverted to the sewer. I understand that this is conceptual so I guess it doesn't really matter at this stage.	Section 6.4	Project Concepts	The first flush was assumed to be equivalent to the 85th percentile storm event for concept sizing. This detail will be added to Section 6.4
9	Public Meeting Comment	Ensure that project implementation is a collaborative effort. Identified projects should not be in conflict with each other.	Section 5.2.1 and Appendix D, Water Recovery Study Section 3.3.6, Table 9, and Appendix C	Project Identification and Implementation	Project footprints were identified through geospatial analysis as described in Section 5.2.1. Project footprints do not overlap; project drainage areas may overlap. Overlapping drainage areas were identified in the Water Recovery Study as described in Appendix D of the SWRP - Section 3.3.6, Table 9, and Appendix C. Prior to moving forward with project design, overlapping drainage areas may need to be considered. This level of coordination is outside of the SWRP Scope of Work. No revision needed.
10	Public Meeting Comment	As other projects are designed, consider on-site runoff capture instead of off-site capture.	Section 5.3	Project Identification	On-site runoff capture was considered as part of project identification for all projects (along with off-site runoff capture, as applicable). Project identification is described in Section 5.3. Project sizing for all projects is outside of the SWRP Scope of Work. No revision needed.
11	Public Meeting Comment	Consider including Phase II Permit requirements while designing projects.	Section 6.4	Project Concepts	As described in Section 6.4, project sizing did consider Phase II permit requirements. No revision needed.

Water Recovery Study-Focused Comments

Comment	Author	Comment	Section	Topic	Project Team Response
12	Tom Reeves	What will be the demand for potable water in 50 years?	-	Policy	Comment is outside of the SWRP and Water Recovery Study Scope of Work. No revision needed.
13	Tom Reeves	If that demand can be met by desalination, is there a better/less expensive alternative?	SWRP Appendix D, Water Recovery Study Section 2 and 3.2	Alternative Water Supply Project Types	The technical-based identification/selection of stormwater capture method is provided and described in Section 2 of the Water Recovery Study. Planning level unit project cost ranges are provided in Section 3.2. Cost range comparison to typical costs for desalination is provided. Policy/economic-based selection of alternative water supply capture methods is outside of the SWRP and Water Recovery Study Scope of Work. No revision needed.
14	Tom Reeves	If stormwater and urban runoff can provide all or a portion of source water, how much of that source water do we need?	-	Policy	Comment is outside of the SWRP and Water Recovery Study Scope of Work. No revision needed.
15	Tom Reeves	If there are physical limits to how much urban runoff/stormwater we can utilize, what are those limits? Can those limits be changed by the building of new infrastructure or if in the case of a regulatory/permitting restriction, changing those limits?	SWRP Appendix D, Water Recovery Study Section 2, 3.3.3, and 4.2	Water Infrastructure Improvements	The scope of the Water Recovery Study included an examination of feasible sources, as described in Section 2. Permitting complexity related to sources was examined and provided in Section 3.3.3. A discussion of infrastructure/storage improvements is provided in Section 4.2. A detailed analysis of the supply limits of identified sources is outside of the scope of the Water Recovery Study/SWRP. No revision needed.
16	Tom Reeves	What is the economic tipping point at which building those improvements makes utilizing urban runoff/stormwater uneconomical?	-	Policy	Comment is outside of the SWRP and Water Recovery Study Scope of Work. No revision needed.

Comment	Author	Comment	Section	Topic	Project Team Response
17	Tom Reeves	If surface water reservoirs are to play a part in utilizing urban runoff/stormwater, how can those limited impoundments most efficiently be used? (Who would manage those reservoirs? How could they be managed to maximize yield?)	SWRP Appendix D, Water Recovery Study Section 2.1,	Policy	Reservoir management improvements are discussed in Section 2.1. Reservoir management responsibilities are outside of the scope of the Water Recovery Study/ SWRP. No revision needed.
18	Tom Reeves	If urban runoff/stormwater is a viable source of water, how best do we distribute the benefit back to the various communities who are cooperating?	-	Policy	The captured stormwater is being directed to the RTP/CAWD WWTP or recharged. Distribution would occur per mechanisms proposed/underway at the RTP/CAWD WWTP and through management of water supply aquifers. Agreements for Water Rights may need to be negotiated. This comment is outside of the SWRP and Water Recovery Study Scope of Work. No revision needed.
19	Tom Reeves	What's the best way to treat and store urban runoff/stormwater so that it can be used for potable purposes (should it go to a regional plant? Are there opportunities for smaller satellite treatment systems? Are there opportunities for injecting treated water into aquifers that are unfit for drinking without treatment by pushing those non-potable waters aside with the injected water as has been done in other parts of the US?)	SWRP Appendix D, Water Recovery Study, Section 2 and 4.2	Alternative Water Supply Project Types and Water Infrastructure Improvements	Options for storage and treatment of captured stormwater and dry weather runoff is discussed in Section 2 and 4.2. Policy/economic-based decisions related to alternative water supply capture methods are outside of the SWRP and Water Recovery Study Scope of Work. No revision needed.
20	Tom Reeves	How close can the Cities of Pacific Grove and Monterey come to achieving the SWRCB's goal of zero discharge?	SWRP, Section 4.2.2 and 4.2.6	Policy	As stated in the SWRP Section 4.2.2, "As summarized in the Monterey Peninsula IRWMP (MPWMD and DD&A, 2014), the ASBS Special Protections generally include the elimination of dry weather runoff to the ASBS, developing measures to prevent wet weather runoff from altering natural water quality in the ASBS, and conducting adequate monitoring to examine if natural water quality and the marine life beneficial use is protected." Plans to reduce dry and wet weather flows to the Pacific Grove ASBS are discussed in the SWRP Section 4.2.6. This comment is outside of the SWRP and Water Recovery Study Scope of Work. No revision needed.

Comment	Author	Comment	Section	Topic	Project Team Response
21	Tom Reeves	If unused allocations from the Castroville Seawater Intrusion Project (CSIP) are more than the regional sewage treatment plant can handle in the winter season, then are there alternatives to treating urban runoff/stormwater during the winter (and likely throughout the year) that wouldn't rely on the existing sewage treatment system?	SWRP Appendix D, Water Recovery Study, Section 3.1 and 4.2	Water Infrastructure Improvements	The projects proposed as part of the Water Recovery Study assume some combination of first flush, wet weather, and dry weather flow capture as discussed in Section 3.1. For some cases, infrastructure improvements to capture additional wet weather flows for supplementary supply are discussed in Section 4.2. An analysis of the ability of the RTP/CAWD WWTP to receive wet weather flows is outside of the SWRP and Water Recovery Study scope of work. No revision needed.
22	Tom Reeves	If Salinas' agricultural wash water is a good source of water for treatment, what does that mean in terms of allocating potable water credits to the Peninsula communities (does that great source of water take all of the capacity away? Is there an allocation of capacity in place so that Peninsula communities can share in the benefits?)	-	Policy	This comment is outside of the SWRP and Water Recovery Study Scope of Work. No revision needed.

APPENDIX I
IRWMP Decision Support Tools

APPENDIX I: IRWMP DECISION SUPPORT TOOLS

This Appendix includes decision support tools relating to prioritizing and funding of projects and/or project opportunities listed in the final SWRP that are included as part of IRWMP project lists for project implementation.

These items are provided on the following pages of this appendix:

* * * *

Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Plan Update, Chapter 6: Project Review Process

Chapter 6 Project Review Process

IRWM Standard 6

The IRWM Plan must contain a process or processes to select projects for inclusion in the IRWM Plan. The selection process(es) must include the following components:

- Procedures for submitting a project to the RWMG
- Procedures for review of projects considered for inclusion into the IRWM Plan. These procedures must, at a minimum, consider the following factors:
  - How the project contributes to the IRWM Plan objectives
  - How the project is related to resource management strategies selected for use in the IRWM Plan
  - Technical feasibility of the project
  - Specific benefits to DAC water issues
  - Environmental Justice (EJ) considerations
  - Project costs and financing
  - Economic feasibility, including water quality and water supply benefits and other expected benefits and costs
  - Project status
  - Strategic considerations for IRWM Plan implementation
  - Contribution of the project in adapting to the effects of climate change in the region
  - Contribution of the project in reducing GHG emissions as compared to project alternatives
  - Whether the Project Proponent has adopted or will adopt the IRWM Plan
  - For IRWM regions that receive water supplied from the Sacramento-San Joaquin Delta, how the project or program will help reduce dependence on the Sacramento-San Joaquin Delta for water supply (not applicable to Monterey Peninsula Region)
- Procedures for displaying the list(s) of selected projects

Review factors must be evaluated for each project and compared for all projects in a systematic manner. The results should be used to promote and prioritize projects in the selection process, while keeping in consideration the unique goals and objectives of the IRWM Region.

6.1 Procedures for Submitting a Project for Inclusion in the IRWM Plan

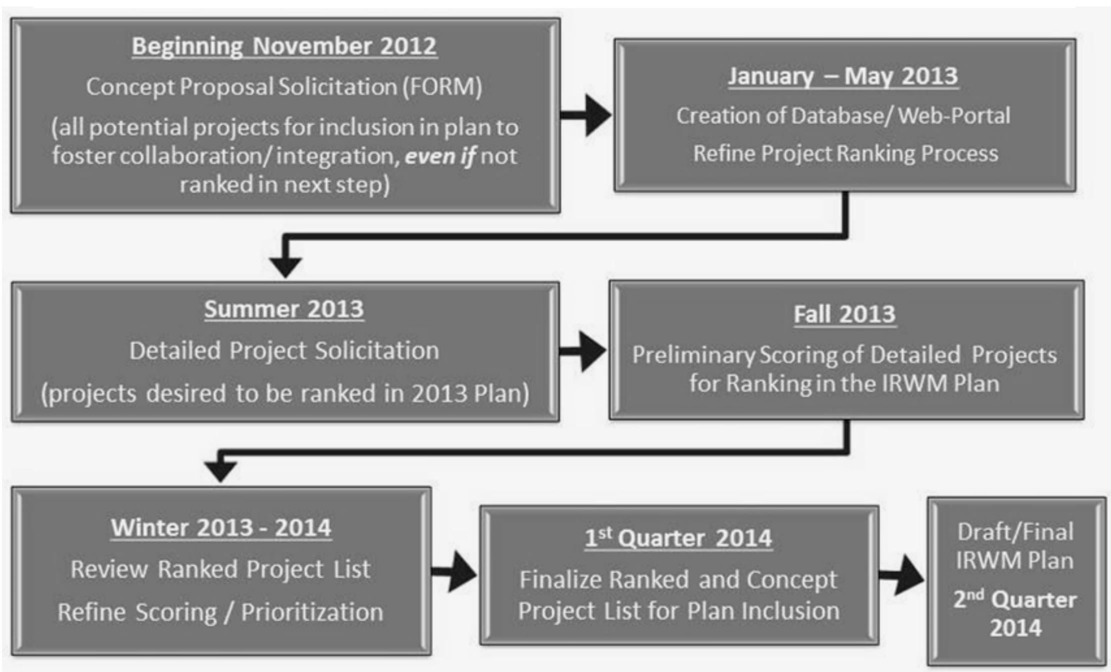
Prioritization of projects is a required element of an IRWM Plan and aids regional decision-making on issues such as project sequencing and quantitative allocations of limited financial, economic, social, and natural resources. Consistent with IRWMP standards, projects that utilize multiple water management strategies, meet Regional priorities, accomplish multiple objectives, and are feasible score higher and are more likely to move forward during implementation of the Plan.

This IRWM Plan incorporates a process to include a large number of stakeholder-sponsored projects with the potential for significant cost; however, given the scope and cost of some of the projects, it is unlikely that all projects can be fully funded by both local and State IRWM funds in the immediate future. Project sponsors may need to seek alternative funding sources in order to close funding gaps.

For the 2007 IRWM Plan, the Stakeholder Group and Technical Advisory Committee developed a system to compare and prioritize projects with vastly different characteristics. A 100-point system was used to evaluate the suite of selected projects, with each project evaluated both against other projects and on whether a project would meet measurable regional objectives. Project characteristics that were deemed more important to the Region were allocated more points. Points were awarded in four different categories – water management strategies, objectives, regional priorities, technical and financial feasibility, and readiness to proceed. The result was an evaluation that describes both the strengths and weaknesses of each project and the project package as a whole. The categories and distribution of points used during project evaluation is outlined in section 6.1.2 and 6.1.3.

The Regional Water Management Group (RWMG) solicited projects for inclusion in the 2013 Update to the Integrated Regional Water Management (IRWM) Plan with a goal of creating a comprehensive project list that included concept proposals and projects that were prioritized and ready to implement. The projects included in this IRWM Plan are consistent with Plan objectives. All projects were required to undergo a thorough review process before they could be formally included in the IRWM Plan. **Figure 6-1** shows an overview of the process.

Figure 6-1: Project Solicitation Process for 2013 IRWM Plan (Update)



For inclusion in the plan, Project Proponents were required to first complete a short concept proposal form. Proposals that met eligibility criteria were included in the IRWM Plan Update and were moved to Step 2, allowing their project to be ranked (or prioritized). Concept proposals were required to meet the following minimum eligibility criteria to be included in the IRWM plan. The concept proposal will:

- assist the Monterey Peninsula region in achieving at least one of its IRWM Plan objectives,
- implement at least one of the region's Resource Management Strategies,
- provide water resource benefits to the region, and
- be consistent with Proposition 84 IRWM Guidelines and Department of Water Resources standards and requirements.

The concept proposal form was available for download starting in the first quarter of 2013 and could be completed and emailed to the MPWMD by accessing a PDF file located on the MP IRWM website. As of approximately March 1, 2013, the new website[1] was ready and the on-line form was available. Projects

[1] www.mpirwm.org

and proposals included in the 2007 Monterey Peninsula IRWM Plan were not automatically included in the 2013 IRWM Plan unless a concept proposal form was completed. The Project Proponent was required to follow specific steps in order to submit a project:

- complete a concept proposal for each project
- ensure the project information was up to date
- respond to requests for information within the established deadline
- request that a project be removed if it was no longer being pursued

Projects submitted to the plan as concept proposals are contained in **Appendix 6-a**.

6.1 Project Review Procedure

6.1.1 Detailed Project Solicitation and Scoring/Ranking (Step 2)

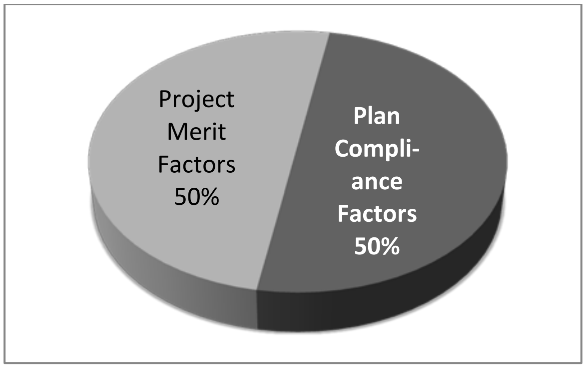
Project Proponents were not required to complete Step 2 in order to be included in the IRWM Plan. However, a detailed project submittal was required to be completed in order to be eligible for inclusion in an implementation grant application to the IRWM Grant Program and to be ranked in the plan.

Step 2 included submittal of detailed project information using a web-based “Project Solicitation Form” as described below that allowed detailed objective scoring and results in an overall ranked or prioritized list of projects. Projects were added to the Project List by the Project Proponent(s) and in the first quarter of 2014, stakeholders were provided an opportunity to comment on the ranked list of projects through an email announcement of their availability on the mpirwm.org website. In the case of multi-entity projects, a lead entity or “Project Proponent” was required to be designated. For projects to be ranked and prioritized, Project Proponents were required to complete and submit the detailed Project Solicitation Form available at www.mpirwmp.org no later than July 19, 2013.[2] To remove a project, the Project Proponent was required to submit a written request for removal to the RWMG. The request for removal must include: the project title, consent to remove the project from all project lists, and the reason for removal of the project. In the event of multi-entity projects, all entities must agree in writing to a project’s removal from the IRWM Plan. However, no projects were removed during the project ranking process or preparation of this plan update.

Each project was ranked based on a score developed from answers on the Project Solicitation Form, which included a methodology for scoring that is summarized below. Two categories of factors were included in the scoring: (1) factors related to how well the project complied with the IRWM Plan, such as policy consistency and ability to assist the region in meeting its goals, and (2) factors related to the individual merits of the project, such as feasibility, readiness to proceed, and costs. Scores from each of these categories comprised one-half of the overall project score as shown in **Figure 6-2**. A detailed description of project scoring criteria, factors, relative weighting, and raw scoring is provided below.

[2] Detailed Project Solicitation forms were available at the MP IRWMP website March 1, 2013.

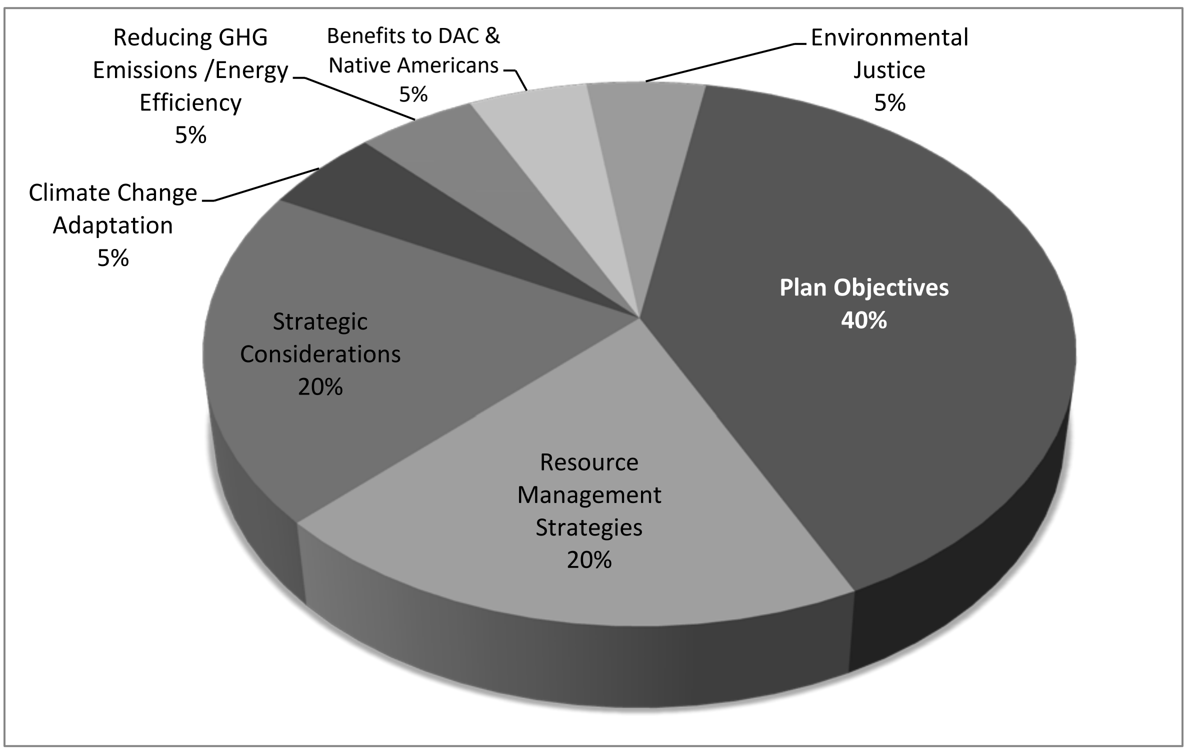
Figure 6-2: Relative Weighting: Plan Compliance vs. Project Merit Factors



6.1.2 IRWM Plan Compliance Factors (50% of total score)

Within the Plan Compliance category, projects were scored based upon the following specific factors and the relative weighting is shown in **Figure 6-3**. Following each factor, (in *italics)* is the methodology used to assign raw scores to projects based upon the project information submitted in the Project Solicitation Form. The appropriate weighting factor was applied to the raw score to give a weighted score to be used in the overall ranking.

Figure 6-3: Relative Weighting of Plan Compliance Factors



- **How the project contributed to the IRWM Plan Objectives** (40% of Plan Compliance Factors)
    - Number of objectives and high priority objectives that the project addressed

      Up to 53 points: Each project received one (1) point for meeting each of 26 objectives (26 max points). Plus, up to an additional 3 points could be received if specific metrics of each of the nine (9) high priority objectives were met.
- **How the project related to Resource Management Strategies** (20% of Plan Compliance Factors)
    - Number of different California Water Plan Management Outcome Categories and number of strategies that the project included.

      Total of up to 35 points, including 1 point per RMS, plus one point for every CWP management outcome category.
- **Strategic considerations for IRWM Plan implementation and project merit** (20% of Plan Compliance Factors)
    - Inter-Regionalism: Did the project involve active inter-regional collaboration or partnerships?

      5 points: project addresses inter-regional issues
    - Partnerships: How many entities were actively partnering to implement the project?

      5 points: project involved three or more partners that included both government agencies and NGOs; or

      2 points: project involved two or more partners: 0 points: project involved only one entity (no partnerships).
    - Monitoring and reporting of project performance: Would the project establish and document achievement of the performance criteria?

      5 points: project presents a plan for monitoring/reporting performance
    - Integration with land use planning: Was the project consistent with local plans, ordinances, and standards? Did the project integrate with local land use and water planning? Did the project increase coordination between water resources agencies and land use planners?

      5 points: if "yes" to all three questions; 3 points if "Yes" to 2 questions; 1 point for "yes" to one question
- **Specific benefits to critical disadvantaged community (DAC) and/or Native American tribal communities' water issues** (5% of Plan Factors)
    - Did the proposed project provide specific benefits to solve critical DAC water issue(s)?

      Yes: 5 points
- **Environmental Justice considerations** (5% of Plan Factors)
    - Did the project redress inequitable distribution of environmental burdens and/or improve access to environmental goods?

      Yes: 5 points
- **Contribution to climate change adaptation** (5% of Plan Factors)

- Would the project contribute to regional adaptation to projected climate change impacts? Does the project propose to implement one or more of the recommendations from the document: "*Evaluation of Erosion Mitigation Alternatives for Southern Monterey Bay*" (Monterey Bay Sanctuary Foundation and the Southern Monterey Bay Coastal Erosion Working Group, May 2012)?

  5 points: one point for every adaptation strategy implemented

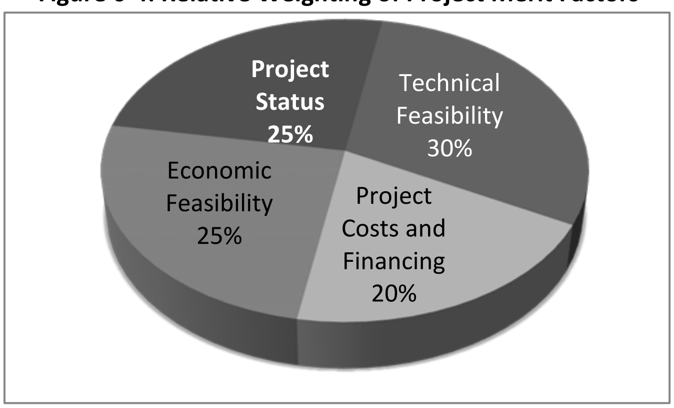
- **Contribution of the project in reducing Greenhouse Gas Emissions as compared to project alternatives** (5% of Plan Factors)
  - Compared to project alternatives, would the project reduce regional GHG emissions and/or improve energy efficiency?

5 points: one point for every GHG mitigation strategy implemented

6.1.3 Project Merit Factors (50% of total score)

Within the Project Merit category, projects were scored based upon the following specific factors with the relative weighting shown in **Figure 6-4**. Similar to the plan compliance factors, the ***italic*** text describes the proposed methodology used to assign raw scores. These factors are based upon the project information submitted in the Project Solicitation Form (and prior to applying the weighting agreed upon at the October 24, 2012 stakeholder meeting).

Figure 6-4: Relative Weighting of Project Merit Factors



- **Technical Feasibility** (30% of Project Merit Factors)
  - Was a common and widely accepted technology with well-documented results being used?
  - Were geologic conditions, hydrology, ecology, and other system aspects adequately described?
  - Were there significant data gaps?
  - Were there sufficient technical data to indicate the project is likely to result in success?
  - Was there enough information to support the project's estimated benefits?

  30 points: technical feasibility was documented in a project-specific pilot study or previous phase or has a documented track record of success

  -- OR score for each of the following –

  10 points: technology proposed has been established as effective in similar situations;

10 points: project site conditions were documented (geology/soil, ecology, hydrology, land use, public utilities;

10 points: project partners have experience with similar projects (e.g., similar site, similar technology).

- **Project Costs and Financing** (20% of Project Merit Factors)
  - ***10 points:*** A project cost estimate was prepared and documented in the Project Form.
  - ***10 points:*** There was an identified revenue source of at least 25% match funding.
- **Economic Feasibility** (25% of Project Merit Factors)
  - ***15 points:*** Project benefits and costs were defined at a level of detail that would allow cost-effectiveness analysis or benefit-cost analysis **-- OR –** ***project is a DAC project.***
  - ***10 points:*** Project had a cost-effectiveness or benefit-cost ratio greater than 1.
- **Project Status** (25% of Project Merit Factors)
  - What steps in project planning were completed?
    - Feasibility Studies and Conceptual Plans
    - CEQA/NEPA Completed
    - Local Cost Share Confirmed
    - Right-of-way / Land Acquisition
    - Permits Acquired
    - Construction Drawings Complete & Bids Acquired

  (*4 points for each of the above criterion met for a possible total of 24 points)*

6.2 Procedures for Communicating Selected Projects

This plan and the mpirwm.org website contains the projects that were submitted to the plan, including concept proposals aimed at increasing collaboration and integration and projects that were submitted using the detailed solicitation form to be ranked. The project ranking process was developed in collaboration with the stakeholders, vetted through the RWMG members, and is described in this chapter. An email announcement of the availability of the preliminary project rankings was sent to RWMG members and stakeholders on January 14, 2014. The email and attachments are included in **Appendix 6-b.** The full detail of the projects submitted to the plan for ranking is in **Appendix 6-c**. The Monterey Peninsula IRWM website (www.mpirwm.org) contains information on the upcoming solicitations for grant programs and how to include projects in future plan updates. **Table 6-1** shows the results of the project ranking process.

Table 6-1: Results of Project Prioritization

"Raw Scores" (Shaded Cells) were populated with the project information from Relevant Project Solicitation sheets within this file

"Weighted Scores" automatically calculate based on the Stakeholder-vetted Scoring and Weighting Table presented at the Feb. 6, 2013 stakeholder meeting.

IRWM PLAN COMPLIANCE CRITERIA

Projects	Objectives: Raw Score (Max 53)	Objectives: Weighted Score	Resource Management Strategies: Raw Score (Max 35)	Resource Management Strategies: Weighted Score	Strategic Considerations – Inter-Regionalism: Raw Score (Max 5)	Strategic Considerations – Partnerships: Raw Score (Max 5)	Strategic Considerations – Monitor / Report: Raw Score (Max 5	Strategic Considerations – Land Use Integ.: Raw Score (Max 5)	Strategic Considerations: Weighted Score	Benefits to DAC & Native Americans: Raw Score (Max 5)	Benefits to DAC & Native Americans: Weighted Score	Environmental Justice: Raw Score (Max 5)	Environmental Justice: Weighted Score	Climate Change Adaptation: Raw Score (Max 5)	Climate Change Adaptation: Weighted Score	Reduction in GHG: Raw Score (Max 5)	Reduction in GHG: Weighted Score	Plan Compliance Total Weighted Score
Carmel Bay ASBS Project	23.2	19.9	6.0	3.9	5.0	2.0	5.0	5.0	19.4	0.0	0.0	0.0	0.0	5.0	5.7	2.0	2.3	**51.2**
Carmel River Integrated Watershed Restoration Program	20.4	17.6	2.0	1.3	0.0	5.0	5.0	1.0	12.5	0.0	0.0	0.0	0.0	1.0	1.1	0.0	0.0	**32.6**
Carmel Valley Livestock & Land Program	19.8	17.1	4.0	2.6	5.0	5.0	5.0	3.0	20.5	0.0	0.0	0.0	0.0	3.0	3.4	0.0	0.0	**43.6**
Carmel Watershed Rural Roads Erosion Assistance Program	12.6	10.9	4.0	2.6	0.0	5.0	5.0	1.0	12.5	0.0	0.0	0.0	0.0	1.0	1.1	0.0	0.0	**27.1**
Incorporation of the Peninsula in the Central Coast Action Tracker	16.1	13.9	4.0	2.6	5.0	5.0	5.0	5.0	22.8	0.0	0.0	0.0	0.0	4.0	4.6	2.0	2.3	**46.1**
Del Monte Lift Station Upgrades	4.8	4.2	1.0	0.7	0.0	2.0	5.0	3.0	11.4	5.0	5.7	0.0	0.0	0.0	0.0	0.0	0.0	**21.9**
Ecosystem Condition Profile for the Carmel River Watershed	19.5	16.8	3.0	2.0	0.0	5.0	5.0	1.0	12.5	0.0	0.0	0.0	0.0	2.0	2.3	0.0	0.0	**33.5**

PROJECT MERIT CRITERIA

Projects	Technical Feasibility: Raw Score (Max 30)	Technical Feasibility: Weighted Score	Project Cost and Financing: Raw Score (Max 10)	Project Cost and Financing: Weighted Score	Economic Feasibility: Score (Max 25)	Economic Feasibility: Weighted Score	Project Status: Raw Score (Max 24)	Project Status: Weighted Score	Project Merit Total Score	**GRAND TOTAL PROJECT SCORE**	**PROJECT POINT %**
Carmel Bay ASBS Project	30.0	34.2	20.0	22.8	0.0	0.0	8.0	9.4	**66.4**	**117.6**	**18%**
Carmel River Integrated Watershed Restoration Program	30.0	34.2	0.0	0.0	0.0	0.0	0.0	0.0	**34.2**	**66.8**	**10%**
Carmel Valley Livestock & Land Program	30.0	34.2	20.0	22.8	0.0	0.0	0.0	0.0	**57.0**	**100.6**	**15%**
Carmel Watershed Rural Roads Erosion Assistance Program	30.0	34.2	0.0	0.0	0.0	0.0	0.0	0.0	**34.2**	**61.3**	**9%**
Incorporation of the Peninsula in the Central Coast Action Tracker	30.0	34.2	20.0	22.8	0.0	0.0	22.0	26.0	**83.0**	**129.1**	**19%**
Del Monte Lift Station Upgrades	30.0	34.2	20.0	22.8	0.0	0.0	0.0	0.0	**57.0**	**78.9**	**12%**
Ecosystem Condition Profile for the Carmel River Watershed	30.0	34.2	10.0	11.4	10.0	11.4	20.0	23.6	**80.6**	**114.1**	**17%**

Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Program Application Form for Implementation Projects and Concept Proposals 2018/2019

MONTEREY PENINSULA, CARMEL BAY AND SOUTH MONTEREY BAY INTEGRATED REGIONAL WATER MANAGEMENT PROGRAM

APPLICATION FORM FOR IMPLEMENTATION PROJECTS AND CONCEPT PROPOSALS

2018/2019

GENERAL INSTRUCTIONS:

Both implementation project proposals and concept proposals are being accepted at this time. Only implementation projects, however, will be eligible for IRWM Implementation Grant funds.

For concept proposals: If you would like to submit a concept proposal, you need only complete Sections I and II of this application.

For implementation projects: There will be two rounds of Proposition 1 IRWM Implementation Grant solicitations (Round 1 in early 2019, Round 2 in 2020). If you are interested in having your project considered for Round 1, you must complete all sections of this application. If you are not interested in having your project considered for Round 1, you need only complete Sections I and II.

For those interested in applying for Round 1: In addition to this application form, stakeholders who are interested in having their projects considered for Round 1 must also complete DWR's Project Information Form. The Project Information Form will be due on February 8, 2019.

Both this form ("Project Application Form") and DWR's form ("Project Information Form") should be submitted to: Maureen Hamilton, Monterey Peninsula Water Management District - mhamilton@mpwmd.net

THIS APPLICATION FORM IS DUE January 14, 2018

THE PROJECT INFORMATION FORM IS DUE FEBRUARY 8, 2019

SECTION I. PROJECT SUMMARY AND IRWM OBJECTIVES

1. Project Proponent (Name of Organization Applying):

2. Type of Entity:

☐ Local Public agency ☐ Nonprofit organization ☐ Public Utility ☐ Mutual Water Company

☐ Federally Recognized or State Indian Tribe

3. Name and Title of Contact Person:

4. Phone:

5. Email:

6. Project Title:

7. Type of Proposal: Is your project an implementation project (developed, with budget) or a concept proposal?

- ☐ Implementation project
- ☐ Concept proposal

8. Project Summary: Briefly describe your project (one paragraph):

9. Project Location: Projects must be located within the Monterey Peninsula, Carmel Bay and South Monterey Bay IRWM region,[1] or otherwise be of direct benefit to the Monterey Peninsula, Carmel Bay and South Monterey Bay IRWM region. Where is your project located?

10. IRWM Criteria

To be eligible for inclusion in the IRWM Plan, projects must include one or more of the following elements. Please check all that apply:

- ☐ Water reuse and recycling for non-potable reuse and direct and indirect potable reuse
- ☐ Water-use efficiency and water conservation
- ☐ Local and regional surface and underground water storage, including groundwater aquifer cleanup or recharge projects
- ☐ Regional water conveyance facilities that improve integration of separate water systems
- ☐ Watershed protection, restoration, and management projects, including projects that reduce the risk of wildfire or improve water supply reliability
- ☐ Storm water resource management, including, but not limited to, the following:
  - Projects to reduce, manage, treat, or capture rainwater or storm water
  - Projects that provide multiple benefits such as water quality, water supply, flood control, or open space
  - Decision support tools that evaluate the benefits and costs of multi-benefit storm water projects
  - Projects to implement a storm water resource plan
- ☐ Conjunctive use of surface and groundwater storage facilities
- ☐ Water desalination projects
- ☐ Decision support tools to model regional water management strategies to account for climate change and other changes in regional demand and supply projections
- ☐ Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff
- ☐ Regional projects or programs as defined by the IRWM Planning Act

[1] The Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM region includes: land areas within the San Jose Creek and Carmel River watersheds, portions of the Seaside Groundwater Basin and former Fort Ord, and most of the Monterey Peninsula (the Greater Monterey County region includes and runs north from Marina, as well as all most remaining areas of Monterey County, with the exception of Pajaro Valley).

11. IRWM Plan Objectives

The following objectives have been identified for the Monterey Peninsula, Carmel Bay and South Monterey Bay IRWM Plan. Please select all of the objectives that the project will address, and very briefly explain (unless it is *entirely obvious*) how your project will address each objective. (For concept proposals, you need not provide the justification.)

	Objective	Justification
Water Supply Goal		
☐	WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.	
☐	WS-2. Maximize use of recycled water and other reuse and where feasible, expand sewer services to areas with onsite systems to increase sources of water for recycling.*	
☐	WS-3. Develop opportunities for stormwater capture and reuse pursuant to the Stormwater Resource Plan.	
☐	WS-4. Evaluate, advance, or create water conservation throughout the Region.*	
☐	WS-5. Improve water supplies to achieve multiple benefits, beneficial uses and environmental flows.	
☐	WS-6. Seek long-term sustainable supplies for adopted future demand estimates.	
☐	WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.	
Water Quality Goal		
☐	WQ-1. Improve inland surface water quality for environmental resources (e.g. steelhead), including headwaters and tributaries of streams, and to protect potable water supplies.*	
☐	WQ-2. Improve ocean water quality, including, but not limited to, Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.	
☐	WQ-3. Protect and improve water quality in groundwater basins, especially where at risk from seawater intrusion.	
Flood Protection Goal		
☐	FP-1. Develop regional projects and plans necessary to protect critical infrastructure and sensitive habitats from flood damage and sea level rise, in particular, along the Carmel Bay and South Monterey Bay shoreline.*	
☐	FP-2. Develop approaches for floodplain restoration or adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).	
☐	FP-3. Promote floodplain restoration that protect quality and availability of water while preserving or restoring ecologic and stream function.	
☐	FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.*	
Coastal and Streamside Erosion Goal		
☐	CSE-1. Manage areas along the shoreline susceptible to erosion, including long-term strategic retreat where appropriate.	
☐	CSE-2. Identify opportunities to restore natural stream function, including meandering, in the lower 15 miles of the Carmel River and selected tributaries.	

☐	CSE-3. Reduce or prevent adverse downcutting in the main stem Carmel River and its tributaries.	
Watershed Management Goal		
☐	WM-1. Reduce human-induced sources of non-point fine sediment runoff.	
☐	WM-2. Restore natural fire frequency in headwater forests.	
☐	WM-3. Restore the natural hydrologic flow regime in disturbed watersheds where appropriate, including low impact development strategies in urbanized areas.	
☐	WM-4. Re-establish a natural level of sediment supply within the Carmel River and its tributaries.	
Environmental Protection and Enhancement		
☐	EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds*; including, but not limited to, promoting the steelhead recovery by meeting accepted or approved environmental flows within the regional watersheds. .	
☐	EV-2. Assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*	
☐	EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.	
☐	EV-4. Identify opportunities for open spaces, trails and parks along streams and other recreational areas in the watershed that can be incorporated into projects.*	
☐	EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.	
☐	EV-6. Promote watershed activities for fire fuel management and adaptive management strategies to protect water quality and water supplies from catastrophic wildfires.*	
Climate Change Goal		
☐	CC-1. Implement adaptation measures and mitigation solutions to climate change effects, including increased large storm intensity and/or frequency, sea level rise, drought and wildfire.	
☐	CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.	
☐	CC-3. Increase energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.	
Regional Communication and Cooperation Goal		
☐	RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts.	
☐	RC-2. Foster collaboration among regional entities as an alternative to litigation through ongoing meetings of the RWMG and regional data sharing.	
☐	RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.	
☐	RC-4. Build relationships with State and Federal regulatory agencies and other water forums and agencies.	

SECTION II. RESOURCE MANAGEMENT STRATEGIES AND CLIMATE CHANGE

This section is required for all implementation projects. If your project is a concept proposal, there is no need to complete this section.

12. Do you want your implementation project to be considered for Round 1?

- ☐ Yes
- ☐ No

13. Resource Management Strategies

One of the goals of integrated regional water management planning is to encourage diversification of water management approaches. Please select the strategies that your project will use (check all that apply):

Reduce Water Demand

- ☐ Agricultural Water Use Efficiency
- ☐ Urban Water Use Efficiency

Improve Operational Efficiency and Transfers

- ☐ Conveyance
- ☐ System Reoperation
- ☐ Water Transfers
- ☐ Infrastructure Reliability

Increase Water Supply

- ☐ Conjunctive Management & Groundwater Storage
- ☐ Desalination
- ☐ Precipitation Enhancement
- ☐ Recycled Municipal Water
- ☐ Surface Storage
- ☐ Storm Water Capture and Management

Improve Water Quality

- ☐ Drinking Water Treatment and Distribution
- ☐ Groundwater/Aquifer Remediation
- ☐ Matching Water Quality to Use
- ☐ Pollution Prevention
- ☐ Salt and Salinity Management
- ☐ Urban Runoff Management
- ☐ Water and Wastewater Treatment

Practice Resources Stewardship

- ☐ Agricultural Lands Stewardship
- ☐ Economic Incentives
- ☐ Ecosystem Restoration
- ☐ Forest Management
- ☐ Land Use Planning and Management
- ☐ Recharge Area Protection
- ☐ Water-Dependent Recreation
- ☐ Sediment Management
- ☐ Watershed Management
- ☐ Environmental and Habitat Protection and Improvement
- ☐ Wetlands Enhancement and Creation

Improve Flood Management

- ☐ Flood Risk Management

People and Water

- ☐ Economic Incentives (Loans, Grants, and Water Pricing)
- ☐ Outreach, Engagement, and Education
- ☐ Water and Culture
- ☐ Water-Dependent Recreation
- ☐ Regional Cooperation
- ☐ Recreation and Public Access

Other Resource Management Strategies

- ☐ Dewvaporation or Atmospheric Pressure Desalination
- ☐ Fog Collection
- ☐ Rainfed Agriculture
- ☐ Monitoring and Research

14. Climate Change Adaptation

a) Does your project contribute to climate change adaptation? If so, what climate change vulnerabilities in the region does your project respond to, specifically? Please describe how, and to what extent. Vulnerabilities for the region are described in Chapter 15 of the 2014 IRWM Plan. This chapter can be downloaded at: http://www.mpirwm.org/IRWM%20Library/IRWMPlan%20Final_whole.pdf

b) Does your project consider the effects of sea level rise on water supply conditions and identify suitable adaptation measures?

c) Does the project take into consideration changes in the amount, intensity, timing, quality and variability of runoff and recharge?

15. Reduction of Greenhouse Gas Emissions (GHGs)

a) Please describe the extent to which your project will help reduce GHGs, compared to project alternatives. *To assist you in estimating GHG emissions, please use the California Emissions Estimator Tool (CalEEMod) on the Greater Monterey County IRWM website: http://www.greatermontereyirwmp.org/performance/.*

b) If appropriate, describe the extent to which the project will help the region reduce GHGs over the next 20 years.

c) To what extent will the project help reduce energy consumption, especially the energy embedded in water use, and ultimately reduce GHG emissions?

SECTION III. PROJECT AND BUDGET NARRATIVE

Complete this and the following sections only if you would like your project to be considered for Round 1 Implementation Grant funds.

16. Project Description (1 page or so): Please describe the proposed project. Provide a general discussion of the problem the project addresses, and describe major tasks/activities. Include any other information that supports the justification for this project, including how the project can achieve any claimed benefits.

17. Project Need/Urgent Need: Is there a special, urgent, or critical need for your project? If so, explain.

18. Budget: Please complete the following budget table.

	Non-State Cost Share[2]	Requested Grant Amount	Other State Cost Share	Total Cost
(a) Project Admin				
(b) Land Purchase/Easement				
(c) Planning/Design/ Engineering/Environmental				
(d) Construction/ Implementation				
(e) Total				

19. Budget Justification: Please provide a budget justification. What is the basis for your costs? (For the final application to DWR, you will need to provide documentation, such as quotes, to justify your budget.)

20. Cost Share: DWR requires that proposals provide at minimum 50% non-State cost share. DWR awards additional points for proposals that provide more than the required 50% non-State cost share. Describe your cost share, and sources of cost share funds.

Please also state whether your agency can contribute to any costs that may be associated with the cost of preparing the final Prop 1 grant application, if any.

21. Disadvantaged Communities: Does the project provide direct water-related benefits to a project area entirely comprised of Disadvantaged Communities (DACs) and/or Economically Distressed Areas (EDAs)? If so, explain. (If you need help with this question, contact Maureen at mhamilton@mpwmd.net)

Will you be requesting a full or partial cost-share waiver based on DAC/EDA status?

22. Operations and Maintenance: Please describe how operations and maintenance of the project will be supported.

[2] Proposition 1 requires a minimum cost share of 50% of the total project cost. An applicant may request the local cost share requirement be waived or reduced for projects that directly benefit one or more DACs and/or Economically Distressed Areas (EDAs). See DWR Proposal Solicitation Package for additional details.

23. Storm Water Resource Plan Requirements: Is the project a storm water or dry weather runoff capture project? If so, is it included in a Storm Water Resource Plan?

24. Groundwater: Will the project affect groundwater levels? If so, how?

If your project is located in the Seaside Groundwater Basin, has it been considered by the Seaside Groundwater Basin Watermaster Technical Advisory Committee and does it conform to the adjudication requirements?

25. AB 1249 Requirements: Does the project address nitrate, arsenic, or hexavalent chromium contamination in the region? If so, how?

26. Stakeholder Coordination: Please briefly describe the nature of stakeholder coordination for planning, developing, and implementing the project.

SECTION IV. COMPLIANCE

Complete this section only if you would like your project to be considered for Round 1 Implementation Grant funds.

To be eligible for IRWM Implementation Grant funds, project proponents must comply with the following.

27. Adoption of IRWM Plan

Proposition 1 IRWM Program Guidelines require that each project proponent named in an IRWM Grant application adopt the IRWM Plan. Please check if your agency/organization:

☐ Has already adopted the IRWM Plan

☐ Hereby commits to adopting the IRWM Plan, if the project is selected for submission in an IRWM Grant application

28. Urban Water Management Compliance

If your agency meets the definition of an urban water supplier ("supplier, either publicly or privately owned, that provides water for municipal purposes, either directly or indirectly, to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually"), you must demonstrate compliance with certain requirements. These include:

- DWR-approved 2015 Urban Water Management Plan
- Verification from DWR that your agency submitted a validated water loss audit report (SB 555).
- Compliance with the water metering requirements (CWC section 525)

Is your agency an urban water supplier, and if so, can it meet these requirements?

☐ Yes, my agency is an urban water supplier and I can demonstrate compliance with these requirements.

☐ No, my agency is an urban water supplier but I cannot demonstrate compliance with these requirements.

☐ N/A: My agency is not an urban water supplier.

29. Surface Water Diverter Compliance

If your agency/organization is a surface water diverter, you must state whether your agency/organization has submitted to the State Water Resources Control Board your annual surface water diversion reports. Is your agency/organization a surface water diverter, and if so, can it meet this requirement?

☐ Yes, my agency is a surface water diverter and I can verify that we meet this requirement.
☐ No, my agency is a surface water diverter but we have not met this requirement.
☐ N/A: My agency is not a surface water diverter.

SECTION V. ROUND 1 PROJECT INFORMATION FORM

Please complete and submit the **Project Information Form** to Maureen Hamilton at mhamilton@mpwmd.net, by **February 8, 2019**.

*Complete the **Project Information Form** only if you would like your project to be considered for Round 1.*

The **Project Information Form** was developed by the Department of Water Resources (DWR). It contains the actual questions that each project proponent must address for the Region's Round 1 application for Implementation Grant funds. This **Project Information Form** is still in draft form; some questions may change between now and the final application process. If your project is selected for Round 1, you will have another opportunity to revise your responses on this form, if necessary, before the Regional Water Management Group submits its Round 1 Implementation Grant application to the State.

Note that if your project is selected for the Round 1 application, you will need to be physically present for a Pre-application Workshop (time and location TBD) during which time DWR staff will review your project information and ask questions.

The information below in blue font is provided, for your information, to help you respond to certain questions on the **Project Information Form.**

A. PROJECT INFORMATION

Question 5. DAC question: No need to provide a map at this time.

Question 8. Funding Category: Your project is a "DAC Implementation Project" only if your project directly and entirely benefits a disadvantaged community.

Question 9. Project Type: Click on "Other" to see the categories.

B. SELECTED ELIGIBILITY REQUIREMENTS

Question 2. How the Project Addresses the Critical Need(s) of the Region: Based on the objectives you selected in Section I Question 11 above, please explain how your project addresses the critical needs of the region.

Question 4. Climate Change: You need to explain how your project addresses climate change vulnerabilities specifically for the Monterey Peninsula, Carmel Bay and South Monterey Bay region, if applicable. Vulnerabilities for the region are described in Chapter 15 of the 2014 IRWM Plan. This chapter can be downloaded at: http://www.mpirwm.org/IRWM%20Library/IRWMPlan%20Final_whole.pdf)

Question 5. Regional Water Self-Reliance: This question is actually intended for regions that depend on water from the Delta watershed. However, if your project includes one of the following, it contributes to regional water self-reliance: water use efficiency, water recycling, advanced water technologies, local and regional water supply project, or improved regional coordination of local and regional water supply efforts.

Question 6. Statewide Priorities. Statewide priorities include the following (see pp. 9-10 of the Prop 1 2016 IRWM Grant Program Guidelines Volume 1 for a full description of these priorities):

☐ Make conservation a California way of life

- Building on current water conservation efforts and promoting the innovation of new systems for increased water conservation.
- Expand agricultural and urban water conservation and efficiency to exceed SB-X7-7 targets
- Provide funding for conservation and efficiency
- Increase water sector energy efficiency and greenhouse gas reduction capacity
- Promote local urban conservation ordinances and programs

☐ Increase regional self-reliance and integrated water management across all levels of government

- Ensure water security at the local level, where individual government efforts integrate into one combined regional commitment where the sum becomes greater than any single piece.
- Support and expand funding for Integrated Water Management planning and projects
- Improve land use and water alignment
- Provide assistance to disadvantaged communities
- Encourage State focus on projects with multiple benefits
- Increase the use of recycled water

☐ Protect and restore important ecosystems

- Continue protecting and restoring the resiliency of our ecosystems to support fish and wildlife populations, improve water quality, and restore natural system functions.
- Restore key mountain meadow habitat
- Manage headwaters for multiple benefits
- Protect key habitat of the Salton Sea through local partnership
- Restore coastal watersheds
- Continue restoration efforts in the Lake Tahoe Basin
- Continue restoration efforts in the Klamath Basin
- Water for wetlands and waterfowl
- Eliminate barriers to fish migration
- Assess fish passage at large dams
- Enhance water flows in stream systems statewide

☐ Manage and prepare for dry periods

- Effectively manage water resources through all hydrologic conditions to reduce impacts of shortages and lessen costs of state response actions. Secure more reliable water supplies and consequently improve drought preparedness and make California's water system more resilient.
- Revise operations to respond to extreme conditions
- Encourage healthy soils

☐ Expand water storage capacity and improve groundwater management

- Increase water storage for widespread public and environmental benefits, especially in increasingly dry years and better manage our groundwater to reduce overdraft.
- Provide essential data to enable Sustainable Groundwater Management
- Support funding partnerships for storage projects
- Improve Sustainable Groundwater Management
- Support distributed groundwater storage

- Increase statewide groundwater recharge
- Accelerate clean-up of contaminated groundwater and prevent future contamination

☐ Provide safe water for all communities

- Provide all Californians the right to safe, clean, affordable and accessible water
- adequate for human consumption, cooking, and sanitary purposes.
- Consolidate water quality programs
- Provide funding assistance for vulnerable communities
- Manage the supply status of community water systems
- Additionally, as required by Water Code §10545, in areas that have nitrate, arsenic, perchlorate, or hexavalent chromium contamination, consideration will be given to grant proposals that included projects that help address the impacts caused by nitrate, arsenic, perchlorate, or hexavalent chromium contamination, including projects that provide safe drinking water to small disadvantaged communities.

☐ Increase flood protection

- Collaboratively plan for integrated flood and water management systems, and implement flood projects that protect public safety, increase water supply reliability, conserve farmlands, and restore ecosystems.
- Improve access to emergency funds
- Better coordinate flood response operations
- Prioritize funding to reduce flood risk and improve flood response
- Encourage flood projects that plan for climate change and achieve multiple benefits

☐ Increase operational and regulatory efficiency

This action is directed towards State and federal agencies; however, consideration will be afforded to eligible local or regional projects that also support increased operational of the State Water Project or Central Valley Project

C. WORK PLAN, BUDGET, AND SCHEDULE

Please summarize the work plan and budget information that you provided (in detail) in Section III above.

D. OTHER PROJECT INFORMATION

Question 5. Does the project address a contaminant listed in AB 1249? These contaminants are, specifically: nitrate, arsenic, hexavalent chromium, and perchlorate.

A “disadvantaged community” (or DAC) is defined as a community with an annual median household income that is less than 80% of the statewide annual median household income, or according to the latest census data, less than $51,026. A “small disadvantaged community” is defined as a DAC that has a yearlong population of no more than 10,000 people.

HOW TO SUBMIT YOUR APPLICATION:

This Project Application Form is due **January 14, 2019**.

The Project Information Form is due **February 8, 2019**.

Please email your completed applications to Maureen Hamilton, at mhamilton@mpwmd.net.

If you do not have email access, please hand-deliver one copy of your application to:

Maureen Hamilton
MPWMD
5 Harris Court, Suite
Monterey, CA 93940

Or by mail:

Maureen Hamilton
MPWMD
P.O. Box 85
Monterey, CA 93942-0085

Proposition 1 Integrated Regional Water Management (IRWM) Round 1 Implementation Grant Project Solicitation Schedule 2018/2019

Proposition 1 Integrated Regional Water Management (IRWM)
Round 1 Implementation Grant Project Solicitation Schedule 2018/2019

Department of Water Resources (DWR) Timeline for Round 1 Implementation Grants

- Oct 5, 2018: DWR released Draft Project Solicitation Package (PSP) and Guidelines; comments due December 14, 2018
- November – early December: Central Coast Funding Area (CCFA) preparing joint comments on Draft PSP
- Early 2019: DWR releases Final PSP released
- DWR will schedule **Pre-Application Workshops** with each Funding Area following release of PSP. The Central Coast IRWM regions are requesting a workshop in June 2019.
- RWMG must provide DWR with information on proposed projects *at least two weeks prior* to the workshop: A Proposal Summary, plus a "Project Information Form" for each project.
- DWR will get back to regions with comments within 4 weeks after the workshop.
- Application to DWR will be due 12 weeks after the workshop date.

Prop 1 IRWM Grant Funds Available to Central Coast Funding Area

Prop 1 Allocation to CCFA:	$43,000,000
Minus State costs (10%):	- $4,300,000
Remaining for CCFA:	$38,700,000

Of that amount:

DAC Funds (20% total allocation):	$8,600,000
General Implementation Grant Funding:	$30,100,000

Prop 1 IRWM Grant Funds Available to the Monterey Peninsula, Carmel Bay and South Monterey Bay Region

Total Prop 1 funds available:
DAC Funds: $931,966
General Implementation: $3,261,882
TOTAL: $4,193,848

Prop 1 funds spent to date:
DAC Involvement (50% of total DAC): $465,983

For Round 1, DWR is proposing that 35% of DAC Implementation funds and 50% of General Implementation funds be provided, leaving the rest for Round 2 in 2020.

Round 1: 50% of General Implementation allocation, 35% of remaining DAC allocation
DAC Implementation: $163,094
General Implementation: $1,630,941
TOTAL: $1,794,035

Round 2 (2020): *50% of Implementation allocation, 65% of remaining DAC allocation*
DAC Implementation: $302,889
General Implementation: $1,630,941
TOTAL: $1,933,830

Proposed Project Solicitation Schedule for IRWMP:

- October 5, 2018: Draft Project Solicitation Package (PSP) was released by DWR.

- Tuesday November 27, 2018: Solicitation begins. Project proponents have approximately weeks to complete the **Project Application Form** (Tuesday Nov 27 – Monday Jan 14). The process will also be reviewed at the December 6 RWMG meeting.

  Those who are interested in having their projects put forward in Round 1 will also need to submit DWR's Project Information Form. The **Project Information Form** will be due Monday February 8, 2019.

- January 14, 2019: Project Application Forms due. Subcommittee ranks projects.

- January 21, 2019: Prioritized project list prepared by TAC (prior to January 24 RWMG meeting).

- January 24 RWMG Meeting: Discuss project ranking with RWMG, and consider ranked Project List for Round 1. RWMG takes a first look at projects on the table for Round 1.

- February 8, 2019: Project Information Forms due.

- February, March and April RWMG Meetings: Project proponents present their projects to the RWMG. RWMG selects projects to put forward.

- April or May RWMG Meeting: Must decide which projects to put forward, in time for June Funding Area Pre-Application Workshop.

- June 2019 (tbd): Pre-Application Workshop with DWR. Proposal Summary and Project Information Forms are due to DWR two weeks *prior* to the workshop.

Local Cost Share

Proposition 1 requires a minimum cost share of 50% of the total project cost. Applicants must demonstrate that a minimum of 50 percent of the total proposal costs will be paid for with non-State funds (Water Code §79742(C)). Costs incurred after January 1, 2015 (the effective date of Proposition 1) can be used as local cost share; in-kind services may also be used for local cost share.

An applicant may request the local cost share requirement be waived or reduced for projects that directly benefit one or more DACs and/or Economically Distressed Areas (EDAs). The 2018 Guidelines, Appendices E and F provide details regarding what documentation must be submitted to support claimed benefits to DACs and/or EDAs. Project benefits may be claimed based on either by population or geographic area. If documentation submitted is reasonable, cost share waivers will be will be determined as follows:

DAC/EDA Benefit Cost Share Waiver

- 76% - 100%: 100 percent cost share waiver
- 51% - 75%: 75 percent cost share reduction waiver
- 25% - 50%: 50 percent cost share reduction waiver
- Less than 25%: No cost share reduction waiver

Eligible Project Types
Subject to regional priorities, projects may include, *but are not limited to*, the following elements (Water Code §79743 (a - j)):

- Water reuse and recycling for non-potable reuse and direct and indirect potable reuse
- Water-use efficiency and water conservation
- Local and regional surface and underground water storage, including groundwater aquifer cleanup or recharge projects
- Regional water conveyance facilities that improve integration of separate water systems
- Watershed protection, restoration, and management projects, including projects that reduce the risk of wildfire or improve water supply reliability
- Stormwater resource management, including, but not limited to, the following:
    - Projects to reduce, manage, treat, or capture rainwater or stormwater
    - Projects that provide multiple benefits such as water quality, water supply, flood control, or open space
    - Decision support tools that evaluate the benefits and costs of multi-benefit stormwater projects
    - Projects to implement a stormwater resource plan developed in accordance with Part 2.3 (commencing with Section 10560) of Division 6 including Water Code § 10562 (b)(7)
- Conjunctive use of surface and groundwater storage facilities
- Water desalination projects
- Decision support tools to model regional water management strategies to account for climate change and other changes in regional demand and supply projections
- Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff
- Regional projects or programs as defined by the IRWM Planning Act (Water Code §10537).

Eligible proposals must do the following. The following requirements may be applied at the project level depending on the individual PSP:

- Advance the purpose of Proposition 1 Chapter 7, Regional Water Security, Climate, and Drought Preparedness (Water Code §79707(c) and §79740) which are, as follows:
    - Assist water infrastructure systems adapt to climate change
    - Provide incentives for water agencies throughout each watershed to collaborate in managing the region's water resources and setting regional priorities for water infrastructure

Eligible also projects must:

- Promote State planning priorities and sustainable community strategies, consistent with Government Code §65041.1 and §65080 (Water Code §79707 (i)
- Be included in a Stormwater Resource Plan that has been incorporated into and IRWM plan, unless exempt per Water Code §10563(c)(2)(B). (Applies only to stormwater and dry weather runoff capture projects.)
- Be supported by the local Groundwater Sustainability Agency. (Applies only to projects that affect Groundwater levels.)

  In the Monterey Peninsula IRWM region, any groundwater projects will be routed to the Seaside Groundwater Basin Watermaster TAC for review.

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APPENDIX 2-F

SAN JOSE CREEK WATERSHED ASSESSMENT

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Balance Hydrologics, Inc.®

800 Bancroft Way • Suite 101 • Berkeley, CA 94710 • (510) 704-1000
224 Walnut Avenue • Suite E • Santa Cruz, CA 95060 • (831) 457-9900
PO Box 1077 • Truckee, CA 96160 • (530) 550-9776
www.balancehydro.com • email: office@balancehydro.com

March 31, 2014

Mr. Tim Jensen
Monterey Peninsula Regional Park District
60 Garden Court #325
Monterey, CA 93940

RE: San Jose Creek Watershed Assessment
Final report submittal

Dear Mr. Jensen:

We have completed the San Jose Creek Watershed Assessment report, in accordance with our contract deadline of March 31, 2014. Since today is a State Holiday (Ceasar Chavez Day) and your office is closed, we are posting an electronic copy to a download site today. We will follow up with two hardcopies and data DVDs, which should arrive at your office shortly.

The completed report addresses your comments on the draft report, sent via email on March 19, 2014, prior to your trip to Burma. Instructions to access the electronic copy of the report and the supporting data will be sent to you and Larry Hampson today.

We have enjoyed working with you on this wonderful watershed and appreciate the opportunity to provide a study with results and recommendations to improve salmonid habitat. When you return from Burma, we will assist with the final check list and quarterly reporting to complete the grant requirements.

Sincerely,

BALANCE HYDROLOGICS, Inc.

Denis Ruttenberg

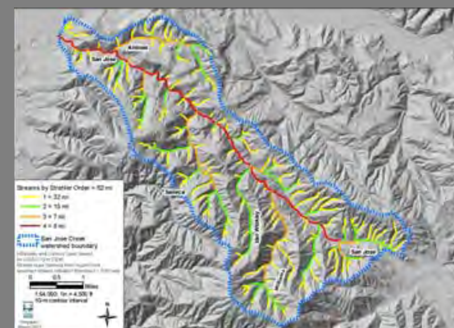
Denis Ruttenberg, PE
Hydrologist/Engineer

Barry Hecht

Barry Hecht, CEG, CHg
Senior Principal

Enclosures: Follow up email with instructions to download final report and supporting data

cc: Larry Hampson
Monterey Peninsula Water Management District



San Jose Creek Watershed Assessment

Prepared for:

Monterey Peninsula Regional Park District

Prepared by:

Denis Ruttenberg and Barry Hecht , Balance Hydrologics, Inc.

Danny Hagans and Tara Zuroweste, Pacific Watershed Associates

March 2014

A report prepared for:

Monterey Peninsula Regional Park District

60 Garden Court #325
Monterey, CA 93940
(831) 372-3196
Attn: Tim Jensen
tjensen@mprpd.org

San Jose Creek Watershed Assessment

by

Denis Ruttenberg, PE
Engineer / Hydrologist

Danny Hagans, CPESC
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PO Box 4433, Arcata, CA 95518-4433
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dannyh@pacificwatershed.com

March 31, 2014

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APPENDICES

1. INTRODUCTION

1.1 Background

At the request of the Monterey Peninsula Regional Park District (MPRPD), as funded by a 2012 Integrated Regional Water Management Plan grant (IRWMP), the following report provides a broad watershed assessment to investigate runoff and sediment issues within the San Jose Creek Watershed. The main goal of this report is to evaluate the San Jose Creek watershed for sediment and fish passage as it relates to salmonid habitat and make recommendations for improvements.

This report identifies current sediment sources within the watershed based on reconnaissance field and aerial surveys; summarizes past stream and sediment gaging; reports stream gaging for the previous water year; presents a partial fish barrier analysis; and evaluates fish passage at the mouth of San Jose Creek.

This study focuses on the portion of the watershed downstream of Van Winkley Canyon. This lower portion of the watershed is largely in agency ownership. Most of the private holdings in the upper part of the basin have already seen several years of detailed studies in related matters. The channels of the upper watershed are also more distal from key salmonid habitat. To the extent possible, previous studies from the upper watersheds are integrated into this analysis. By leveraging analysis to the lower watershed, a better understanding of areas previously unstudied for sediment loading and salmonid habitat is provided.

MPRPD selected Balance Hydrologics (‘Balance’) to conduct this assessment on October 17, 2013. The proposed scope included Pacific Watershed Associates (‘PWA’) as a major and fundamental subcontractor, charged with most of the work on the slopes and road network, and working side by side with Balance on assessment of passage and erodibility in the channels. Rob Thompson of Thompson Wildland Management also served as a subcontractor, assisting in storm monitoring. The contract was approved by the MPRPD on December 3, 2013. Installation of some gages occurred prior to authorization, due to seasonal needs.

1.2 Study objectives

To follow upon findings and recommendations in Nelson (2006a; 2006b) and to fulfill the scope of work for the watershed study, the Project team of Balance and PWA set a field program to address objectives as follows:

- Install temporary stream gage network to evaluate base flows and storm flows in water year 2013.
- Evaluate sediment sources in upland areas through review of aerial photography, analysis of previous studies, and reconnaissance field surveys.
- Locate sediment sources from instream bank erosion and morphology through instream surveys and field reconnaissance.
- Measure rates of erosion and sediment delivery from uplands areas and stream banks.
- Estimate sediment loading from upland and instream sources.

- Provide more detailed study of fish barriers identified by CDFW in 2006
- Provide photography to document opening and closing of lagoon during fish migration period (March - June)
- Conduct ground survey of lagoon cross sections to document geomorphology
- Prepare recommendations for improvement of salmonid habitat from additional studies and/or projects for sediment management, fish barrier removal, and lagoon improvement.

1.3 Weather and Watershed Conditions During the Study

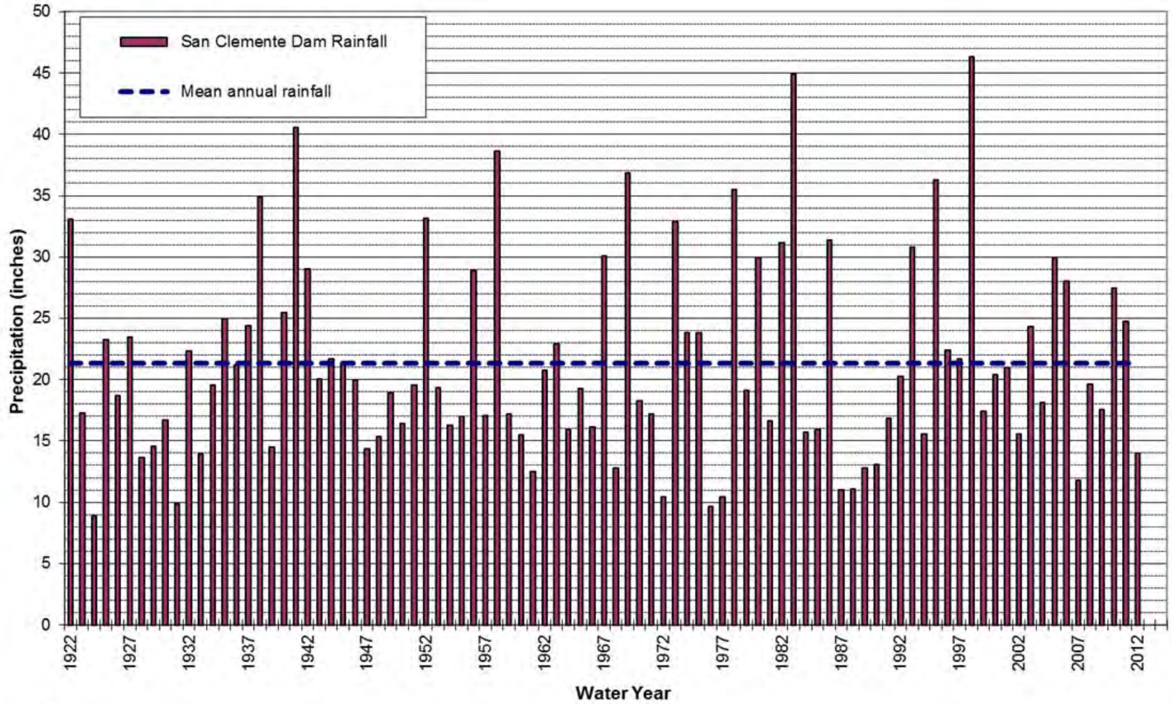
Watershed studies which include gaging, sediment transport, and hillslope sediment contributions typically extend through three or more winters. This study was more abbreviated in concept, in part because of its focus on steelhead habitat. Unfortunately, the one water year initially allowed for this study[1] was WY2013[2], which proved to be one of the drier years on record. Additionally, it followed a dry WY2012. While WYs2010 and 2011 were somewhat wetter than average, it has been 15 years since the watershed experienced a major recharge season – which we have identified as about 165 percent of mean annual rainfall in our work in the nearby Las Garzas, San Clemente and Pine Canyon watersheds. Annual rainfall totals at San Clemente Dam, the area's primary rain gage, are shown in Figure 1.1. For comparison, WY2012 and WY2013 totaled to 13.99 inches and 14.6 inches of rainfall at San Clemente Dam [3], respectively. Based on 92 years of records, average annual rainfall at San Clemente Dam is 21.27 inches, so the two consecutive below normal WY2012 and WY2013, were 66% and 69% of the average annual rainfall, respectively. WY2014 is also looking to be a dry year as well, with 7.5 inches of precipitation until mid-march.

A similar weather pattern occurred in 1961, which represented a third dry year in a row. In relation this sequence of dry years, Appendix D presents stream bed observations by California Department of Fish and Game Warden Lester Gordon (CDFG, 1962). The observations include remarks about streams in the upper watershed lacking permanent flow and sand deposits throughout the system.

[1] The initial deadline for completion of field work, September 30, 2013, was extended to allow collection of additional data through January 15, 2014. We continued the monitoring through the first week of February 2014. Field work was terminated on that time to allow completion of the project report by March 31, 2014.

[2] A water year (abbreviated "WY") is the basic period used for hydrologic and sedimentologic analysis. It commences on October 1 and extends through September 30 of the named year. WY2013 began on October 1, 2012 and concluded on September 30, 2013.

[3] Precipitation provided by the MPWMD as a courtesy to the study. Data is provisional and provided for reference.



Balance Hydrologics, Inc.

Annual rainfall at San Clemente Dam and Mean Annual rainfall. Observer: California American Water Company. Source: Monterey Peninsula Water Management District (data report, 1999, and personal communications).

Figure 1.1. Rainfall history at San Clemente Dam, 6 miles east of the San Jose Creek

Watershed conditions were reasonably undisturbed during the period of study. Fires of watershed extent have not been reported from this area since the early 1930s. The last major flooding occurred in 1995 and 1998, so no fresh flood-generated disturbance was noted. Grazing has been sharply curtailed over the past decade or more. No extended multi-year drought has occurred since the early 1990s. A number of homes and driveways had been constructed within the boundaries of the Santa Lucia Conservancy (Rancho San Carlos) over the past 20 years. Most of these are located upstream of Van Winkley Canyon, outside of the study area.

The one significant environmental disturbance noted was the prevalence of sudden oak death. Several patches of 3 to 5 acres each were observed to be losing all hardwoods. We make note in the report where such patches may have various local effects. Given the steep slopes, the roots of such trees have an important role in slope stability. Continued expansion of areas where interpenetrating roots will be lost and will likely lead to additional landsliding and gullying, particularly on the south side of San Jose Creek (SJC).

1.4 Acknowledgments

Balance and PWA staff appreciate the efforts made by many different individuals to make this study possible. In particular, Tim Jensen, MPRPD Planning and Conservation Manager, has always been a strong advocate for Palo Corona and the San Jose Creek watershed. He developed the concept for this study, then was able to support it with a combination of funding from the MPRPD board and a grant from the Monterey Peninsula Integrated Regional Water

Management Program (IRWMP), managed by District Engineer Larry Hampson and his staff at the Monterey Peninsula Water Management District (MPWMD). Funding for the IRWMP came from Proposition 84 funds awarded to MPWMD (as fiscal agent) by the State Water Resources Control Board.

We also wish to express our gratitude to a number of landowners who allowed us access and permitted installation of a wide variety of instrumentation. Some of our work and much of our instrumentation was installed at the Santa Lucia Conservancy (SLC), which manages the upper one-third of the San Jose Creek watershed under the direction of Christina ("Christy") Fischer. Big Sur Land Trust (BSLT) permitted use of work performed 5 years ago by PWA staff, and allowed access to review conditions at some sites. In addition, the land owners of private property on Monastery Beach were kind enough to allow access for our team to install and maintain time-lapse cameras of the lagoon.

Rob Thompson, proprietor of Thompson Wildland Management and a former watershed manager at SLC, assisted with the field work, often under adverse conditions. Lynne Overtree, former resident caretaker at Palo Corona Ranch made several helpful suggestions, and provided historical background and anecdotal accounts which brought life to some parts of our work.

Jennifer Nelson, senior biologist with the California Department of Fish and Wildlife (CDFW), walked and studied SJC in considerable detail in 2006, a wet year. Her photos and reports provided both context for change over time and context for the differences between wet and dry years (Nelson, 2006a; 2006b).

Finally, and most warmly, we wish to thank Greg James, Hydrography Programs Coordinator at MPWMD, who has shared with us his observations, opinions, and the data he has collected over the past 25 years. We suspect that Greg had to make significant changes to his annual schedule of data collection and management to provide us with final data on the schedule required for this short-fuse report.

2. EXISTING CONDITIONS

2.1 Watershed Description

The San Jose Creek Watershed covers approximately 14.42 mi^2 located in northwest Monterey County. The mouth of San Jose Creek (SJC) exits on the north end of Monastery Beach off Highway 1 approximately 2 miles south of Carmel (Map 1). There are 4 major tributaries of SJC: Animas Creek, Seneca Creek, Van Winkley Canyon, and Williams Canyon. Animas Creek subwatershed is 1.60 mi^2 and is the northern most tributary to SJC. Seneca Creek subwatershed is 2.30 mi^2 and is the largest and most southwestern named tributary to SJC. Van Winkley Canyon subwatershed is 0.86 mi^2 and located between Seneca and Williams Canyon. Finally, Williams Canyon subwatershed is 1.97 mi^2 and is the most southeastern named tributary to SJC (Table 2.1).

Table 2.1. Subwatersheds of San Jose Creek, San Jose Creek Watershed Assessment, Monterey County, California.

Subwatershed	Area (mi^2)	% area
Animas Creek	1.60	11%
Seneca Creek	2.30	16%
Van Winkley Canyon	0.86	6%
Williams Canyon	1.97	14%
Remaining San Jose Creek	7.69	53%
Total Watershed Area	14.42	**100.00%**

The main stem of SJC is aligned northwest to southeast and extends for about 8 miles, with the main slope aspects facing northeast and southwest (Map 1). The watershed is bordered by the Carmel River basin to the north and coastal watersheds in the Santa Lucia Range to the south. Average annual rainfall for the watershed is 27.1 inches (USGS, 2014). The topography ranges from elevation 0 to 3173 feet and is typically steep terrain with an average slope of 39%, based on the 30 meter DEM of the watershed (USGS, 2014). About 45 percent of the watershed is vegetated in forest. Less than 0.1 percent is impervious area. The hydrologic flow regime is typically sheet flow in the upper elevations on steep grass land, which then collects into confined channels and forested canyons, ultimately reaching the ocean through a narrow, sand-bedded, long-shore lagoon. The mouth of SJC opens intermittently and lagoon water levels are linked closely to tide levels.

San Jose Creek watershed includes 70.19 mi of 1st order, 2nd order, 3rd order, 4th order, and 5th order streams. Stream order was identified utilizing GIS generation (3m DEM) and the Strahler stream order system (Table 2.2, Map 2). The Strahler ordering system, developed in 1952, is a simple method of classifying stream segments based on the number of upstream tributaries. A stream with no tributaries (headwater stream) is considered a first order stream. A segment downstream of the confluence of two first order streams is a second order stream. Any n^{th} order stream is always located downstream of the confluence of two $(n-1)^{th}$ order streams (Strahler, 1952).

Table 2.2. Stream Strahler Orders of San Jose Creek Watershed, San Jose Creek Study, Monterey County, California.

Strahler Order	Length (mi^2)	% length
1 [4]	36.72	52%
2	14.47	21%
3	7.151	10%
4	4.98	7%
5	6.87	10%
Total Length in Watershed	70.19	**100.00%**

Ownership within the SJC Watershed includes larger holdings of: State of California (State), Monterey Peninsula Regional Park District (MPRPD), Big Sur Land Trust (BSLT), and Santa Lucia Conservancy (SLC). The remaining watershed is held privately or is designated as "unknown" (Table 2.3, Map 1). Access to the Animas Creek subwatershed and lower SJC areas is from Carmel on Highway 1 through California State Park property and through a MPRPD gate. Seneca Creek is accessed by the MPRPD Palo Corona entrance off Highway 1 or by Rancho San Carlos Road from the north. Van Winkley Canyon and Williams Canyon subwatersheds are accessed via Rancho San Carlos Road and SLC and BSLT properties.

Table 2.3. Ownership within San Jose Creek Subwatersheds, San Jose Creek Study, Monterey County, California.

Ownership	Subwatershed Area (mi^2)					% Total area
	Animas	Seneca	Van Winkley	Williams	San Jose	
Big Sur Land Trust	0.15	0.02	0.10	1.43	0.46	15%
Santa Lucia Conservancy	0.00	0.00	0.31	0.30	2.38	21%
Monterey Peninsula Regional Park District	0.45	2.24	0.45	0.05	1.00	29%
State Of California	0.00	0.04	0.00	0.17	1.42	11%
Private Landholdings	1.00	0.00	0.00	0.02	1.99	21%
Unknown	0.00	0.00	0.00	0.00	0.44	3%
Total Area	**1.60**	**2.30**	**0.86**	**1.97**	**7.69**	**100%**

[4] Based on the resolution of GIS –DEM, 1st order stream channels are likely underestimated.

2.2 Geology

2.2.1 Surface lithology

The distribution of mapped lithological units within the SJC watershed is illustrated in Table 2.4 and Map 3. The lithology for the study area was compiled from GIS provided by the MPRPD (Rosenberg, 2001), as used for the Palo Corona Roads Report (CGS, 2010). Within the Animas watershed the primary geologic unit is the Monterey formation from the middle to late Miocene (Tm). The stratigraphy is tilted and uplifted, with differentially eroded beds leaving a characteristic landscape image, as shown on the aerial photos (see Appendix A). The Monterey formation beds extend along the slopes north of SJC within the upper watershed. The Monterey formation, and underlying Vaqueros sandstone (Tvq) and an associated Unnamed marine sandstone (Tts), overlie Cretaceous porphyritic granodiorite (Map symbol Kgdm). All three geologic units develop friable sandy soils, with moderate to high erosion potential, particularly when disturbed by natural episodic events or anthropogenic activities.

Table 2.4. Lithology of San Jose Creek Watershed, San Jose Creek Study, Monterey County, California.

Lithology	Area (mi^2)	% area
Qb – Beach sand (Historical)	0.00	0.0%
Qal– Alluvium (Holocene)	0.37	2.6%
Qc– Colluvium (Holocene)	0.09	0.6%
Qls – Landslide deposits (Holocene-Pleistocene)	0.39	2.7%
Qct – Coastal terrace deposits (Pleistocene)	0.13	0.9%
Tc – Carmelo Formation (Early Eocene)	0.00	0.0%
Tm – Monterey Formation (Mid-Late Miocene)	1.99	13.8%
Tts – Marine sandstone (Miocene)	0.82	5.7%
Tvq – Vaqueros Formation – sandstone (Oligocene)	0.03	0.2%
Tva – Basaltic andesite (Oligocene)	0.03	0.2%
Kgdm – Porphyritic granodiorite of Monterey (Cretaceous)	4.37	30.3%
Kgdc –Granodiorite of Cachagua (Cretaceous)	1.75	12.1%
Kqds – Hornblende-biotite quartz diorite of Sobranes Point (Cretaceous)	4.45	30.9%
Total Watershed Area	**14.42**	**100.00%**

In the lower SJC watershed, the Kgdm granodiorite unit is also mapped on south side of SJC and the western side of the Seneca Creek watershed (Map 3). Continuing southeastward from Seneca Creek, the ridge between Seneca Creek and Van Winkley Canyon is mapped as Cretaceous granodiorite of Cachagua (Kgdc). Rounding out the southeast section of the watershed, in the Williams Canyon drainage and the headwaters of SJC, the geologic unit is mapped as Cretaceous hornblende-biotite quartz diorite of Soberantes Point (Kgds).

At the bottom of the canyons, along the main stem of SJC, narrow bands have been mapped as alluvium and mudflow sediments from the Holocene, recent geologic deposits. These deposits are the result of periodic, episodic upland landslides and fluvial erosion processes.

2.2.2 Geologic structure

San Jose Creek has developed a course more or less along the alignment of the San Francisquito fault zone, one of several faults which accommodate the geologically rapid uplift of the northern Santa Lucia Mountains. The stream has eroded through the fractured rock along the fault zone throughout its course. Other faults, mainly unnamed and only partly mapped likely shape the hydrography of the Animas watershed and other areas north of the creek. (Clark and others, 1997; Rosenberg, 2012)

San Jose Creek is one of four major Monterey Peninsula streams which have asymmetric watersheds, with the south side of the catchment rising to substantially greater heights, and contributing the preponderance of winter peak flow, base flow sustained by groundwater surcharge, and sediment. Other such streams are Cachagua Creek, the Carmel River in Carmel Valley, and Canyon del Rey. In each case, the main stem streams flow along fault systems which have raised the bedrock block to the southwest much more rapidly than the northern sides of the bedrock in their catchment.

2.2.3 Implications of uplift

The continuing history of uplift prevailing during the past several million years has a number of implications for managing anadromous fish in SJC. First, the vast majorities of sediment and groundwater entering the stream from its flanks come from the southwestern side, both because the greater elevations impart more potential energy from this side, and because streams are longer since they drain larger watersheds. The longer tributaries run through longer and deeper canyons from which sediment may be delivered. Secondly, terraces deposited along streams (alluvial) or the coastline (marine) occur on both sides of the fault, but extend higher on the southwest side. Elsewhere in the Carmel watershed, terraces are visible to heights of 1500 feet or higher (Hecht, 1981; Richmond, 2009), and they seem to be identifiable throughout the Seneca watershed and along Palo Corona Road, albeit growing fainter with elevation. Terraces are important modifiers of sediment delivery, because they can (1) store sediment, which accumulates on the flattened treads, and (2) develop clay accumulations or 'claypans' in the subsoil over periods of tens or hundreds of thousands of years. The accumulated clays on the tops of ridges south of SJC are important influences on the erodibility of the deeply-weathered granitic rocks that supply much of the sediment to SJC. This is further described in Sec. 2.3, immediately below and on the soil hydrologic group map. Finally, north-facing slopes on hills southwest of the creek are much damper (more mesic) than the drier (more xeric) slopes to the northeast of the stream. A combination of exposed versus shelter aspect, a drier shale geology to the north of the creek, and less groundwater availability to the north all combine to make contrast across the watershed much more articulated than in many other coastal watersheds.

2.3 Soils

The soils throughout the SJC watershed are primarily loams with varying degrees of slope. A summary of soil types and characteristics within the watershed are summarized on Table 2.5. Also shown on Table 2.5 are K factors for the Universal Soil Loss Equation (USLE). These factors range from 0.05 to 0.37, with higher K factors indicating more potential for erosion.

Regarding runoff potential, about 45-percent of the soils are hydrologic group B (moderate infiltration) and 18-percent are in hydrologic soil group A (high infiltration), indicating a majority of the watershed has significant infiltration rates and lower surface runoff rates, mostly on the south side of the main stem of SJC(Figure 2.1).

Table 2.5. Soils within San Jose Creek Watershed according to NRCS Websoil Survey (USDA, 2014), San Jose Creek Study, Monterey County, California.

					Universal soil loss K factor	
Map unit	Map unit name	acres	%	HSG	whole soil	rock free
Jc	Junipero-Sur complex	1,728	18.7%	B	0.10	0.17
Ga	Gamboa-Sur complex	1,468	15.9%	A	0.05	0.15
CcG	Cieneba fine gravelly sandy loam, 30 to 75 percent slopes	1,376	14.9%	D	0.15	0.28
SoG	Sheridan coarse sandy loam, 30 to 75 percent slopes	1,039	11.3%	B	0.17	0.17
JbG	Junipero sandy loam, 30 to 75 percent slopes	811	8.8%	B	0.10	0.15
SfF	Santa Lucia channery clay loam, 30 to 50 percent slopes, MLRA 15	667	7.2%	C	0.05	0.17
Sg	Santa Lucia-Reliz association	573	6.2%	C	0.05	0.20
SoE	Sheridan coarse sandy loam, 15 to 30 percent slopes	453	4.9%	B	0.17	0.17
ShE	Santa Ynez fine sandy loam, 15 to 30 percent slopes	213	2.3%	D	0.32	0.32
GkB	Gorgonio sandy loam, 0 to 5 percent slopes	206	2.2%	A	0.10	0.20
GfF	Gazos silt loam, 30 to 50 percent slopes	190	2.1%	C	0.20	0.37
Rc	Rock outcrop-Xerorthent association	151	1.6%	D		
LcG2	Linne-Shedd silty clay loams, 50 to 75 percent slopes, eroded	71	0.8%	C	0.28	0.28
EbC	Elder very fine sandy loam, 2 to 9 percent slopes	60	0.7%	B	0.37	0.37
GfE	Gazos silt loam, 15 to 30 percent slopes	53	0.6%	C	0.17	0.37
LmE	Los Osos clay loam, 15 to 30 percent slopes	43	0.5%	D	0.28	0.28
ScE	San Andreas fine sandy loam, 15 to 30 percent slopes	43	0.5%	B	0.20	0.20
ShC	Santa Ynez fine sandy loam, 2 to 9 percent slopes	29	0.3%	D	0.15	0.32
NcE	Narlon loamy fine sand, 15 to 30 percent slopes	22	0.2%	D	0.28	0.28
Am	Arnold-San Andreas complex	7	0.1%	B		
LeC	Lockwood shaly loam, 2 to 9 percent slopes	12	0.1%	B	0.15	0.28
PdC	Pfeiffer fine sandy loam, 2 to 9 percent slopes	6	0.1%	A	0.20	0.20
ScG	San Andreas fine sandy loam, 30 to 75 percent slopes	5	0.1%	B	0.24	0.24
SoD	Sheridan coarse sandy loam, 5 to 15 percent slopes	1	0.0%	B	0.17	0.17
	Totals for Area of Interest	**9,229**	**100.00%**			
	Hydrologic Soil Group (HSG) A	1,681	18%	High infiltration, low runoff		
	Hydrologic Soil Group B	4,161	45%	Moderate infiltration when wet		
	Hydrologic Soil Group C	1,555	17%	Slow infiltration when wet		
	Hydrologic Soil Group D	1,832	20%	Very slow infiltration when wet		

Areas with predominately moderate to high runoff potential (hydrologic soils groups C and D) are located in the Animas Creek drainage and on the north side of the watershed on the ridge within private land holdings and the Santa Lucia Conservancy. The overall distribution of the higher-runoff soils is similar to ridge top and terrace areas with more deeply-developed soils which tend to have accumulated clays in their subsoils. Group C soils are found largely in areas where Tertiary sedimentary rock (particularly the Monterey diatomites and shales) is mapped. This area contrasts with the Kgdm geologic formation with greater potential for erosion and sediment source, in part because this unit is where most of the older terrace deposits are found, with the related clayey subsoils. Site visits and oblique aerial photography have confirmed piping, rill erosion and gullies occur in this area.

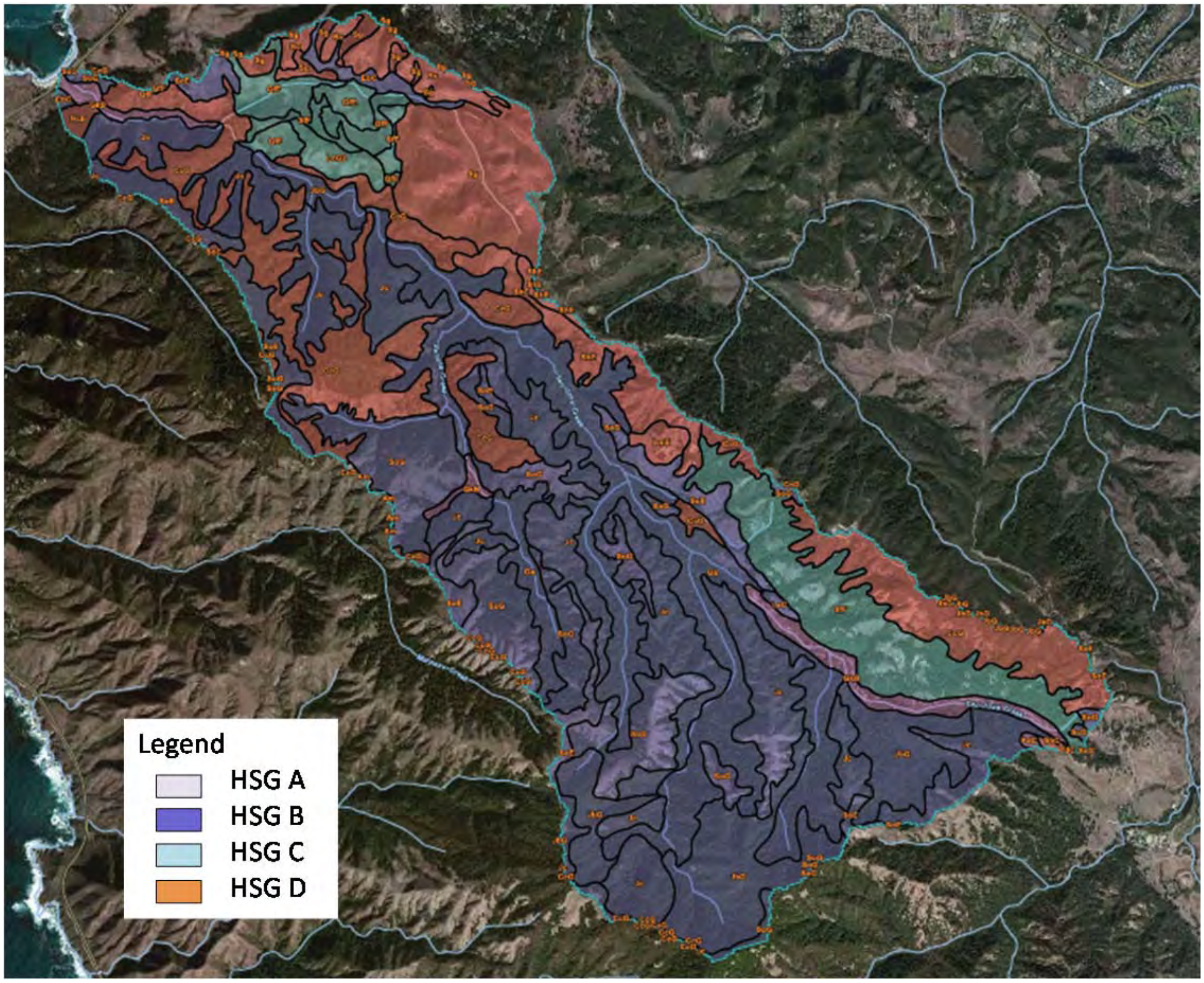


Figure 2.1. Soils within San Jose Creek Watershed by Hydrologic Soil Group (HSG) according to USDA NRCS, San Jose Creek Study, Monterey County, California.

Conventional K factors and USLE analyses – originally developed for low-gradient cropland and weather patterns found east of the Rockies -- tell literally only half the story in the northern Santa Lucias. One-third to one-half the sediment yield in this region is generated solely during episodic events, such as post-fire runoff, major floods, large landslides, and droughts (c.f., Hecht, 2000). For example, our work at Los Padres Reservoir following the 1977 Marble-Cone fire demonstrated that sedimentation in the lake during the first year following the fire equaled the total sedimentation recorded during the prior 38 years (Hecht, 1981). Since the fire cycle averages 40 to 60 years in this region, the data support the conclusion of one-third to one-half of sediment production is directly associated with episodes, and the importance of integrating episodic sedimentation for habitat or watershed-management purposes. In the SJC watershed, sediment generation during chronic or normal periods may come predominantly from the ridge tops and soils of Hydrologic Soil Groups C and D; sediment delivery to the stream following fires or major regional storms or following landslides, on the other hand, come largely from the hillslopes above the channels – which almost universally fall within the HSG B in the SJC watershed. [5]

The work of the Balance/PWA team occurred during a period with virtually no episodic disturbance. Our observations and measurements characterize a period of chronic erosion, quiescent relative to the periods of episodic sedimentation. Overall- long-term sediment yields may be expected to be half-again-as-large, or twice as large, as those measured during this study. Erosion may focus on the hillslopes during periods of episodicity, rather than chronic periods where the ridgetops may be focus of sediment entrainment as identified in the USLE analysis above.

One of the definitions of an episodic period (Hecht 1993) is when processes predominate which otherwise happen very seldom during a more normal, or chronic, period. One only has to walk the lower reaches of Williams Canyon – strewn with debris-flow or mudflow lobes – to understand that very different processes can predominate in this watershed following episodic disturbance. What this means for steelhead passage or rearing habitat may warrant consideration as part of the ultimate watershed planning.

2.4 Slope gradients

Slope gradients in the SJC watershed range from very gentle (<5%) to very steep (>65%). Typically the gentlest slopes are found within the low lying valleys of higher order (3rd through 5th) stream channels and along ridgetops (Map 4). The distribution of slope gradients by subwatershed are displayed in Table 2.6. The subwatersheds of Seneca, Van Winkley, and Williams have the highest occurrence (30-35%) of hillslopes with gradients greater than 65% based on overall subwatershed area. Hillslope gradients exceeding 65% in steepness represent only 7% of the Animas Creek's total area. Based on distribution, steeper slopes are more likely to occur within Cretaceous granitics (Kgdm, Kgdc, Kqds) and along lower order (1st and 2nd) tributaries (Maps 2-4).

Table 2.6. Slope gradient area by Subwatershed, San Jose Creek Study, Monterey County, California.

Slope gradient Range (%)	Subwatershed area (mi^2)					
	Animas Creek	**Seneca Creek**	**Van Winkley Canyon**	**Williams Canyon**	**Remaining San Jose Creek**	**Total**
<35%	0.78	0.56	0.15	0.33	2.94	4.76
35-49.99%	0.43	0.51	0.20	0.41	1.38	2.93
50-64.99%	0.28	0.55	0.25	0.54	1.23	2.85

[5] This discussion describes the inherent natural erodibility of the landscape, and it should be noted that roads and other land management activities can alter sediment yield estimates regardless of the underlying geologic and soil characteristics.

≥65%	0.11	0.68	0.26	0.69	2.14	3.88
Total	**1.60**	**2.30**	**0.86**	**1.97**	**7.69**	**14.42**

Hillslope gradient is an important factor when studying slope stability and erosion potential. Erodibility of soils, the competence of underlying geology, and anthropogenic influences may be consistent throughout a portion of a particular subwatershed. However, the erosion potential will be greater in areas where hillslope gradients exceed 65%. In addition, saturated soil conditions, episodic ground shaking events (earthquakes), and forest fire affect slopes with steeper gradients more significantly, and can result in a higher likelihood of erosion or failure. Refer to *Section 4* for additional discussion of slope gradients influence in upslope erosion and sediment delivery.

2.5 Infrastructure and natural resources

Figure 2.2. View of a typical upper slope native, unsurfaced road found within SJC Watershed with insloped road shapes and concentrated runoff. Photo taken in Animas Creek watershed.

2.5.1 Road Networks

The majority of road networks within SJC watershed exist on MPRPD, SLC, and BSLT properties within Animas Creek, Seneca Creek, and Williams Canyon subwatersheds as well as along upper and lower SJC main stem. Over 86 miles of road have been constructed throughout SJC for an average road density of 6 mi/mi^2 of watershed area (Table 2.7). The majority of roads within SJC watershed were originally constructed for the purposes of commercial logging and ranching. Other than the approximately 5 mi of paved roads found within the private landholdings located in the upper SJC watershed, the majority of the roads are native and unsurfaced (Figure 2.2 and Figure 2.3). As the State, MPRPD, BSLT, and SLC purchased land and began undertaking the major hurdle of conservation and protection of the watershed's resources, they in turn inherited the serious erosion problems associated with the existing network of poorly constructed, poorly maintained legacy roads that were eroding and delivering sediment directly into SJC and its' tributaries.

The majority of the SJC roads lie within the 10,000 acre Palo Corona Regional Park (Palo Corona). Vehicle access to many of these roads is limited to MPRPD and partnering agency staff. The public can be granted access via permits authorized by MPRPD, with use restricted to foot traffic only. In addition, cattle grazing is permitted throughout Palo Corona between February and June.

2.5.1.1 Animas Creek Road Network

The road density within the Animas Creek subwatershed is 8.53 mi/mi^2, the greatest density of any subwatershed (Table 2.7). Of the nearly 14 mi of road, most consist of native, unsurfaced, and low-use roads (Figure 2.2 and Figure 2.3). Ownership is dominated to the west by BSLT and MPRPD and to the east by a very large private landholding. Motorized travel along the road network is primarily utilized by BSLT and MPRPD staff to access SJC tributaries and Palo Corona property for maintenance, conservation, protection, and research. In addition, foot traffic along these roads is granted to the public via access permits obtained from MPRPD, and cattle can be seen along roads as they graze these lands February to June.

Figure 2.3. View of a typical upper slope native, unsurfaced road found within SJC Watershed with insloped road shapes, concentrated runoff and locally retreating cutbanks.

Table 2.7. Road/trail Network of San Jose Creek by Subwatershed, San Jose Creek Study, Monterey County, California.

Subwatershed	Estimated length of road/trail (mi)	% total	Road density[a] (mi/mi^2)
Animas Creek	13.65	16%	8.53
Seneca Creek	17.49	20%	7.60
Van Winkley Canyon	4.30	5%	5.00
Williams Canyon	13.17	15%	6.69
Remaining San Jose Creek	37.84	44%	4.92
Total Road Mileage in the Watershed	**86.45**	100%	**6.00**

[a] Study area is 14.42 mi

2.5.1.2 Seneca Creek Road Network

Roads found within the Seneca Creek subwatershed represent 20% of all roads in SJC watershed (17.49 mi), and has the 2nd highest road density within the SJC watershed (Table 2.7). Roads found within the subwatershed lie almost entirely within Palo Corona and are primarily used by MPRPD and BSLT staff to access lands for maintenance, conservation, protection, and research. In addition, visitors are granted access to roads for hiking on a permitted basis only.

Roads include streamside, lower, mid, and upper slope roads. Roads exhibit varying degrees of use and maintenance. The streamside road segments in the subwatershed cross the main stem of Seneca Creek several times. Although the majority of the main stem crossings are fords ("wet" crossings) and do not contain road fill; several culverts remain, which require continued maintenance (Figure 2.4).

Figure 2.4. View of a native, unsurfaced streamside road found within Seneca Creek Subwatershed. Photo depicts road crossing Seneca Creek main stem at inventoried instream site #29 (Map 5).

2.5.1.3 Van Winkley Canyon Road Network

Van Winkley Canyon subwatershed has the fewest road mileage within the of SJC watershed at only 4.3 mi (Table 2.7). Primarily located along the upper slopes of the subwatershed along the ridgelines separating Van Winkley Canyon from Seneca Creek and Williams Canyon, these roads lie within Palo Corona and are infrequently used by motorized vehicles and receive primarily foot traffic only.

2.5.1.4 Williams Canyon Subwatershed Road Network

Approximately 85% of Williams Creek is encompassed by Mitteldorf Preserve, owned and managed by BSLT. Nearly 95% of all roads/trails (12.42 mi) located in the watershed fall within the Preserve, with the exception of approximately 0.75 mi located in the lower extent of the watershed on SLC property. Roads include streamside, lower, mid, and upper slope roads (Figure 2.5). Roads exhibit varying degrees of use and maintenance. All roads are unsurfaced and utilized primarily by BSLT and SLC staff with granted access provided to Preserve visitors by permit only.

2.5.1.1 *Remaining San Jose Creek Road Network*

The remainder of the SJC watershed contains approximately 44% of all roads/trails in the watershed (Table 2.7). Roads found along the lower SJC main stem consist of a main streamside access road that is maintained and managed by the State utilized primarily by State, BSLT, and MPRPD staff to access their properties for maintenance, conservation, and research. There are several short mid and upper slope road segments that exhibit less frequent use. All roads in the lower watershed are native and unpaved. However, many roads found within the upper SJC watershed are paved (approximately 5 mi) as they are part of the Rancho San Carlos gated community. All of the most recent (<40 years old) road building has occurred in the upper watershed within this private community.

Figure 2.5. View of native, unsurfaced roads found within Williams Canyon Subwatershed. Left photo depicts a lower-streamside road and the right photo depicts a mid slope road. Both roads are located on BSLT property.

2.5.2 Williams Canyon Infrastructure

Other than the road and trail network discussed in *Section 2.4.1.5*, there exists a residential lodge, a bunkhouse and barn within the Mitteldorf Preserve located in the Williams Canyon subwatershed. BSLT has future plans to update this infrastructure so it may be utilized to host nature camps and outdoor education and research programs.

2.5.2.1 *Santa Lucia Conservancy and Private Land Holdings*

The upper watershed and headwaters of SJC are within the Santa Lucia Conservancy and private land holdings. A limited and gated paved road with driveway offshoots runs the length of the watershed. The Santa Lucia Conservancy manages the wildlands for ecosystem protection and interaction with the private land holders. Overall, SLC controls about 20,000 acres, with land-management activities conducted by a knowledgeable staff with a record of continuity. The Conservancy and its board take what may be characterized as a long-term perspective driven by conditions of approval, commitments to owners, and an endowment which makes land-management feasible. The SJC watershed occupies about 20 percent of the Conservancy, including some of its steepest and least developed areas.

2.5.2.2 California State Park Lands

The lower part of the watershed and mouth of SJC at Monastery Beach is owned by California State Parks. Monastery Beach is actively used for a wide range of day activities, often accessed from parking along Highway 1, with trails running from the road shoulder through the dunes and across the long-shore lagoon. Upstream of the highway the State Parks lands are not open to the public. There is limited access for State Parks staff to ranger residences. About 0.4 miles upstream of the Highway 1 crossing, the MPWMD operates a stream gage. Also, the MPRPD recently acquired a property (Whistler Property) just beyond the State Parks land that is accessed via the State Parks service road. The MPRPD is currently in discussions which will lead to a plan for managing the new property.

2.6 Historic aerial photography review

PWA reviewed historical aerial photography covering portions of and/or the entire SJC watershed[6]. Sequential historic aerial imagery was reviewed to identify locations of upslope sediment sources in the watershed. Sources of digital imagery used in the review included historical aerial photographs, *Google Earth* imagery (1994-2012), and NAIP imagery (USDA, 2010 and 2012). Historical aerial photographs included the following years and views: 1949 (view of ~1mi^2 of lower watershed and mouth); 1954 (view of lower watershed, downstream from Van Winkley); 1966, 1971 (view of ~95% of watershed, missing uppermost Williams and SJC main stem); and 1985 (view of ~95% watershed, missing central sliver). *Google Earth* imagery provided views of the entire watershed from the following years: 1994, 1998, 2002, 2004, 2005, and 2007-2012. In addition, 2010 and 2012 NAIP imagery of the entire watershed was reviewed.

Due to the lack of stereographic pairs and poor resolution of historical photos, a quantitative analysis identifying the distribution and delivery estimates of upslope erosional features (i.e. landslides) was not completed. However, based on inspection of the available photographs and imagery available for review, PWA can ascertain that the largest identified upslope erosional features have been present since the earliest historical photos. These include many linear gully features associated with headward migration of 1st order streams that are underlain by Miocene sedimentary rock types on the south facing hill slopes in the middle watershed (Gullies #1-3, Map 5). It appears as if some of these gully features have enlarged and continue to develop through “subsurface piping and collapse processes” since their inception. For further discussion of these upslope sediment sources, refer to *Section 4.1.*

In general, shallow debris slide scars are concentrated on the higher elevation and steep, headwater grassland hill slopes within Williams Canyon, Van Winkley Canyon and in Seneca Creek (Figure 2.6, Map 5). The debris slides are found to occur most often within the Cretaceous granitics bedrock types (Kgdm, Kgdc, Kqds) and along hill slopes with gradients >65% (Maps 3 and 4). Very few shallow debris slides are present within the gentler-sloped Animas Creek watershed, as well as on other south facing, non-granitic hillslopes along the north side of the main stem SJC. Most of the deep-seated rotational landslides do occur in these areas of sedimentary bedrock, as discussed below.

[6] Certain years of historical photographs do not cover the entire watershed.

Figure 2.6. Upper Williams Canyon headwater hill slopes underlain by granitic bedrock displaying a high frequency of shallow debris slides.

2.7 Oblique aerial photography

As requested in the Request for Proposals, two fixed oblique photography flights were planned. The first was for initial reconnaissance at the beginning of the study to identify the locations and distribution of larger erosional features present within the watershed, and to plan field reconnaissance on the ground. A second flight was planned after the winter of 2013 to locate any watershed changes brought about by storms and erosion in water year 2013.

On February 16, 2013 the first flight was performed to help identify significant upslope erosional features in the SJC watershed (Appendix A). This flight was conducted after preliminary historical photogrammetry review and study of the 2010/2012 NAIP imagery as discussed in *Section 2.5* above. Observations during the flight taken at the beginning of the study did not reveal any significant features not identified during the photography review. The second post winter aerial flight was not performed due to the lack of significant and prolonged winter rains that are necessary to trigger hill slope landslide responses. A typical photo from the fixed wing survey is shown on Figure 2.6.

Appendix A documents historic aerial photos, oblique aerial photos, and ground based photographs that show watershed conditions. The photographic appendix further illustrates the results generated through the aerial photography review.

3. HYDROLOGY AND GAGING

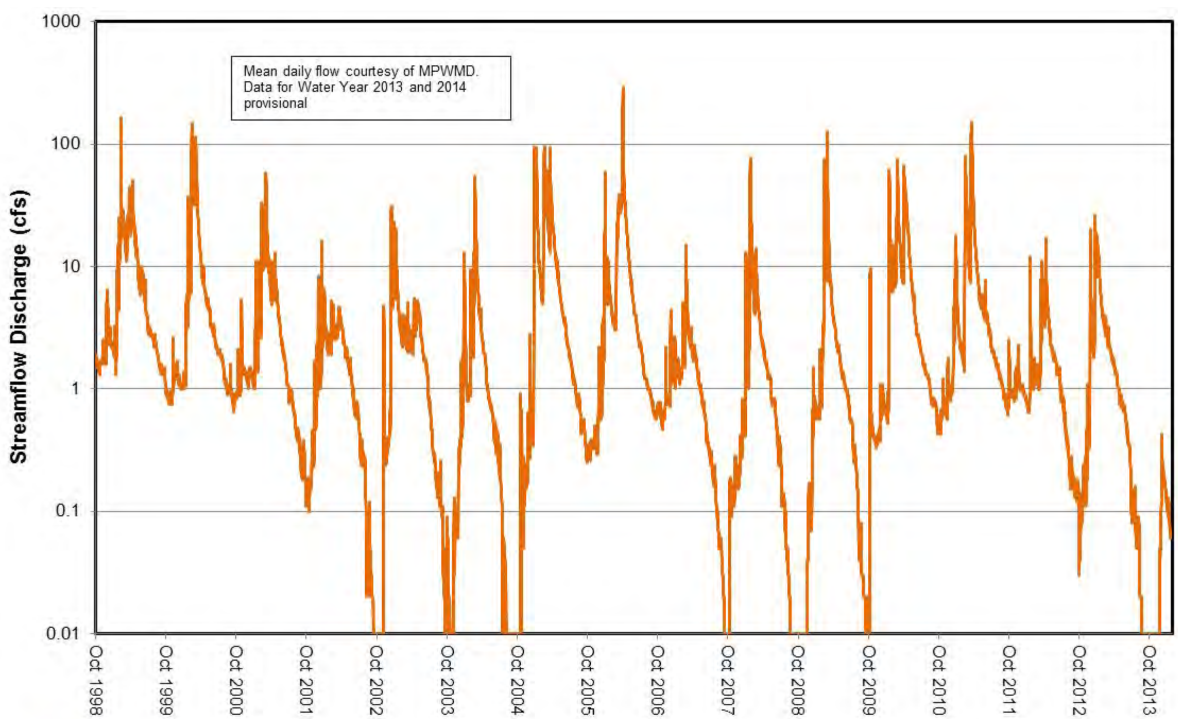
In conjunction with field investigations on sediment sources, fish barrier analysis, and lagoon geomorphology, a network of stream gages was installed and monitored for Water Year 2013 and then continued an additional 4 months through January 2014. This gaging network consisted of three temporary gaging sites, located to work in conjunction with existing gaging and previous gaging activities. In addition, storm measurements were performed throughout the watershed.

3.1 Past and current gaging within watershed

3.1.1 MPWMD gaging

Since 1999, the MPWMD has maintained a stream gage site near the mouth of SJC on California State Parks land, about 0.4 miles upstream of the Highway 1 bridge and Monastery Beach. During this watershed study, the Balance team worked closely with the MPWMD staff to share flow data and measurements at the lower gage site.

The MPWMD historic average daily flows are shown on Figure 3.1. Annual peak flows from the gaging program are shown on Table 3.1. We applied a Log Pearson Type III distribution to calculate estimated discharges for some commonly-used design intervals. Results are reported in Table 3.2. The 2-year flow is estimated at about 130 cfs and the 100-year flow is estimated at about 700 cfs, as determined from the 15 peak-flow data points (Table 3.2).



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Mean daily flow; San Jose Creek at Monterey Peninsula Water Management District (MPWMD) gage, Monterey County, California, water year 1999 to 2013.

Figure 3.1. Mean daily flow at MPWMD gage, Water Years 1999 to 2013.

Table 3.1. Annual peak flows for MPWMD gaging site near mouth of San Jose Creek. Data Courtesy of MPWMD. Water year 2013 data are provisional.

Water Year	Peak flow date	Gage height (ft)	Peak flow (cfs)
1999	2/9/1999	5.54	400
2000	2/13/2000	5.09	293
2001	3/4/2001	3.85	83
2002	12/2/2001	3.40	40
2003	12/16/2002	4.02	103
2004	2/25/2004	4.35	146
2005	3/22/2005	4.71	204
2006	4/4/2006	5.26	440
2007	2/27/2007	3.09	20
2008	1/28/2008	4.09	122
2009	3/4/2009	4.74	189
2010	1/20/2010	4.56	164
2011	3/24/2011	4.94	232
2012	4/13/2012	3.27	29
2013	12/2/2012	3.81	69

Table 3.2. Flood frequency flows based on peak flows from MPWMD gage near mouth of San Jose Creek. Based on Log Pearson Type III distribution analysis. Source data courtesy of MPWMD.

Recurrence Interval (years)	Peak Discharge (cfs)
1.25	58
2	132
5	267
10	369
25	503
50	604
100	705
200	804

3.1.2 CSU Monterey Bay gaging

California State University Monterey Bay (CSUMB) maintained two stream gages in Water Year 2011 (October 2010 to October 2011), one on the main stem of upper San Jose Creek, upstream of Van Winkley Canyon and the other on Williams Canyon (Figure 3.2) These gages were installed to better understand watershed yield by subwatershed and to optimize conservation strategies (Paddock, 2012). Each gaging station recorded water stage at 15-minute intervals, which were converted to discharge using rating curves. These data are shown on Figure 3.3 and Figure 3.4. Peaks flows at the gages for Water Year 2011 are estimated as 15 and 25 cfs and base flows are estimated to range between 0.1 and 0.7 cfs for Williams Canyon and Upper SJC, respectively.

Figure 3.2. Location of CSUMB gaging sites for water year 2011, adapted from Paddock (2012).

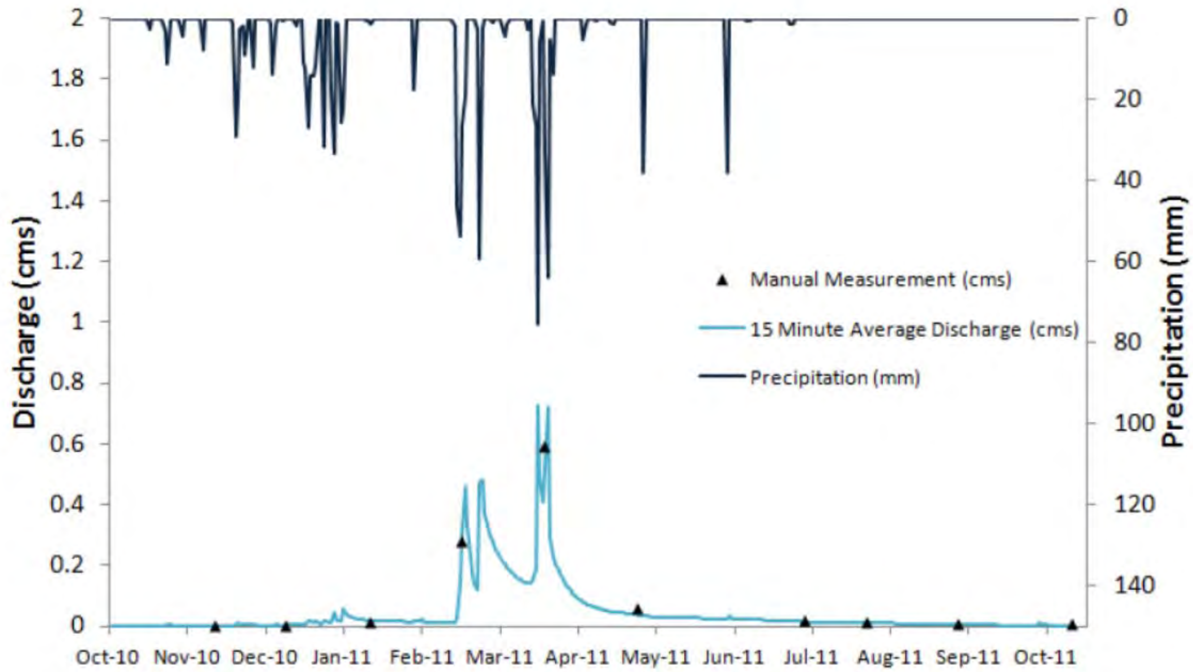

Figure 3.3. Discharge record from CSUMB for Water Year 2011 on upper San Jose Creek, based on Emily Paddock's work (2012). Note that 1 cubic meter per second (cms) is about 35.3 cfs. Rating curve is commented to be accurate up a discharge of 0.59 cms. Peak flow estimated as 25 cfs.

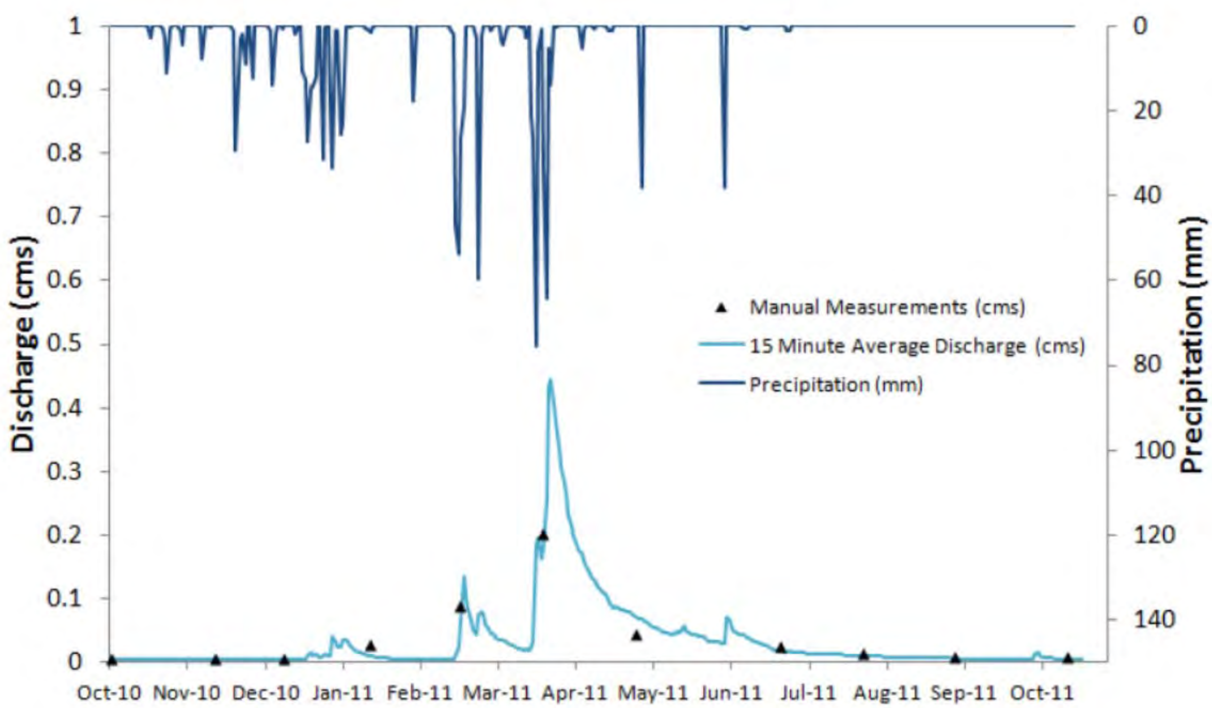

Figure 3.4. Discharge record from CSUMB for Water Year 2011 on Williams Canyon Creek, courtesy of Paddock (2012). Rating curve is commented to be accurate up a discharge of 0.2 cms (or about 14 cfs). Only one stage discharge rating curve was apparently used. Peak flow estimated as 15 cfs.

3.1.3 Other studies and gaging

Balance Hydrologics has assisted the Santa Lucia Conservancy with hydrologic services since the early 1990s, which also includes flow and sediment measurements at the v-notch weir site, about 1 kilometer downstream of the CSUMB upper SJC gage site (Map 5). Flow measurements from the Balance Hydrologics studies are plotted on Figure 3.5. Base flow at the V-notch site was noted to range from 0.03 to 0.78 cfs (13 to 193 gpm) between 1990 and 1998, based on flow measurements between April and September (Hecht and Napolitano, 1995). For comparison, the base flow from the temporary gage during this study at the v-notch site, ranged from 0.01 to 1.0 cfs, starting in April 2013. See section 3.2 below for more information on the temporary gage.

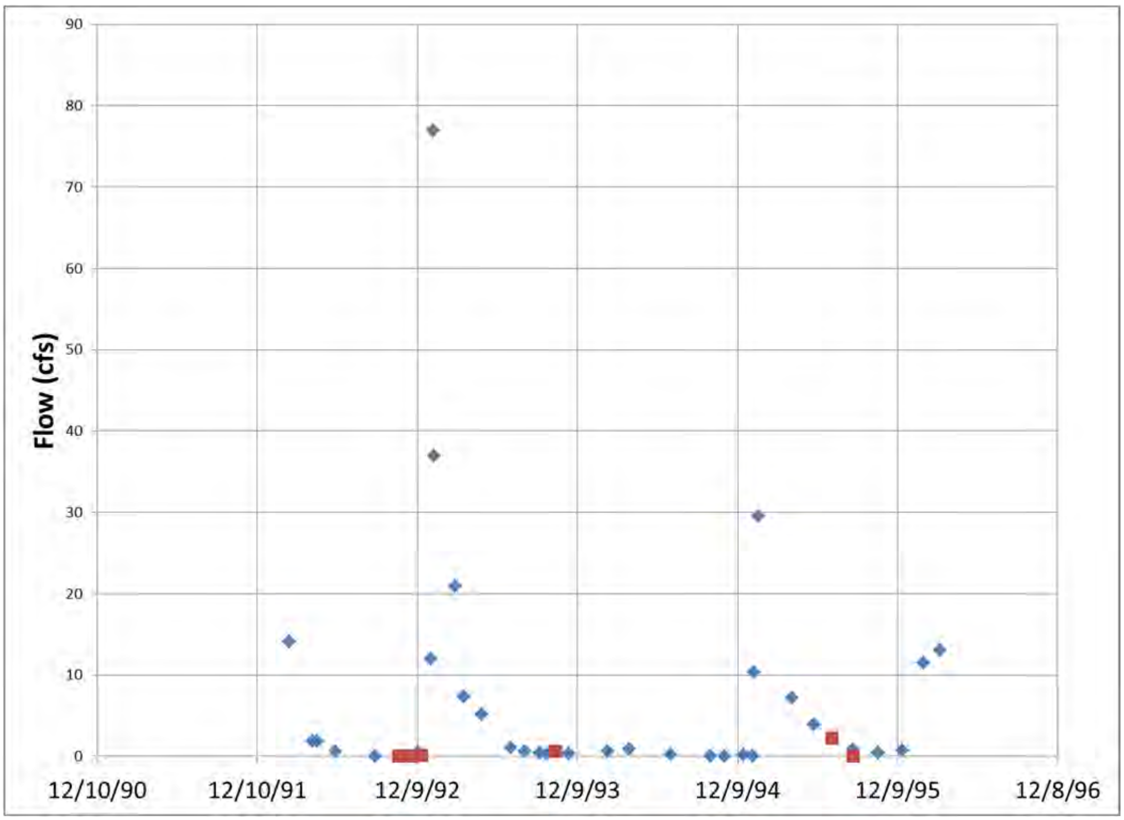

Figure 3.5. Past flow measurements at v-notch weir on San Jose Creek by Balance Hydrologics (Hecht and Napolitano, 1995).

3.2 Temporary extended stream gaging and rain gage network

Three temporary gages were installed and maintained for this watershed study. The locations of these gages were strategic to coordinate with field work, sample sediment transport rates, align with gaging from past studies, and expand data collection to areas previously unstudied. For each location depth sensors were installed. Streamflow and sediment-transport rates were measured to develop rating curves, then applied to each day's measured flow depths, as is done to complete a flow record through water year 2013. Locations of these gaging sites are shown on Map 5.

In addition, to provide stronger findings on storm response to precipitation, two temporary rain gages were installed in the SJC watershed to describe local orographic and other regional differences in precipitation within the watershed. Data from these gages would then be related to the gaged flows.

3.2.1 San Jose Creek at V-notch weir downstream of Van Winkley Canyon

With permission from the Santa Lucia Conservancy, Balance installed several gages near the former gaging site, just upstream of an abandoned concrete v-notch weir in the main stem of San Jose Creek[7] (Map 5 and Appendix B). The gaging instrumentation included:

(a) a pressure –depth sensor at the V-notch weir,[8]

(b) an open channel flow station placed upstream to measure high flows

(c) a non-recording station where periodic measurements could be on an unnamed north-bank tributary approximately 200 feet upstream, and

(d) a non-recording station where periodic measurements could be made on SJC just upstream of the unnamed north-bank tributary.

Flows in Van Winkley Canyon could be estimated by the difference between the upstream and downstream measurements. We arranged this approach as we could not find a good place to establish a temporary stream gage on lower Van Winkley, where much of the flow in the lower portions of this tributary goes through dense root masses or through subsurface channels.

Specific conductance (an index of dissolved solids in a stream) and concurrent water temperature were measured each time that we visited the individual gaging sites in this complex.

Each of the two recording stations was equipped with a second transducer to record water level, to provide redundancy and backup in case one was to fail. The open-channel flow gage provided better measurement conditions for higher flows (exceeding 50 cfs), and would have proved functional if the V-notch weir were to be obstructed by wood or sediment, as it had been during Balance's prior work at this gage in 1990-1995. Also, the upstream open channel flow station provided a location for measuring bedload and suspended sediment. Site visits to this

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[7] On Sept. 29, 1990 – during the fourth consecutive dry year-- Mr. Hecht walked San Jose Creek from upstream of the Williams confluence to the western boundary of Rancho San Carlos. He found the most baseflow a short distance upstream of the V-notch weir. Since one of this study's objectives was to measure baseflow, we decided to reoccupy this gage, where flow could best be measured.

[8] The V-notch weir was installed in the early 1980s by CDM Engineers, which had planned to measure flow using the same weir equation from measured depth of flow using a transponder positioned about 6 feet above the water level. This proved unworkable, as the weir pool was immediately filled with sediment. Three other weir/transponder stations were constructed on the other main streams of Rancho San Carlos, which sought a water supply for a proposed community of about 3200 homes once envisioned.

station included monthly visits for maintenance and storm visits for flow and sediment transport calibration points.

As it happened, essential no high flows occurred during the gaging period, so the V-notch weir (with its high precision for measurement) became our primary gage at this site. Stage measurements from the level logger, located in the pool upstream of the V-notch were measured to establish depth of flow above the low point in the v-notch, from which we computed depth using a standard v-notch weir equation. to determine stream flow.

The redundancy of the two set ups provides a more secure data collection, if one setup was compromised by stream conditions or instrument malfunctions.

3.2.2 Seneca Creek just upstream of confluence with San Jose Creek

To evaluate flows on Seneca Creek and expand on previous gaging efforts, a station was installed near the mouth of Seneca Creek (Map 5 and Appendix B). The installation included a level logger placed in a somewhat rectangular cross section, bounded by root-bound stream banks. The gage was installed on MPRPD land. Visits to gage included storm measurements and monthly visits to maintain calibration and check on the status of the sensor.

3.2.3 Water level sensor and flow at mouth of San Jose Creek

A third gaging set up was placed about 30 feet downstream of the Highway 1 bridge in the SJC Lagoon (Map 1 and Appendix B). The objective was to monitor water levels in the lagoon, to help bracket its role in shaping steelhead populations in SJC. This was one of MPRPD's study objectives. This sensor also was designated to monitor flow conditions in SJC as it enters the lagoon. The instrumentation for this station was a perforated PVC pipe with a level logger, a staff plate and a fence post placed into a sand bed and concealed amongst wetland vegetation. The staff plate and station was surveyed in during the lagoon cross sections and profile.

3.2.4 Rain gages

Two rain gages were deployed for the term of the study, located as shown on Map 5. One gage was installed on a fence line at the east end of the old Palo Corona Ranch near Rancho San Carlos Road, on the ridge line, north of SJC about midway through the watershed. The second rain gage was installed on the ridge on the south side of the watershed in the Palo Corona ranch area. The locations of these gages were based on geographic data gaps from other gages, access, and hydrologic diversity to assess rainfall trends in the watershed as a whole.

The rain gages were Onset rain gages (screened canisters), with event based Hobo data loggers attached to tipping buckets. Dates and times for each tip of the bucket were logged and clustered by bucket tips per hour. Locations for the gages were areas clear of trees and on fence posts above the ground, within or on structures to be secure from curious or itchy cattle.

3.3 Results

3.3.1 Precipitation

Total rainfall for the last water year at the temporary rain gages was 8.54 inches and 16.21 inches on Santa Lucia Preserve and Palo Corona ridge, respectively. The distributions of rainfall through the year are shown on Figure 3.6. This last year and beginning of water year 2014 has been critically dry.

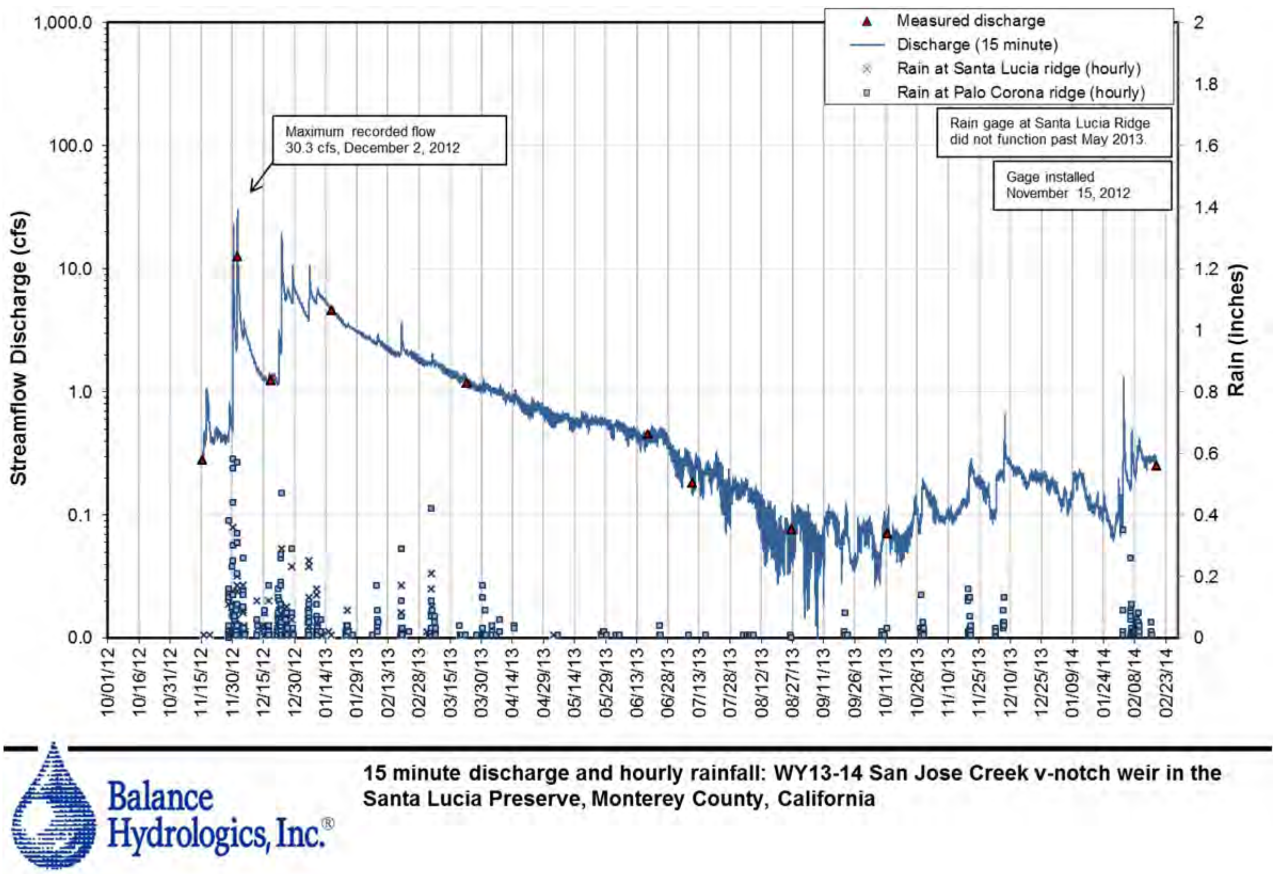
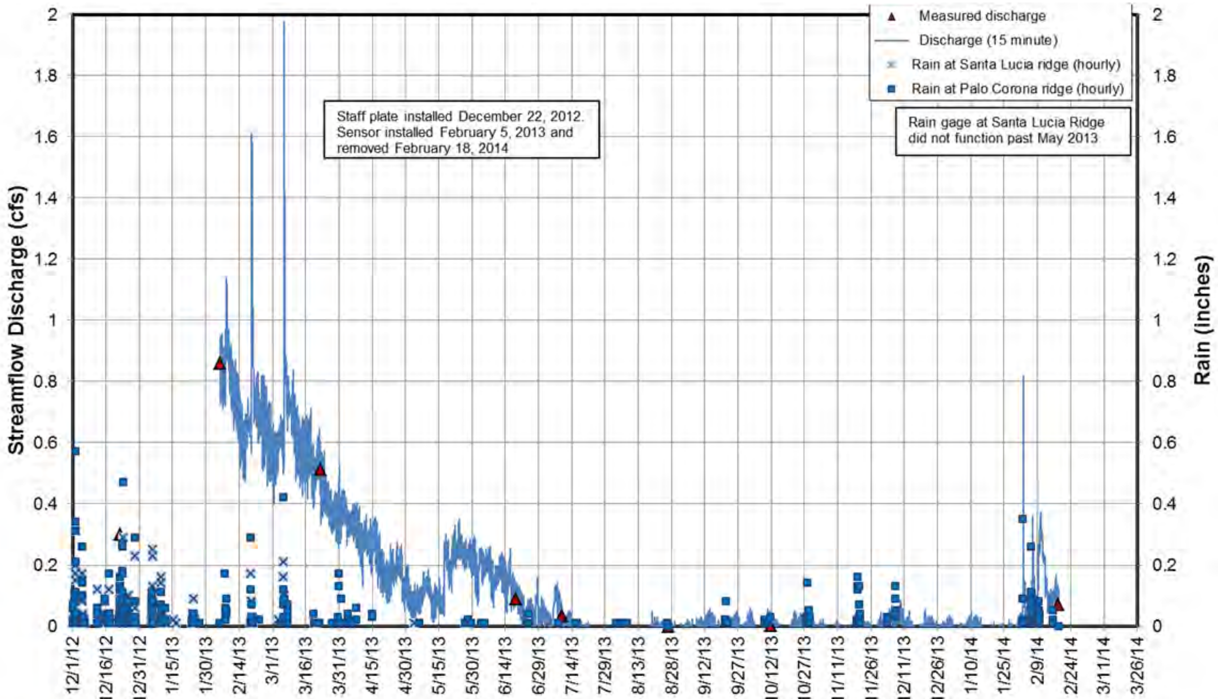


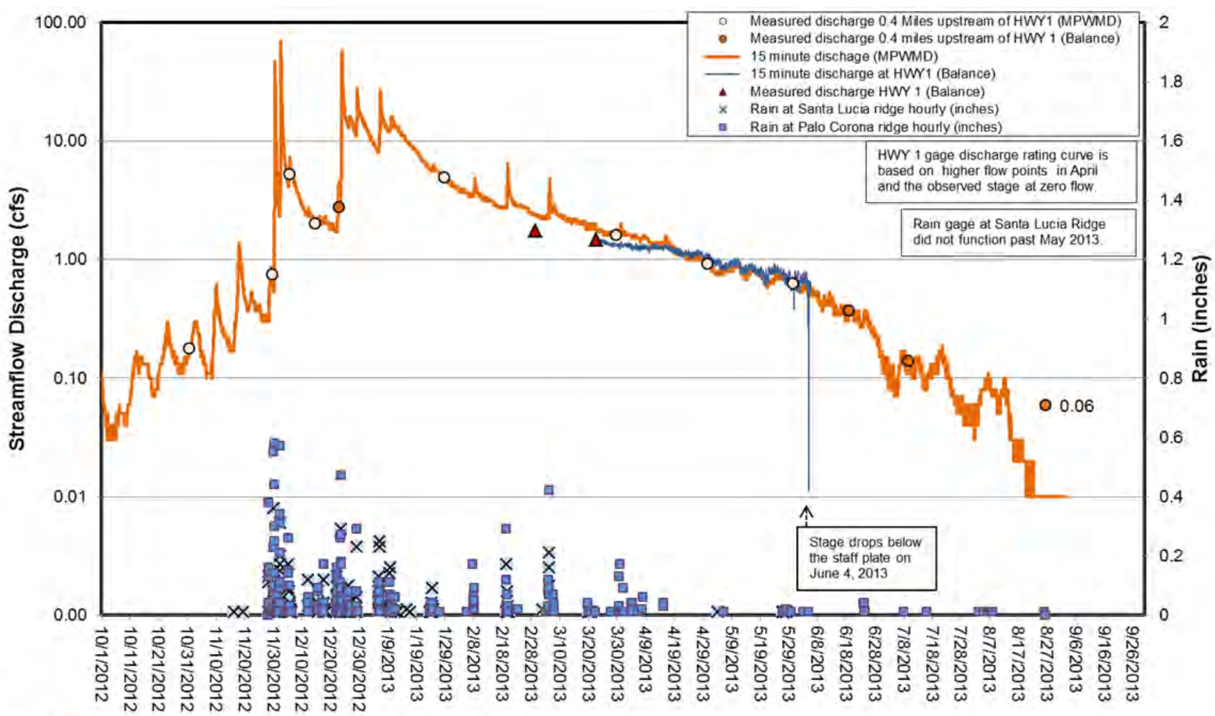
Figure 3.6. Gaged flow at V-notch weir on San Jose Creek, and precipitation at two nearby rain gages installed for this study during WY2013 and the first four months of WY2014.



Balance Hydrologics, Inc.®

15 minute discharge and hourly rainfall: Seneca Creek just upstream of the confluence with San Jose Creek, Monterey County, California, water year 2013-14.

Figure 3.7. Gaged flow and precipitation on Seneca Creek for Water Year 2013



Balance Hydrologics, Inc.®

15 minute discharge and rainfall; San Jose Creek at Highway 1 (Balance) and 0.4 miles upstream at the Monterey Peninsula Water Management District (MPWMD) gage, Monterey County, California, water year 2013-14.

Figure 3.8. Gaged flow and precipitation on San Jose Creek at Highway 1 for Water Year 2013

3.3.2 Storm flows

Discharge records for San Jose Creek and Seneca Creek are shown on Figure 3.6, Figure 3.7, and Figure 3.8. Precipitation records are also plotted on these charts for reference, as well as measured discharges.

The most significant storms occurred during water year 2013. The first was on 12/2/12 and the second was on 12/23/12. Smaller storms occurred in March 2013, but were not significant in terms of generating runoff or peak flows. For the two main storms in December 2012, at the V-notch gaging station, these peak flows were estimated as 30.3 cfs and 19.5 cfs, for December 2 and 23, respectively. Corresponding peaks at the MPWMD station were 69 cfs and 57 cfs for December 2 and 23, respectively. Lag times between the peak flows from the V-notch to the MPWMD site were 1.75 hours for December 2 and 2.25 hours on December 23. Suspended load and bedload samples were taken during these storms.

3.3.3 Base flow

Because this last water year was very dry, the base flow dropped to very low levels and at an earlier time frame. Seneca Creek ranged from 0.3 cfs to 0.1 cfs from April to June, effectively drying out by July. Flow at the V-notch dropped from about 1 cfs to 0.1 cfs from April to August. During the summer flows at the V-notch varied from 0.03 to 0.08 cfs, rising up slightly in the fall, presumably due to reduced uptake (evapotranspiration). At the lagoon, water level records indicate the mouth of SJC went dry around June 4, 2013, corresponding to a flow of about 0.5 cfs at the MPWMD State Park gage.

4. SEDIMENT ANALYSIS

4.1 Upland sources

4.1.1 Road/trail networks - Overview

Sediment delivery to stream channels from roads, trails, and road/trail networks has been extensively documented, and is recognized as a significant impediment to watershed health and salmonid habitat (Furniss et al., 1991; Higgins et al., 1992; Harr and Nichols, 1993; Flosi et al., 1998; NMFS, 2000, 2001). Road/trail related sources of sediment include both *episodic site specific* and *chronic erosional processes*. Episodic sediment production requires large and/or persistent rainfall and consequent peak flows to trigger catastrophic geomorphic changes, both along the road system as well as within stream channels. Common site-specific sources of road-related sediment production can be, but are not limited to: stream crossings, landslides, point source springs, ditch relief culverts, and sites of downslope concentrated flow (i.e. gullies). Chronic sediment sources are primarily associated with "hydrologically[9] connected road segments" including the road bed, cutbank and inboard ditch (i.e. road surface sites). All road-related erosion, whether from an episodic or chronic sediment source, is man-caused and is deemed controllable, accelerated sediment production in a watershed.

A *stream crossing* is a ford or structure on a road or trail (such as a culverted road prism or bridge) installed across a stream or watercourse (USDA Forest Service, 2000). When they erode, sediment delivery from stream crossings is always assumed to be 100%, because any sediment eroded is delivered directly to the stream. The size of the stream affects the rate of sediment movement, but any sediment delivered to small lower order or ephemeral streams has the potential to be transported to downstream fish-bearing stream channels.

Large volumes of erosion may occur at stream crossings where culverts are too small for the drainage area and storm flows exceed culvert capacity, or when culverts become plugged by sediment and debris. In these instances, flood runoff will spill onto or across the road or trail, eroding the road fill. Alternately, the stream crossing may have a diversion potential, which means that streamflow is diverted down the road or trail, either on the running surface or in the ditch, instead of spilling over the fill and back into the same stream channel. In this case, the roadbed/trailbed, hillslope, and/or stream channel that receives the diverted flow may become deeply gullied or destabilized. These hillslope gullies can become quite large and have the potential to deliver large quantities of sediment to stream channels (Hagans et al., 1986). Diverted streamflows that discharge onto steep, unstable slopes can also trigger large hillslope landslides.

According to the California Forest Practice Rules (CalFire, 2013), stream-crossing culverts must be able to convey a 100-year storm flow[10] as well as sediment and organic debris in transport

[9] *Hydrologically connected* describes sites or road segments from which eroding sediment is delivered to stream channels (Furniss et al., 2000).

[10] A *100-year flow* is the discharge that can be expected to occur, on average, once every 100 years.

during high flows to be considered adequately sized (Weaver et al., 2006). Undersized culverts do not have the capacity to convey streamflow during periods of heavy rainfall, and are more likely to become plugged by sediment and debris. Many stream crossing culverts in the SJC watershed are substandard, i.e., are not large enough to convey a 100-year flow, or are installed at too low a gradient through the stream crossing fill to prevent plugging. Improper culvert installations such as these were once common because they required shorter lengths of pipe to convey flow through the road, and were therefore used to cut costs. However, in the long run these cost-cutting measures prove detrimental to erosion control and maintenance costs because the culvert discharges water onto unconsolidated road fill, rather than into the pre-existing stream channel, which exacerbates erosion of the outboard, downstream fill face.

Road-related *landslides* are masses of road fill (and in some cases additional hillslope material) with the potential to fail during heavy and/or prolonged rainfall events. Sediment delivery as a result of road related landslides are the easiest to correct or prevent, generally requiring excavating the unstable road fill and sidecast material and redepositing it in a stable, permanent location. However, deep-seated landslides are typically more problematic, and usually technically infeasible to treat. Refer to *Section 4.1.2 Hillslope landslides and gullies* for discussion of non-road related landslides.

Point-source springs are erosion sites where spring flow shows potential to produce and deliver road-related erosion. Flow from multiple springs may become concentrated where there are inadequate drainage structures on a road, which can lead to the formation of downslope gullies or fillslope failures. *Ditch relief culverts* (DRCs) are drainage structures that move water from a road or trail inboard ditch to areas beyond the outer edge of the road or trail fill. This results in flow from the inboard ditch, which may include both runoff from the running surface and shallow subsurface flow intercepted by the cutbank, being drained onto slopes below the road or trail (Pacific Watershed Associates, 1994). When properly spaced, DRCs limit the quantity of water available to cause erosion at any single location, allowing flow to disperse and therefore reduce the likelihood of gullies forming at their outlets. *Downslope concentrated flow* refers to sites of focused runoff channeled from road surfaces and other upslope areas during periods of intense rainfall. *Gullies* often form at the point where the concentrated flow exits the road or trail surface. *Refer to Section 4.1.2 Hillslope landslides and gullies* for discussion of non-road related gullies.

Road surface sites are segments of hydrologically connected road or trail with chronic[11], accumulated runoff and uncontrolled flow from long sections of undrained road surface and/or inboard ditch. By definition, road surface sites are not associated with other sediment delivery sites, but rather are individual locations in which accumulated road drainage is the sole source of erosion and sediment delivery. (Segments of hydrologically connected road that are directly adjacent to other delivery sites are categorized separately, as *chronic* sources and discussed below). Sediment discharge at road surface sites typically occurs at low spots in the road where concentrated flow exits the road and travels downslope, often forming gullies.

Chronic sources of road related sediment include the unpaved road surfaces and their associated ditches and cutbanks. The chronic production and delivery of fine sediment to stream channels

[11] Erosion from road or trail surfaces and cutbanks occurs on an ongoing basis, and hence is referred to as *chronic*.

is the result of: (1) mechanical pulverizing and wearing down of road or trail surface by vehicular, equestrian, bicycle and foot traffic; (2) erosion of unpaved road or trail surfaces by raindrop impact and runoff during periods of wet weather; (3) erosion of the inboard ditch by runoff during wet weather; and 4) erosion of the cutbank by dry ravel, rainfall, slope failures, and brushing/grading practices.

4.1.2 Road/trail networks – Previous watershed assessments

Several road assessments have been conducted in recent decades within the SJC watershed. Two of the most recent, comprehensive investigations were conducted by PWA in 2007 and by California Geological Society (CGS) in 2009. Of the approximately 86.45 miles of road/trail identified in the SJC watershed, approximately 47.25 mi or 55% have been inventoried (Table 4.1). Of the 47.25 mi, 34.83 mi have been evaluated based on key structural, hydrological, sedimentological, and environmental characteristics and ranked based on their need for attention (CGS, 2010), and 12.42 mi were evaluated by a quantitative assessment utilizing approved California Department Fish and Wildlife (CDFW) Salmonid Stream Habitat Restoration Manual Chapters IX and X protocols (PWA, 2007). In addition, for the purposes of this study, the Project Team conducted a reconnaissance level evaluation along a minimum of approximately 25 miles of the roads within the watershed.

Table 4.1. Evaluated road/trail Network of San Jose Creek by Subwatershed, San Jose Creek Study, Monterey County, California.

Subwatershed	Total Estimated length of road (mi)	Inventoried road length (mi) [a]	% total
Animas Creek	13.65	3.82	28%
Seneca Creek	17.49	17.23	99%
Van Winkley Canyon	4.30	3.85	90%
Williams Canyon	13.17	12.42	94%
Remaining San Jose Creek	37.84	9.93	26%
Total Road Mileage in the Watershed	**86.45**	**47.25**	**55%**

[a] Inventoried roads within Williams Canyon were assessed to identify sources of sediment delivery and quantify future erosion volumes (PWA, 2007). Inventoried roads within the remaining subwatersheds were evaluated and ranked based on need of attention (CGS, 2010). Many of the roads throughout the watershed downstream from the mouth of Williams Canyon were observed by the Project Team during the field reconnaissance (Balance/PWA, 2012-2014).

In 2007, PWA conducted a road related sediment source assessment in the Mitteldorf Preserve, owned and managed by BSLT (PWA, 2007). Mitteldorf Preserve encompasses about 85% of the Williams Creek watershed. Results of PWA's investigations revealed accelerated erosion and sediment delivery has been caused by anthropogenic practices, including logging and rural road construction. PWA field crews inventoried approximately 12.42 mi of roads/trails in the Preserve to evaluate all road/trail-related erosion sites and their potential for delivering sediment to the local stream system. PWA identified 48 sites and 3.78 miles of hydrologically connected road lengths recommended for treatment[12]. If left untreated, approximately 5,585 yd^3 of sediment was estimated to be delivered from these erosion sites and road surfaces to the stream system over the next decade. The assessment determined that approximately 36% of the roads/trails were hydrologically connected. Of the 48 road/trail related sites, 72% were stream crossings, 10% were landslides, and 18% were "other" sites[13]. Of the approximately 5,585 yd^3 of estimated future sediment delivery from sites recommended for treatment, 66% was attributed to hydrologically connected road surfaces, 29% was attributed to stream crossings, 4% to landslides, and less than 1% to "other" sites (Table 4.2) (PWA, 2007).

Table 4.2. Estimated volume of future sediment delivery for sites and road surfaces assessed within Williams Canyon Subwatershed, San Jose Creek Watershed Study, Monterey County, California[a].

Sediment sources	Estimated future sediment delivery (yd^3)	Percent of total
Stream crossings	1,646	29%
Landslides	235	4%
"Other" sites[b]	13	1%
Hydrologically connected road and cutbank surfaces adjacent to other sediment delivery sites[c]	3,691	66%
Total	**5,585**	**100%**

[a] Data was taken from the Williams Creek Watershed Erosion Prevention Planning Project, Monterey County, California (PWA, 2007) and only includes sites and road surfaces recommended for treatment.
[b] *Other sites* include ditch relief culverts, point source springs, sites of concentrated downslope flow (including gullies), and hydrologically connected road or trail segments not adjacent to other sediment delivery sites ("road-surface sites").
[c] Decadal sediment delivery for unsurfaced roads, assuming a 25 ft wide road surface and cutbank contributing area, and 0.2 ft lowering of road and cutbank surfaces per decade.

As part of the 2007 assessment, PWA assigned treatment priority ratings to sites or groups of sites based on the combined evaluation of 4 criteria that consider different aspects of remediating erosion problems. Higher priority ratings apply when erosion potential, sediment delivery, treatment immediacy, and cost effectiveness are all moderate or high, with lower priority ratings correspondingly based on lower ratings for the combination of these criteria.

Of the 48 sites, 6 (12%) were rated higher priority, 23 (48%) moderate priority, and 19 (40%) low priority.

In 2009-2010, the California Geological Survey (CGS) evaluated 42 miles of road within the Palo Corona Regional Park (CGS, 2010). Of the 42 miles of road, nearly 35 miles were located within

[12] The discrepancies in reported mileage are due to minor adjustments made to the roads/trails GIS layer between the 2007 assessment report and 2010 implementation.
[13] *Other sites* include ditch relief culverts, point source springs, sites of concentrated downslope flow (including gullies), and hydrologically connected road or trail segments not adjacent to other sediment delivery sites ("road surface sites").

SJC watershed. Although primarily a GIS analysis project, approximately 14 miles were assessed on the ground. The purpose of the CGS study was to evaluate the roads based on key structural, hydrological, sedimentological, and environmental characteristics and then rank them based on their need for rehabilitation. In the CGS study (2010), roads were evaluated for 58 physical criteria (i.e. slope, width, surfacing, etc.) and 80 hydraulic criteria (i.e. water bar, x-drain culvert, and ditch lead out). Based on this evaluation, entire road segments were then ranked according to treatment priority (green = low priority, yellow = moderate priority, and red = needs attention).

According to the assessment, 134 road segments and 278 hydrologic features were identified. Of the 42 miles evaluated, 2 (5%) were rated higher priority (red), 15 (36%) moderate priority (yellow), and 25 (59%) were categorized low priority (green). Of the 147 stream crossings identified in the assessment, 71 (48%) were rated higher priority (red), 62 (42%) moderate priority (yellow), and 14 (10%) were categorized low priority (green)[14].

Figure 4.1. View of undersized culverted stream crossing along Seneca Creek.

Figure 4.2. View of hydrologically connected road reach with no permanent drainage structures installed to disperse road runoff. Note ruts forming along outboard road tread.

[14] Some road segments weave in and out of the watershed boundary. Therefore, for ease of discussion and as to not misrepresent CGS data, results are reported to include all evaluated roads (including the approximately 7 miles located outside the SJC watershed boundary).

Based on the reported results of both road assessments, erosional and sedimentological issues resulting from the decline of these "legacy" roads were identified and the importance of treating them to reduce the continued sediment delivery to SJC streams and overall impact to the health of the watershed was emphasized. Both assessments identified stream crossing sites as the single largest road related problem that directly deliver sediment to streams in the SJC watershed (Figure 4.1). The CGS assessment identified approximately 4 stream crossings per mile of road; PWA assessment identified approximately 3.5 crossings per mile.

In addition, both assessments identified hydrologic connectivity as a major problem in contributing sediment noting that the lack of permanent road drainage features (such as rolling dips, DRCs, roadshaping) or improper spacing of these features exacerbates road surface erosion and results in increased sediment delivery to SJC tributaries (Figure 4.2).

4.1.3 Road/trail networks – Future sediment delivery estimates

Based on recommendations provided in these two road assessments, the BSLT has undertaken most of the erosion control and sediment prevention treatments within Williams Canyon, whereas the results of the CGS study are beginning to be addressed throughout Palo Corona Regional Park. Where implementation has occurred, these treatments are effectively reducing anticipated future sediment delivery volumes to the SJC watershed, however, additional work is needed to protect aquatic habitat from anthropogenic sediment sources.

Based on PWA's 2007 assessment in Williams Canyon, BSLT secured funding from CDFW in 2009 to implement sediment reduction treatments along 8.1 mi of assessed road within Williams Canyon. This work, completed in 2010, substantially diminished the delivery of coarse and fine sediment to Williams Creek by preventing approximately 6,030 yd^3 from episodic and chronic sources of erosion[15]. Anecdotal observations have revealed that the waters entering SJC main stem from Williams Canyon are noticeably clearer since the roads were treated in 2010 and therefore are assumed to be transporting much less sediment.

During the 2013 field reconnaissance, recently implemented treatments addressing road-related erosion were observed along road segments within Seneca Creek and the remaining SJC. Unfortunately, there is no quantifiable documentation on how much sediment can be estimated and prevented from entering the system resulting from these implemented treatments. However, if we assume that these treatments are effective, we can make a conservative estimate that approximately 2 mi and 7 mi have been recently treated within Seneca and remaining SJC, respectively, and exclude those segments from any extrapolations to estimate future sediment delivery volumes.

[15] Data taken from PWA Report No. 11085701 (PWA, 2010)

Utilizing the quantitative data from PWA's 2007 Williams Canyon assessment; site density reported from both the 2007 and 2010 evaluations; observations from the 2012-2013 field reconnaissance; and a GIS analysis of geology, hillslope gradient, road location, and road density, we have developed a very conservative rough estimate of potential future sediment delivery volumes resulting from untreated road related sources from unpaved roads within the SJC watershed. The following lists the assumptions that were used to achieve the very conservative future sediment delivery estimates listed in Table 4.3:

- 3 stream crossing sites per mile of road
- 30 yd^3 of future erosion per stream crossing site
- 25% hydrologic connectivity[16]
- 20 ft wide contributing area (includes road, ditch, and cutbank)
- 0.15 ft road lowering rate per decade[17]
- Estimated volumes are reported over 30 years for episodic sources 10 years for chronic

There are exceptions to the above list of assumptions; these exceptions include the following:

- 2 mi of road within Seneca Creek: mileage is assumed to have been treated as identified during the 2012-2013 field reconnaissance (refer to footnote "e" in Table 4.3)
- 6,030 yd^3 of sediment delivery to Williams Canyon: volume was prevented as a result of treating 8.1 mi of road in 2010 (refer to footnote "f" in Table 4.3)
- Remaining untreated 5.07 mi within Williams Canyon: a different set of assumptions was used for calculating sediment delivery estimates (refer to footnote "f" in Table 4.3)
- 12 mi of road within the remaining SJC: 5 mi of road is paved and 7 miles is assumed to have been treated as identified during the 2012-2013 field reconnaissance (refer to footnote "g" in Table 4.3)

[16] Based on the ~35% hydrologic connectivity of assessed road mileage in Williams Canyon we adjust to 25% for a more conservative extrapolation to other subwatersheds, which on average are not as steep

[17] We are utilizing a moderate-low surface lowering rate of 0.15 ft per decade and a narrower road/cutbank/ditch width as a conservative extrapolation to use in subwatersheds other than Williams Canyon.

Table 4.3. Estimated future erosion anticipated from road related (upslope) sources by subwatershed based on extrapolation of field estimates, San Jose Creek Study, Monterey County, California.

Subwatershed	Estimated length of road (mi)	Estimated future sediment delivery volume per mile (yd³) [a]		Estimated future sediment delivery volume within subwatershed (yd³) [a]		Total future sediment delivery volume within subwatershed (yd³) [d]
		episodic [b]	chronic [c]	episodic [b]	chronic [c]	
Animas Creek	13.65	90	145	1,230	1,980	14,210
Seneca Creek[e]	17.49	90	145	1,575	2,535	4,110
Van Winkley Canyon	4.30	90	145	385	625	1,010
Williams Canyon [f]	5.07	175	340	885	1,725	2,610
Remaining San Jose Creek [g]	25.84	90	145	2,325	3,745	6,070
Total	**66.35**	**--**	**--**	**6,400**	**10,610**	**17,010**

[a] Values are based on the assumptions listed above in the text, rounded to the nearest 5 yds³, and reflect estimates over 30 years for episodic sources and 10 years for chronic sources if left untreated.
[b] Based on 3 sites per mile and 30 yds³ of sediment per site for mileage except as noted under footnote "f" for Williams Canyon.
[c] Based on 25% hydrologic connectivity and utilizing 20 ft contributing area and 0.15 ft road lowering per decade to assume 145 yd³ per mile for all subwatersheds except as noted under footnote "f" for Williams Canyon.
[d] Total combines episodic and chronic estimates.
[e] Estimated future delivery volumes do not include any potential sediment delivering from the ~2 mi of previously treated road segments in Seneca Creek subwatershed.
[f] Estimated future delivery volumes exclude the 8.1 mi of treated roads and use the following estimates based on calculated averages from actual field measurements from the 2007 assessment: 3.5 sites per mile, 50 yds³ of sediment per site, 35% hydrologic connectivity, 25 ft contributing road, 0.2 ft lowering rate.
[g] Estimated future delivery volumes do not include any potential sediment delivering from the ~7 mi of previously treated road segments and ~5 mi of paved road segments within the remaining SJC subwatershed.

Table 4.3 details the extrapolated results of estimated future sediment delivery from road related sources within SJC watershed broken out by subwatershed. It must be clearly stated that these estimates are based on a combination of actual field measurements, extrapolated assumptions based on field measurements, GIS analysis, and observations from field reconnaissance and were not generated by direct field measurements.

Therefore, based on these assumptions and extrapolated data, if the currently untreated roads and trails are not properly re-designed (i.e. storm-proofed) and maintained, we estimate that approximately 6,400 yd^3 of sediment will be delivered from sources of episodic erosion and 10,610 yd^3 of sediment from sources of chronic erosion during the next decade alone. This leads to an overall estimate of approximately 17,010 yd^3 of sediment that can be anticipated to be delivered to SJC watershed by road/trail related sources (Table 4.3).

4.1.4 Hillslope Landslides and Gullies

During the aerial photogrammetry review, the aerial flight, and field reconnaissance of SJC watershed, the Project Team observed landslides and gullies scarring the hillside throughout the watershed. Due to the canopy cover, slim budget and lack of available tools (i.e. stereographic photography) the Project Team was unable to systematically evaluate the occurrence and magnitude of the hillslope erosional features. However, observations as to the location, type, and relative size of these features were noted throughout the watershed.

For the purposes of this investigation we have categorized non road-related upslope erosional features as either *landslides* or *gullies*. *Landslides* refer to "the movement of a mass of rock debris, or earth down a slope" (Cruden, 1991). These features are typically identified as having a "tear drop" shape, or modified ellipse with a measurable geometry of length, width, and depth. For simplicity sake, a landslide can be thought of as having three main features: (1) a surface of rupture, (2) a zone of depletion, and (3) a zone of accumulation. The surface of rupture is the trace along which the original ground surface meets the "mass in motion". The most visible portion of this trace would be the main scarp, or the upper edge of the landslide consisting of undisturbed, usually steep, ground. The zone of depletion is the portion of the landslide where original ground has been displaced (i.e. moved down slope) and this material lies below the original ground surface. Finally, the zone of accumulation is the area where the displaced material has come to rest and lies above the original ground surface (Cruden and Varnes, 1994).

States of landslide activity include "active" or "inactive". Active landslides are those that are currently moving. Inactive landslides have not moved in more than one annual cycle. If the cause of an inactive landslide is still relevant, the slide is dormant; if the cause is no longer relevant the landslide is either abandoned or stabilized (CDMG, 1999). Active landslides typically exhibit denuded surfaces and are visible throughout the watershed when reviewing historical and current photogrammetry. In addition, inactive landslides may or may not exhibit denuded surficial expressions. Even if undetectable through historical or current imagery, large inactive features may be visible throughout the watershed when viewing the landscape using 3m digital elevation models (DEM). The geometry of larger inactive features is visible as altered topography within the outline of the feature (Appendix A).

Landslide potential is affected by a variety of factors, primarily including: underlying geology, stream network characteristics, hillslope gradient, and vegetation (CDMG, 1999). Given these factors, both active and inactive landsliding features have been identified to be predominately located within the portions of the watershed: underlain by Cretaceous granitics (Kgdm, Kgdc, Kqds), along hillslopes with gradients >65%, in steep convergent, headwall swale or zero-order basins, at or below major breaks-in-slopes, and within grassland setting (Maps 3 and 4, Appendix A). The highest concentration of shallow debris slides is located on headwater hillslopes in the Seneca, Van Winkley Canyon and Williams Canyon watersheds (Map 5). The only difference in slope/geologic characteristics in the identification of inactive features is that they are also found within isolated portions of steep forested slopes primarily in the southern half of the watershed.

Another key factor contributing to landslide potential within the watershed is soil saturation that generally requires prolonged precipitation to pre-dispose segments of hill slope to failure. The higher concentration of debris slides in the granitic rock types is influenced by soil characteristics. The granitics are generally deeply weathered resulting in low tenacity or strength of the rock, and the overlying soil profile in a deep sandy soil with clay-rich horizons, including the C horizon. The high permeability of the sandy soils coupled with the clay mineralogies or cohesion results in the soil mass becoming saturated and gaining considerable weight during intense storms. When the pore pressure exerted by the water exceeds the strength of the soil and rock, the deeply weathered mass can essentially liquefy resulting in an increased potential for failure via gravitational processes (Wagner, 1991).

Non-road hillslope *gullies* are upslope erosional features typically caused by increased concentration of subsurface or surface flow.[18] Although these features have measurable length, width, and depth dimensions their shape is distinctly different from landslides both in plan and cross sectional views. The shapes of the gullies are linear as opposed to the more elliptical shape of landslides (Figure 4.3).

Figure 4.3. Active hill slope gullies predominately concentrated in Miocene sandstone bedrock on planar, south facing slopes.

Most of the hillslope gullies identified in the SJC watershed were found to be located in the shallower soils on south facing grassland and chaparral slopes located to the north of the main stem SJC. The majority of these hillslopes are either underlain by deeply weathered Miocene sedimentary rock types or the Cretaceous granodiorites (Map 3). Most are occurring upslope of the initiation points of 1st order streams. Several gullies are developing on planar hill slopes, and the gullies are occurring on a wide range of hill slope gradients, from 25% to over 65% in steepness (Map 5, Appendix A). While most of the larger gully networks are visible on the 1950's and 1960's aerial photography, field observations suggest the gullies are continuing to evolve, albeit at a slower rate than in the past. Most of the hillslope gullies have 0.5:1 or steeper sideslopes, exhibit a noticeable lack of vegetation, have semi-active headcuts and exhibit sideslope failures (Figure 4.4, Figure 4.5, and Figure 4.7). Most importantly, subsurface soil pipes or linear cavities are common on the Miocene sandstone rock types, and many appear to be occurring near the base of the soil profile with the underlying weathered bedrock (Figure 4.6

[18] The hillslope gullies are not road-related, i.e. caused by stream diversions at stream crossings along a road, or caused by concentrated runoff along long lengths of road bed or inboard ditch.

and Figure 4.8). As subsurface near surface groundwater enlarges the soil pipes through time, the overlying soil collapses into the void resulting in an expansion of the surface water drainage network (i.e. headward growth of the 1st order drainage network).

Historically, the initiation of hillslope gullies has been attributed to over-grazing practices, changes in the composition of native grassland communities, as well as oceanic salt spray in coastal landscapes (Cook, 1978). Currently, grazing practices are limited in the SJC watershed, and it is unclear how, if at all, cattle could be influencing the widespread observed piping processes.

Figure 4.4. These large active hillslope gullies forming on gentle, planar slopes have over-steepened sideslopes, lack vegetation and are prone to periodic sideslope collapse. The gullies are a major source of fine sediment production in the SJC watershed.

A field reconnaissance was undertaken at three south-facing hillslope gullies located above two 1st order tributaries to SJC main stem located midway between the Seneca Creek and Van Winkley Canyon (Map 5, SB #1-#4). Gully #1 is approximately 260 ft in length, ranges from 30 to 165 ft in width and 1 to 8 ft in depth. Gully #2 has two channels: one 115 ft in length and one 310 ft in length with widths ranging between 10 and 25 ft and depths ranging from 1 to 3 ft. Gully #3 is approximately 420 ft in length, ranges from 5 to 20 ft in width and 1 to 3 ft in depth. Utilizing void measurement techniques, past erosion volume from the gully features ranges from 500yd^3 to approximately 3,000yd^3. Since the gully features are voids on the landscape, and the proximity of these gullies to 1st order streams results in the inevitable annual direct delivery of past and future sediment volumes into SJC.

Hillslope landsliding and gullying is an important and significant upland source of sediment. Based on visual observations and rough estimates of potential sediment delivery volumes from upslope erosional features, hillslope erosional features are more likely to result in larger volumes of sediment delivery than compared to road related sources. However, it is the frequency and the likelihood of occurrence, the proximity to a stream, and causal mechanisms that should be noted.

Figure 4.5. View of the upslope initiation point of Gully #2 (Map 5). Note the lack of vegetation, near vertical sideslopes and scarp forming at red arrow.

Hillslope landsliding typically occurs during an episodic event such as: periods of heavy and/or prolonged rainfall, groundshaking (i.e. earthquakes), wildland fire, or any combination thereof. These episodic landslide events occur less frequently than events that would typically cause road related erosion. In addition, many of these landslide features occur in upper slope, headwater locations, far enough away from any watercourse as to have more limited input of sediment into the stream system. Finally, mechanisms that cause these hillslope features to occur are not as strongly linked to anthropogenic activities (compared to road-related sediment sources), and cannot as easily be prevented or mitigated. Therefore, in terms of management recommendations, the focus of reducing upslope sources of sediment should be on addressing mitigations related to existing road and trail networks. See *Section 7.4 Recommendations for future work* for further discussion.

Figure 4.7. View looking downslope at actively enlarging and oversteepened sideslopes of gully #1 just upslope of abandoned road. Red arrow identifies 6″ scarp and 6′ wide block of collapsing earth into gully axis. .

Figure 4.6. Upslope of the head of active hillslope gullies one can observe linear, mole-like tracks of collapsing ground suggesting sub-surface groundwater piping is occurring.

Figure 4.8. Collapse structures such as shown in the photo are common on gentler hill slopes underlain by the Miocene sandstone bedrock. A combination of animal burrowing and groundwater piping processes may be largely responsible for the observed expansion of the existing gully network.

4.2 Instream sources

4.2.1 Background Stream Inventories

In 2006, staff from CDFW and California Conservation Corps (CCC) conducted stream inventories along SJC from the mouth upstream approximately 8.06 miles (Nelson, 2006a) and along Seneca Creek from the confluence with SJC upstream approximately 2.02 miles (Nelson, 2006b). The purpose of the stream inventories were to document habitat types and channel type; collect stream temperature and stream flow readings; sample fish; and collect estimates of substrate composition and embeddedness, shelter rating, canopy density, bank composition and vegetation. Inventories followed methodologies described in CDFW's California Salmonid Stream Habitat Restoration Manual (Flosi et al., 1998). In addition to the quantitative data collected during the stream inventories, the survey team also documented observations on sources of erosion, land use, landmarks, existing or potential fish barriers, and any other issues that may impact stream habitat. Reported interpretations during the 2006 stream inventories revealed that the most obvious sources of sediment in both inventoried reaches along SJC and Seneca Creek could be attributed to road-related stream crossings and some minor bank erosion. In addition, crews documented visual evidence of turbidity and sediment fans along the lower reaches of unnamed lower order (1st and 2nd) tributaries to both Seneca and SJC.

The Project Team reviewed the comprehensive 2006 stream inventory reports prior to conducting our instream sediment source assessment. The Team documented any changes in identified features and/or the occurrence of new features since the 2006 studies relative to our investigations. In addition, we reviewed the CDFW Memorandum detailing observations of Warden Lester Golden in the summer of 1962 and likewise noted significant changes (CDFW, 1962; reprinted in the present report as Appendix D).

4.2.2 PWA Instream Sediment Source Site Assessment Objectives and Methodology

The instream field assessment had three main objectives: (1) identify instream sources of sediment resulting from erosion; (2) identify instream obstructions that may be causing erosion, causing diversion, and/or retaining sediment; and (3) identify any potential fish barriers. This section will focus on instream sediment sources resulting from erosion and retention. For more detail on identified fish barriers, please refer to *Section 5*.

Instream sources of sediment include: *bank erosion*, streamside *landsliding*, *road crossings*, and retained sediment behind instream obstructions (*log jams* and *dams*). In order to identify instream sources of sediment, PWA assessed 5.45 miles, or 8% of all 1st through 5th order stream mileage in the watershed. This included 13% of 3rd order streams, 16% of 4th order streams, and 54% of all 5th order streams in the SJC watershed (Table 4.4). Stream order was identified utilizing the Strahler stream order system. This system, developed in 1952, is a simple method of classifying stream segments based on the number of tributaries upstream. A stream with no tributaries (headwater stream) is considered a first order stream. A segment downstream of the confluence of two first order streams is a second order stream. Any nth order stream is always located downstream of the confluence of two (n-1)th order streams (Strahler, 1952).

Table 4.4. Stream length and average drainage density of San Jose Creek by Strahler order, San Jose Creek Study, Monterey County, California.

San Jose Creek watershed	Strahler order					Total
	1	2	3	4	5	
Total channel length in San Jose Creek Watershed (mi)	36.72	14.47	7.15	4.98	6.87	70.19 mi
% of total channel length, by order	52%	21%	10%	7%	10%	100%
Length sampled[a] (mi)	--	--	0.90	0.81	3.74	5.45 mi
Length sampled (%)	--	--	13%	16%	54%	8%
					Study area	$14.42\ mi^2$
					Stream density	$4.87\ mi/mi^2$

[a] Of the 5.45 mi of stream assessed, 3.74 mi (5th order channels) was assessed along the San Jose Creek main stem and the remaining 1.71 mi (3rd and 4th order channels) was assessed along Seneca Creek.

Inventoried sites for the instream sediment source assessment were identified and mapped only if they were judged to have delivered > 5 yd^3 of sediment to the stream within the last 20 years, or had the potential to deliver greater than 5 yd^3 of material to the stream in the future. In addition, log jams were only mapped if the feature was: (1) impeding flow or downstream migration of bedload; (2) causing a diversion or resulting in >5 yd^3 of erosion; and/or (3) presenting a temporary or permanent barrier to fish. For each site identified, PWA staff recorded a series of field observations including: (1) detailed site description; (2) nature and magnitude of past, present, and potential erosion problems (including retained sediment); (3) likelihood and activity of erosion or slope failure; (4) causes of erosion (instream and/or hillslope); and (5) potential to impede fish migration (Appendix C). In addition, where applicable, PWA field staff evaluated the potential for erosion, retention, and sediment delivery and collected field measurements (width, depth, and length of the past/potential sediment source area) to derive erosion/retention and sediment delivery volumes (Table 4.3).

For the purposes of this study, *bank erosion* is defined as stream bank erosion caused by lateral migration of stream flows (i.e. flow deflection or stream undercutting) into alluvial, colluvial or bedrock banks, or stream channel incision (vertical down cutting) caused by fluvial processes. Bank erosion does not include streamside hillslope failures (mass wasting). Hillslope failures were only identified as *landslides* if there was no evidence that active fluvial processes were aggravating the problem.

4.2.3 PWA Instream Sediment Source Site Assessment Results

The instream assessment identified 57 sites: 3 bank erosion, 1 landslide, 38 log jams, 12 road-related stream crossings, 2 dams, and 1 bedrock cascade (Table 4.5; Map 5; Appendix C). Of the sites identified during the instream assessment, 4 sites were determined to be potential fish barriers.

The instream assessment identified 200 yd^3 of past sediment delivery from instream erosion sites during the past approximately 20 years, and estimated 155 yds^3 of future sediment delivery from the 57 mapped sites (Table 4.6). Past erosion at bank erosion sites accounted for 87% or 175 yd^3 of the past erosion (Figure 4.9 and Figure 4.10). Future bank erosion sites were estimated to potentially contribute 155 yd^3 or 54% of all future sources of sediment derived from instream sources, with road-related culverted stream crossings sites as the second largest contributor to future sediment delivery volumes at 110 yds^3 or 39% (Table 4.6).

Table 4.5. Inventoried instream site types, San Jose Creek Study, Monterey County, California.

<table>
<tr><th colspan="2">Site types</th><th># of sites</th><th>Percent of total</th><th># of sites determined to be a fish barrier[a]</th></tr>
<tr><td colspan="2">Bank erosion</td><td>3</td><td>5%</td><td>--</td></tr>
<tr><td colspan="2">Landslide</td><td>1</td><td>2%</td><td>--</td></tr>
<tr><td colspan="2">Log jam</td><td>38</td><td>67%</td><td>3</td></tr>
<tr><td rowspan="3">Other</td><td>Road crossing</td><td>12</td><td>21%</td><td>--</td></tr>
<tr><td>Dam</td><td>2</td><td>3%</td><td>--</td></tr>
<tr><td>Bedrock Cascade</td><td>1</td><td>2%</td><td>1</td></tr>
<tr><td colspan="2">Total number of sites</td><td>57</td><td>100%</td><td>4</td></tr>
</table>

[a] Fish barrier sites include 3 log jams (#33, 41, 50) and 1 "Other" site, a bedrock cascade (#7).

Figure 4.9. View of inventoried bank erosion site along Seneca Creek, Site #31 (Map 5).

Figure 4.10. View of inventoried bank erosion site along SJC, Site #43 (Map 5).

Figure 4.11. Retained sediment behind log jam at Site #24 along Seneca Creek (Map 5). This jam was not a barrier to fish.

In addition to identifying future sediment sources resulting from erosion, there is a similar volume of retained sediment that was measured within the channels behind log jams and dams. This retained volume has the potential to remobilize into the stream system during a singular event. The majority of retained sediment identified during the instream survey was found stored behind log jams and not other obstructions (i.e. dams). Field estimates of the retained sediment behind these log jams typically did not exceed 20 yd^3, such as Site #24 inventoried along Seneca Creek (Figure 4.11). However, the larger dams, such as site #47 which was profiled have resulted in larger retained sediment volumes >100 yd^3. Of the 40 instream obstructions, 38 were log jams and 2 were dams. Of these 40 sites, 33 were found to be retaining sediment upstream, 4 were found to be causing a diversion, 4 were found to be causing erosion, and 3 were found to be potential fish barriers (Table 4.7, Figure 4.12 and Figure 4.13).

Table 4.6. Estimated past and future sediment delivery from inventoried instream sites, San Jose Creek Study, Monterey County, California.

Sources of sediment delivery[a]		Estimated past sediment delivery (yd³)	Percent of total	Estimated future sediment delivery (yd³)	Percent of total
	Bank erosion	175	87%	155	54%
	landslide	10	5%	5	2%
	Log jam[a]	15	8%	15	5%
Other	Road crossing[b]	0	0%	110	39%
Other	Dam	0	0%	0	0%
Other	Bedrock Cascade	0	0%	0	0%
	Total sediment delivery	**200**	**100%**	**285**	**100%**

[a] Sediment delivery associated with log jams refer to erosion of banks or native hillside caused by the jam(s). Volume does not include retained sediment behind the jam(s) which if blown out may mobilize sediment downstream, see Table 4.7 for those volumes.
[b] The only road-related stream crossings that had future sediment delivery >5yd³ were culverted (Sites #26, 29, 30).

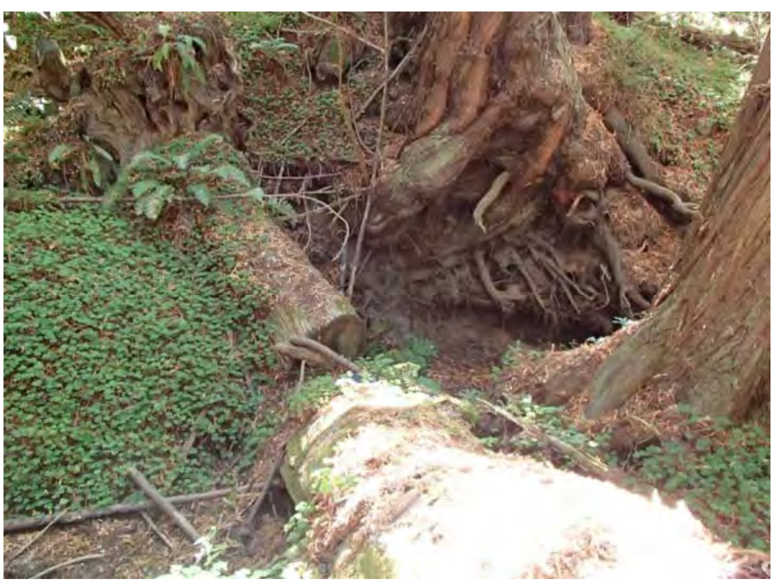


Figure 4.12 Log jam Site #41 on Seneca Creek (Map 5). View from the right bank (PWA photo 2013). This site was identified as a fish barrier in both PWA's 2013 assessment and CDFW's 2006 assessment (located within Habitat Unit 414).

Figure 4.13. Additional view of inventoried log jam site along Seneca Creek, Site #41 (Map 5). This site was also identified as a fish barrier in both PWA's 2013 assessment and CDFW's 2006 assessment, located within Habitat Unit 414. (Photo by Nelson, 2006b)

Figure 4.14. View of inventoried log jam site along San Jose Creek, Site #49 (Map 5). This log jam is comprised of SOD affected tan oaks. Log jam was not identified in CDFW's 2006 assessment.

PWA identified several smaller log jams along the 2013 inventoried reaches of SJC that were not observed nor reported on during CDFW's 2006 assessment. There is a large stand of tan oak trees that border the stream on both hillsides around SJC stream mile 7. These trees were struck with sudden oak disease (SOD) and have died as a result. Although the SOD infected trees were observed and noted during CDFW's 2006 instream assessment, it can be ascertained that sometime after the summer of 2006, the tops of these SOD affected tan oaks broke off during a large wind storm and fell into the stream causing the development of the LWD/SWD jams inventoried in the 2013 assessment (Figure 4.14 and Figure 4.15; Sites# 49-53, Map 5).

Retained sediment volume estimates behind instream obstructions were obtained by field measurements and are considered conservative estimates (Figure 4.15). In some cases it was difficult to quantify all retained sediment due to the magnitude and/or configuration of the jam. Log jams that span greater lengths of channel (>25 ft) and/or those that contain a high volume of mixed wood and debris, as found in the recently formed SOD log jams, often obscure pockets of retained sediment.

Log jam (Site #47) was surveyed by PWA on January 25, 2013. Retained sediment located upstream of the log jam was calculated from the longitudinal profile and cross sections. Profiles and cross sections for Site #47 are found in Section 5 Fish barrier analysis (Figure 5.17 and Figure 5.18). The total volume of retained sediment estimated behind all instream obstructions inventoried during the 2013 assessment is approximately 340 yd3 (Table 4.7).

Figure 4.15. View of retained sediment behind inventoried log jam site along San Jose Creek, Site #50 (Map 5). This log jam is comprised of SOD affected tan oaks. Log jam was not identified in CDFW's 2006 assessment.

Table 4.7. Summary results of inventoried instream obstructions by LWD type, San Jose Creek Study, Monterey County, California.

Site type[a]	# of sites	# of sites retaining sediment	Volume of retained sediment[b]	# of sites causing stream diversion	# of sites causing erosion	# of sites acting as barrier to fish[c]
LWD log jam	4	4	25	1	1	0
LWD/SWD log jam	24	19	250	2	3	1
SWD log jam	10	8	25	1	0	1
Dam/falls	3	2	40	0	0	1
Total	**40**	**33**	**340**	**4**	**4**	**3**

[a] LWD = large woody debris (wood ≥ 1′ in diameter and ≥ bankful width); SWD = small woody debris (< 1′ in diameter); LWD/SWD = large and small woody debris.

[b] Volume of retained sediment poised to mobilize downstream if obstruction is removed (or blown out) was an estimate and not determined by a survey (except site #47). It is quite likely the volume is underestimated. Volume is not included in Table 4.6 claiming volumes of past/future sediment delivery.

[c] Instream sites acting as potential fish barriers are located at log jam sites #41 and 50 and bedrock falls site #7.

Field estimates of sediment delivery volumes from all the inventoried instream features total 200 yds^3 during the past approximately 20 years with another 625 yds^3 estimated to be delivered during the next 30 years (Table 4.8). Approximately 83% of all past delivery volume and 66% of all future is attributed to sources found in 3rd order streams (Table 4.8). Of the 625 yds^3 of future sediment poised to enter or be re-mobilized in the system, 285 yd^3 or 46% will come from instream erosion sources (i.e. bank erosion and landsliding) and 340 yd^3 or 54% will come from retained sediment behind instream obstructions (i.e. log jams and dams) (Tables 4.6 and 4.8).

Table 4.8. Field estimated sediment delivery from all inventoried instream sites by stream order, San Jose Creek Study, Monterey County, California.

Strahler Order	Length of stream (mi)	Length of stream inventoried (mi)	Past sediment delivery volume (yd^3)	% of total	Future sediment delivery volume (yd^3)[a]	% of total
1	36.72	--	--	--	--	--
2	14.47	--	--	--	--	--
3	7.15	0.90	165	83%	315	66%
4	4.98	0.81	5	2%	40	9%
5	6.87	3.74	30	15%	270	25%
Total	**70.19**	**5.45**	**200**	**100%**	**625**	**100%**

[a] Future sediment delivery estimates from instream sources is reported over 30 years and includes retained sediment behind instream obstructions.

4.2.4 Instream Observations and Sediment Source Summary

Field observations during the 1962, 2006 and 2013 instream assessments all conclusively agree on many factors that remain relatively unchanged in regards to channel characteristics, instream sediment sources, and their relation to viable fish habitat. There have, however, been significant changes in potential fish barriers noted by each inventory, please refer to *Section 5* for further discussion.

In general, SJC main stem is a low gradient stream with established and quasi-stable riffle-pool sequences and locally bounded by well-developed terraces. The channel exhibits a generally broad sinuosity and only locally contains tight meanders. Small point bars are present along the inside of these broad bends in the channel. The channel substrate varies as you travel from the mouth upstream to the headwaters. Sand and fine gravel dominate the channel bottoms of the lower watershed, below Seneca Creek. As you move upstream, the channel bottom exhibits a more bimodal distribution (Figure 4.16). However, sand and fine gravels are present throughout the system and are commonly a dominant substrate when viewing long reaches of SJC. Within the higher reaches in the watershed, upstream of Seneca Creek, the channel remains low gradient but becomes more entrenched, with fewer manifestations of the alluvial terraces and articulation of point bars.

Figure 4.16. View of San Jose Creek. The reach is low gradient with a well-established floodplain along the right bank and bimodal distribution of the channel bottom.

Based on observations from CDFW (2006) instream assessments, observations and quantitative data collected during PWA's 2013 instream field assessment, and GIS analysis of geology and stream density, we have extrapolated data to estimate total sediment delivery volumes anticipated from instream sources along 3rd, 4th, and 5th order channels throughout the SJC watershed (Table 4.8).

Results from this extrapolation show a conservative estimate of approximately 1,230 yd^3 of sediment can be anticipated from instream sources generated from 3rd order streams and 30 yd^3 of sediment from 4th and 5th order streams (Table 4.9). This estimation supports observations during both the instream assessment and field reconnaissance that lower order streams (1st through 3rd) exhibit more erosion and therefore have increased potential to deliver larger volumes of sediment to the watershed.

Table 4.9. Estimated future sediment delivery volumes anticipated from instream sources by Strahler Order based on extrapolation of field estimates, San Jose Creek Study, Monterey County, California.

Strahler Order	Length of stream (mi)	Length of stream inventoried (mi)	Future Sediment delivery [a] Volume (yd^3)	Sediment delivery volume per stream mile[b] (yd^3/mi)	Estimated Sediment delivery volume within watershed[c] (yd^3)
1	36.72	--	--	--	--
2	14.47	--	--	--	--
3	7.15	0.90	155	172	1,230
4	4.98	0.81	5	6	30
5	6.87	3.74	15	4	30
Total	**70.19**	**5.45**	**175**	**--**	**1,290**

[a] Sediment delivery volume per stream mile is based on inventoried instream sites and reaches only. 110 yd^3 of road related future sediment measured in 3rd order reach (Sites #26, 29, 30) was not included as it is attributed as an upslope source in Table 4.8.

[b] Total estimated delivery volume is an extrapolation of data gathered during the instream inventory (reported over 30 years) and should be not be considered measured estimates.

[c] Total estimated volumes are rounded to the nearest 5 yd^3.

Based on field observations during the instream assessment of 3rd through 5th order channels, quantified sediment volumes resulting from instream sources, and comparing those results to observations made during field reconnaissance of 1st and 2nd order tributaries, greater volumes of instream sediment sources are likely to be generated in lower order (1st and 2nd) tributaries. Instream erosion and sediment sources were observed more frequently and in greater volumes within these lower order tributaries through increased channel incision, bank erosion, channel enlargement due to stream diversions, and headcutting.

Although high volume instream sediment sources were found to be unlikely, 2013 field observations as well as field and laboratory analysis confirm there is a large amount of sand in the stream system. These findings were echoed through observations made in CDFW's 1962 and 2006 instream assessments. For results of sediment analysis of material sampled from the channel bed, floodplain, lagoon, retained lobes or fans, and point bars refer to Section 4.3.

In addition, comparing our 2013 observations with those of Nelson (2006) did not reveal any significant development of new instream sediment sources. This supports the conclusion that much of this finer grained material observed and sampled in the system is not found to be in “regular transport” but remains “in residence”. This long residence time of material also supports the interpretations that there is a great degree of channel stability found throughout the watershed, i.e. the stream is in equilibrium with its current sediment supply. Refer to *Section 7* for further discussion on how longer residence time and infrequent mobilization of finer grained sediment on an episodic timeline are thought to be the largest factor controlling instream sediment within SJC on a watershed scale.

4.3 Sediment gaging

4.3.1 PWA Sediment Retention Basins (Traps)

After literature review, examination of aerial photogrammetry, and initial field reconnaissance and instream channel surveys, it became quite clear that the primary sources of sediment in the watershed were resulting from roads and hill slope processes occurring outside and upslope of the stream channels. Based on PWA’s 2007 road/trail assessment in Williams Canyon, we already had quantifiable data in which to extrapolate to the SJC’s watershed wide road/trail network. However, we did not have any quantifiable data on sediment delivery estimates from episodic mass wasting or gully processes unrelated to the road/trail network.

Therefore, in order to collect data reflecting episodic sediment delivery estimates resulting from upslope features and winter storms, PWA staff installed 4 small wooden sediment retention basins below active gullies that have experienced continued erosion as 1st order channels migrate headward, and the hillslope structures collapse as a result of concentrated flow from a combination of groundwater piping, burrowing animals, hillslope runoff, and possible perturbation due to grazing and other land use activities.

Figure 4.17. View of the installation of sediment retention basin (SB #1) placed within the failing road crossing to capture transported material from the erosion of upslope Gully #1 (Map 5).

PWA installed 2 basins just above an access road crossing Gully #1 (SB #2 and SB #3, Map 5) and 2 basins below the confluence of Gully #2 and Gully #3 (SB #1 and SB #4, Map 5). All 4 sediment basins were constructed on January 24-25, 2013 (Figure 4.17; Appendix D). However, since the area did not receive any significant rainfall events during the life of the study, there was no measurable deposition of eroded material from the upslope gullies found transported to the basins during post installation monitoring (September 17, 2013, October 2-3, 2013 and January 2014).

4.3.2 Bed Sediment samples

Given the dry water year, limited bedload samples were taken during live stream flow, as they require an active bed and higher flows. Some bedload samples were taken during the December 2, 2012 storm. Particle size gradations are shown on Figure 4.18 and Table 4.10. To augment a data set for bed load transport, in lieu of bedload storm measurements, samples of bed material were taken from the stream bed in various locations to characterize the bed material previously transported.

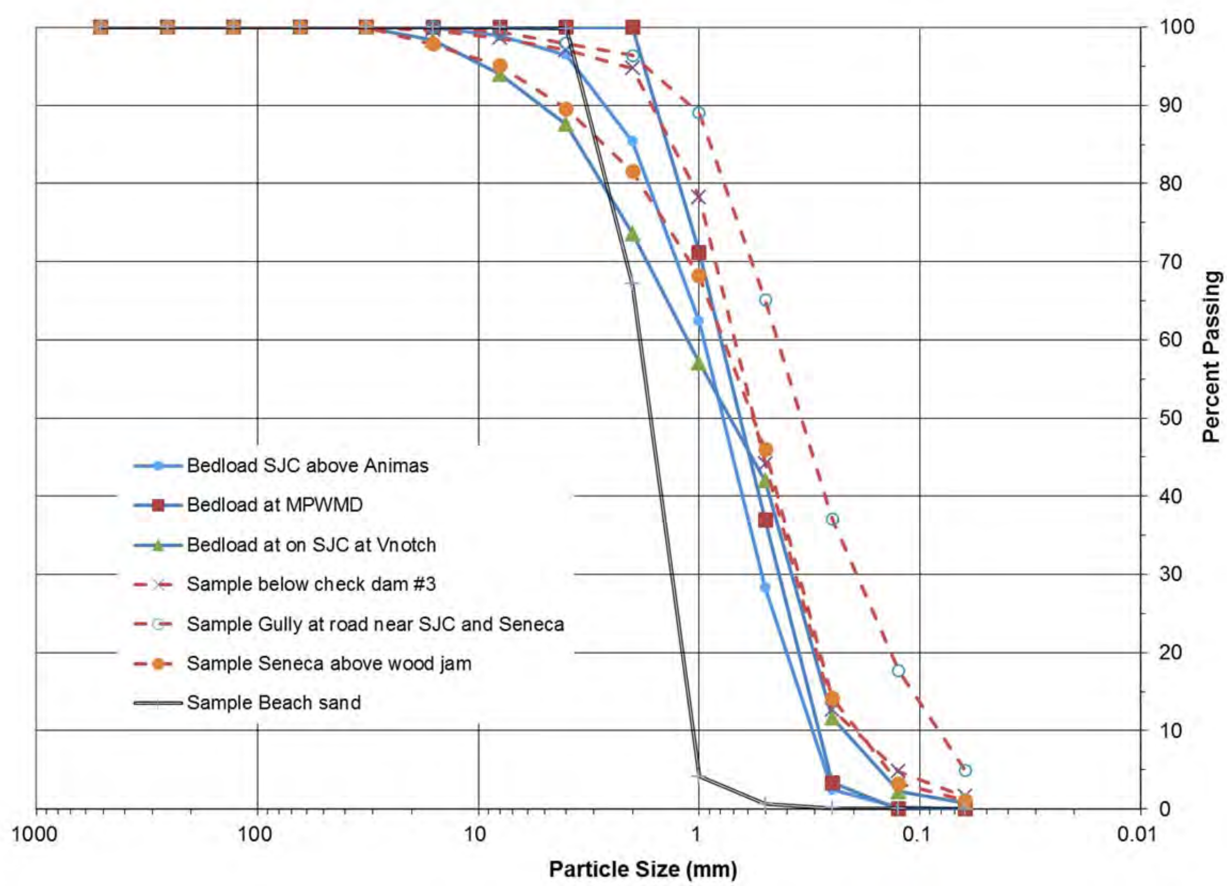


Figure 4.18. Particle size gradation of bedload samples (blue solid lines), bed samples (red dashed lines), and beach sand (gray solid line) for SJC

Table 4.10. Particle-size analysis for bedload samples and bed samples in mm

	Bedload Samples (storms)			Bed samples (excavated)			
Size	SJC US Animas	SJC at MPWMD	SJC V-notch	SJC below check dam #3	Gully sample 1	Seneca Sample 2 woodjam	Beach Sand
D-16:	0.36	0.32	0.28	0.27	0.11	0.26	1.14
D-50:	**0.78**	**0.65**	**0.72**	**0.56**	**0.34**	**0.57**	**1.66**
D-84:	1.92	1.36	3.35	1.27	0.86	2.48	2.86
D-95	3.65	1.77	9.42	2.16	1.75	7.92	3.61

Based on the data in Table 4.10, the D50 for the bed material is typical sand, with a slightly smaller size for bed samples (excavated), versus transporting bedload (storm sample). Beach sand had a D50 of about 1.7 to 2 mm, or coarse sand, dissimilar from the bedload transporting through the system, reflecting different littoral process on the steep beach.

4.4 Estimated sediment transport and yield

For a summary of upland source deliveries see Table 4.3.

For a summary of instream delivery see Tables 4.7 and 4.9.

4.4.1 Sediment transport in channel

We measured sediment transport at 2 continuous gages and 4 temporary gages (Map 5). These included:

a. SJC at the V-Notch gage, immediately downstream of Van Winkley Canyon, where rates of sediment transport had been measured by Mr. Hecht and his colleagues at Balance Hydrologics during water years 1991 through 1995. Both the 2013 and the 1990s gaging efforts at this location included continuous-record flow gaging.

b. SJC about 100 feet upstream of Van Winkley Canyon, and just upstream of the confluence of an unnamed right-bank tributary which was visibly eroding and incising. This temporary station also allowed us to estimate sediment transport in Van Winkley Canyon by difference. It also offered a station somewhat comparable to Emily Paddock's measurements about 200 yards upstream (no major tributary confluences).

c. Seneca Creek above the confluence with SJC. We added this station about in December 2012, about 2 months after the start of the program, after our initial work suggested that it might prove informative. The station initially included a staff plate installed in December 2012, followed by a continuous recording device installed in February 2013.

d. SJC above Animas Creek. This temporary station proved useful and relatively stable for sediment measurements.

e. Animas Creek above its mouth. This temporary location was measured only several times, primarily during storm events.

f. SJC at the MPWMD gage, an established continuous-record station operated since 1999. Our measurements of sediment transport were the first to be made at this station. Because the station is located at a bouldery riffle, most of the sediment-transport measurements were made about 100 feet downstream of the gage (see station observers' log in Appendix B).

We measured both bedload and suspended sediment transport. Bedload includes the coarser fraction of sediment, which rolls and saltates along the bed. It is sampled with the a Helley-Smith bedload sampler, with a 0.25 ft opening, and a bag with a 0.250 mm mesh, such that all sediment finer that 0.25 mm is not collected, and considered suspended sediment. Suspended sediment is supported by turbulence in the flow, and is transported above the bed in the water column. It is collected in a vented nozzled sampler (generally an Federal Interagency Sediment

Program DH-48 or DH-81 sampler) using equal transit rate methods. Bedload plus suspended sediment constitutes total sediment load.

Bedload sediment transport rates from this study were combined with bedload transport rates as measured in Hecht and Napolitano (1995). Both data sets were measured at the V-notch weir site. The result is a bedload transport rating curve shown on Figure 4.19. In addition, results from suspended sediment measurements were grouped with data from Hecht and Napolitano (1995) and compiled into a rating curve shown on Figure 4.20. Their work, conducted during water years 1991 through 1995, indicated that

(a) SJC transported bedload at rates within the low end of those observed in other Carmel-area streams,

(b) bedload constituted almost half of the total sediment load, and

(c) medium and coarse sand constituted most of the bedload.

The rating curve for **suspended sediment** may actually overestimate suspended load, as the data points collected in water year 2013 may actually represent a first flush event, and the not the average transport through the year. Estimates of the annual suspended-sediment load using the most recent water year 2013 data indicate about 165 tons of transport (Appendix B, Form 1 for the V-notch gage). If the curve were shifted towards the 1995 data, total suspended transport for water year 2013 is estimated as 15 tons, indicating a range of an order of magnitude for estimating transport. About 12 tons is estimated to have been transport by bedload processes (Appendix B) during water year 2013.

To further explore matters and characterize sediment transport, the risk of fire in the watershed greatly increases the potential for sediment transport. According to Hecht and Napolitano (1995), depositional rates of sediment nearly doubled for post fire watersheds, based on lake deposits below impacted watersheds. Additional considerations are also increases in sediment load due to seismic activity and landsliding. The overall observation here is that a wide range of sediment transport rates could occur, based on episodic activity in the watershed and will vary in time scale. Average annual delivery and transport is not guaranteed.

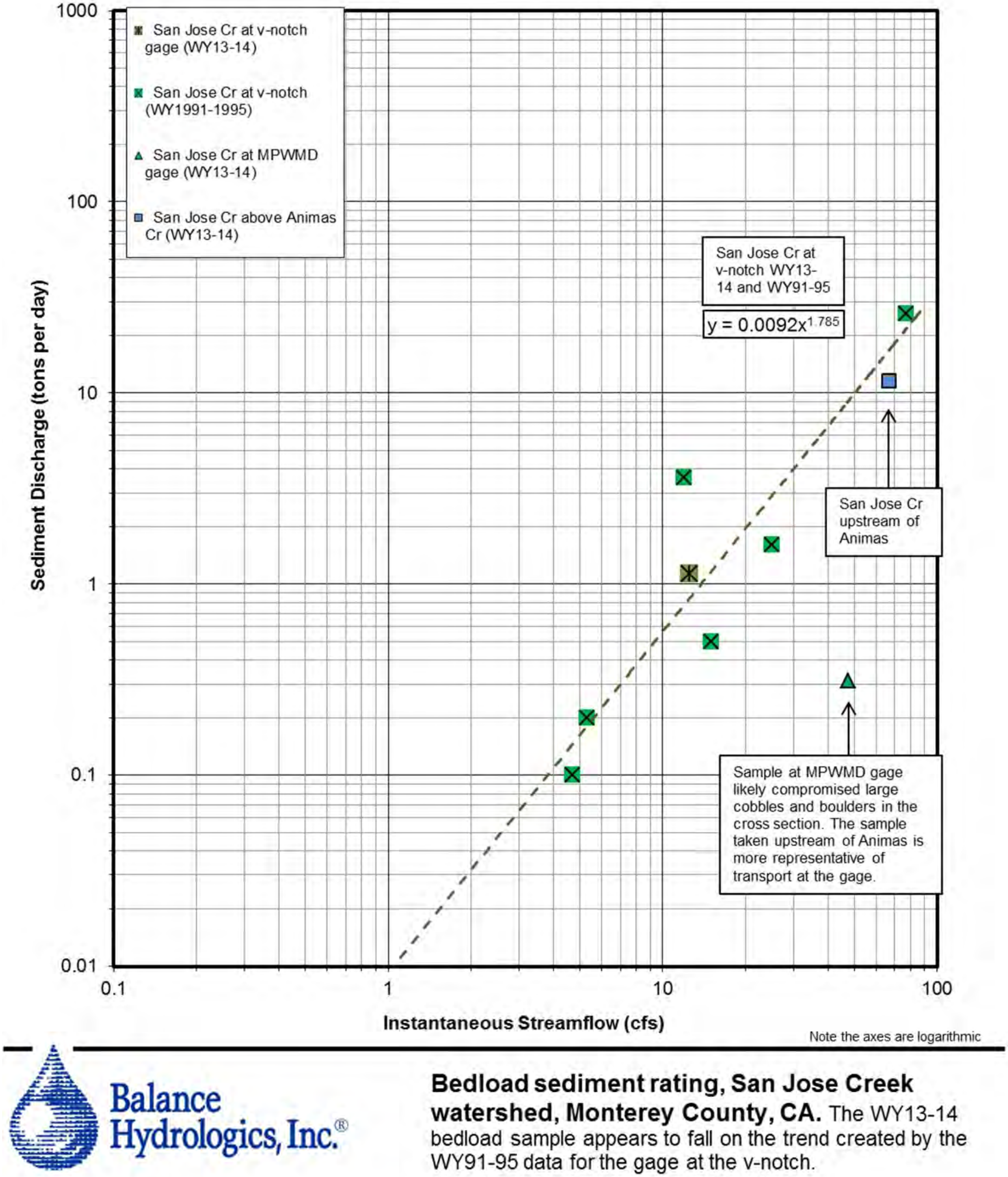
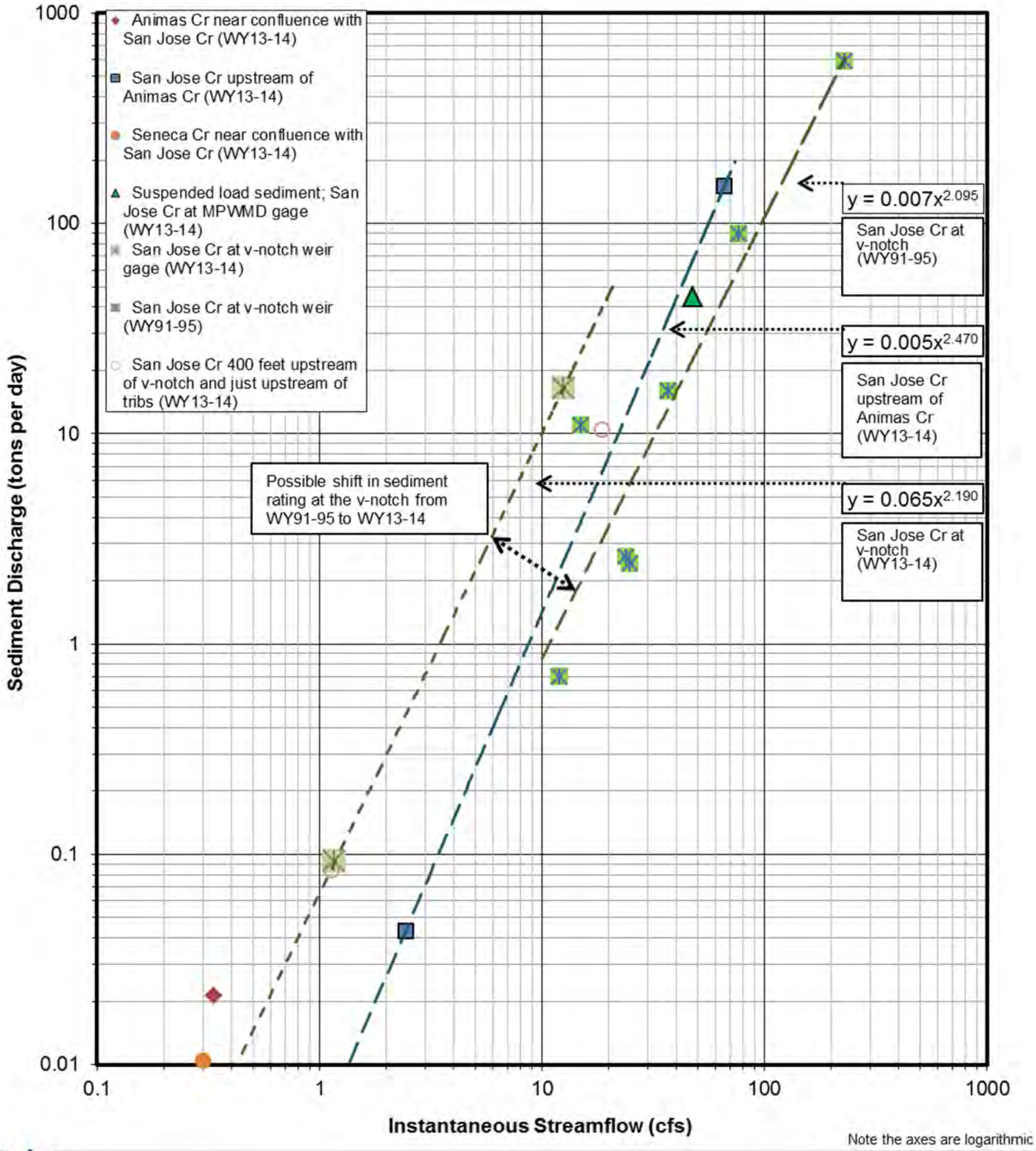


Figure 4.19. Estimated bedload rating curve for San Jose Creek



Balance Hydrologics, Inc.®

Suspended sediment rating, San Jose Creek watershed, Monterey County, CA. The shift between WY91-95 to WY13-14 rating may indicate higher sediment transport rates however due to the low number of flow events during WY13-14 there are very few data points.

Figure 4.20. Estimated suspended-sediment rating curve for San Jose Creek

5. FISH BARRIER ANALYSIS

5.1 Introduction

Task 3.0 in the MPRPD Scope of Services indicated Balance/PWA team should evaluate the three major fish passage barriers identified by CDFW (Nelson 2006a, b) and other barriers encountered during field transects. In order to adequately evaluate these barriers, we completed longitudinal creek profiles and cross sections near the fish barriers and calculated impounded sediment volumes. In addition to evaluating the barriers, the Request for Proposals (RFP) requested the consultant present a range of solutions and/or benefits related to restoration options and comment on the potential for steelhead habitat improvement.

5.2 CDFW Barrier and Other Potential Barrier Analyses

In November 2013, after reviewing available literature identifying potential fish barriers, Denis Ruttenberg (Balance) and Danny Hagans (PWA) conducted additional stream surveys to locate and perform a more in depth analysis of site and channel conditions at 1) the 3 major fish barriers in SJC (FB #1 - #3, Map 5) identified by CDFW (Nelson 2006a)[19]; 2) an abandoned small concrete dam (Site #1, Map 5) located on SJC just upstream of the mouth of Animas Creek, and 3) at the largest log jam identified during the 2013 in-stream sediment source inventory (Site #47, Map 5). Table 5.1 and Map 5 provide the location of each of the 5 surveyed in-stream features along San Jose Creek. The concrete dam located upstream of Animas Creek was identified by CDFW (Nelson, 2006a), as well as in the PWA in-stream surveys (Site #1, Map 5), and neither considered the dam to be a barrier to adults, but juvenile salmonid migration is likely impaired during summer low flow periods.

Table 5.1. Surveyed fish barriers (FB), San Jose Creek Study, Monterey County, California.

Type of barrier	Stream	Map identification and location (stream mi)	Figures
Concrete dam	San Jose Creek	Site #1, 1.90	Figures 5.1 and 5.2
Bedrock falls/cascade	San Jose Creek	FB #1, 2.85	Figures 5.3 through 5.6
Log jam	San Jose Creek	Site #47, 5.05	Figures 5.7 through 5.15; Figures 5.17 and 5.18
Log jam	San Jose Creek	FB #2, 7.5	Figures 5.19 through 5.23
Log jam	San Jose Creek	FB #3, 8.0	Figures 5.24 through 5.26
Concrete dam[a]	Seneca Creek	Site #37, 1.74	Figures 5.28
Log jam[a]	Seneca Creek	Site #41, 1.9	Figures 5.29

[a] Longitudinal profiles and/or cross sections were not completed at the two identified barriers along Seneca Creek. However, the sites were evaluated during the instream assessment.

[19] The three surveyed fish barriers (FB) are identified as FB #1, FB#2, and FB #3 and are located on Map 5

Based on the CDFW instream assessment along Seneca Creek (Nelson, 2006b), numerous features (log jams, culverted road crossings, and a flashboard dam) were identified as being potential temporary impediments to fish passage under certain flow regimes. However, the most significant potential fish passage barrier (FB) during most flow regimes for both life phases of steelhead was a LWD log jam located within habitat unit #414 at stream mile 1.9 (Site #41, Map 5).

The results of other smaller log jams encountered during the PWA in-stream sediment sources inventories are presented in Section 4.2.2. The in-stream survey occurred along 5.45 miles of 3rd, 4th, and 5th Strahler Order streams, or along 13% of 3rd order, 16% of 4th order, and 54% of all 5th order streams for a total of 8% of all stream orders in the SJC watershed (Table 4.4; Map 5). None of these smaller log jams identified were considered to be more than minor barriers to juvenile migration at summer low flows (Nelson, 2006 a-b).

5.2.1 San Jose Creek Potential Barriers

Based on the CDFW instream assessment along SJC (Nelson 2006a), three sites were identified as potential impediments to fish passage. The downstream-most barrier is a permanent[20] natural feature, a bedrock falls/cascade (Fish Barrier FB #1 and PWA Site #7, Map 5), located within CDFW habitat unit #305 at stream mile 2.85 that would impede fish passage for both juveniles and adults at low flows. The second barrier is a large natural temporary[21] log jam located in habitat unit #957 at stream mile 7.5 (FB #2, Map 5), and the upstream-most barrier is also a large natural temporary log jam located in habitat unit #1050 at stream mile 8.0 (FB #3, Map 5). The middle log jam (FB #2) was identified by CDFW as the most significant fish barrier along the main stem of SJC (Nelson, 2006a).

Longitudinal profiles were surveyed at each of the 5 SJC features, and estimates of overall stability, persistence, volume of channel stored sediment and habitat improvement potential were evaluated. The 5 features will be discussed in an upstream direction starting with the concrete dam near the mouth of Animas Creek (Site #1, Map 5).

5.2.1.1 Concrete dam at station # 1.51 upstream of Animas Creek confluence

A long-abandoned 3’ tall by 12’ wide concrete stream diversion dam spans 90% of SJC within a boulder-bedded, average 3% to 4% in gradient “run” reach of the creek (Figure 5.1). The dam age is unknown, but likely it was constructed at least four or more decades ago. Over the years since construction, SJC has eroded the alluvial left bank resulting in the creation of a steep gradient, boulder-bedded low flow channel around the dam (Figure 5.2). Winter high flows have resulted in the formation of a 0.5’ pool downstream of the dam face. The dam poses minimal potential to impede adult steelhead movement, however, juvenile upstream migration could be limited at a variety of flow regimes.

[20] *A Permanent fish barrier refers to a barrier that is not likely to “blow out” or “dislodge” during the larger flood events that the creek has/will experienced.*
[21] *A Temporary fish barrier refers to a barrier that has the potential to “blow out” or “dislodge” as a result of any episodic natural event.*

The flanked dam contains minimal amounts of channel stored sediment, estimated at <6 yd^3 of primarily coarse sand sized particles. The dam itself is of home-made construction, appears to lack any rebar, and consists of <10 yd^3 of concrete. The main, low use access road up SJC main stem is immediately adjacent the dam and channel, providing excellent access to the dam for heavy equipment. It is recommended the dam be removed to fully re-establish the natural flow regime and eliminate any potential fish passage concerns[22]. Refer to *Section 7.4 Recommendations for Future Work* for further discussion of recommended removal of this potential barrier. Impacts to SJC would be very minimal and short lived during and following removal of the relict man-made structure.

Figure 5.1. View from road across SJC to right bank at low concrete dam (Site #1, Map 5) and channel breach around dam on left bank, in foreground.

[22] Mr. Hecht has been told of the pond behind the dam 'blowing out' during 1983 and 1995. We believe it also blew out during 1998. Considering this history, effects on aquatic habitat downstream of the dam are not likely to have a lasting adverse effect.

Figure 5.2. View downstream at concrete dam in center of photo with thalweg in channel to left of large natural boulder in SJC.

5.2.1.2 CDFW barrier #1: Bedrock falls at station # 2.85

The permanent bedrock falls and box canyon barrier #1 (FB#1 and Site #7, Map 5) identified by CDFW (Nelson, 2006a) and PWA during the instream survey confines SJC for a distance of 70′ and contains an elevation change of approximately 6′ over a distance of <20′ (Figure 5.3 and Figure 5.4). The 6′ elevation change consists of a upper 3′ tall, average 45^o bedrock chute and a lower near-vertical 3′ bedrock falls that flows into a small 8′ x 10′ x 1′ deep bedrock pool (Figure 5.3). Downstream of the small pool is a large >3′ deep bedrock pool, which at moderately high winter flows will merge with the small pool to improve the potential for adult steelhead to negotiate the chute and falls (Figure 5.3). Near the head of the large pool, besides approaching the 6′ falls and chute, the box canyon shrinks to an averages 10-12′ wide channel. The constriction of SJC at the upstream end of the large pool will result in greatly increased velocities as fish approach the barrier (Figure 5.3 and Figure 5.5).

Upstream from the top of the bedrock chute, the channel of SLC is unconfined and twice as wide as through the box canyon. Stored sediment depths are minimal (<1′ -2′) and the active channel exhibits a broad sinuous pattern with low lying alternating point bars. At the downstream riffle crest, spawning habitat is moderately good and ocular estimates consist of small, well rounded gravels with some sand (Figure 5.4).

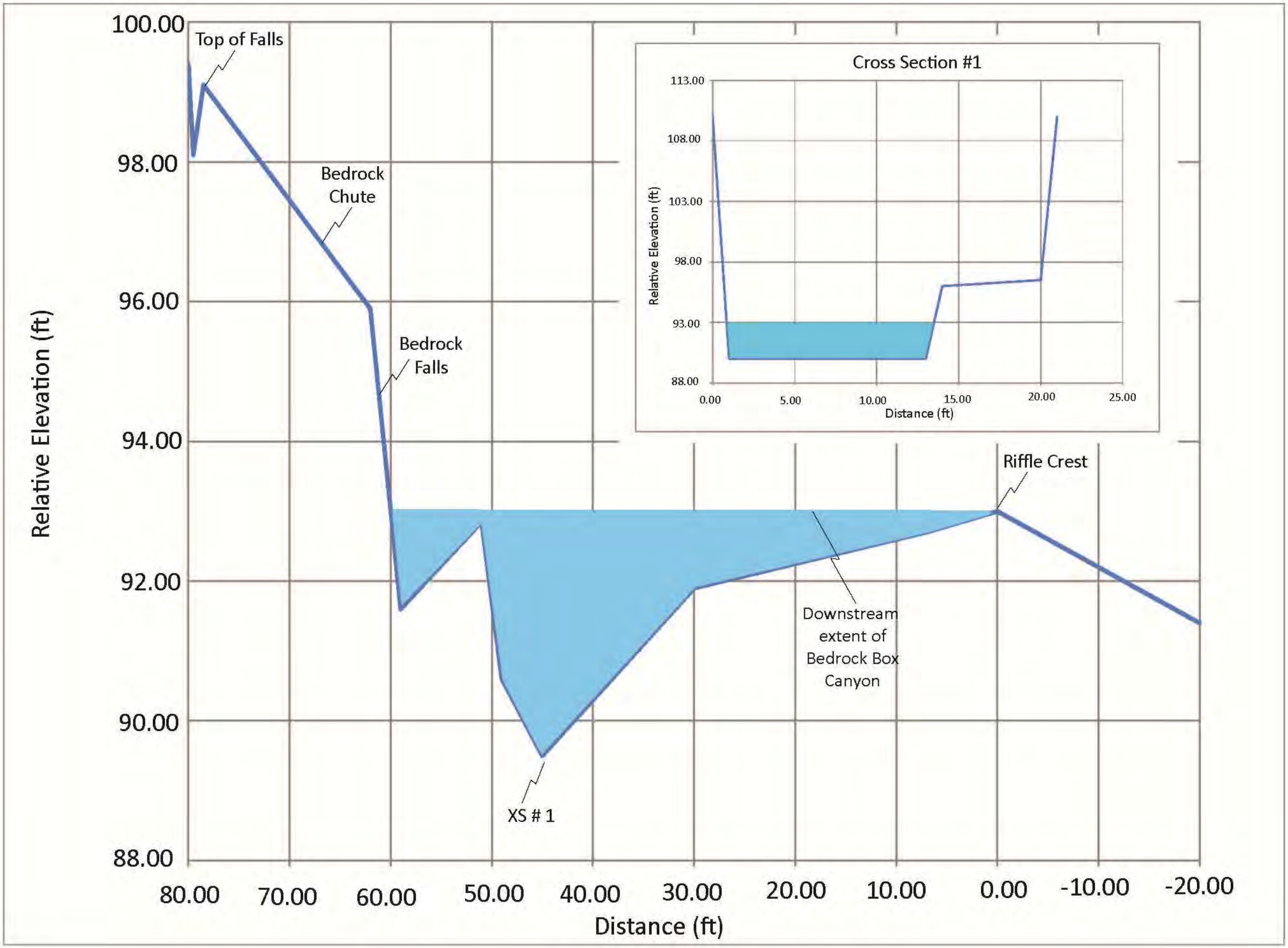


Figure 5.3. Fish barrier #1, Longitudinal Profile and Cross Section at bedrock falls natural barrier on San Jose Creek.

Figure 5.4. View upstream at CDFW barrier #1 (Site #7, Map 5) taken from downstream riffle crest.

Figure 5.5. Close up of 6′ tall bedrock chute and falls at CDFW barrier #1 behind person (Site #7, Map 5). The bedrock box canyon narrows to +/- 11′ just above the large 3′ deep pool in the foreground.

Preliminary hydraulic modelling was performed to estimate the water surface profile and velocities at the bedrock falls barrier. Hydrology for the model was based on flood frequency analysis of the peak flows from the MPWMD (Table 3.1). Results of the coarse HEC-RAS hydraulic model are shown on Figure 5.6.

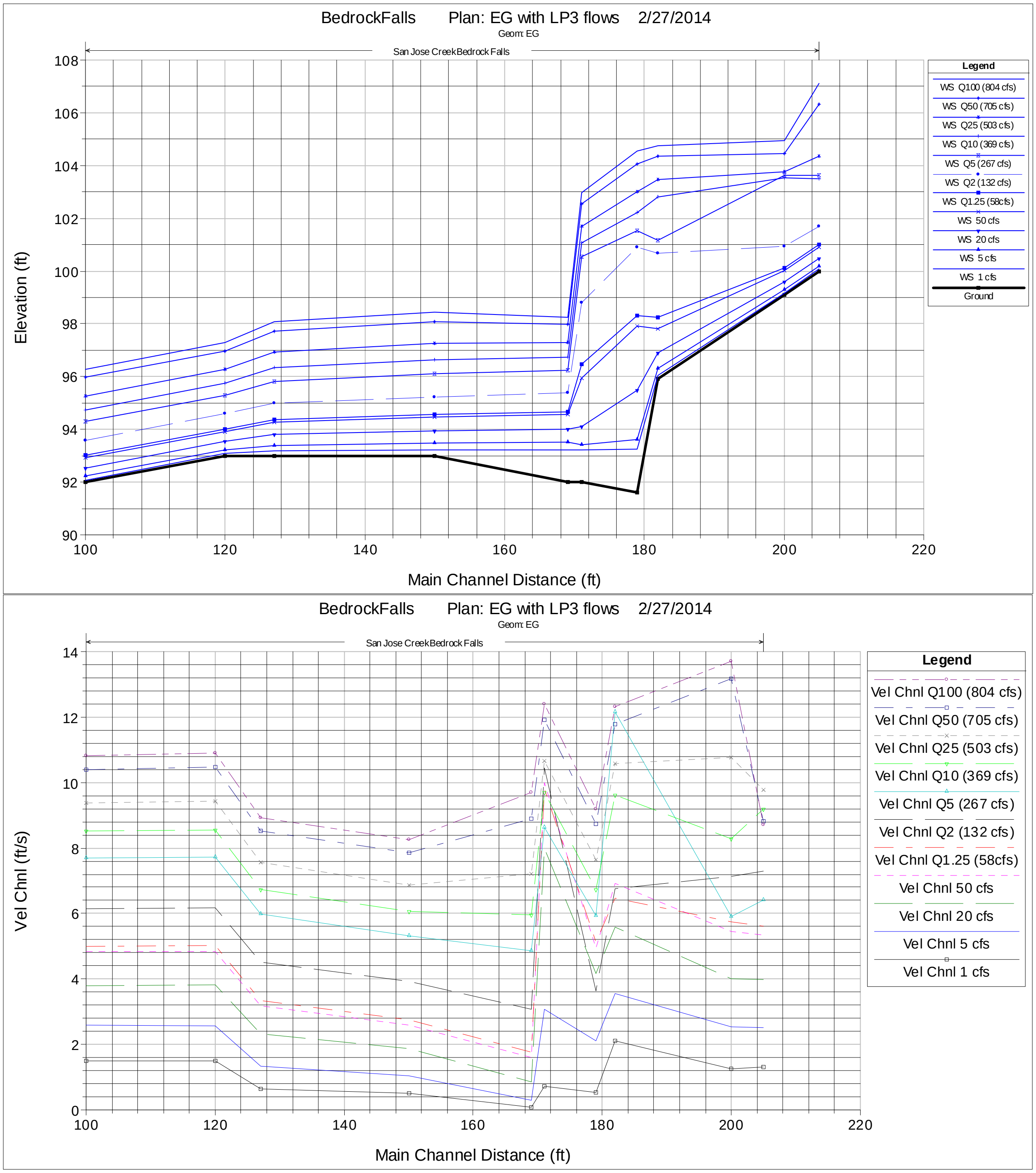


Figure 5.6. Estimate hydraulics from course HEC-RAS model at bedrock falls barrier

The coarse HEC-RAS hydraulic model and field evidence indicates the bedrock falls and chute is a total barrier for juvenile steelhead, by virtue of velocity, depth or hydraulic drop. More adept and athletic fish (juveniles and adults, depending on the flow) could possibly move through the barrier with burst speed. In general, the barrier seems to begin to back water somewhere around 50 to 60 cfs, estimated as the 1.25 year flow and above, but average channel velocity is high and possibly prohibitive for passage. In addition, there still appears to be a prominent drop in the water surface (greater than 0.5 feet maximum, a guideline for passage of juveniles in CDFG, 2009). More detailed ground survey and advanced hydraulic modeling, beyond the scope of this study, will more clearly define the hydraulic nature of this barrier and implications to passage of juvenile and adult steelhead

Modifying natural bedrock falls/barriers to fish migration that have been present for thousands of years is not routinely embraced by state and federal regulatory agencies. However, if stakeholders desire to increase fish passage over a wider range of streamflows, the bedrock chute portion of the barrier could be most easily eliminated or modified in height by using drilling and explosive techniques. However, additional investigation would be necessary for design considerations and to determine the subsurface conditions and depth to bedrock within the channel upstream of the top of the bedrock barrier.

The barrier is very isolated within a steep, confined reach of stream, and with no vehicular access to the site other than by walking more than ½ mile up the channel of SJC. Constructing a roughened channel to reduce the height of the barrier would be cost-prohibitive, technically challenging, and result in eliminating one of the largest and deepest pools observed along the main stem of SJC. We recommend discussing the natural barrier with CDFW and NOAA Fisheries. Please refer to *Section 7.4 Recommendations for Future Work* for additional discussion.

5.2.1.3 PWA Site #47 log jam at station # 5.05

The largest temporary log jam observed by PWA during the channel surveys is located approximately 3,200′ upstream from the mouth of Seneca Creek (Site #47, Map 5). The double log jam appears to have formed after 2006 since the CDFW stream surveys (Nelson, 2006a) made no specific mention on the presence of the jam. The key lower log jam is composed of several 2′ to 3′ diameter logs and other rafted woody debris that span the channel of SJC just upstream of two large live redwoods located on the left and right bank of the channel (Figure 5.14). The second upper log jam is located 35′ farther upstream and is composed of a single 2′ to 3′ windfall tree and other rafted debris (Figure 5.13). Cumulatively, the jams elevate the streambed nearly 4′ vertically, and store a wedge of primarily sand sized material for a distance of 100′ upstream from the lower jam (Figure 5.7 through Figure 5.15, Figure 5.17 and Figure 5.18). Currently the jams store approximately 150 to 175 yd^3 of sediment.

The channel aggradation has lowered the channel slope (Figure 5.17) triggered channel widening in the vicinity of the 2 log jams (Figure 5.18), and resulted in the formation of a high-flow channel along the right unconfined, alluvial channel bank (Figure 5.13 and Figure 5.14). The-high flow channel is flowing over former floodplain deposits containing abundant roots from the large adjacent redwood tree.

The log jam is likely a barrier to juvenile fish migration during most summer and winter low flow conditions, however, during normal or greater winter flows, adult steelhead should have minimal difficulty traversing either the jam or the high flow channel.

It should be noted that approximately 450′ upstream from the log jam at Site #47, a tremendous amount of recent SOD mortality is occurring along several hundred feet of SJC. The fallen trees have created an impenetrable woody debris accumulation that currently stores minimal amount of sediment (Figure 4.14, Figure 4.15, and Figure 5.16). However, the potential to form a new large log jam and barrier to fish passage is significant. MPRPD personnel should evaluate the location and evaluate whether some amount of debris removal would be advantageous. Please refer to *Section 7.4 Recommendations for Future Work* for additional discussion.

Figure 5.7. Site #47: View upstream from cross section #1 (Figure 5.18). Start of survey in pool below spanning bay trees (Figure 5.17). Note coarse pebble to cobble riffle crest.

Figure 5.8. Site#47: View downstream from cross section #1 (Figure 5.18) at upstream end of channel stored sediments (Figure 5.17). Note the well sorted sands burying the tail of the riffle composed of large gravels at the bottom of the photo.

Figure 5.9. Site#47: View upstream from cross section #2 (Figure 5.18) at aggraded channel reach.

Figure 5.10. Site#47: View downstream from cross section #2 (Figure 5.18) at upper logjam.

Figure 5.11. Site#47: View upstream from cross section #3 (Figure 5.18).

Figure 5.12. Site#47: View downstream from cross section #3 (Figure 5.18) at upper and lower logjams.

Figure 5.13. Site#47: Photo mosaic taken from right end stake of cross section #4 (Figure 5.18) showing the upper and lower logjams, associated channel stored sediment, and the right bank high flow channel in foreground.

Figure 5.14. Site#47: Photo mosaic taken from thalweg looking upstream at lower logjam (in center of photo) and developing high flow channel and sediment filled plunge pool on left below exposed redwood roots. Note presence of boulders on natural streambed downstream of the logjam.

Figure 5.15. Site#47: View downstream from near centerline of San Jose Creek illustrating typical SJC riffle characteristics, as well as a small <5 yd3 left bank erosion site at yellow arc, and the end point for the long profile at the arrow.

Figure 5.16. Extensive Sudden Oak Death mortality and fallen trees potentially forming a large log jam 450 ft upstream from PWA Site #47.

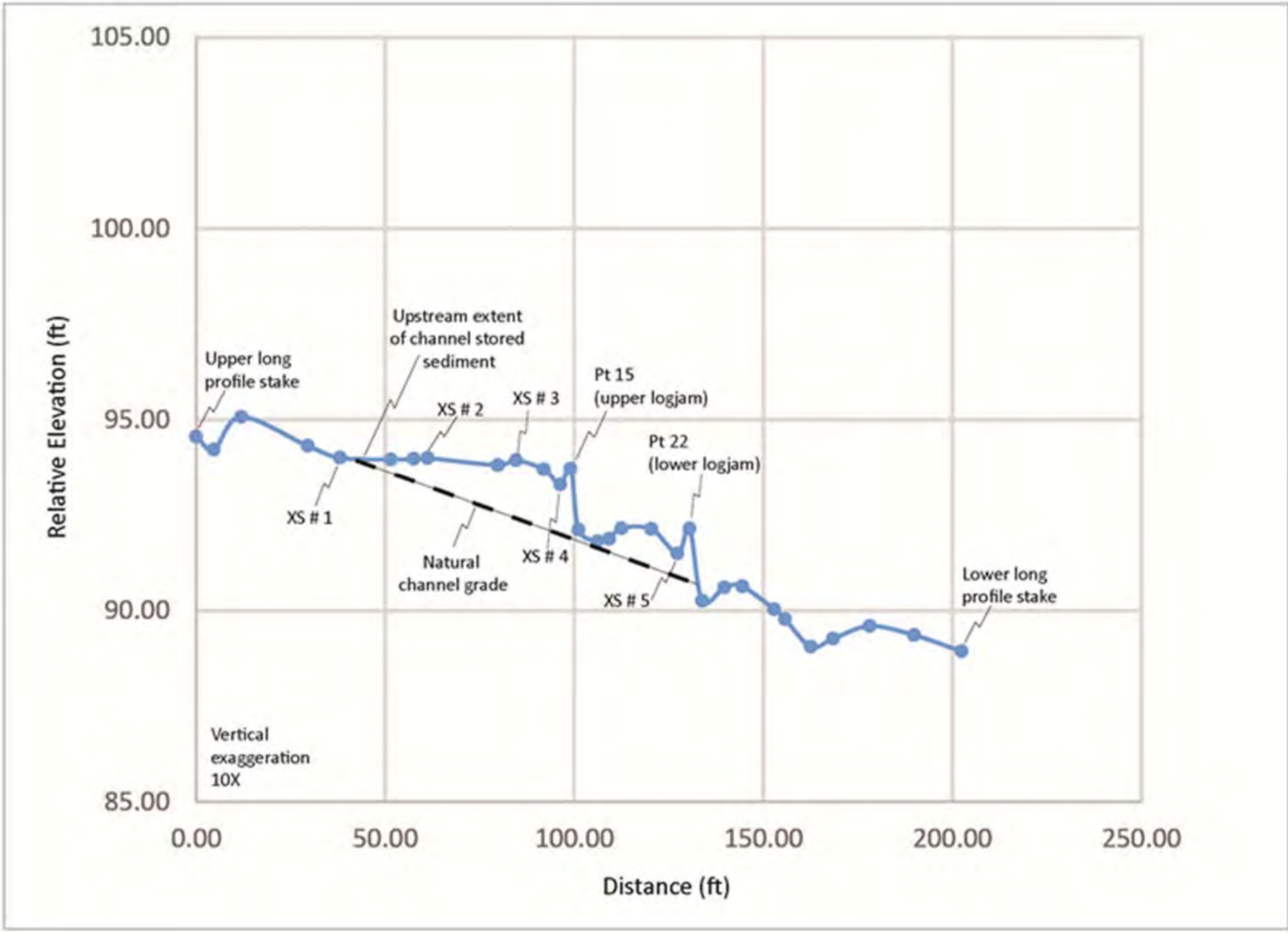


Figure 5.17. Longitudinal Profile of Logjam, Site #47 along San Jose Creek.

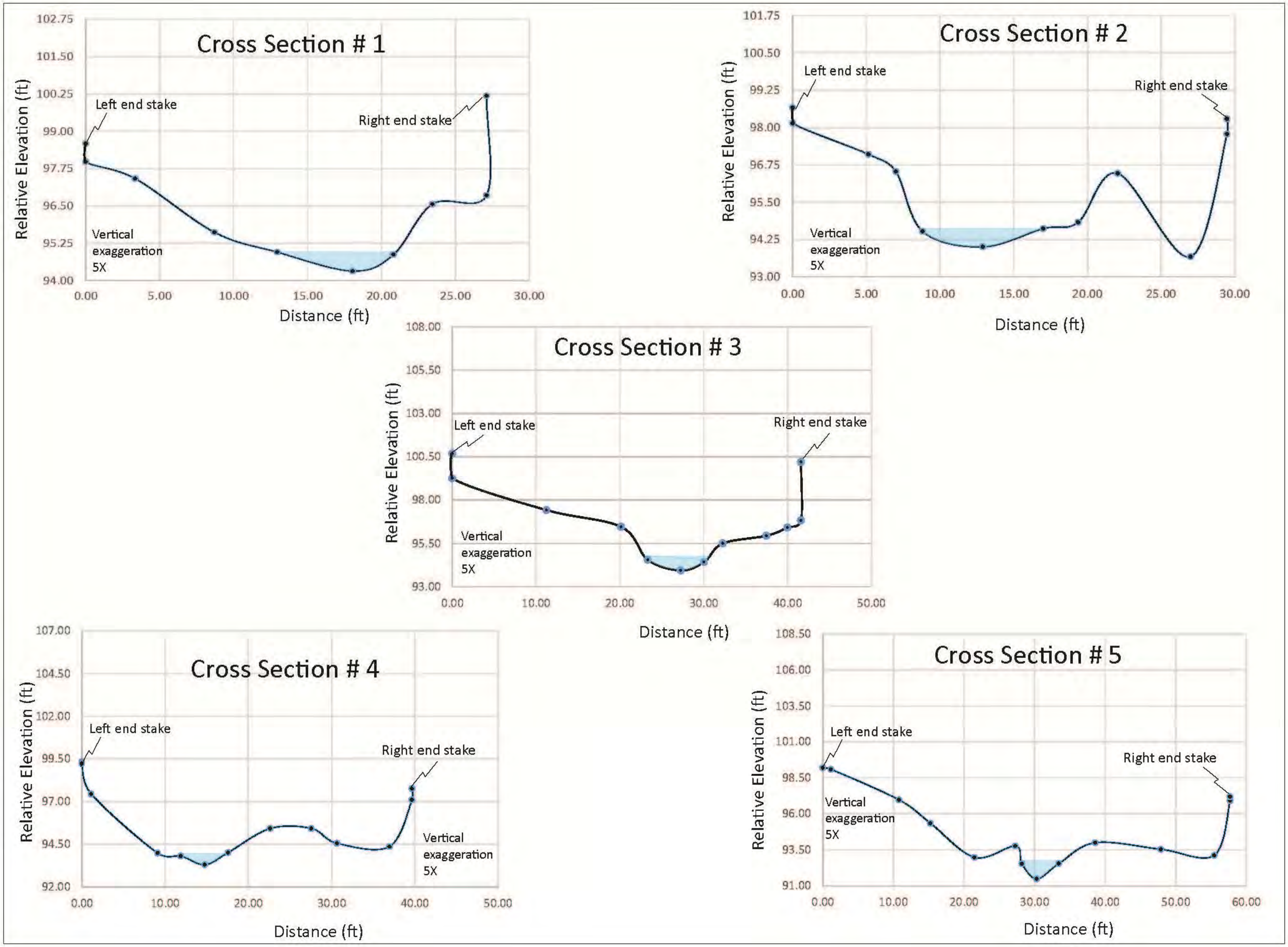


Figure 5.18. Cross Sections #1 through #5 of Logjam, Site #47 along San Jose Creek.

5.2.1.4 CDFW barrier #2 near CDFW station # 7.5

The second barrier identified by CDFW (Nelson, 2006a) consists of a large 8'+/- redwood that fell from the steep left bank hillslope across the channel of upper SJC (Map 5 and Figure 5.19 and Figure 5.20). The tree was located on the outside of a bend in SJC and likely due to bank erosion, the tree and rootwad fell and nearly 100% plugged the well-incised channel of SJC. Based on numerous vertical redwood sprouts growing on the fallen tree trunk, it is estimated the tree fell approximately 25 to 30 years ago, at the minimum. Due to the near complete blockage of the active channel of SJC, it appears woody debris and sediment in transport rapidly backfilled the natural channel to near the height of the downed redwood trunk over the next decade or so. CDFW indicated barrier #2 was probably the most significant barrier to anadromous fish passage in the watershed (Nelson, 2006a).

Currently the temporary log jam barrier is very sound and stable, forms a 8' near vertical step in the channel and is likely to remain intact for many decades, if not much longer. There is evidence of minor seepage from the base of the jam, but this is unlikely to trigger release of the channel stored sediments upstream of the tree truck and rootwad.

Channel aggradation associated with barrier #2 extends approximately 500' upstream based on the presence of a near uniform, fine grained sandy streambed and the lack of visible coarser pebble, cobble and boulder bed materials (Figure 5.21 and Figure 5.22). Upstream of the zone of aggradation, the channel of SJC coarsens to a more typical pebble to boulder streambed and the channel gradient increases slightly.

Figure 5.19. View upstream from SJC at CDFW log jam barrier #2 in distance and at headcut on

right bank terrace where diverted SJC streamflow re-enters the main stem of SJC.

Figure 5.20. View downstream taken from top of CDFW barrier #2 with 8′ vertical step in channel. Note old-growth terrace on right bank where stream diversion flows re-enter SJC.

Figure 5.21. View downstream from near station #180 in the long profile at aggraded sandy streambed and stored sediment upstream of barrier #2. About 50′ downstream of the large leaning redwood is the location where SJC is diverted onto the right bank terrace.

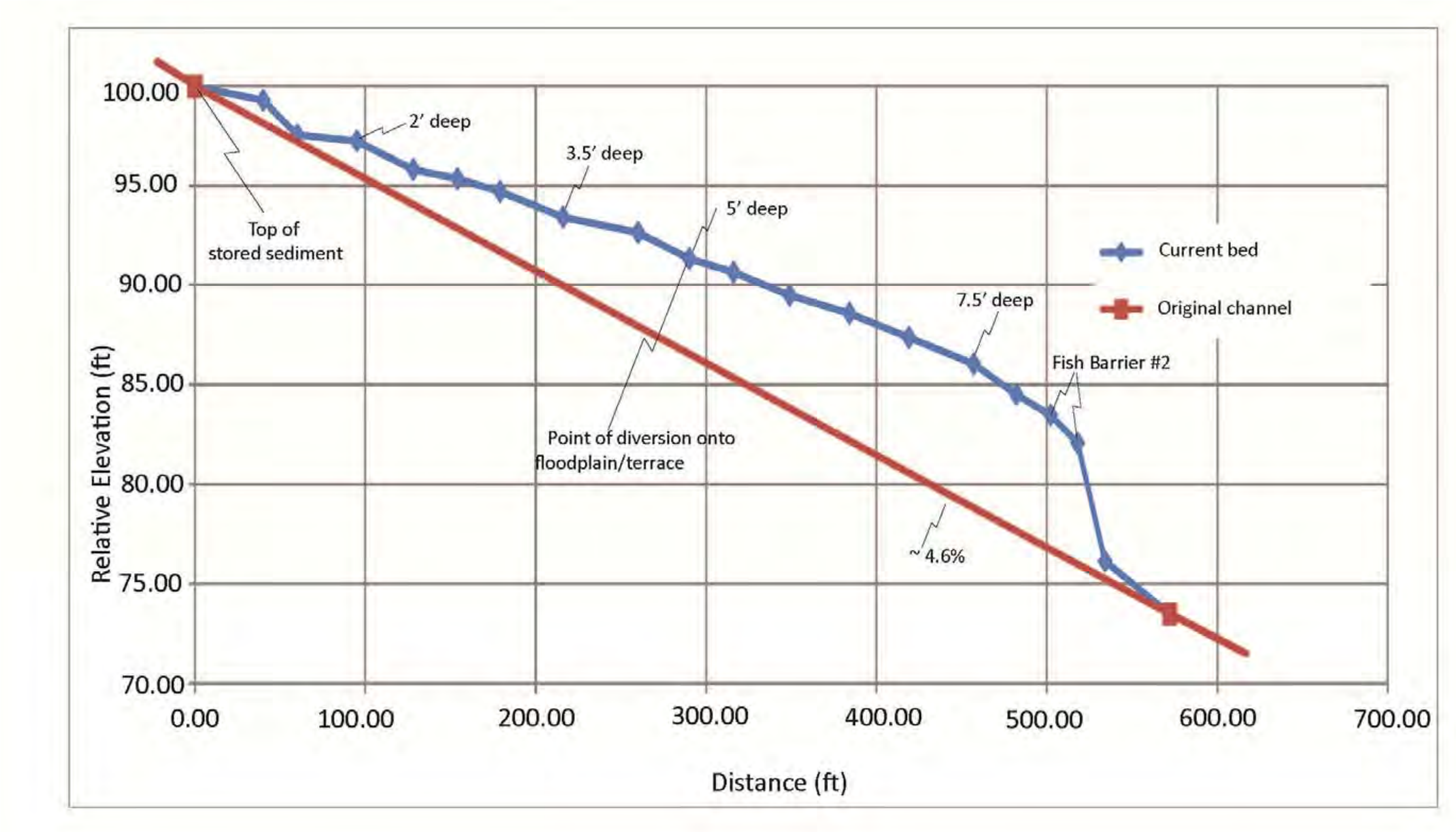


Figure 5.22. Longitudinal profile of Fish Barrier #2, large redwood logjam with side channel on San Jose Creek.

We estimate the volume of channel stored sediment, primarily sand-sized material, that has been deposited upstream of barrier #2 is approximately 1,400 yd^3. It is estimated the original natural channel grade beneath the stored sediment is approximately 4.6% (Figure 5.22).

Approximately 210′ upstream from the log jam, it appears aggradation within the natural channel elevated the natural streambed to equal the floodplain/terrace surface elevation, and SJC streamflow has been diverted onto the right bank surface and out of the natural channel. For at least a decade or so, it appears essentially all of SJC streamflow has been flowing through an average 4′ to 6′ wide, very poorly incised diversion channel along and across the right bank terrace surface that hosts old growth redwoods (Figure 5.23). The diverted SJC streamflow re-enters the main stem of SJC about 30′ downstream from barrier #2 (Figure 5.19). Streamflow has created a quasi-stable approximately 8′ tall headcut off the right bank terrace. The headcut is a maze of dense old growth root systems that are severely limiting migration of the headcut (Figure 5.20).

We consider barrier #2 and the current terrace channel and headcut to be a near permanent, long term barrier to both adult and juvenile steelhead migration. The barrier is located in a very remote portion of upper SJC, there is no easy access for heavy equipment to reach the site, and the quality and extent of habitat upstream of the barrier is likely far less than the habitat located downstream of the barrier. Consequently, the costs to remove the barrier verses instream habitat gains and potential impacts to SJC suggest efforts to modify or remove the barrier are questionable. It is potentially possible to cut a large deep, average 10′ wide notch

Figure 5.23. View downstream from near station #350 in long profile at diverted SJC stream across old growth terrace. The channel averages 4′ to 6′ wide, is very poorly incised and characterized by a sandy streambed.

through the trunk of the fallen redwood, but this would result in the release of most of the channel stored sediment, since there is no easy way to excavate the sediment. The large rootwad may also be problematic, since it would likely continue to block the channel and in the future, potentially capture additional organic debris in transport.

5.2.1.5 CDFW barrier #3 near CDFW station 8.0

The third and upstream-most barrier identified by CDFW (Nelson, 2006a) consists of a ½ dozen large old growth logs and trees with rootwads and lots of medium and small wood debris that has been rafted onto the core wood (Figure 5.24). It appears the barrier has been blocking the channel of SJC for 3 or more decades. Formation of the core log jam is difficult to explain in the old growth forest location (i.e. no evidence of tree throw or bank erosion). The log jam appears very solid and stable and forms a 7′ to 8′ steep in the channel (Figure 5.25). There is a minor amount of seepage at the base of the jam.

The log jam has stored sediment, primarily sand sized material, for a distance of 190′ upstream (Figure 5.27), and all stored sediment is contained within the active channel (Figure 5.26). It appears at some time in the past sediment accumulated in the channel to the current top of the log jam. Subsequently, field evidence indicates some form of piping/sink holes must have occurred/formed immediately upstream of the jam that has resulted in re-incision and transport of a portion of the stored sediment through the jam (Figure 5.25 and Figure 5.26). The incised notch varies in the upstream direction, but averages 1′ to 3′ deep and 5′ to 10′ wide.

Figure 5.24. View upstream at CDFW barrier #3 taken from top right bank. The complex log jam creates a 7′ to 8′ tall fish barrier and total blockage of upper SJC.

Figure 5.25. View downstream at crest of log jam (at survey rod) with channel stored sediment covered by litter. Note inactive sinkhole near jam crest and recently incised channel upstream of the sinkhole.

Figure 5.26. View downstream taken from station #80 in long profile at recently re-incised channel through previously stored sediment.

In the past, we estimate the maximum amount of stored sediment behind the jam was approximately 320 yd^3. The more recent incision of the channel stored sediment wedge released approximately 80 to 85 yd^3 of mostly sand sized material through the log jam. Currently, we estimate 235 to 240 yd^3 is still stored behind the barrier. It is estimated that the buried natural channel gradient is approximately 7.5% through the stream reach influenced by the log jam (Figure 5.27).

Based on the evidence of past incision through previously stored sediments, the fate of the remaining stored sediment upstream of the jam is questionable. Unlike at CDFW barrier #2, the remaining stored sediment at barrier #3 has a higher potential to be released during future high flow events. The field evidence suggests the completeness of the debris blockage in the sub-surface above the jam is less tight than at barrier #2.

Currently, barrier #3 is a total barrier to salmonid migration. While the potential for the log jam to fail or breach is extremely low, it exhibits a moderate to high potential to periodically release stored sediment from above the jam. In 2006, Nelson ended her habitat typing surveys at barrier #3 suggesting minimal anadromous habitat is present upstream from this point in the watershed. This is supported by the steeper projected natural channel gradient of 7.5% above the barrier. This coupled with the near permanent blockage of fish passage at barrier #2 suggest treating the feature would be more likely classified as a sediment management project rather than a fish passage project.

Restoration options at barrier #3 are more feasible than at CDFW barriers #1 and #2. While in an old growth setting, the adjacent natural hillslope are not steep, and heavy equipment access to the barrier and its' stored sediment wedge could be fairly easily accomplished. Utilizing heavy equipment to remove the sediment within the lower 90' to 100' of channel above the jam, approximately 75% of the total volume of channel stored sediment upstream of the barrier could be excavated and safely spoiled upon the adjacent right bank terrace/fan surfaces. The log jam could also be fairly easily dis-assembled, and the wood could be re-introduced to the channel reach so as to provide for improved habitat and channel complexity.

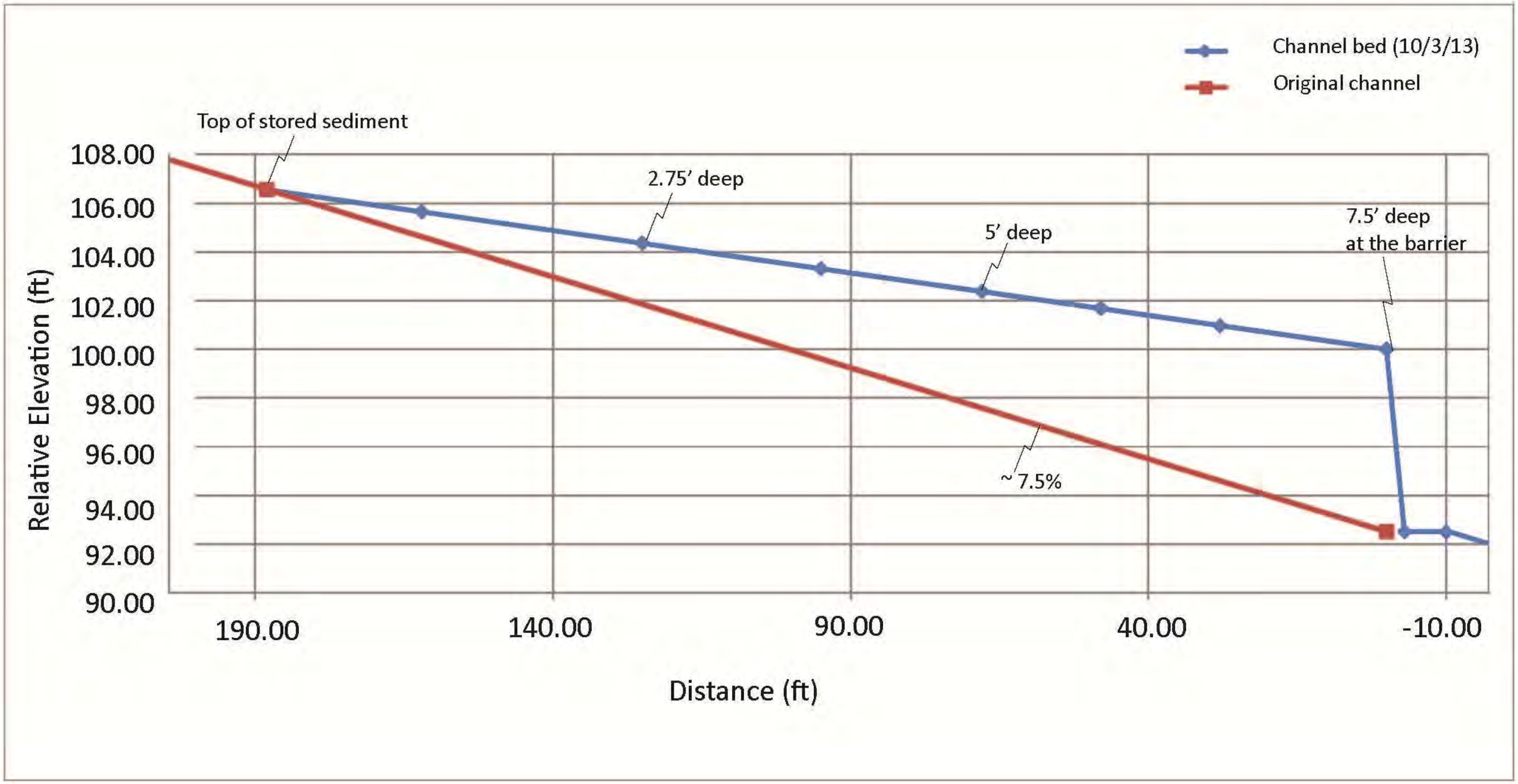


Figure 5.27. Longitudinal Profile at Fish Barrier #3, large multi logjam on San Jose Creek.

5.2.2 Seneca Creek Potential Barriers

There are two potential barriers to fish passage identified by both Nelson (CDFW 2006b) and PWA during 2013. The downstream man-made partial barrier is located in the middle watershed adjacent the old homestead at stream mile 1.74 (Site #37, Map 5). The upper barrier is a temporary barrier at stream mile 1.9 composed of several large root wads and rafted smaller debris (Site #41, Map 5).

5.2.2.1 Barrier at 1.74 mile

The man-made barrier consists of a 4′ tall x 20′ wide concrete dam that spans the channel at a ford road crossing located about 200′ upstream of the old homestead house (Figure 5.28). There is a 6′ wide opening in the dam face for flashboard installation in order to impound stream flow annually.

A multi-stepped concrete apron creates a 2.5′ vertical step in the channel that extents approximately 13′ downstream from the spillway and results in a shallow and fast water cascade (Figure 5.28) eliminating jump pools and impairing passage. It appears it has been many decades since the dam was fully functional and the dam currently served as a total temporary barrier to upstream adult and juvenile steelhead migration. In its present condition, juvenile fish passage would be very difficult because of high velocities and shallow water depths over the apron during most flows.

Because the homestead is no longer a residence, it may be advantageous and a relatively straight-forward task to completely remove the man-made structure if it is not determined to be a site of cultural and/or historical significance. Vehicular access to the location is easily available and the stream channel is low gradient and poorly incised at the dam location. We estimate approximately 20 yd^3 of primarily sand-sized channel stored sediment is located upstream of the dam. In removing the channel stored sediment, the approaches to the ford crossing may need to be slightly modified, lessened in steepness, in order to accommodate post dam removal vehicular access.

Figure 5.28. View upstream at concrete dam face and apron on Seneca Creek (Site #37, Map 5) located at stream mile 1.47 near the old homestead.

5.2.2.2 CDFW barrier at station 1.9 mile

Based on the 2006 CDFW instream assessment along Seneca Creek, numerous features (log jams, culverted road crossings, and a flashboard dam) were identified as being potential impediments to fish passage under certain flow regimes. However, the only identified feature classified as a barrier to both fish life stages during most flow regimes was a LWD log jam located within habitat unit #414 at stream mile 1.9 (Site # 41, Map 5). This log jam is comprised of 2 LWD stumps with SWD filling interstitial spaces and is 5′ to 7′ high with no jump pool located downstream of the jam (Figure 5.29).

During the instream assessment and field reconnaissance along Seneca Creek streamside roads, we observed many of the log jams that are potential impediments to fish during low flow regimes. In addition, we identified and confirmed that the log jam at stream mile 1.9 was a temporary fish barrier for all life stages at most flows. We did not survey this log jam as part of our fish barrier analysis. However, the log jam is located in a Strahler Order 3 stream with an active channel width that rarely exceeds 8′ in width. While still within a perennial stream reach, summer low flows are extremely low thereby limiting the long term benefit of the habitat located upstream of the jam.

Figure 5.29. View looking upstream at site #41 (Map 5) at station #1.9. Photo taken from Nelson, (2006b) see also Figure 4.11.

6. SAN JOSE CREEK LONGSHORE LAGOON

6.1 Introduction and background

We investigated conditions at the San Jose Creek lagoon using a set of study methods developed for other Monterey Bay lagoons supporting anadromous salmonids. Budget available for the lagoon study was equivalent to about 5 days of work. The investigation, summarized below, show that SJC has a lagoon atypical of the regional norm in that:

- The lagoon occupies the lower portion of backdune river channel. The creek flows north for a distance of about 1200 feet parallel to the beach, then enters Carmel Bay at a point where it is deflected across the dunefield into the bay by a bedrock outcrop. Few other coastal lagoons have this property of flowing parallel to the beach for a distance of about 80 channel widths or more.
- SJC has developed a channel through the backdune reach with its bed and banks composed of clean, well-sorted coarse sand and fine gravel. Infiltration into the bed and through the dunefield to the ocean occurs throughout this reach. We have observed several occasions in which flows of 3 to 5 cfs (estimated by a hydrologist) a short distance upstream of the Highway 1 bridge have completely infiltrated in the coarse sand and fine gravels before flow can reach the lagoon.
- Once annual flows recede below 3 to 5 cfs, the lower portion of the lagoon is kept watered by tidewater flowing through the sands into the lagoon. The tidal inflows through the dunes cannot keep ponded the upper two-thirds of the channel up to the bridge, where the channel seems to have an elevation of about 10 to 11 feet above mean lower low water (0.14 feet above the NAVD88 datum). In many years, seasonal recession will have formed a flow barrier relatively early during the smolt downmigration period from early April through mid-June.
- The 'lagoon' most resembles that which forms at the mouth of Pilarcitos Creek, near Half Moon Bay. This stream also conveys a coarse-sand sediment with a predominantly granitic origin. It enters the backdune channel reach with a bed elevation of about 15 feet MLLW, and infiltrates 1 to 2 cfs before entering the ocean. Pilarcitos Creek has been studied as part of an enhancement planning process, discussed below.

6.2 Work Conducted

Three monitoring activities were performed in the lagoon during this study (Figure 6.1).

1. A water level sensor was set up just downstream of the Highway 1 bridge.
2. Two time lapse cameras were set up to monitor the lagoon hydrography during the salmonid migration season
3. Ground survey was performed to monitor geomorphology of the lagoon and compare to Lidar topography.

6.2.1 Unique geomorphology

The hydrography and geomorphology of the lagoon differs from that for most central coast lagoons. As noted above, the lagoon has always formed in a backdune channel with a long reach between the bridge and the ocean. It is underlain by a thick wedge of coarse sand over bedrock. Our impression, and several observations comparing flows at the MPWMD gage and the Highway 1 bridge, suggest that infiltration occurs upstream of the bridge (see Appendix A).

6.2.2 Similar unique role in salmonid ecology

Relative to other lagoons for streams of similar size along the Santa Cruz and Monterey coasts (such as Aptos or Scott Creek, or the lagoons at the mouths of Watsonville Slough and the Little Sur River) beach bar opening are likely to be more infrequent, with greater daily fluctuations perhaps limiting rearing value, and not sufficient to sustain ponding to near the bridge, where essentially the downstream limit of continuous cover ends.

6.2.3 No role in amphibian or reptile ecology

It appears to us that the diurnal fluctuations limit values of the lagoon for amphibians and reptiles. The backdune channel is highly trafficked by visitors, which may also limit use.

6.2.4 Pilarcitos Creek Lagoon as site analog

Work done to enhance Pilarcitos Lagoon can inform the conceptual approach to the San Jose Lagoon. Pilarcitos Lagoon also has a supratidal point of entry into a long backdune channel which ponds intermittently. It has been studied intensively for potential enhancement (Parke and Hecht, 2009; Siegel and others, 2010). Three alternative concepts were assessed to improve steelhead upmigration and smolt downmigration, as part of a larger watershed-enhancement plan directed by the resource agencies:

a. Deflecting flow directly into the Pacific Ocean at the elbow where the backdune channel began, using a set of groins
b. Using step-pool morphology to minimize infiltration into the dune and stabilize a relatively permanent channel.
c. No action for the backdune channel, with enhanced willow planting to provide shade, cover, and resting habitat for the migrating salmonids.

Ultimately, the resource agencies chose to not pursue any of these alternatives, given the level of management that each might need, as well as the general intrusiveness of modifying the stream course. We suspect that much can be learned from the Pilarcitos experience. An effort to define the biological values of the lagoon would be a good place to direct further progress in working with the San Jose Lagoon.

6.3 Water Level Gaging and Ground Survey

In December 2012 a staff plate was installed downstream of the Highway 1 bridge (Figure 6.1). On February 5, 2013 Balance installed a water level recorder at the same location, about 30 feet downstream of the Highway 1 bridge, within a thicket of cattails/bulrush. The flow pattern under the bridge appears to be a wide flat channel on a sand bed, which then enters thick aquatic vegetation and emerges on the beach to follow a long path northward through the dunes to the mouth at the ocean. The water level sensor was installed to monitor the lagoon/outlet levels. The gaging record is shown on Figure 3.8. Water-level data were adjusted vertically to approximately NAVD 88, based on ground survey performed May 2, 2013 and datum corrections to match Lidar data from the 2009 - 2011 CA Coastal Conservancy Coastal Lidar Project. NGS survey benchmarks were not recoverable near the site, so vertical adjustments are based on survey shots on the bridge deck, compared to the Lidar data.

As shown on Figure 3.8, the water levels fluctuate daily. During WY2013, pools dried up on June 4, 2013, and remained subsurface through January 2014. The low water level and dry creek at the Highway 1 bridge is primarily linked to the critically dry two year period of this study and stream gaging effort.

Ground surveys were also used at the lagoon to monitor changes in the channel cross section and profile through the study and during openings of the creek, as available. Five cross sections and a long profile of the creek were performed on May 2, 2014 (Figure 6.1). At the time of the ground survey, the creek was not flowing to the ocean and had not been since March, due to the critically dry year. The surveyed cross sections are shown on Figure 6.2, in comparison to Lidar data developed from the 2009 - 2011 CA Coastal Conservancy Coastal Lidar Project.

6.4 Photo documentation of lagoon with time lapse cameras

Two remote time-lapse cameras were set up and recorded images at 5-minute intervals from February 16 to June 4, 2013, to document the anticipated opening and closing of the mouth of SJC during the salmonid migration/passage season. One camera was positioned to monitor the lagoon water levels, lagoon hydrography, and geomorphology (i.e. view to south parallel to beach and Highway 1), and the other was oriented to monitor the opening and closing of the mouth of SJC (i.e. view to west toward pacific ocean). A typical cycle of tidal inundation and cycling of lagoon water is shown on Figure 6.3.

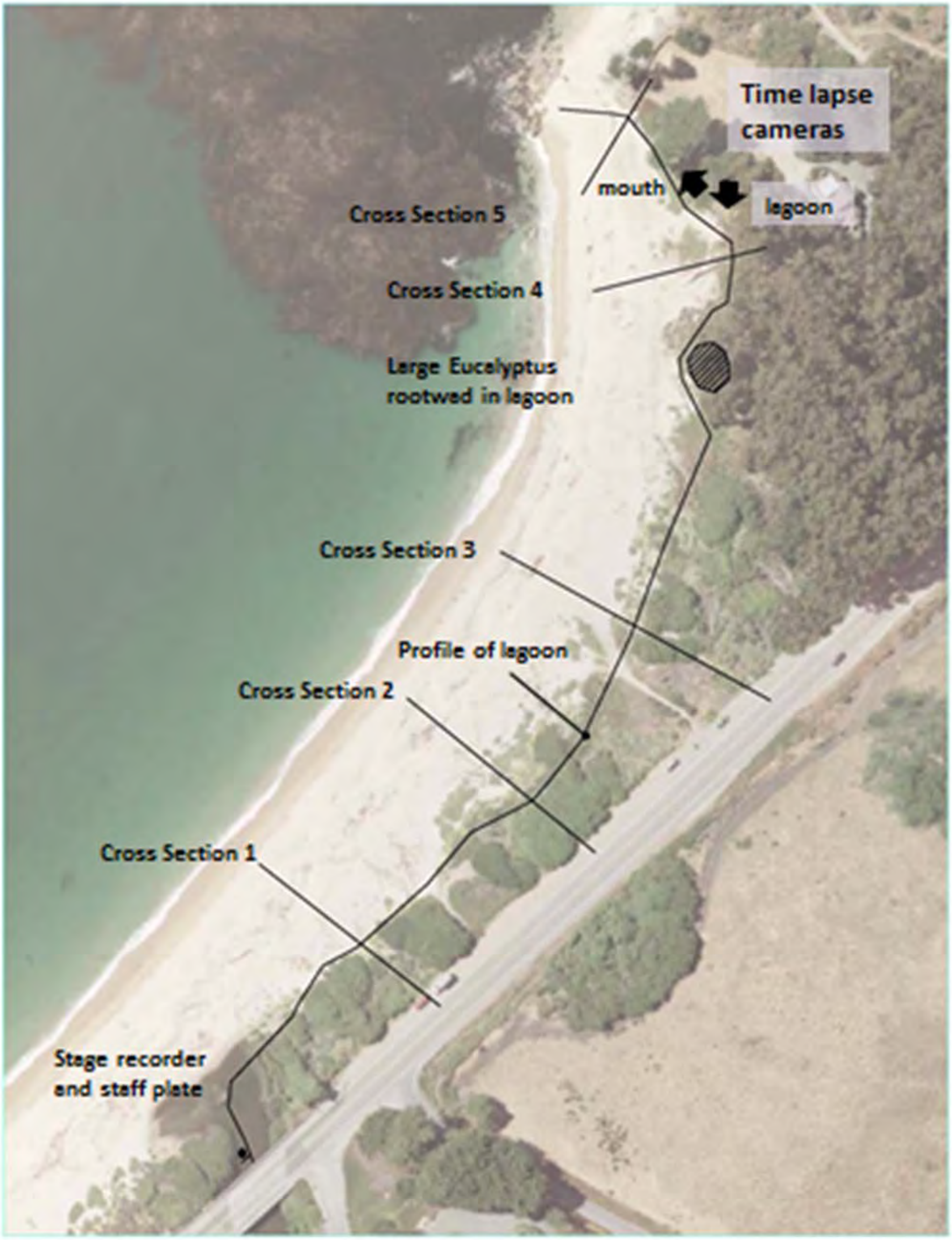


Figure 6.1. San Jose Creek Lagoon survey, time lapse camera locations, and water level recorder location

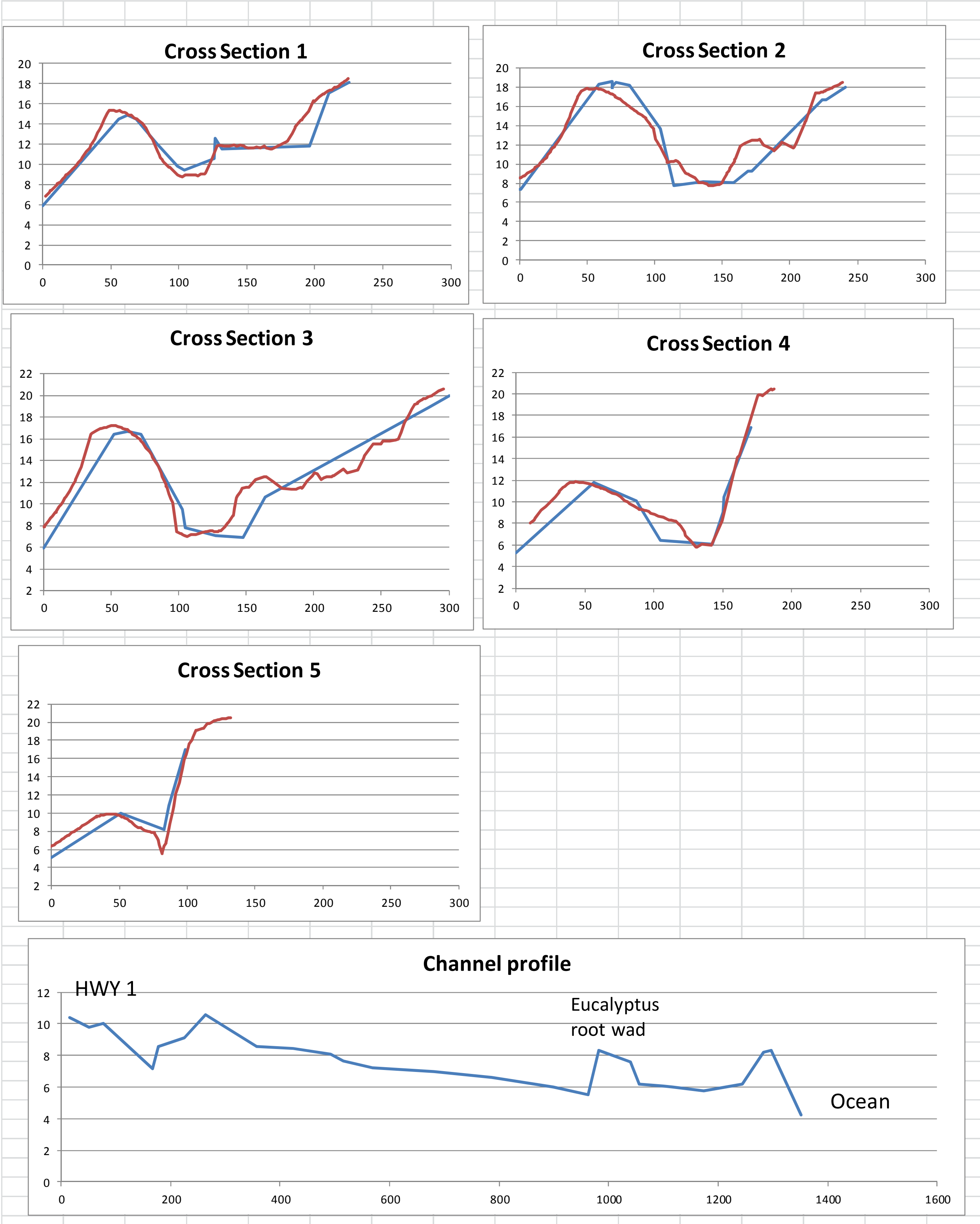


Figure 6.2. San Jose Creek Lagoon surveyed cross sections and profile from May 2, 2013 (blue lines), compared to 2009 – 2011 CA Coastal Conservancy Coastal Lidar Project (red lines). Elevations in NAVD 88, approximately MLLW datum.

Figure 6.3. Typical photos from time lapse photography showing relation of lagoon inundation to tidal cycle.

6.5 Observations

6.5.1 Alignment and geometry of San Jose Creek lagoon

As shown on historic aerial photography and historic oblique photography from the Coastal Project (see Appendix A), the lagoon retains a long-shore orientation in water year 2013, running northward from the Highway 1 crossing along the back side of the beach for about 1,200 feet until a bedrock formation pushes deflects the flow in the lagoon seaward through a low spot in the barrier dune. The cross section geometry and profile did not change appreciably during this dry water year.

The cross section and profile of the lagoon seemed to remain somewhat unchanged during the course of this study, with the exception of wave over-run that altered dune structure near the mouth of the creek, at the northern end of Monastery Beach. In addition, about 300 feet from the mouth, a large 15′ diameter (estimated) rootwad from fallen eucalyptus trees is blocking and deflecting flow in the lagoon and forming a sediment plug within the lagoon. Beyond these geomorphic features, aeolian processes and public access are the next most influential factors affecting lagoon geomorphology.

Also note that the ground survey on May 2, 2013 is not that different from the LiDAR cross sections (Figure 6.2), with the prominent dune between the lagoon and the ocean. There are some minor topographic differences between the lagoon and highway, but this can possibly be explained by limited survey shots due to poison oak, or LiDAR inaccuracies from vegetation interference. A comparison of the two data sets set suggests and supports the concept that the lagoon is typically a narrow long-shore lagoon that is deflected north, bounded by a barrier dune and impacted by tidal seepage.

6.5.2 Opening and closing of lagoon

Opening and closing of the lagoon is a complex interaction of tidal dynamics, wave energy, fluvial activity, groundwater levels, hyperheic flow, and site lithology. An attenuated shallow opening of the mouth of San Jose Creek appears most frequently with a high tide of above 4.5 MLLW. A summary of observed openings and closings of the lagoon in the salmonid migration season is shown on Table 6.1. The process of lagoon opening appears to be related to tidal water permeating through the dune structure into the lagoon and waves that manage to traverse the dune structure to strengthen the opening. Inflow from SJC also has an influence, but the baseline sequence for opening seems to be a function of the tide and wave interaction, and mostly limited to opening and ponding at the mouth.

Table 6.1 Observed opening and closing of San Jose Creek lagoon at Monastery Beach during salmonid migration season for water year 2013, according to review of time-lapse photography

Dates	Open/closed	observations
2/17 – 2/27	Partial day opening	Changes with high tide, outflow shallow, 0.5′ or less
3/7 – 3/12	Partial day opening	Changes with high tide, outflow shallow, likely opening due to wave activity
3/22 – 3/23	Partial day opening	Wave overrun imported sand and filled remnant channel, flow does not extend further inland anymore
4/8	Partial day opening	Wave overrun and short duration impoundment
4/9	Closed	Closed for rest of summer and fall , time lapse camera removed 6/4/13

Opening of the lagoon also appears related to a bedrock structure about 100 feet from the mouth that deflects outbound flow ocean-ward. Periods of higher baseflow and peaking flows from storms from SJC appear to provide a setting for more frequent openings of the lagoon.

Based on comparison of tidal peaks and recorded images from the time-lapse cameras, it is estimated a high tide of about 4.5 feet MLLW typically raises the ocean level sufficiently and permeates through 50 to 70 feet of beach dunes to create a temporary lagoon. However, during the dry WY 2013, it is unlikely the small tidally created lagoon rarely received sufficient streamflow from SJC to provide for either upstream or downstream fish passage.

According to a sample of beach sand, the average diameter (D50) of the poorly-graded (somewhat uniform grain size) coarse sand is about 2 mm, which correlates to a permeability of 12 feet per hour (0.1 cm/s), per Freeze and Cherry (1979). This equates or about four to six hours of travel time to traverse the barrier dune from the waves to the narrow long-shore lagoon, with less travel time towards the mouth of th lagoon, where the dune width is less. The relatively short travel time through the coarse dune sand remotely links tidal cycles and the presence of water in the lagoon, also evidenced by time lapse photo sequences, as shown on Figure 6.3. Unlike in many coastal lagoons, flow in SJC has relatively little effect on the depth and extent of the lagoon. We do not have sufficient data to establish the range of flows which open the barrier beach; our impression is that even small freshets generate sufficient flow to open the lagoon in April, May and June, the months when steelhead smolt outmigrate, provided that flow at the bridge exceeds 3 to 5 cfs. On two separate occasions, we observed flows of 2.5 to 3 cfs upstream of the bridge infiltrating into the sands before reaching the lagoon.

7. KEY FINDINGS AND RECOMMENDATIONS

7.1 San Jose Creek Stream Gaging

Available data reveals WY2012 was dry, estimated as 66% of mean rainfall at San Clemente Dam (14.0 inches versus 21.3 inches) and water year 2013 was even drier at about 69% of mean precipitation (14.6 inches, estimated, versus 21.3 inches). These data are based on rainfall records dating to 1922. Water year 2014 is also looking to be critically dry to date. During the measurable storms during this study, limited bedload movement was observed with an initial pulse of fine sediment flushed through the system during initial storms. Ultimate disposition of fine sediment is indeterminate, but is possibly in-channel or flushed out to sea. As base flow recedes in the lower reach, it eventually sinks into the sandy stream bed, leaving the stream bed dry by the Highway 1 crossing.

7.1.1 Storm and Stream Gage Monitoring

Due to the dry nature of WY 2012/2013, we recommend that the gaging stations (Fig 6.1, Map 5) occupied and/or established as part of this study continue to be monitored. Gathering quantitative flow data in conjunction with sediment concentrations during significant storm event(s) will assist in painting an overall picture of episodic sediment sources in the watershed.

7.2 Sediment

As suggested by prior work in the early 1990s, sediment transport in SJC is relatively low relative to other Carmel-area channels, at about 3 to 30 tons per square mile during typical years. Lower values were measured in WY2013 and the first 4 months of WY2014. About half of the transport is sand.

Very little coarse gravel, and virtually none of the cobbles or boulders making up the stream bed are transported during typical years. Most of cobbles and boulders are in a position suggesting that they have not moved for many tens or perhaps 100s of years, with many being shaped by sandblasting, suggesting many, many years of immobility.

Bedload transport rates at the V-Notch gage suggest that the stream is now transporting higher loads at a given streamflow than were measured in 1991-1995 using similar equipment and methods. Because flows were so low during the recent sampling, this finding should be verified at higher flows before it is accepted. We believe that most of the additional sediment originates from a single active-incision tributary which enters SJC from the north side just upstream of Van Winkley Canyon, at Mile 5 on Rancho San Carlos Road. If so, the additional sediment could be mitigated by restoring this channel.

The work of the Balance/PWA team occurred during a period with virtually no episodic disturbance. Our observations and measurements characterize a period of chronic erosion, quiescent relative to the periods of episodic sedimentation. Overall- long-term sediment yields may be expected to be half-again-as-large, or twice as large, as those measured during this study. Erosion may focus on the hillslopes during periods of episodicity, rather than chronic periods where the ridgetops (and roads) may be focus of sediment entrainment as identified in the USLE analysis above.

The identified major source of sediment found is identified as coming from upland sources, such as head cuts, roads, and hill slope erosion. There is limited and minor bank erosion, otherwise well secured stream banks with redwood forest was typical of the main stem and major tributaries. The supply of gravels for spawning material seemed limited, but present in smaller fractions. The stream bed was typically bimodal, consisting of sand and cobbles. This study has determined that upslope erosional features are the most likely sources of sediment in the SJC watershed. One of the most important watershed management elements of long-term restoration and maintenance of both water quality and fish habitat is the reduction of future impacts from upland erosion and sediment delivery.

7.2.1 Quantitative Road/Trail Assessment

Unlike many watershed improvement and restoration activities, erosion prevention through "storm-proofing" rural, ranch, and forest roads provides immediate benefits to the streams and aquatic habitat of a watershed (Weaver and Hagans, 1994, 1999; Weaver et al., 2006). It measurably diminishes the impact of road related erosion on the biological productivity of the watershed's streams, and allows future storm runoff to cleanse the streams of accumulated coarse and fine sediment, rather than allowing continued sediment delivery from managed areas.

We have seen the benefit of implementing erosion prevention and sediment reduction treatments along roads and trails through the comprehensive assessment utilizing CDFW recommended protocols, followed by the successful storm-proofing of approximately 8 mi of roads within the Williams Canyon subwatershed. By implementing these treatments, approximately 6,030 yd^3 of sediment was saved from entering Williams Canyon and the main stem of SJC, where based on this study, the residence time may be quite long.

We recommend that future efforts be made to assess the remaining approximately 74 mi of road/trail within the watershed. The assessment(s) should identify and quantify all sources of future erosion, and most importantly, quantify the volume of future erosion being prevented from entering streams, as well as provide site-specific recommended treatments to reduce erosion and prevent future sediment delivery. In addition, a prioritized, treatment plan complete with a cost estimate and necessary labor and equipment needs should be a deliverable product.

7.2.2 Quantitative Upslope Erosion Assessment

Besides man-caused road related erosion and sediment delivery, based on preliminary review of historical and current aerial photography as well as reconnaissance field evaluations, non-road related hill slope mass wasting and fluvial erosion are considered to be significant source of sediment in the SJC watershed. Therefore, we recommend conducting a comprehensive upslope erosion assessment of non-road related sediment sources.

The continued upslope migration of 1st order stream channels via headcutting and sub-surface piping processes, particularly on south facing hill slopes underlain by Miocene sedimentary bedrock within SJC, should be evaluated on a case by case basis with prioritized treatments developed in concert with land management goals.

A study identifying sources of erosion, quantifying past and future sediment delivery volumes and prescribing future treatment options can lead to developing a prioritized, treatment plan complete with a cost estimate and necessary labor and equipment needs to reduce future sediment delivery from upslope sources.

7.2.3 Maintain Installed Sediment Basins

To reiterate, this study has determined that upslope erosional features are the most likely sources of sediment in the SJC watershed. The Project Team installed four small sediment basins (SB #1-4, Map 5) in order to collect quantitative data from identified non-road-related upslope sediment sources. Due to the lack of rainfall during WY2013 and WY2014, sediment basins did not retain measurable quantities of episodic sediment from the upslope gullies. We recommend that these sediment basins continue to be maintained and monitored after significant rainfall events in order to quantify sediment delivery volumes from the upslope gullies due to episodic events. If these sediment basins are properly maintained, quantifiable data could assist in completing the upslope sediment source budget.

Prior to next winter, we recommend that the basins be evaluated for structural integrity and reinforced as deemed necessary. Basins should be evaluated after significant rainfall events and measurements taken and volumes recorded to document sediment derived from the upslope erosional features. Regular maintenance will also be required as the storage volume behind each dam is small (i.e. <2 yd^3). The volume of sediment removed from the basins should be dispersed at a location that does not have the potential to deliver to any nearby watercourse.

7.2.4 Treatment of Identified Instream Sites

Although instream sources were not determined to be a significant input of sediment into the SJC watershed, based on the instream assessment we recommend that 15 of the 57 inventoried sites be treated to reduce sediment, improve instream habitat, and/or improve fish migration. Of the 15 sites recommended for treatment, 8 are road crossings, 5 are log jams, and 2 are concrete instream dams (Table 7.1).

Table 7.1. Inventoried instream sites recommended for treatment, San Jose Creek Study, Monterey County, California.

Problem type		Instream sites	
		Inventoried (#)	**Recommended for treatment (#)**
	Bank erosion	3	--
	Landslide	1	--
	Log jam	38	5
Other	Road crossing	12	8
Other	Dam	2	2
Other	Bedrock Cascade	1	--
	Total	**57**	**15**

Based on this study, we recommend 4 different types of instream treatments along the inventoried reaches of SJC and Seneca Creek. Recommended treatments primarily consist of removing instream obstructions and excavating/removing material from the stream channel (Table 7.2). For additional treatment information, treatment summaries are provided in Table 7.2, which refer to information in Appendix C.

Table 7.2. Recommended treatments for inventoried instream sites, San Jose Creek Study, Monterey County, California.

Treatment type	No.	Comments
Remove existing culvert and install armored ford (wet) crossing	3	Remove existing culvert and all road fill and convert into a ford crossing (Site #26, 29, and 30)
Soil excavation	5	At 5 sites, excavate and remove a total of 225 yd^3 of sediment at 3 stream crossings (Site #26, 29, and 30) and concrete at 2 dams (Sites #1 and 37).
Remove, clear, or cut notch in LWD/SWD log jam	5	At 5 sites, Remove, clear a portion, or cut a notch in the existing log jam to allow for fish passage (Site #33, 49, 50, 51, and 52)
Rolling dip	17	Install to improve road drainage and reduce delivery of road related sediments to streams.

For the 2 concrete non-functioning dam sites, both can easily be removed with minimal disturbance to the adjacent stream banks and the stream bed, following cultural clearance that they are not significant structures. Both have good vehicular access and the stream channels are low gradient and mildly incised at the dam locations. At Site #1 on the main stem of SJC (Map 5), not including moving a small track driven excavator and dump truck to and from the dam site, it is estimated approximately 10 hours of work will allow for demolishing the dam, and loading the concrete into a dump truck for removal from the SJC watershed, or to a proper spoil disposal location within the watershed. It is unlikely any of the stored sediments behind the dam could be retrieved primarily because it is deposited in and amongst the natural boulders contained in the streambed.

At Site #37 on Seneca Creek (Map 5), not including moving a small track driven excavator and dump truck to and from the dam site, it is estimated approximately 20 hours of work will allow for demolishing the dam, reshaping the bed and banks, and loading the concrete into a dump truck for removal from the SJC watershed, or to a proper spoil disposal location within the watershed. This time on site will allow for modifying the road approaches to the ford crossing located immediately upstream, as well as excavating the approximately 20 yd^3 of primarily sand-sized channel stored sediment within the crossing and upstream of the dam. The approaches to the ford crossing need to be slightly modified, lessened in steepness, in order to accommodate post dam removal vehicular access. Ample locations are available on the nearby farmed terraces for disposal of the excavated bank materials and stored sediment.

At both dam sites, temporary coffer dams will need to be constructed both upstream and downstream of the instream construction sites (i.e. the dam removal site work area) in order to isolate the work area and maintain water quality through the use of pumps. In addition, electrofishing will be required to relocate fish and amphibians. All bare soil areas where surface erosion could deliver sediment to the stream should be seeded and mulched with appropriate materials.

Table 7.3 details the 15 sites recommended for treatment and lists treatment immediacy, complexity, and effectiveness as well as the total estimated volume of excavated material and estimated hours for heavy equipment. The equipment needs are reported as equipment times, in hours, to treat each individual sites. These estimates only include the time needed for the actual treatment work, and do not include additional construction activities such as mobilizing equipment, materials and/or field personnel, and traveling between sites. An estimated total cost to implement the recommended instream treatments for the project was not developed, but we can assist with that if requested.

7.2.5 Further Specific Instream and Upslope Assessments

This study has determined that the primary source of instream sediment is likely derived from lower (1^{st} and 2^{nd}) order tributaries. A small, unnamed (2^{nd} order) tributary opposite and just upstream of Van Winkley Canyon, draining south facing hill slopes, was identified as visibly undergoing active incising with active headcuts. In addition, higher sediment concentrations were observed from this tributary during synoptic storm monitoring. Therefore, should the adjacent land owners be willing, we recommend finding where sediment originates and determining alternatives and actions to stabilize the tributary.

Table 7.3. Estimated heavy equipment and labor requirements based on treatment immediacy and effectiveness for instream inventoried sites recommended for treatment, San Jose Creek Study, Monterey County, California.

Site #	Treatment immediacy	Complexity	Effective-ness	Excavated volume[a] (yd³)	Excavator (hr)	Dozer (hr)	Dump truck (hr)	Labor (hr)[b]
1	Moderate	Low	High	10	8	--	8	10
2	Low	Low	High-moderate	--	--	6	--	--
15	Low	Low	High-moderate	--	--	2	--	--
26	High-moderate	Moderate-low	High	70	3	2	--	2
29	High-moderate	Low	High	75	3	2	--	--
30	High-moderate	Moderate-low	High	70	2	2		2
33	Moderate	Low	High	--	--	--	--	2
37	High	Low	High	35	20		20	20
38	Low	Low	Moderate	--	--	5	--	--
42	Moderate	Low	Moderate	--	--	2	--	--
46	Moderate - low	Low	Moderate	--	--	2	--	--
49	High-moderate	Moderate	High	--	--	--	--	60
50	High-moderate	Moderate	High	--	--	--	--	40
51	Moderate	Moderate-low	High-moderate	--	--	--	--	6
52	Moderate	Low	High-moderate	--	--	--	--	6
Total				**260**	**36**	**23**	**28**	**148**

Note: Equipment and labor times do not include hours necessary to move in and out of the project area and traveling between sites.

[a] Excavated volume includes material permanently removed and/or stored at a stable location out of the floodplain.

[b] Labor time includes using chainsaws and other hand tools, seeding and mulching activities and pumping activities.

7.3 Fish Barriers

Evaluation of previously identified fish barriers by CDFW was completed for the purposes of this study. The natural permanent barrier (FB #1, Map 5) presents complexities of hydraulics beyond the scope of this study. The barrier on SJC, located between Animas and Seneca Creeks, appears to be a significant bedrock drop at low flows (6 feet total for a chute and 3-foot vertical drop to pool) within a very constricted section of creek. In higher flows the backwater will raise the tailwater and ease the jump heights, but it still may reflect a significant barrier with a drop and a plunging water fall. Only strong adult swimmers would make it past this lower barrier, and we suspect few juvenile move upstream at any flows.

The two temporary natural fish barriers (FB #2 and FB #3, Map 5) are in the upper quarter of the watershed and based on field observations, it is suggested that these should be left in place. Each are composed of old growth logs and root wads, are very stable and near permanent features in SJC with average vertical changes in bed elevation of 7-8', and each are 100% fish barriers to all life phases of resident and anadromous salmonids.

7.3.1 Further Evaluation and Treatment of FB #1

A detailed hydraulic study is recommended for the bedrock falls barrier, identified as FB #1 (Map 5). Because this barrier is low in the watershed, a better understanding of existing hydraulic conditions and required swimming performance will inform access to the rest of the watershed for spawning and rearing habitat in order to develop recommendations to improve fish passage. As a result, if there is concern for passage and restoration beyond a natural barrier, the stakeholders might consider chipping the bedrock to facilitate a lower drop in step elevation or some other measures, but additional analysis will also be needed upstream of the falls to determine channel conditions and depth to underlying bedrock.

7.3.2 Treatment of FB #2 and FB #3

Until a decision is made to conduct further study and investigation of FB #1, it is not advised to pursue efforts and study to facilitate removal of the natural and stable log jams/temporary fish barriers at FB #2 and FB #3 (Map 5). Stakeholders must consider the extent of instream habitat gains upstream of each barrier versus potential impacts of the release of channel stored sediments in relation to the level of effort to eliminate the features as barriers.

7.3.3 Monitoring of Sudden Oak Disease and Treatment of Potential Fish Barriers

There is a section of SJC upstream of the confluence with Seneca Creek and PWA site #47 (Map 5) that may be delivering anomalously high wood loadings volumes to SJC from sudden oak death. The potential for formation of future additional wood jams that could impede fish passage is high. This area should be closely monitored for future additional instream impacts. Based on decisions regarding treatment of fish barriers located downstream, existing and future log jams may be modified and/or removed to enhance fish migration.

7.4 Long-Shore Lagoon

The hydrography and geomorphology of the SJC lagoon differs from that for most central coast lagoons. SJC has been identified as an important anadromous watershed. Sediment impairment is a primary restorative goal. However, field observations, surveys, and time lapse photography demonstrate lagoon opening is an important factor when discussing fish migration. Littoral processes and tidal dynamics play a large role in lagoon opening. The anomalously dry year in which our necessarily limited study was conducted should be balanced with an additional more thorough coastal dynamic and fluvial study will better answer how often the lagoon will open. Based on this study, it appears the timing/opportunities for adult upstream migration, as well as outmigration for juvenile salmonids are very limited in many water years.

7.4.1 Further Lagoon Studies

We recommend conducting a study to understand the lagoon cycling and evolution. Such a study would combine an analysis of coastal dynamics, hydrology, and further geologic investigations of the Monastery Beach area. We suggest that a biological reconnaissance identify the potential uses of the lagoon, such that a more site-specific set of observation can be made.

Based on monitoring performed within the scope of this study, we doubt whether the physical attributes of the lagoon will support the same suite of habitat values characterizing other central coast coastal lagoons. We suggest that a biological reconnaissance identify the potential uses of the lagoon, such that a more site-specific set of observation can be made. The anomalously dry year in which our necessarily limited study was conducted should be balanced with an additional more thorough coastal dynamic and fluvial study that will better answer how often the lagoon will open. Littoral processes and tidal dynamics appear to play a large role in lagoon opening and the duration of time the lagoon would remain open. A recommended study to understand the lagoon cycling and evolution would combine a study of coastal dynamics, hydrologic analysis, and further geologic investigations of the Monastery Beach area.

7.4.2 Recapture Lagoon Photo Points and Surveys

As part of either further study or independently, we recommend re-occupying the photo point locations, longitudinal profile lines, and cross sections (Figure 6.1, Map 5) established for the purposes of this study. Photographic evidence combined with quantitative data could reveal important conclusions in regards to available and potential fisheries habitat.

7.5 Limitations

This report was prepared in general accordance with the accepted standard of hydrologic practice existing in Northern California at the time the investigation was performed. No other warranties, expressed or implied, are made. As is customary, we note that readers should recognize that interpretation and evaluation of subsurface conditions and physical factors affecting habitat is a difficult and inexact art. Judgment leading to conclusions and recommendations are general made with an incomplete knowledge of the conditions present. More extensive or extended studies, including additional hydrologic investigations through additional water years, can reduce the inherent uncertainties associated with such studies. If the client wishes to further reduce the uncertainty beyond the level associated with this study, Balance should be notified for additional consultation.

We have used standard environmental information -- such as rainfall, soil mapping, and geology mapping -- in our analyses and approaches without verification or modification, in conformance with local custom. Information specific to the San Jose Creek Watershed is current through January 2014. New information or changes in regulatory guidance could influence the plans or recommendations, perhaps fundamentally. As updated information becomes available, or as pertinent water-quality information is issued for the region, the interpretations and recommendations contained in this report may warrant change. To aid in revisions, we ask that readers or reviewers advise us of new plans, conditions, or such data of which they are aware.

Concepts, findings and interpretations contained in this report are intended for the exclusive use of the MPRPD and the MPWMD. Their use elsewhere could lead to environmental or structural damage, and/or to noncompliance with water-quality policies, regulations or permits. Data developed or used in this report were collected and interpreted solely for the purposes described in the report. They should not be used for other purposes without great care, updating, review of sampling and analytical methods use, and consultation with Balance staff familiar with the site. In particular, Balance Hydrologics, Inc. should be consulted prior to applying the contents of this report to geotechnical or facility design, instream restoration, or for other purposes not specifically cited in this report.

Finally, we ask once again that readers who have additional pertinent information, who observed changed conditions, or who may note material errors should contact us with their findings at the earliest possible date, so that timely changes may be made.

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Appendix 2-G

Canyon Del Rey Master Drainage Plan Update

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Canyon del Rey
Master Drainage Plan

Funded by the California Department of Water Resources With Local Matching Funding

Prepared for:

Monterey Peninsula Water Management District

Monterey County Water Resources Agency

City of Seaside, California

July 2014

July 14, 2014

Canyon Del Rey Master Drainage Plan

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EXECUTIVE SUMMARY

This report presents an update to the Master Drainage Plan for Canyon del Rey originally prepared for the Monterey County Water Resources Agency (MCWRA) in 1977. This updated plan accounts for the changes in hydrologic and hydraulic conditions in the watershed, as well as the addition of new and updated flood management facilities. It also provides a new investigation and evaluation of sediment related processes in the watershed, including analyses of sediment transport, erosion, and deposition within the stream channel system. Project activities included:

- field investigation of existing storm water management facilities,
- surveying of selected culverts and storm water basin outlet structures,
- field investigations of stream channel morphology and sediment migration,
- bathymetric surveys of Roberts Lake and Laguna Grande,
- collection of available rainfall and stream flow gauge data within and in proximity to the watershed
- updating of rainfall data and depth-duration-frequency estimates and mean annual rainfall estimates ,
- completion of a comprehensive hydrologic model of the entire watershed including both designed and de facto stormwater storage areas,
- hydraulic analysis (using FHA HY-8) of conveyance capacity of culverts and crossings to determine their adequacy for handling design storm events,
- preliminary cost estimating for recommended upgrades to selected facilities,
- analysis of sediment mobilization, transport and deposition processes in the watershed, and
- consideration of alternative future watershed and flood management activities.

A set of recommendations for ongoing management of the watershed is provided for your consideration.

The following summarizes the principal results, conclusions, and recommendations.

1. Work in this study included the survey and subsequent hydrologic and hydraulic analyses of 51 culverts, 32 water and sediment basins, and the two lakes in the overall 14.3 square mile watershed.

2. Bathymetric surveys of Roberts Lake and Laguna Grande revealed that very little deposition of sediments has occurred since the last time that the lakes were dredged. This indicates that relatively small amounts of sediment have been transported into the lakes from the creek. Fine sediments have accumulated to a greater degree in Laguna Grande than in Lake Roberts but both sedimentation rates have been markedly low.

3. Management practices before, and particularly since, the 1977 plan have resulted in the construction of numerous stormwater basins within the watershed. Furthermore, flow restrictions at the many highway crossings and associated culverts create significant additional de facto detention storage areas which dramatically alter stream flows and sediment transport throughout the system.

4. The evaluation of available precipitation gage records concludes that local gage data are not sufficiently robust to be used to update the 1977 mean annual rainfall isohyet map. This data are also not sufficient to enable development of improved depth/duration/frequency relationships for the watershed.

5. However, the detailed analyses underlying the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 data are appropriate and were used to generate depth-duration-frequency estimates for hydrologic modeling purposes.

6. Analogously, data from the Parameter-elevation Relationship on Independent Slopes model (PRISM) is technically robust and was used to produce an updated mean annual precipitation isohyetal map for the watershed.

7. A comprehensive hydrologic model using the U.S. Army Corps of Engineers' HEC-HMS platform was created for the watershed, which was divided into 37 sub-watersheds for modeling purposes. Model operation was calibrated using data from the former USGS gage site now operated by the Monterey Peninsula Water Management District, with very close correlation.

8. Predicted peak discharge for the watershed is summarized at numerous points for both 10-year and 100-year design storms. Predicted peak discharge at Fremont Boulevard in Seaside is 209 cfs for the 10-year storm and 753 cfs for the 100-year storm. These values are somewhat lower than predictions of future flows in the 1977 plan, which were 214 cfs for the 10-year storm and 870 cfs for the 100-year storm. For comparison, the FEMA 2009 Flood Insurance Study predicts discharges at Fremont Boulevard equal to 250 cfs for the 10-year storm and 675 cfs for the 100-year event. In all three cases, the ratios of 100 year peak flows to 10 year peak flows (approximately 3 to 1 up to 4 to 1) differ noticeably from the regional norm of about 2 to 1, reflecting the unique attributes of the sandy soils.

9. Flow and sediment transport in Canyon del Rey are attenuated in 8 to 10 natural mainstream compartments which pond water and settle sediment. Constrictions between the compartments are largely natural and persistent.

10. Sediment yields in Canyon del Rey are normally quite low in most years, yet can be very high during extreme events. While many watersheds function this way, the differences in Canyon del Rey are much more extreme than the norm. This indicates that different processes may be in effect during the 10-year flood than during the larger 100-year event, leading to unusually large differences in sediment transport during 100-year events than during smaller storms. Episodic events – such as wildfires, large magnitude storms, and landslides and their after-effects – probably account for much of the sediment delivered to the Canyon del Rey valley floor. Such events are sufficiently rare and/or poorly understood that they are not generally incorporated in drainage or watershed plans.

11. Despite the widely-held view that windblown sand is a substantial contributor to sedimentation of Roberts Lake and Laguna Grande, particle sizes, the overwhelmingly angular grains, mineralogy, and diagnostic statistical metrics establish that the source of nearly all sediment in Laguna Grande and probably in Roberts Lake is from stream deposition.

12. Bathymetric surveys of Roberts Lake and Laguna Grande revealed that very little deposition of sediments has occurred since the last time that the lakes were dredged. This indicates that relatively small amounts of sediment have been transported into the lakes from the creek. Fine sediments have accumulated to a greater degree in Laguna Grande than in Lake Roberts but both sedimentation rates have been markedly low.

13. Dredging of Laguna Grande and Roberts Lake occurred in 1870 in conjunction with a real-estate promotion, and then again in 1983. Assuming that post-1983 deposition patterns persist, no need for dredging during coming decades is anticipated. The lakes are not likely to be a regular source of dredged material for beach nourishment.

14. Analysis of the behavior of the constructed and de facto natural detention basins (which are part of the defined "compartments" in this report), many of which are located on the main stem, indicates that the basins are an important contributor to flood flow management under existing conditions. Seven of the basins reduced incoming peak storm flows by 50% or more, and supplemental hydrologic runs indicate that peak flow entering Laguna Grande is reduced by approximately 60% due to the combined effects of upstream storage.

15. Two approaches to sediment management in the watershed are identified and developed: 1) continuation of the existing and largely natural compartmental accumulation of produced sediments and 2) modification of channel and storage elements to emphasize passing sediment downstream to Laguna Grande. It appears that continuation of the existing compartmental storage mechanisms will have multiple benefits for the watershed in terms of both sediment management and flood flow attenuation. However, the multiple implications of such a policy call for a broader planning perspective. Likely effects on habitat, existing policies and regulations, flood mapping, public safety, and maintenance costs all warrant greater consideration before a suitable approach can be adopted.

16. Evaluation of culvert capacities and recommendations regarding culvert improvements are predicated on a continuation of the existing compartmental storage mechanisms in the stream system.

17. Upgrades to 16 culverts are recommended, based on their inability to safely pass the 100-year peak discharge. The recommended upgrades are designed to reduce the depth of overtopping of the roadway associated with the culvert to 0.5 feet or less.

18. The impacts of the recommended upgrades on flows in the creek were estimated by modifying the HEC-HMS model to represent the changed culvert hydraulics. The model predicts that peak flows would increase in some locations by no more than 20% and decrease in some locations by no more than 7%.

19. The impacts of the recommended culvert upgrades on sediment transport, channel stability, and delivery of sediment to the lakes were not analyzed explicitly in this study. Given the relatively small changes in peak flows resulting from the upgrades, substantial changes in sediment

movements and/or channel stability seem unlikely. However, ongoing observation of stream behavior and sediment accumulation in the compartments is warranted.

20. The costs of the recommended upgrades were estimated using a preliminary design and a unit pricing methodology. Unit prices were obtained from the CalTrans Contract Cost Database and bid results for similar projects. Total cost for all 16 upgrades is estimated at $6.5 million, with the individual costs varying from $158,000 to $1,645,000.

21. Extensive amounts of data were collected during this work and are provided in a set of electronic files. It is recommended that these data be placed in an active data server and made available to District personnel and other users.

22. Changes in runoff due to changes in the watershed are likely to change storm flows and sediment transport. Decisions regarding land development, wildfire management, road improvements, and upgrades to the flood conveyance facilities should be made with full understanding of potential impacts on peak flows, creek channel stability, and sediment transport into the lakes. The HEC-HMS model developed for this project can be used in the future to estimate hydrologic effects of changes in the watershed.

23. Regular upgrades to this plan, on an approximately 10 year schedule, are recommended to provide that the plan remains reasonably up to date and useful in planning for the watershed.

1 INTRODUCTION

1.1 Background

This master drainage plan update was authorized by the Monterey Peninsula Water Management District and funded in part through a grant from the California Department of Water Resources. The purposes and scope of this update acknowledge the changes in hydrologic and hydraulic conditions in the watershed, as well as the addition of new and updated flood management facilities within the watershed, that have occurred since the prior master drainage plan (Koretsky King, et al, 1977) was completed. In addition, changes in land use have also occurred as a result of building within the watershed. There is also evidence that erosion and sediment transport have changed stream channel conditions, which should be evaluated from a flood management perspective.

The Master Drainage Plan for Canyon del Rey (Koretsky King, et al, 1977) was produced in 1977 for the Monterey County Flood Control and Water Conservation District. The purpose of the previous report was to provide a basis for orderly land development and design of associated flood control facilities. Within this general purpose were specific objectives, including: establishing flood control facility design criteria, assessing the adequacy of existing flood control facilities, determining the drainage patterns and hydraulic characteristics, defining the need for an estimated cost of needed flood control facilities, and recommending legal instruments needed to implement the plan.

The 1977 plan included a hydrologic analysis of existing data, predictions of future flows, a hydraulic analysis of existing facilities, and made recommendations for future improvements. One recommendation in that plan was “A periodic updating of the Master Plan to reflect actual conditions, as development occurs, is strongly recommended as the basis on which to provide for future conditions.” No update of the plan has occurred since completion of the study.

Improvements recommended in the 1977 drainage study were proposed to reduce flooding damage to structures as a result of the expected 100-year return period flood. Additional analyses and recommendations were made in the 1977 study to pass the expected 10-year storm flows at road and highway drainage facilities. To fund needed improvements, the 1977 study recommended both property tax assessments and fees for new developments. However, with the passage of Proposition 13 in June 1978, property taxes were capped and only the development fee was initiated. In the interim, some improvements and erosion prevention measures on individual parcels developed since that time have been completed.

1.2 Location description

The Canyon Del Rey watershed is located in Monterey County on the Central Coast of California, just east and north of the City of Monterey (see Figure 1-1). Canyon Del Rey Creek (also called Arroyo del Rey) is an intermittent stream that drains to the Pacific Ocean from an area of 14.3 square miles (approximately 9,137 acres) along Highways 68 and 218, beginning near the Laguna Seca raceway at the eastern end of the watershed and flowing west into Monterey Bay (see Oversized Figure 1). [1] The watershed includes portions of Seaside, Del Rey Oaks, Monterey, and unincorporated areas in Monterey County.

1.3 Study objectives

This report and the efforts contributing to these results and recommendations are focused on updating the 1977 plan to account for: changes to the watershed over the intervening 37 years; additions to flood control facilities; additional hydrologic, hydraulic and geologic information that is available now; improvements in analytical, computational, and modeling methods; and changing needs for development and flood management. In particular, this report provides expanded analyses of sediment production, transport and fate within the watershed and relates those analyses to facility improvement and management. Specific study objectives include:

1. Updating the hydrologic model contained in the 1977 Drainage Study. The 1977 study included rainfall data from the mid-1930’s to the mid-1970s. An additional 35 years of rainfall data are now available for use in updating isohyetal maps and depth-duration-frequency curves. In addition, assumptions about land use, the effects of development, and the effect of various drainage facilities on surface flows were evaluated and updated.

2. Surveying and documenting the design and condition of the existing flood conveyance and management facilities.

3. Evaluating the hydraulic capacity of facilities to pass existing flows. Using information gathered in the field and an update of flow estimates, the hydraulic characteristics of each primary and selected secondary drainage facility will be evaluated.

4. Updating expected erosion and sedimentation rates. The 1977 drainage study postulated that the creek was in a “juvenile” stage of channel development and that, despite transportation of silt from the

[1] Many of the topographic drainage areas used throughout this report are approximate, given that boundaries are often drawn at the crest of dunes, which may or may not reflect how water actually drains.

headwaters, the amount of sediment carried by the creek was limited. The historic, existing, and future rate of sediment transport to the lakes needed review.

5. Producing a plan report which updates the 1977 plan and provides the new results and findings.

1.4 Acknowledgments

This project was jointly funded by the Monterey Peninsula Water Management District and the Monterey County Planning Department under the direction of Larry Hampson (Chief Engineer) and Tom Moss (Floodplain Manager), respectively. This project also benefited from, and likely contributed to, a concurrent planning study for Frog Pond Wetland Preserve, sponsored by the Monterey Peninsula Regional Parks District, under the supervision of Tim Jensen, conservation planner.

Many individuals and entities contributed to this effort. Whitson Engineers conducted all surveys, and helped in many ways with documenting the history of the watershed. The Whitson staff, under the direction of Rich Weber and Tom Hannon, also assisted in preparing for and conducting the stormwater measurements.

CSUMB, through Prof. Rikk Kvitek, conducted the bathymetric mapping and bed characterization of Laguna Grande and Roberts Lake. This work and the findings to which it led were central to identifying the role of compartments, and in guiding subsequent sedimentologic, geomorphic, and beach-sand recruitment analyses.

The geomorphic team benefited from discussions with Prof. Doug Smith (CSUMB), who also provided the key well log identifying the character of the valley-floor sediments upstream of Frog Pond. Elizabeth Geisler, CSUMB graduate student in hydrology generously shared her thoughts and observations. Jonathan Lear, MPWMD hydrogeologist, contributed helpful observations regarding the variable depth of dune sands and groundwater fluctuations throughout the watershed.

Hydrologic records, including rainfall and streamflow gauge data, were provided by multiple parties, including U. S. Geological Survey, Monterey Peninsula Water Management District, Laguna Seca Golf Course, Naval Post Graduate School, and the National Weather Service.

Finally, we wish to thank Greg James, chief hydrographer for MPWMD, who provided both up-to-date and historical information for daily and 15-minute flows at the District's gage in Work Park (formerly site of the USGS gage discussed throughout the 1977 report).

2 WATERSHED AND FACILITIES DESCRIPTIONS

2.1 Hydrologic setting

High flows during the extremely wet years of 1995 and 1998 enable observations of drainage system behavior and confirmed some of the predictions made in the 1977 study, especially concerning head-cutting in Canyon Del Rey Creek (the creek or CdR creek) and sedimentation of culvert and other road drainage facilities. Upland areas in the watershed continued to experience erosion and observations indicated sediment transport in the channel system. These conditions raised questions regarding potential sedimentation and resultant reduction of flood storage (volumetric) capacity in Laguna Grande and Roberts Lakes.

It should be noted that Monterey County implemented regulations to prevent or reduce sediment and runoff from new development beginning in the 1960's. In addition, since completion of the 1977 drainage plan, the City of Monterey has implemented all recommendations from that plan for new development within the city limits of Monterey.

Along the Central California Coast, which contains a significant number of watersheds underlain with sandy soils, it has been noted recently that the hydrologic effects of development may be much greater in deep sandy soils than in loamy, clay and/or shallow soils (Hecht and Woyshner, 1984). Only limited data were available regarding lake sedimentation.

There have been reports that the stream channel suffers from bank instability, head-cutting, and erosion problems during high flows in multiple locations due to a variety of factors such as increased stream flows during rain events, changes in sediment supply in the watershed, and creek side development. Evidence of these effects is very limited.

The watershed is heterogeneous and its creek system complex. Land use, soils, slopes, and land cover vary widely (see Sections 2.2 and 4.5), with particularly large differences between the sub-watersheds north of Hwy 68 and those south of the highway. Urbanization has occurred in some sub-watersheds and has been completely absent in others (see Section 2.3 and the map plates in Appendix A), increasing the complexity of watershed response during storms. The morphology of creek channels and depositional areas is highly variable, with erosion dominating in some reaches while deposition dominates in other reaches (see Chapter 7). The results from this study provide considerably more detail regarding these conditions and propose a set of hydrologic and sedimentation behaviors that conform to observations in the watershed (see Chapters 4 and 7).

2.2 Watershed description

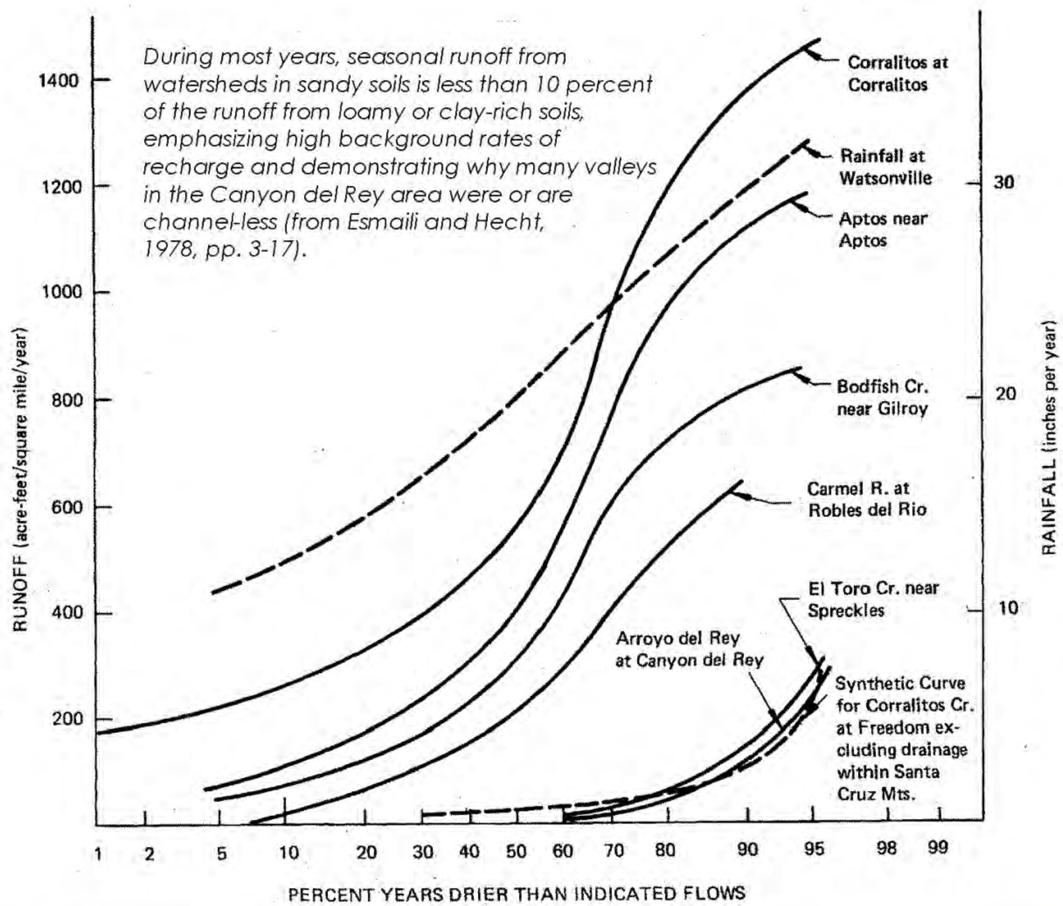
To better analyze the watershed, with an overall area of 14.3 square miles, we divided it into 37 sub-watersheds. Of these, 16 flow into CdR creek from the south and 19 from the north. The shape and extent of these sub-watersheds were developed to enable and simplify simulation of hydrologic processes, leading to variation in area from 8 acres to 1.88 square miles. While the sub-watershed boundaries generally follow drainage divides, boundaries also are set to represent changes in land use or soils. The delineations of these sub-watersheds are shown in Oversized Figure 1 and on the map plates in Appendix A. A map showing areas within the watershed with certain ranges of ground slopes is provided as Oversized Figure 2. Slopes vary from essentially flat to well in excess of 25%. High slope areas extend throughout the southern and western portions of the watershed.

Significant portions of the watershed to the south of Highway 68 are also sparsely developed and rise to 1,300 feet in elevation with a mix of coastal scrub, pine, and oak woodlands. Much of the runoff to the creek is from this area, which is also subject to relatively higher rates of erosion. Areas to the north of Highway 68 are generally low rolling grassy hills covered with sandy soils that generate little storm runoff to the creek, except during the wettest periods. The west end of the basin, in the Cities of Monterey, Seaside, and Del Rey Oaks there is a high degree of urbanization with a mix of single- and multi-family units and commercial development.

The peak 100-year flow in the creek (Koretsky King, et al, 1977) ranged from 800 cfs (existing) to 1,000 cfs (future conditions). Many of the primary facilities surveyed in 1977 could pass less than one-half of the 100-year peak. The most recent update of the FEMA Flood Insurance Rate Map (April 2, 2009) shows zones of shallow flooding in the 100-year event that would affect residences and businesses adjacent to the creek between Roberts Lake and the intersection of Highway 68/Highway 218 [2]. Portions of both highways would be inundated during a 100-year flood.

Geologic evidence and soil moisture budget analyses (Yates et al, 2003) both indicate the presence of a shallow alluvial aquifer system that sustains wetlands and phreatophytic vegetation and also supports base flow in Canyon Del Rey in wet years. Hydro-geologic conditions along Canyon Del Rey suggest that infiltration into the aquifer system *from* the channel or valley bottom is dominant and runoff in the creek normally represents a small fraction of the annual rainfall.

[2] Locally known as Tarpy's Corners, a name we frequently use in this report.



Balance Hydrologics, Inc.

Figure 2-1: Rainfall and annual runoff recurrence curves for streams in the eastern Monterey Bay area.

2.3 Development within the watershed

Urbanization of Canyon del Rey has a two sided history. In Seaside, North Monterey and Del Rey Oaks, development occurred primarily during the three decades following WWII, perhaps coincident with the growth of the functions of Fort Ord. The period of most rapid expansion was roughly 1949 to 1959. The ditches and drainage ways fully developed during these years. Relatively little urbanization has progressed since that time. Laguna Grande and Roberts Lake were dredged in 1983, following this period of growth (see Appendix H).

Conversely, in the upper half of the watershed only limited development occurred prior to 1980; significant expansion followed, including residential areas, infrastructure, business parks, and intensive open-space recreational uses such as golf courses, a speedway, and equestrian boarding and facilities.

It is clear that the volume of recharge reaching the bedrock aquifers beneath the valley has been diminishing over the past 25 years (e.g., Yates and others, 2003). Additionally, streams have incised into valleys floors which did not support streams, including parts of the main stem in the upper half of the valley. Channel incision allows storm runoff to move more quickly through the watershed. More runoff (and sediment) leaves the watershed, with less time for infiltration. Figure 2-1 shows that the sandy watershed previously yielded only a small fraction of incident rainfall, commonly less than 10% of the runoff from watersheds with more loamy and clay soils, The opportunities to both reduce storm runoff and increase recharge are an important part of developing an integrated drainage plan.

Many of the improvements recommended in the 1977 study have been implemented. General Plans for development in the cities and unincorporated areas have changed, water quality standards for storm water runoff have become more stringent, and tools to understand and predict water and sediment flows have improved. (Monterey County implemented regulations to prevent or reduce sediment and runoff from new development beginning in the 1960's. In addition, since completion of the 1977 drainage plan, the City of Monterey has implemented all recommendations from that plan for new development within the city limits of Monterey. It is unknown which improvements have been implemented within the city of Del Rey Oaks.

2.4 Facilities overview

Existing storm water conveyance and management facilities within the study area which were evaluated and included in the modeling and analysis consist of: 51 culverts (primarily under roadway crossings), 32 water and sediment detention basins, and the Roberts and Laguna Grande impoundments. These facilities vary greatly in size, design, and physical condition. Table 2-1 provides a list of the detention basins. Table 2-2 provides a list of the road crossing culverts. Details of these facilities and their condition are provided in Section 2.5.

The nomenclature used in identifying specific facilities is defined in the facility ID as follows:

- the first two digit number is the sub-watershed identifier,
- followed by a letter indicating whether the facility is a basin (B) or a culvert (C),
- followed by a two digit number that is the facility sequence number within the sub-watershed, and
- occasionally followed by a letter indicating that the object is a component of a facility, with all components sharing the same number.

Abbreviations used in defining the materials of construction for culverts are defined at the end of Table 2-2.

The 1977 study (Koretsky King, et al, 1977) differentiated between primary and secondary facilities, with primary facilities defined as structures (culverts) providing at least 12 square feet of usable flow area. Secondary facilities were those culverts with lesser usable flow area. The 1977 plan recommended improvements for primary structures. Evaluation of structures was based on ability to carry the 10 year peak storm flow for secondary facilities and the 100 year peak storm flow for primary facilities.

This plan update does not differentiate between primary and secondary facilities. It does exclude certain very small structures which are located on private property. All facilities are evaluated according to the same criteria (described in Section 5.4).

Canyon del Rey creek (main stem) has its source at the crest of Hwy 68, runs mostly westerly along Hwy 68 until the junction of Hwy 68 with Hwy 218, at which point it follows Hwy 218 north and west to Laguna Grande, Roberts Lake, and finally Monterey Bay. Both highways cross the creek at many locations, creating a series of flow restrictions and associated impoundments. These restrictions and impoundments, along with both naturally occurring ephemeral lakes and marshes and basins constructed for storm water detention, dramatically alter the natural runoff from the watershed and the peak storm flows in the creek.

Table 2-1: Detention basin facilities in Canyon del Rey watershed.

Facility ID	Location
LS_B_01	Lake at Laguna Seca Raceway.
04_B_01	South of Hwy 68 at S.P.C.A. facility.
04_B_02	South of Hwy 68 at S.P.C.A. facility.
05_B_01	South of Hwy 68, approx. 1'650 feet west of S.P.C.A. entrance road.
06_B_01	North of Hwy 68, approx. 500 feet west of S.P.C.A. entrance road.
07_B_01	North of Hwy 68, approx. 1,000 feet east of Boots Road.
08_B_01	South of Hwy 68. Approx. 250 feet southeast of Boots Road.
08_B_02	South of Hwy 68. Approx. 250 feet southeast of Boots Road. Not modeled.
09_B_01	Approx. 200 feet south of where Boots Road and Whip Road meet near Hwy 68.
10_B_01	Pasadera golf course pond, approx. 200 feet south of Las Laderas Drive.
10_B_02	Pasadera golf course pond, approx. 230 feet west of Las Brisas Drive.
10_B_03	Pasadera golf course pond, approx. 200 feet southeast of Pasadera Country Club.
11_B_01	Pasadera golf course pond, approx. 180 feet west of Mirasol Ct. Not modeled.
11_B_02	Pasadera golf course pond, at the intersection of Pasadera Drive and Via Del Milagro. Modeled as one (10_B_04).
10_B_04	
11_B_03	1'400 feet west of Pasadera Drive and 180 feet north of Hwy 68. Part of the Laguna Seca Golf Ranch.
12_B_01	1'650 feet west of Pasadera Drive and 270 feet north of Hwy 68. Part of the Laguna Seca Golf Ranch.
12_B_02	2'050 feet west of Pasadera Drive and 270 feet north of Hwy 68. Part of the Laguna Seca Golf Ranch.
14_B_01	Canyon del Rey reach west of Pasadera Road and South of Hwy 68.
19_B_01	Directly west of where Wilson Road and York Road meet.
21_B_01	North of Hwy 68. Approx. 1'300 feet east of Ragsdale Drive.
22_B_01	North of Hwy 68. Approx. 1'000 feet east of Ragsdale Drive.
24_B_01	West side of Hwy 218. Approx. 1'400 feet south of the Hwy 68 and Hwy 218 interchange.
24_B_02	West side of Hwy 218. Approx. 1'400 feet south of the Hwy 68 and Hwy 218 interchange.
25_B_01	Approx. 650 feet northwest of the Ragsdale Drive and Lower Ragsdale drive T intersection. South of the Harris Ct business development.
25_B_02	Directly south of the Hwy 68 and Hwy 218 interchange. South of the Monterra Subdivision.
26_B_01	South of Hwy 68 and west of 218 at interchange. North of the Monterra subdivision entrance.
27b_B_01	Directly east of Hwy 218 at Pheasant Ridge Road.
29_B_01	Frog Pond Wetland Preserve.
29_B_02	Northeast of the Monterey Airport. North of N road.
29b_B_01	Park behind Safeway, west of hwy 218 and south of Wilson Way.
30_B_01	Laguna Del Rey and Roberts Lake combined. North and south of Del Monte Blvd.

Table 2-2: Roadway crossing culverts in Canyon del Rey watershed.

Facility ID	Location	Description
LS_C_01	Lake at Laguna Seca Raceway	15" circular CPE
01_C_01	Crossing under Hwy 68, approx. 1'240 feet east of Laureles Grade	18" circular CMP
01_C_02	North of Hwy 68 across from Laureles Grade. Parallel to Hwy 68.	18" circular CMP
01_C_03	Crossing under Laureles Grade.	24" circular CMP
02_C_01	Crossing under Hwy 68, just west of Laureles Grade.	double 28" x 20" oval CMP
02_C_02	Crossing just east of the S.P.C.A. entrance and parallel to Hwy 68. South	18" circular CMP
02_C_03	Crossing under S.P.C.A. driveway entrance.	18" circular CPE
03_C_01	Crossing under the east gate to Laguna Seca Raceway.	48" x 30" oval CMP
03_C_02	Crossing under the main entrance to the Laguna Seca Raceway.	40" circular HDPE-S
04_C_01	Crossing under Hwy 68 just west of S.P.C.A.	24" circularCMP
04_C_02	Crossing under Hwy 68, approx. 770 feet west of S.P.C.A.	24" circular HDPE-S
05_C_01	Crossing under Hwy 68, approx. 1'750 feet west of Laguna Seca Raceway	24" circular CMP
06_C_01	Crossing under gated access road, approx. 2'130 feet west of Laguna Seca	48" and 30" circular CMP
07_C_01	Crossing under Hwy 68, approx. 1'160 feet east of Pasadera entrance.	24" circular HDPE-S
08_C_02	Crossing under Hwy 68, just west of Boots Road.	52" circular RCP
09_C_01A	Crossing under Whip Road and Boots Road.	40" circular HDPE-S
10_C_01	Crossing diagonally under Hwy 68, approx. 950 feet east of Pasadera ent	36" circular CMP
10_C_02	Crossing under Boots Road, south of Hwy 68.	60" circular RCP
10_C_03	Crossing under Pasadera entrance, north of Hwy 68. Flows from Pasader	36" circular RCP/CMP
12_C_01	Crossing under Hwy 68 at Laguna Seca Golf Ranch.	48" circular CMP
14_C_01	Crossing under Hwy 68 at Laguna Seca Golf Ranch. West of 12_C_01.	48" circular CMP
15_C_01	Crossing parallel to Hwy 68, approx. 2'800 feet east of York Road. North c	48" circular CMP
16_C_01	Crossing under Hwy 68, approx. 3'600 feet east of York Road.	24" circular CMP
17_C_01	Crossing under York Road.	14.4' x 8' concrete box with earth floor
18_C_01	Crossing under Hwy 68, just west of York Road.	6' x 4' RCB
21_C_01	Crossing under Hwy 68, approx. 1'800 feet west of York Road.	triple 28" x 24" synthetic fiberglass pipes
25_C_01	Crossing under Monterra entrance (Hwy 218).	double 48" and triple 18" circular RCP
25_C_02	Crossing under Hwy 68, just west of Monterra entrance.	double 48" circular RCP

Table 2-2: Roadway crossing culverts in Canyon del Rey watershed (continued).

Facility ID	Location	Description
25_C_03	Crossing under southeast entrance of the Stone Creek Center. Parallel tc	14' x 7.7' RCB
26_C_01	Crossing under Hwy 68. Starting approx. 650 feet northwest of Monterra	36" circular HPDE-S
27_C_01	Crossing under northeast entrance of the Stone Creek Center. Parallel tc	14' x 8' RCB
27_C_02	Crossing under entrance to storage lot, just north of the Stone Creek Cer	14' x 6.7' RCB
27_C_03	Crossing under Del Rey Gardens Drive, west of Hwy 218. Parallel to Hwy	87.6" circular CMP
27_C_04	Crossing under Hwy 218, approx. 520 feet southeast of General Jim Moor	6' x 8' RCB
28_C_01	Crossing under General Jim Moore Blvd. at Hwy 218.	10.1' x 8' RCB
28_C_02	Crossing under General Jim Moore Blvd approx. 500 feet northeast of Hw	3' x 3' RCB
29_C_01	Crossing under Hwy 218 at the Frog Pond, approx. 50 feet northwest of V	6' x 8' RCB
29_C_02	942 Angelus Way.	not modeled
29_C_03	938/934 Angelus Way driveway.	wooden bridge with concrete walls
29_C_04	930/926 Angelus Way.	wooden bridge with concrete walls
29_C_05	Across Angelus Way from Altura Pl.	48" circular CMP
29_C_05A	Across Angelus Way from Altura Pl.	12' x 8' concrete bridge
29_C_06	Angelus Way, just west ofAvalon Pl.	concrete bridge
29_C_07	Crossing under Rosita Road at Angelus and Rosita intersection.	6' x 8.25' RCB
29_C_08	Crossing under Fremont Blvd, starting at the park behind Safeway.	8' x 8' RCB
30_C_01	Crossing at the southeast end of Laguna Grande Park. East of Laguna Grai	6' x 6' RCB
30_C_02	Bridge crossing at Laguna Grande Park southeast of Branner Ave.	100' x 7'(in middle) Wooden arched bridge
30_C_03	Laguna Del Rey Lake crossing under Del Monte Avenue.	double 16' x 7' RCBs
30_C_03B	Laguna Del Rey Lake crossing under Del Monte Avenue.	double 21.36' x 7' RCBs
30_C_04	Roberts Lake crossing under Roberts Avenue.	double 8' x 6' RCBs
30_C_05	Crossing under Hwy 1 off-ramp at Hwy 218. Outlet at Seaside beach east	Quad 6' x 6' RCBs
Materials:		
CMP:	CORRUGATED METAL PIPE	
CPE:	CORRUGATED POLYETHYLENE PIPE - CORRUGATED EXTERIOR/INTERIOR	
HDPE-S:	HIGH DENSITY POLYETHYLENE PIPE - TYPE S - CORRUGATED EXTERIOR/SMOOTH INTERIOR	
PVC:	POLYVINYL CHLORIDE PIPE	
RBC:	REINFORCED BOX CULVERT	
RCP:	REINFORCED CONCRETE PIPE	
OTHER:	OTHER MATERIAL; SEE FIELD NOTES	

2.5 Descriptions of existing facilities

SUB-WATERSHED LS:

- Map Panel: C-7
- Basins: LS_B_01
- Culverts: LS_C_01
- Drainage area (acres): 188
- *Hydrologic Characteristics:* This watershed encompasses the Laguna Seca Lake (LS_B_01) and its contributory drainage area.
- *Hydraulic Facilities*: A single 15 inch pipe, LS_C_01, runs 2,640 feet to a creek which is tributary to the main stem, dropping in elevation from 743 feet to 508 feet. An outlet gate in a 3 foot wide flume controls flow from the lake into the pipe. The gate controls lake water level between 738.85 and 746.85 feet.

SUB-WATERSHED 01:

- Map Panel: C-7 and C-8
- Basins: None
- Culverts: 01_C_01, 01_C_02, 01_C_03
- Drainage area (acres): 128
- *Hydrologic Characteristics:* Sub-watershed 01 is located at the eastern upstream limit of the study area at the watershed divide. While the watercourse is poorly defined in places, three culverts carry flow under roads.
- *Hydraulic Facilities*: Culvert 01_C_01 is a 18 inch RCP carrying local drainage to the north side of Hwy 68. Culvert 01_C_02 is a pair of 18 inch CMP pipes in series which carry flow along the north side of Highway 68. Culvert 01_C_03 is a structure consisting of 18 inch and 24 inch RCP, a junction manhole, and a 24 inch CMP running under Laureles Grade Road. This structure drains a detention pond on the southwest side of the intersection of Hwy 68 with Laureles Grade Road.

SUB-WATERSHED 02:

- Map Panel: C-7 and C-8
- Basins: None
- Culverts: 02_C_01, 02_C_02, 02_C_03
- Drainage area (acres): 484
- *Hydrologic Characteristics:* Sub-watershed 02 is located on the south side of Hwy 68 and is drained by a swale running in part along Laureles Grade Road. Runoff is concentrated where the swale approaches the highway.

- *Hydraulic Facilities*: Culvert 02_C_01 is a pair of 28 inch by 20 inch elliptical RCP, which carry flow from this sub-watershed north across Hwy 68. Culvert 02_C_02 is a pair of 15 inch CMP running along the north side of Hwy 68, carrying flow under a side road. Culvert 02_C_03 is an 18 inch CPP running under a driveway.

SUB-WATERSHED 03:

- Map Panel: C-7
- Basins: None
- Culverts: 03_C_01, 03_C_02
- Drainage area (acres): 250
- *Hydrologic Characteristics:* Sub-watershed 03 is located between sub-watersheds LS and 01, north of Hwy 68, and drains steep slopes between Laguna Seca lake and the highway. Much of the runoff is routed to the highway via a drainage swale running due south.
- *Hydraulic Facilities*: Culvert 03_C_01 is a 48 x 30 inch CMP running under the Laguna Seca access road and gate, on the north side of Hwy 68. 03_C_02 is a 40 inch HDPE pipe running under the Laguna Seca main entrance road on the north side of Hwy 68.

SUB-WATERSHED 04:

- Map Panel: C-7 and C-8
- Basins: 04_B_01, 04_B_02
- Culverts: 04_C_01, 04_C_02
- Drainage area (acres): 53
- *Hydrologic Characteristics:* Sub-watershed 04 is a small shed located immediately south of Hwy 68 between sheds 02 and 05. A small creek drains the area.
- *Hydraulic Facilities*: Basins 04_B_01 and 04_B_02 are located on the creek in series just south of Hwy 68. Basin 04_B_01 flows over a concrete weir into basin 04_B_02, which drains to a swale south of Hwy 68 via a 12 inch PVC pipe. Culvert 04_C_01 (24 inch CPP) carries the flow from the basins north under Hwy 68, while culvert 04_C_02 (24 inch CPP) carries local flow under the highway.

SUB-WATERSHED 05:

- Map Panel: C-7 and C-8
- Basins: 05_B_01
- Culverts: 05_C_01
- Drainage area (acres): 290

- *Hydrologic Characteristics:* Sub-watershed 05 is located on the south side of Hwy 68 and the Laguna Seca ranger station. It drains mostly steeps slopes that extend nearly to the southern drainage divide via narrow valleys.
- *Hydraulic Facilities*: Basin 05_B_01 captures virtually all of the runoff from the sub-watershed. Culvert 05_C_01, a 24 inch CMP, drains water from the basin and carries it north under Hwy 68.

SUB-WATERSHED 06:

- Map Panel: C-7
- Basins: 06_B_01
- Culverts: 06_C_01
- Drainage area (acres): 229
- *Hydrologic Characteristics:* Sub-watershed 06 is located between Hwy 68 and the Laguna Seca Raceway basin and drains mostly steeps slopes that extend to the northern drainage divide via a narrow valley. The channel runs parallel to the Laguna Seca main entrance road and carries flow from Laguna Seca sub-shed (LS). A number of minor basins and small culverts along the west side of the road (not modeled or field surveyed) carry water downslope.
- *Hydraulic Facilities*: Basin 06_B_01 has a substantial storage area, is controlled by culvert 06_C_01 and extends 2000 feet eastward along the north side of Hwy 68. Culvert 06_C_01, consisting of 30 inch and 48 inch CMP, run on the north side of Hwy 68 and carry water under the ranger station access road. A wetland area has developed upstream from the culvert, while the culvert outlets are suspended 8-12 feet above the downstream channel.

SUB-WATERSHED 07:

- Map Panel: C-7 and C-8
- Basins: 07_B_01
- Culverts: 07_C_01
- Drainage area (acres): 86
- *Hydrologic Characteristics:* Sub-watershed 07 is a small shed which spans Hwy 68 between sheds 05-06 and sheds 08-11. A small creek drains the southern area. Detention basin 07_B_01 is a long, narrow storage area controlled by culvert 10_C_01.
- *Hydraulic Facilities*: Culvert 07_C_01, a 24 inch CPP, carries water from the south side under Hwy 68 to the main stem. This culvert has grated concrete box inlet.

SUB-WATERSHED 08:

- Map Panel: C-7 and C-8

- Basins: 08_B_01, 08_B_02
- Culverts: 08_C_01, 08_C_02
- Drainage area (acres): 388
- *Hydrologic Characteristics:* Sub-watershed 08 is located between Hwy 68 and the south drainage divide. A single channel drains much of the shed, which are mostly steep slopes.
- *Hydraulic Facilities*: The two basins, 08_B_01 and 08_B_02, which are in series, control nearly all of the runoff. Basin 08_B_01 is very shallow and has a riser outlet with a grate on top. The downstream location of the outlet was not found in the field survey. Basin 08_B_02 is located immediately downslope from basin 08_B_01 and is a shallow, small depression without obvious outlet or inlet structures. Culvert 08_C_01 is a short 24 inch CMP which drains basin 08_B_01. Culvert 08_C_02, a 52 inch RCP, carries all of the main stem flow north under Hwy 68. Both the inlet and outlet are on concrete headwalls; the outlet is at creek bed while the inlet is partially silted.

SUB-WATERSHED 09:

- Map Panel: C-6 and C-8
- Basins: 09_B_01
- Culverts: 09_C_01
- Drainage area (acres): 189
- *Hydrologic Characteristics:* Sub-watershed 09 extends from south of Hwy 68 to the southern drainage divide. A narrow ravine along Boots Road drains the area, which has moderate to very steep slopes.
- *Hydraulic Facilities*: Basin 09_B_01 is a large, constructed detention basin with an engineered notched weir outlet structure. Culvert 09_C_01 is a 40 inch HDPE pipe which captures water from the basin outlet structure via a wide swale, carries the flow under Whip Road, and then under Boots Road, with manhole access between the crossings. Flow exits the culvert via an energy dissipation outlet structure into sub-watershed 08.

SUB-WATERSHED 10:

- Map Panel: C-7
- Basins: 10_B_01, 10_B_02, 10_B_03, 10_B_04
- Culverts: 10_C_01, 10_C_02, 10_C_03
- Drainage area (acres): 308
- *Hydrologic Characteristics:* Sub-watershed 10 extends from the northern drainage divide to Sub-watershed 07. Slopes vary from steep to relatively flat and the lower slope portions of the shed are occupied by the Pasadera Golf Course. Multiple basins and drainage pipes form the golf

course storm water retention and drainage system. Of these, four basins and three culverts were investigated and modeled in this study.

- *Hydraulic Facilities*: Basins 10_B_01, 10_B_02, 10_B_03, 10_B_04 interconnect via pipes and surface swales such that storm water moves down slope in series through the basins. The storage in the basins was included in the hydrologic modeling, but the pipes and swales were not investigated in detail or analyzed. Culvert 10_C_01 is a 36 inch CMP carrying flow from basin 07_B_01 south under Hwy 68. Culvert 10_C_02 is a 60 inch RCP which carries the main stem under Boots Road at the Hwy 68 junction. Culvert 10_C_03 is a 36 inch CMP which drains basin 10_B_04 and carries the flow west under the Pasadera entrance at Hwy 68.

SUB-WATERSHED 11:

- Map Panel: C-5 and C-7
- Basins: 11_B_01, 11_B_02, 11_B_03
- Culverts: None
- Drainage area (acres): 344
- *Hydrologic Characteristics:* Sub-watershed 11 is west of shed 10, includes the north and west portions of Pasadera Golf Course and portions of Laguna Seca Golf Ranch, and contains several detention ponds associated with the golf courses. Three basins were included in the hydrologic modeling, but no culverts or other pipes were included in the hydraulic analyses or field investigation.
- *Hydraulic Facilities*: Basin 11_B_01 is a large pond in the south-central portion of the shed and receives water from a small portion of the shed. It is drained by two risers leading to 18 inch and 30 inch CMPs. Basin 11_B_02 was combined with 10_B_04 for modeling purposes. It has a single submerged pipe which carries water to basin 10_B_04. Basin 10_B_04 outlet is a grated concrete structure with a 36 inch CMP, leading to a junction with culvert 10_C_03. Basin 11_B_03 (sheet C-5) sends water to basin 12_B_01 via an overflow across a golf cart path; the installed outlet pipe is buried.

SUB-WATERSHED 12:

- Map Panel: C-5 and C-7
- Basins: 12_B_01, 12_B_02
- Culverts: 12_C_01
- Drainage area (acres): 90
- *Hydrologic Characteristics:* Sub-watershed 12 drains a portion of the Laguna Seca Golf Ranch. Slopes vary from moderate in the north to relatively low in the vicinity of the basins.
- *Hydraulic Facilities*: The two basins operate in series with two 18 inch CMPs connecting them under a cart path. Basin 12_B_02 drains to a swale via

24 inch and 12 inch CMPs. Culvert 12_C_01 carries the main stem flow southward under Hwy 68 in a 48 inch CMP.

SUB-WATERSHED 13:

- Map Panel: C-5
- Basins: None
- Culverts: None
- Drainage area (acres): 99
- *Hydrologic Characteristics:* Sub-watershed 13 is a narrow drainage north of Hwy 68 which extends to local hilltops. There is no well-defined water course; runoff continues overland to the main stem.
- Hydraulic Facilities: None

SUB-WATERSHED 14:

- Map Panel: C-5 and C-6
- Basins: None
- Culverts: 14_C_01
- Drainage area (acres): 148
- *Hydrologic Characteristics:* Sub-watershed 14 extends south from Hwy 68 up a very steep rise to a local ridge separating this shed from shed 18. A single incised channel carries the bulk of the runoff to the main stem.
- *Hydraulic Facilities*: Culvert 14_C_01, a 48 inch CMP, carries the main stem and runoff from this shed north under Hwy 68. The channel is narrow with steep sides. The culvert entrance is at a concrete headwall, while the outlet is above a concrete apron designed to resist scour. The apron is undercut and failing.

SUB-WATERSHED 15:

- Map Panel: C-5
- Basins: None
- Culverts: 15_C_01
- Drainage area (acres): 156
- *Hydrologic Characteristics:* Sub-watershed 15 extends north from Hwy 68 and includes much of Laguna Seca Golf Ranch. It consists of a broad westward sloping apron along Hwy 68 with steep slopes to the north.
- *Hydraulic Facilities*: Culvert 15_C_01, a 48 inch CMP, carries the main stem parallel to Hwy 68 and under a drive way. The culvert entrance is a vertical shaft with a trash rack (not currently installed). The outlet is through a head wall with invert at channel invert.

SUB-WATERSHED 16 A & B:

- Map Panel: C-5 and C-6
- Basins: None
- Culverts: 16_C_01
- Drainage area (acres): a: 65, b: 104
- *Hydrologic Characteristics:* Sub-watershed 16 a & b is a narrow shed along the south side of Hwy 68 which extends to a ridge dividing it from shed 18. Nearly the entire area is very steep, with a single defined drainage running north to the highway.
- *Hydraulic Facilities*: Culvert 16_C_01, a 24 inch CMP, carries local runoff northward under Hwy 68. The culvert entrance is flared, while the outlet opens above the main stem channel.

SUB-WATERSHED 17:

- Map Panel: C-5
- Basins: None
- Culverts: 17_C_01
- Drainage area (acres): 149
- *Hydrologic Characteristics:* Sub-watershed 17 extends north from Hwy 68. Slopes are moderate, with a single drainage channel extended ½ way up into the watershed.
- *Hydraulic Facilities*: Culvert 17_C_01 is 14.5 foot by 8 foot elliptical culvert with a dirt floor. This culvert carries the main stem parallel to Hwy 68 and under York Road. Both entrance and outlet are flared with concrete headwalls.

SUB-WATERSHED 18:

- Map Panel: C-5 and C-6
- Basins: None
- Culverts: 18_C_01
- Drainage area (acres): 964
- *Hydrologic Characteristics:* Sub-watershed 18 is a large shed extending south from Hwy 68 to the watershed divide. A single dendritic creek drains the area, which converges at the highway immediately west of York Road. Slopes are highly variable, with multiple steep rises to hilltops. Numerous dirt roads cross the area.
- *Hydraulic Facilities*: Culvert 18_C_01, a 6 foot by 4 foot box culvert, carries runoff from the shed north under Hwy 68 to the main stem. There are headwalls on both ends of the culvert.

SUB-WATERSHED 19:

- Map Panel: C-5
- Basins: 19_B_01
- Culverts: None
- Drainage area (acres): 99
- *Hydrologic Characteristics:* Sub-watershed 19 is a small shed on the north side of Hwy 68 with York Road running through its center. Slopes are moderate with no well-defined channel. A local storm drain network installed in the Ryan Ranch development drains into basin 19_B_01
- *Hydraulic Facilities*: Basin 19_B_01 is a small basin at the southeast end of the shed immediately north of the main stem channel. Inflow is primarily from a 24 inch RCP and outflow is via a 24 inch CMP with a 24 inch riser covered by a trash rack. High flows are passed by a 3 foot wide trapezoidal grass overflow spillway and grass swale.

SUB-WATERSHED 20:

- Map Panel: C-3, C-5 and C-6
- Basins: None
- Culverts: None
- Drainage area (acres): 320
- *Hydrologic Characteristics:* Sub-watershed 20 is located between Hwy 68 and the southern drainage divide. Slopes are generally steep with one dendritic channel draining much of the area.

SUB-WATERSHED 21:

- Map Panel: C-5
- Basins: 21_B_01
- Culverts: 21_C_01
- Drainage area (acres): 123
- *Hydrologic Characteristics:* Sub-watershed 21 drains the relatively low slope Ryan Ranch industrial area between Hwy 68 and shed 28 via a local storm drain network. The network elements drain to a swale which flows to basin 21_B_01.
- *Hydraulic Facilities*: Basin 21_B_01 receives flow from a small upstream basin (not field investigated or modeled) via a concrete weir and spillway. Both basins are located in the downslope, southwest corner of the shed. The upstream basin receives the runoff from the storm drains. The outflow from basin 21_B_01 is controlled by a concrete outlet structure containing a square notch weir. Culvert 21_C_01 consists of three 28 inch by 24 inch elliptical fiberglass pipes and carries the main stem south across Hwy 68. Both inlet and outlet are in concrete headwalls.

SUB-WATERSHED 22:

- Map Panel: C-5
- Basins: 22_B_01
- Culverts: None
- Drainage area (acres): 9.6
- *Hydrologic Characteristics:* Sub-watershed 22 is a very small shed encompassing a single steep drainage immediately north of Hwy 68.
- *Hydraulic Facilities*: Basin 22_B_01 receives flow from the drainage swale; outflow to local drainage swale is controlled by a weir in a narrow concrete flume.

SUB-WATERSHED 23:

- Map Panel: C-6 and C-3
- Basins: None
- Culverts: None
- Drainage area (acres): 454
- *Hydrologic Characteristics:* Sub-watershed 23 is a large shed south of Hwy 68 which extends to the watershed divide and is drained by an extensive dendritic channel network. Slopes are general steep with incised valleys. There are no natural basins or ponds.

SUB-WATERSHED 24:

- Map Panel: C-3 and C-2
- Basins: 24_B_01, 24_B_02
- Culverts: None
- Drainage area (acres): 160
- *Hydrologic Characteristics:* Sub-watershed 24 is located between sheds 23 and 26 and drains a moderately steep, narrow area with a single swale. Two basins have been constructed in series at the north end of the shed, with lower basin discharging into the main stem.
- *Hydraulic Facilities*: Basin 24_B_01 receives flow from the swale; outflow to basin 24_B_02 is controlled by the combination of a 36 inch CMP vertical riser plus culvert and an 8.7 foot wide spillway. The riser opening is at the same elevation as the spillway crest. Basin 24_B_02 drains via three 15 inch CMP, which run under a driveway.

SUB-WATERSHED 25, 25B, 25C:

- Map Panel: C-2 and C-5
- Basins: 25_B_01, 25_B_02

- Culverts: 25_C_01, 25_C_02, 25_C_03
- Drainage area (acres): 161
- *Hydrologic Characteristics:* These sub-watersheds, combined, drain relatively low sloped areas between the main stem and shed 28, primarily on the northeast side of Hwy 68. Most of the runoff occurs overland, with two short defined channels in the vicinity of the highway.
- *Hydraulic Facilities*: Basin 25_B_01 is located in Ryan Ranch business park and intercepts local runoff. Outflow from this basin is via both a 24/36 inch vertical, perforated riser connected to an 18 inch CMP culvert and a separate 18 inch CMP culvert. Basin 25_B_02, basin on the main stem, was not surveyed, but is controlled by culvert 25_C_01. Culvert 25_C_01 consists of three 18 inch RCP and two 48 inch RCP, which carry the main stem westward under Monterra Ranch Road. Culvert 25_C_02 consists of two 48 inch RCP, which carry the main stem northward under Hwy 68. Culvert 25_C_03 is a 14 foot wide by 7.7 foot high concrete box culvert which carries the main stem under a driveway on the west side of Hwy 218.

Sub-watershed 26:

- Map Panel: C-2 and C-3
- Basins: 26_B_01
- Culverts: 26_C_01
- Drainage area (acres): 324
- *Hydrologic Characteristics:* Sub-watershed 26 is long, narrow shed with an incised channel and moderately steep to very steep slopes, located between Hwy 68 and the southern drainage divide. Portions of this shed border the Monterey airport. The channel has one basin located near the highway.
- *Hydraulic Facilities*: Basin 26_B_01 controls much of the runoff from this shed and is located in the northern, downstream part of the shed. Outflow is controlled by a high flow spillway and a lower flow outlet consisting of three 24 inch CMP risers and pipes through the containment berm. Culvert 26_C_01 is a 36 inch CPP which carries runoff from this shed northward under Hwy 68 and enters the storm drain system via a 3 foot by 4 foot concrete box with an 18 inch inflow and 36 inch outflow pipe.

Sub-watershed 27 and 27b:

- Map Panel: C-2
- Basins: 27b_B_01
- Culverts: 27_C_01, 27_C_02, 27_C_03, 27_C_03
- Drainage area (acres): 129
- *Hydrologic Characteristics:* Sub-watersheds 27 and 27b contain the Stone Creek Center and other commercial properties. Shed 27 extends from the

airport boundary nearly to the Fort Ord reservation boundary and includes the main stem and Hwy 218. Shed 27b extends along the east side of Hwy 218 to a regional park. Slopes are highly variable, from very step at the airport boundary to very flat in the valley floor. Local storm drains route most of the flow in shed 27.

- *Hydraulic Facilities*: Culverts 27_C_01 and 27_C_02 are 14 foot by 8 foot high concrete boxes which carry the main stem under Stone Creek Center entrances from Hwy 218. Culvert 27_C_03 is a 7.3 foot diameter CMP which carries the main stem under the Del Rey Gardens entrance on the west side of Hwy 218. Culvert 27_C_04 is a 6 foot wide by 8 foot high concrete box culvert which carries the main stem eastward under Hwy 218. Both inlet and outlet have retaining wing walls.

SUB-WATERSHED 28:

- Map Panel: C-1, C-2, C-4, C-5
- Basins: None
- Culverts: 28_C_01, 28_C_02
- Drainage area (acres): 1201
- *Hydrologic Characteristics:* Sub-watershed 28 is a large, elongated shed which is entirely within the Fort Ord reservation and drains northwestward via both local swales and a well-defined channel near the south boundary of the shed. Slopes vary from relatively high in the eastern portions to low in the far west portion.
- *Hydraulic Facilities*: Culvert 28_C_01 is a 9.6 foot by 8 foot high box culvert which carries the main stem under General Jim Moore Road on the north side of its intersection with Hwy 218. Culvert 28_C_02 is a 3 foot by 3 foot concrete box which carries the runoff from this shed westward under General Jim Moore Road and into basin 29_B_01.

SUB-WATERSHED FP:

- Map Panel: C-1 and C-2
- Basins: 29_B_01
- Culverts: 29_C_01
- Drainage area (acres): 67
- *Hydrologic Characteristics:* Sub-watershed FP is a small area immediately surrounding the Frog Pond basin which includes portions of the regional park. Slopes are relatively low; much of the shed, other than the park, is developed. The main stem winds through a woodland before entering the basin.
- *Hydraulic Facilities*: Basin 29_B_01 is the frog pond, which detains flows on the main stem. It is a natural depression, with water level controlled by a spillway which is part of culvert 29_C_01. This culvert is a 6 foot wide by 8 foot high box culvert which carries the basin outflow south under Hwy 218.

SUB-WATERSHEDS 29 AND 29B:

- Map Panel: C-2
- Basins: 29_B_02
- Culverts: 29_C_02, 29_C_03, 29_C_04, 29_C_05, 29_C_06, 29_C_07, 29_C_08
- Drainage area (acres): 29: 138; 29b: 246
- *<u>Hydrologic Characteristics:</u>* Sub-watershed 29 encompasses a relatively flat, high area and includes the majority of the municipal airport. Drainage, including portions of the airport drained by culverts, flows west and north to a single swale with a basin controlling flow to shed 29b and the main stem. Sub-watershed 29b is a largely developed area, with exception of park lands along the channel. The channel runs alongside the park and through developments; it is a narrow, deep notch with limited capacity. Local runoff enters the channel via storm drains. Multiple bridges and culverts carry the flow under driveways and streets.
- *<u>Hydraulic Facilities</u>*: Basin 29_B_02 captures much of the drainage from the eastern portions of the airport. Outlet control consists of a 12 foot wide trapezoidal spillway, a 30 inch RCP under the berm, and a 48 inch RCP and riser with a 36 inch grate on the entrance. Culvert 29_C_03 is a private wood deck over the channel. Culvert 29_C_04 is a driveway bridge. Culvert 29_C_05 is a driveway bridge with a 48 inch CMP under a concrete apron. Culvert 29_C_06 is a driveway bridge. Culvert 29_C_07 is a 6 foot wide by 6.8 feet high concrete box carrying flow under Rosita Ave. Culvert 29_C_08 is a 8 foot wide by 8 foot high concrete box with wing walls carrying flow under Freemont Blvd. The inlet has a trash rack.

SUB-WATERSHEDS 30:

- Map Panel: C-1 and C-2
- Basins: Laguna Grande, Roberts Lake
- Culverts: 30_C_01, 30_C_02, 30_C_03, 30_C_03, 30_C_04, 30_C_05
- Drainage area (acres): 1011
- *<u>Hydrologic Characteristics:</u>* Sub-watershed 30 includes a portion of the regional airport and much of Seaside. Almost the entire shed is urbanized and drained by storm drain networks. Slopes are mild to flat. Roberts Lake and Laguna Grande and associated park land are located immediately upstream of Hwy 1 and the beach. These lakes control outflow to the ocean.
- *<u>Hydraulic Facilities</u>*: Culvert 30_C_01, a 6 foot by 6 foot concrete box, is located immediately north of Fremont Blvd. and carries flow under an earthen berm. Culvert 30_C_02 is a park foot bridge set on pilings over the channel at its entrance into Laguna Grande. Culvert 30_C_03 consists of a 16 foot wide by 7 foot high concrete channel connecting Laguna Grande to Roberts Lake. Bridges for Del Monte Blvd. and a foot path span the channel. Culvert 30_C_04 consists of two 8 foot wide by 6 foot high

concrete boxes and two 24 inch gate valved low flow pipes. An inlet weir sets the normal lake elevation. This culvert runs under Roberts Avenue. Culvert 30_C_05 consists of four 6 foot wide by 6 foot high concrete boxes. The outlets are partially filled with sand. This culvert carries flow under the Hwy 1 interchange structure and highway overpass and discharges adjacent to the Monterey Beach Hotel.

2.6 Lake surveys and mapping

The condition of the Laguna Grande - Roberts Lake complex and the rate of accumulation of sediment in the lakes were evaluated via a field investigation and a bathymetric survey of bottom elevations.

Hydrographic Mapping Methods

The CSUMB Seafloor Mapping Lab performed comprehensive high resolution hydrographic survey of both Roberts Lake and Laguna Grande on April 7-10, 2013. Swath bathymetry and acoustic backscatter data were collected using an SEA SwathPlus interferometric sidescan sonar system coupled with an Applanix POS MV inertially aided GPS positioning and attitude measurement system mounted on a small skiff. All measurements were reference to the vertical and horizontal control benchmark specified by the sponsor (figure 1). This benchmark was occupied with a Trimble NetR5 geodetic grade GPS receiver during the survey and the data were used to post-process the POS MV position data to better than 0.05 ft precision. The channel area located just south of the roadway separating the two bodies of water was surveyed manually using a leadline and GPS because the very low foot bridge at the south end of that channel prevented access by the sonar survey vessel.

All bathymetry data were processed to IHO Special Order standards in CARIS hydrographic software, and used to generate final bathymetry DEMs and soundings at 2ft horizontal spacing and 0.01 ft vertical precision. Sounds were gridded at 2ft cell size with 5x5 interpolations to eliminate any minor data gaps. Acoustic backscatter data were processed into mosaics using SAE SwathPlus software and the results classified by echo return intensity in ArcGIS to reveal sediment texture patterns on the basin floors.

All results were project and referenced as follows:

- Coordinate system: State Plane NAD83 CA 4 US Feet
- Datum: NAVD88(Geoid12a) feet
- Reference bench mark position: N: 2115125.842 E: 5723380.903 EL:19.155 (NGS ’83, CA Zone IV, NAVD ’88, based on Geoid 12A)

Final products

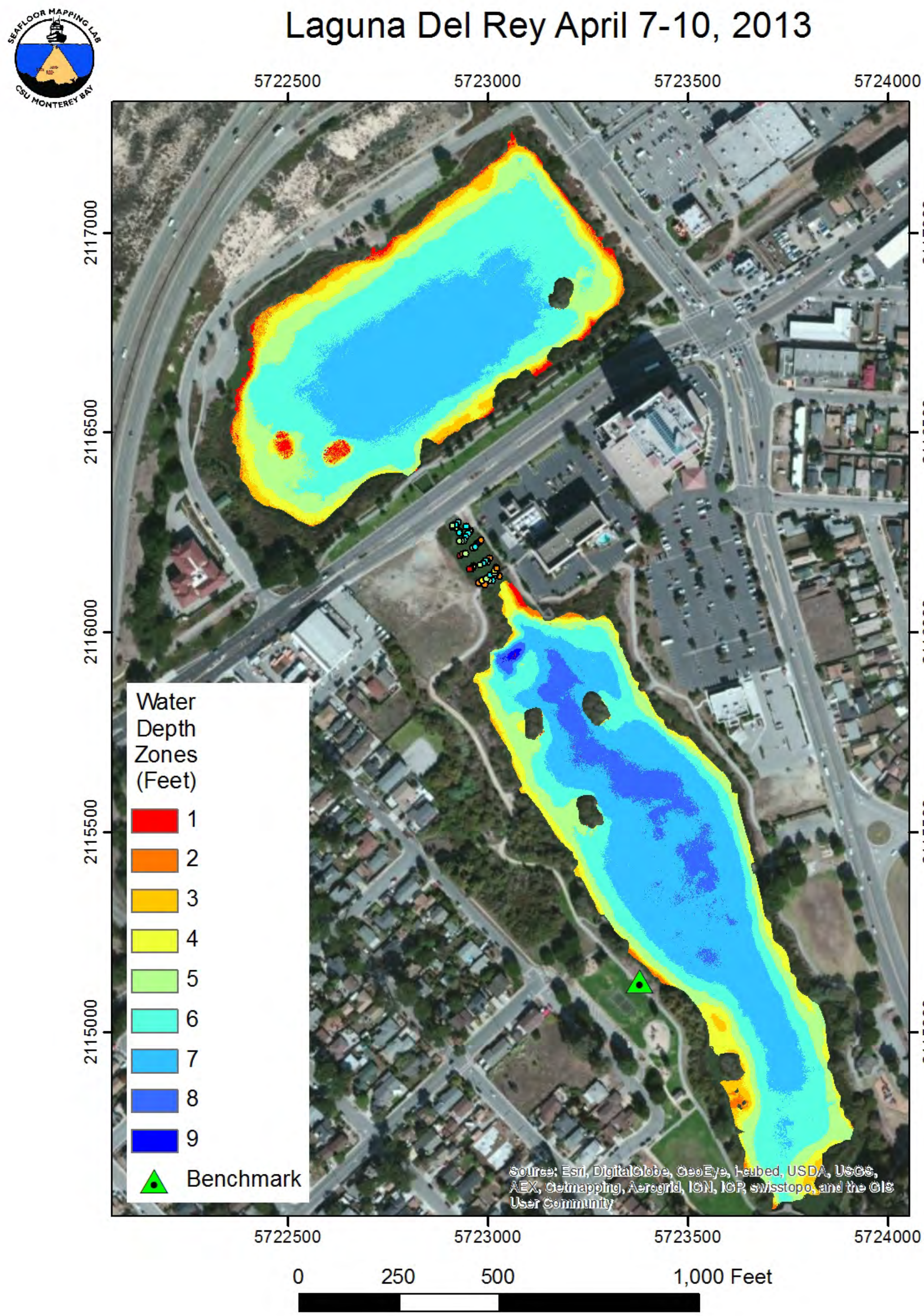
Products provided in digital submittals include:

- digital elevation models (DEM) in ArcView Grid formats
- shaded relief images in greyscale and colored by depth in GeoTiff format
- xyz point data at 2ft spacing as text files
- classified acoustic backscatter mosaics in GeoTiff format
- Survey vessel tracks in shapefile format
- Channel xyz data in text and shapefile format
- ArcGIS project with all associated product data layers

Mapping Results

The bathymetric mapping results (Figure 2-2 and Table 2-3) show all of Roberts Lake and > 85% of Laguna Grande to be shallower than 7 ft. deep. The bottoms of the basins are both quite flat with the only relief found along the banks and associated with the small islands. Curves relating elevations (NAVD) to lake volumes are provided in Figure 2-3.

The acoustic backscatter (sidescan sonar) echo return intensity results suggest a greater coverage by finer sediments in the deeper areas of Laguna Grande than in Roberts Lake (purple class in Figure 2-2). Finer sediments have weaker echo returns. Of particular note are the surface tracks still visible on the floor of Roberts Lake that show in the backscatter image because they appear to have been filled in with finer (purple) sediments. These track marks are visible in both the classified mosaic (Figure 2-4) and the unclassified sidescan sonar mosaic (Figure 2-5), and were likely created either during basin construction or subsequent dredging. The fact that the tracks are still visible suggests that there has been relatively little in the way of sediment accumulation since they were formed.



Cooler colors are deeper and warmer colors shallower. Horizontal and vertical control benchmark is shown on southwest shore of Laguna Grande.

Figure 2-2: Bathymetry of Roberts Lake (top) and Laguna Grande (bottom) shown in 1 foot depth zones as elevation in feet NAVD88.

Table 2-3: Percent area and volume of Lakes for corresponding depth zones.

Depth Zone (ft)	Laguna Grande			Roberts Lake		
	Area (acres)	Percent Area	Percent Volume	Area (acres)	Percent Area	Percent Volume
1	0.02	0.2%	0.0%	0.18	1.6%	0.3%
2	0.08	0.7%	0.2%	0.27	2.4%	0.9%
3	0.25	2.1%	1.0%	0.57	5.1%	2.7%
4	0.87	7.4%	4.7%	0.95	8.6%	6.1%
5	1.68	14.3%	11.5%	1.76	15.9%	14.1%
6	2.77	23.5%	22.6%	3.89	35.1%	37.2%
7	4.86	41.3%	46.4%	3.48	31.4%	38.8%
8	1.22	10.4%	13.3%	0.00	0.0%	0.0%
9	0.01	0.1%	0.2%	0.00	0.0%	0.0%
Total	11.77	100.0%	0.0%	11.10	100.0%	100.0%

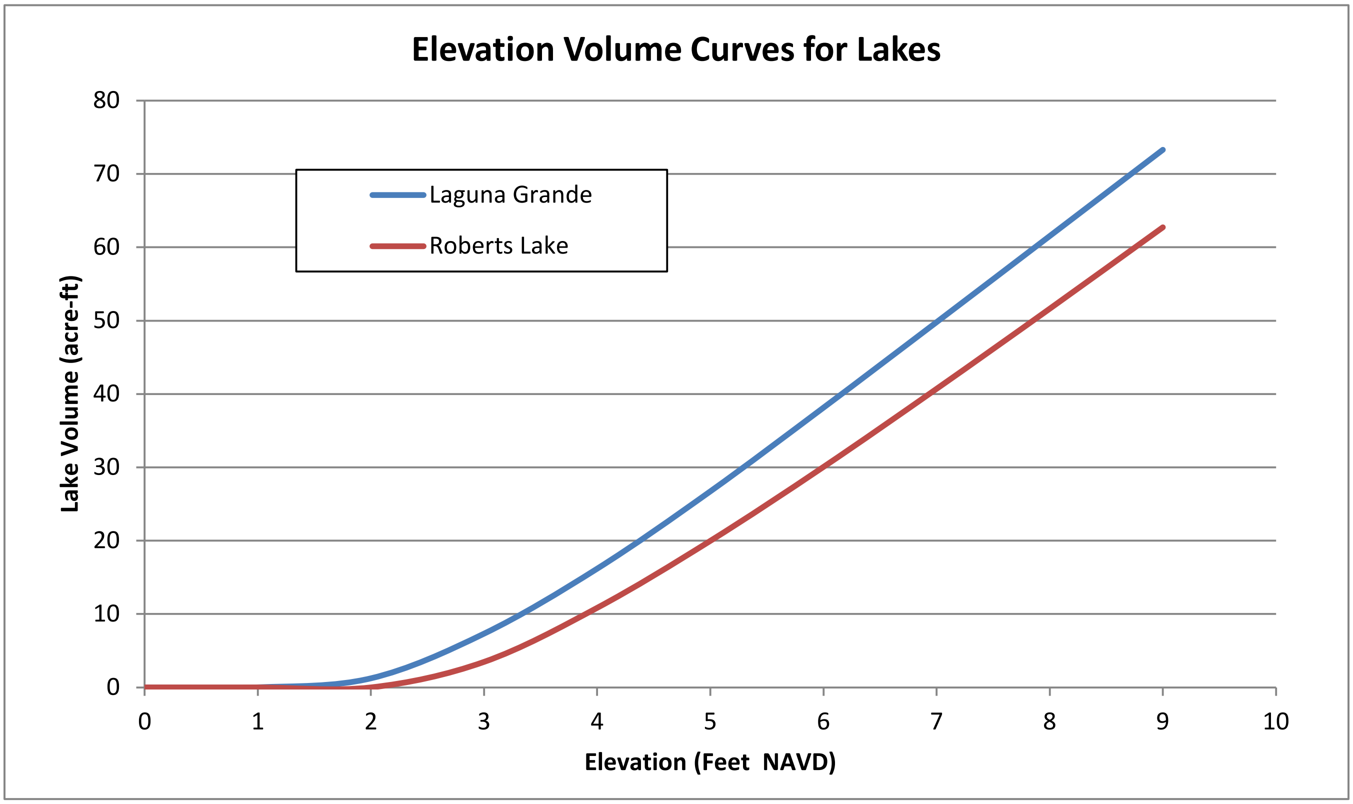
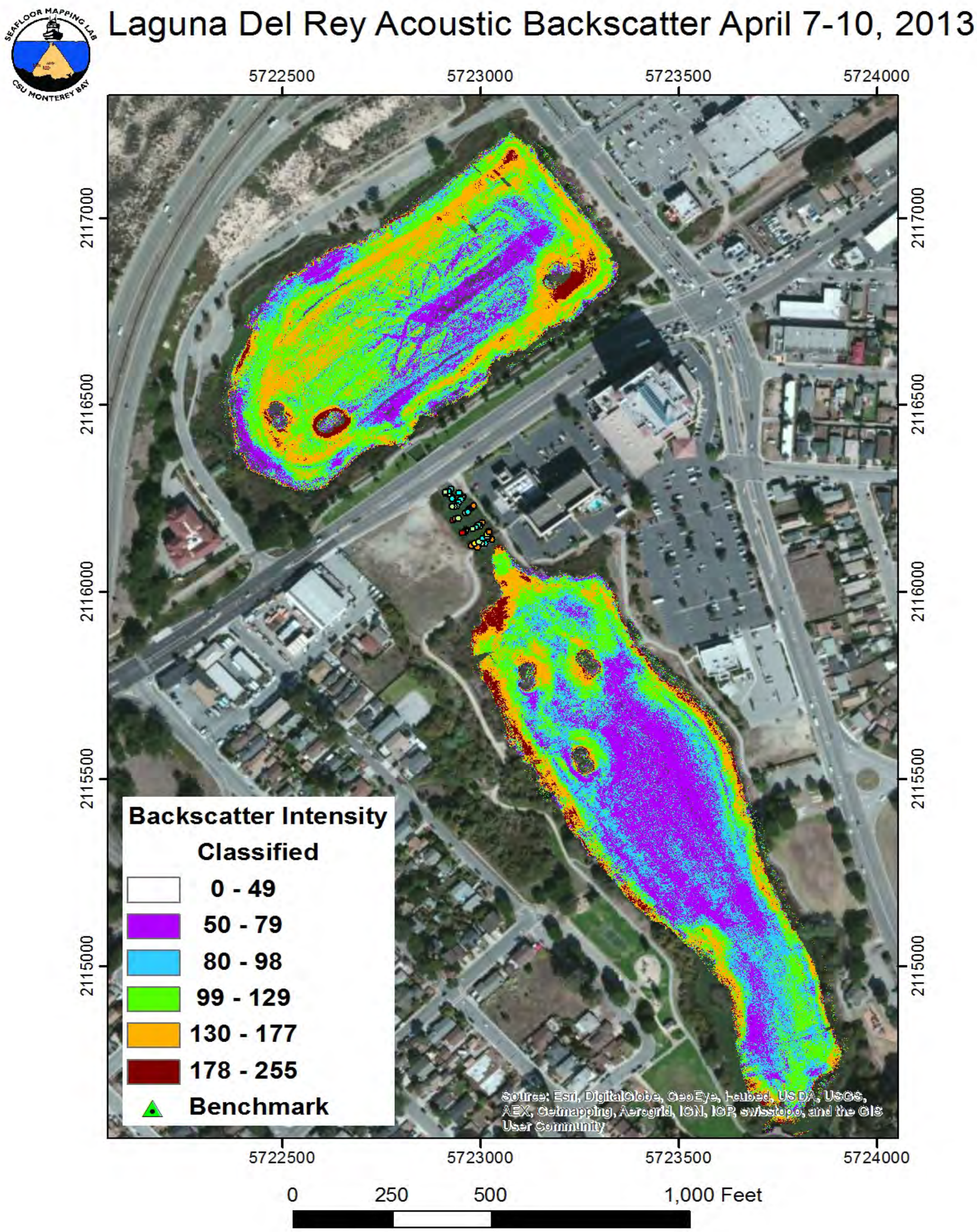


Figure 2-3: Elevation-volume curves for Laguna Grande and Lake Roberts.



Results suggest a higher coverage of fine sediments (purple class) in the deeper areas of Laguna Grande than in Roberts Lake. Note the remnants of tracks now filled with finer sediments on the bottom of Roberts Lake still visible from either the original basin construction or past dredging.

Figure 2-4: Acoustic backscatter echo return intensity classified into natural breaks.

Stronger returns are shown as lighter and weaker returns as darker grey. The relic track marks in the deeper parts of Roberts Lake are also clearly visible in these “raw” data.

Figure 2-5: Unclassified sidescan sonar backscatter intensity mosaic - hydrologic conditions and precipitation estimates

3 HYDROLOGIC CONDITIONS AND PRECIPITATION ESTIMATES

3.1 Available precipitation gages and data

The following rainfall records were found for the vicinity of Canyon Del Rey.

- Salinas Airport (Hrly) - 7/1/48-9/1/1951, 4/1/2001-11/20/2011 - incomplete
- Del Monte, Monterey (15 min) - 5/2/1971 - 6/29/1995 generally complete, some missing data
- Naval Post Graduate School (Daily) - 1970 – 2010 generally complete, some missing data
- Monterey County ALERT Data Stations (Cumulative Rainfall) - Point Pinos: 1/3/2007 - 2/11/2013 readings every approximately 12 hrs.
- Mt Toro: 7/27/2006 - 2/11/2013 readings every approximately 12 hrs - Blanco Circle: 7/27/2006 - 2/11/2013 readings every approximately 12 hrs
- CIMIS Data - Carmel, #210: 10/24/2008 – current, hourly; Pacific Grove, #193: 10/26/2011 – current, hourly
- Fort Ord CDEC Station (Hourly Rainfall) - WY 2002 -2011, Full record, good quality
- KMRY - Monterey Regional Airport, NWS (Daily Rainfall) - 1/1/1970 - 12/31/2010, Full record, good quality
- MPWMD - 187 Eldorado (Daily Rainfall) - 10/25/1991 - 9/23/2000 Hand recorded, good quality
- MPWMD - 5 Harris Ct., Ryan Ranch, Monterey (Daily Rainfall) - 10/10/2000 - 9/11/2012, Hand recorded, good quality
- Laguna Seca Golf Course (Daily Rainfall) - obtained limited data set: WY2012 - current
- Weather Underground data sources - daily data, short term records

The locations of rain gages with useful records are shown in Figure 3-1, which is a reproduction of the 1977 master plan isohyet map with gage locations added.

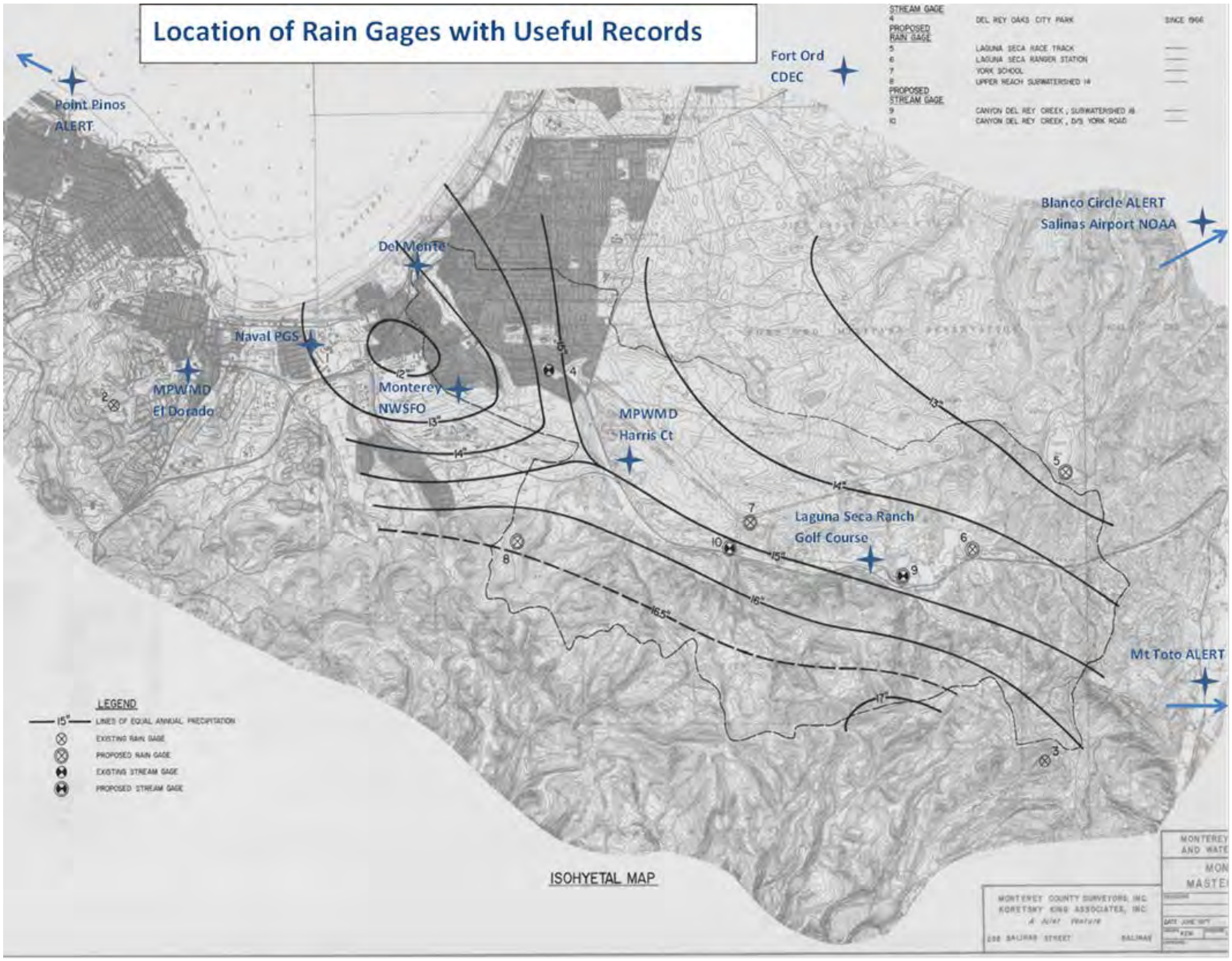


Figure 3-1: Rainfall gages with useful records.

3.2 Precipitation data quality and utility

Long term rainfall records are required to generate usable depth/duration/frequency relationships. With the exception of the NOAA del Monte and the NOAA Monterey gages, none of the gage records have a long enough duration to yield usable statistics. In addition, most of the records provide only daily values, rather than the hourly and 15 minute records needed for frequency analyses. Correlations between records (gage cross-correlation) can sometimes be used to fill and extend missing data in a gage records using the full data set for another gage record. Such correlations can also be used, when records are sufficiently long and detailed, to create hourly or 15 minute data for a gage record which is limited to daily or hourly data.

In order to quickly assess the potential for record filling using correlations, the annual precipitation values for all of the useful gages over the overlapping record periods were correlated, producing correlation coefficients for each gage pair. Table 3-1 provides the results of that exercise.

Table 3-1: Correlations of annual precipitation values between gage records.

	CDEC Fort Ord	MPWMD Harris	MPWMD El Dorado	NOAA del Monte	NOAA Monterey	Naval Post Grad School	Laguna Seca Golf Course
CDEC Fort Ord		0.91			0.84	0.94	
MPWMD Harris	0.91				0.75	0.98	
MPWMD El Dorado				0.9	0.95	1	
NOAA del Monte			0.9		0.97	0.82	
NOAA Monterey	0.84	0.75	0.95	0.97		0.88	
Naval Post Grad School	0.94	0.98	1	0.82	0.88		
Laguna Seca Golf Course							

For most gage pairs, the number of values in the calculations varied from 3-12. The lightly shaded results are for gage pairs using 23-39 values. Higher numbers of values produce correlation estimates which are more reliable, so that a number close to 1 for a gage pair with over 23 values indicates a well correlated gage pair. The strengths of the correlations, with the exception of the NOAA del Monte – NOAA Monterey pair, are poor to fair. Together, these two gages provide a record spanning 1949-2012, which is sufficient to generate long term statistics. However, poor correlations with the other useful gage records make extending and filling the other gage records unrealistic.

Conclusions regarding the utility of the available rainfall gage data for generating depth/duration/frequency estimates and other statistics are summarized below.

- Record lengths vary from 2 to 40 years; gage correlations only fair
- Measurement frequencies are mostly daily; exceptions: Salinas AP is hourly; Monterey NWS is 15 min; ALERT twice daily
- Gage locations are mostly near sea level; exceptions: Laguna Seca Golf gage is at 370 ft, Ft Ord at 490 ft
- Quality of the data is generally good, but not tested
- Extension of short gage records using longest records is possible, but the quality of results questionable; correlations are based on < 12 yrs

- Poor spatial distribution of gages and inconsistency between gages limits use of gages for isohyet development

- Adjustment of precipitation estimates for elevation and topographic orientation problematic due to lack of data

- Production of adequate precipitation/ frequency estimates from gage data seems unlikely

The conclusion is that wholesale modification of the 1977 isohyet map cannot be supported by the available data. This is particularly true because the gage data produces substantially different MAP estimates over much of the watershed, so that isohyet map modifications would be controversial and difficult to support with the data. Further, the precipitation records are not sufficient to enable development of depth/duration/frequency relationships.

3.3 Selected methodology for developing rainfall depth estimates and storm hyetographs

NOAA Atlas 14 is the data server implemented precipitation-frequency atlas for the United States; Volume 6 of the atlas provides the data for California. The details of the atlas, including technical bases for its development, are provided in a very thorough report (NOAA, 2012). NOAA Atlas 14 contains precipitation frequency estimates for a range of durations and frequencies and other information on temporal distribution of rainfall in California. Estimates are provided with 90% confidence intervals and at a 30 arc-second (approximate ½ mile) spatial resolution. Event durations range from 5 minutes to 60 days. Recurrence intervals range from 1 year to 1,000 years.

Locations for estimates are selected graphically on a California map, by specifying latitude and longitude, or by selecting specific stations where the detailed analyses were developed.

Complete documentation of the NOAA Atlas 14 server is available at http://www.nws.noaa.gov/oh/hdsc/PF_documents/Atlas14_Volume1.pdf. Precipitation-frequency estimates are obtained from the Atlas using a graphical user interface available at the following URL: http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ca.

Examples of Atlas 14 results for the Canyon Del Rey watershed are provided in Table 3-2, which shows precipitation depths for specific storm durations and frequencies at 10 points which represent a variety of elevations and orientations to incoming storm events.

Table 3-2: Precipitation-Duration-Frequency results for Canyon Del Rey watershed. Precipitation depths in inches.

Grid Results from NOAA Atlas 14									
Location	Lattitude	Longitude	Elevation	100 yr 24 hr	100 yr 6 hr	100 yr 60 day	10 yr 24 hr	10 yr 6 hr	10 yr 60 day
Laguna Del Rey	36.6037	-121.8556	13	4.78	2.76	21.2	2.95	1.73	14.5
Naval Post Graduate School	36.5972	-121.8776	35	4.7	2.74	21.1	2.89	1.72	14.2
Hwy 68/ 218 junction	36.5812	-121.8279	123	5.13	2.92	22.9	3.16	1.84	15.8
Hwy 218/ Moore Blvd Jct	36.5911	-121.8322	146	5	2.86	22.3	3.08	1.8	15.3
Laguna Seca Golf Ranch	36.572	-121.7876	382	5.54	3.08	24.5	3.43	1.96	17.2
Fort Ord CDEC gage	36.627	-121.786	480	5.12	2.87	22.7	3.17	1.81	15.9
S Boundary Rd, N of Laguna Seca Ranch	36.5795	-121.7885	600	5.48	3.05	24.5	3.39	1.94	17.2
Tehama Golf, S of 68/218 Jct	36.5587	-121.8329	750	5.34	3	24.1	3.29	1.9	16.7
Boots and Saddle Rd Jct, S of Laguna SR	36.5528	-121.7825	1056	5.76	3.15	25.4	3.58	2.02	17.9
Laureles Grade, top of grade	36.5446	-121.7534	1243	5.83	3.16	25.7	3.65	2.04	18.1

These results are internally consistent and reasonable when compared with PRISM results and the San Francisco Bay Depth-Duration-Frequency tables which were used in the 1977 Master Plan. Table 3-3 provides a brief comparison of results for locations at low, moderate and higher elevations.

Table 3-3: Comparison of Atlas 14 and 1977 Master Plan DDF estimates. Precipitation depths in inches.

Comparison of NOAA Atlas 14 DDF Results with 1977 Master Plan - SF Bay DDF Table									
Longitude	Lattitude	Elevation	Mean Ann Precip (PRISM)	Precip from Plan Table	Atlas 14 100yr 12 hr	Master 100yr 12 hr	Atlas 14 10yr 12 hr	1977 Master 10yr 12 hr	Atlas 14 100yr 1 hr	1977 Master 100yr 1 hr
-121.75	36.546	668	20.18	20	4.17	3.45	2.63	2.6	1.33	1
-121.8131	36.5818	279	17.85	18	3.75	3.23	2.34	2.42	1.4	0.96
-121.8776	36.5972	36	15.95	16	3.35	3.01	2.08	2.24	1.43	0.91

The Atlas 14 results are generally higher than the Plan results for less frequent events and very similar for more frequent events. The variation of precipitation depths with mean annual precipitation is similar. The differences appear to be within the estimation error range.

3.4 Mean annual precipitation estimates

Table 3-4, below, summarizes the mean annual precipitation statistics for the useful gaging stations and compares them with the average annual precipitation estimates taken from the 1977 Master Drainage Plan.

Table 3-4: Comparison of Mean Annual Precipitation Estimates.

	CDEC Fort Ord	MPWMD Harris	MPWMD El Dorado	NOAA del Monte	NOAA Monterey	Naval Post Grad School	Laguna Seca Golf Course
Record Duration	WY 2002-2011	WY 2001-2012	WY 1992-2000	WY 1949-1994	WY 1996-2011	WY 1971-2010	WY 2012-2013
Avg Ann Precip (inch)	11.53	15.04	23.2	12.44	14.48	20.29	14.91
Long Term Avg Ann Precip		17.8	20.4				15.63
Location in watershed	NE of bndry	Central	W of bndry	N edge	W Central	NW Edge	E Central
Avg Ann Precip from Map	13-14	15	14-15	12.5	12.5	13	14.8
Ratio of gage to isohyet	85.4%	100.3%	160.0%	99.5%	115.8%	156.1%	100.7%

Long term average annual precipitation estimates were computed for three of the gages (MPWMD at Harris Court, MPWMD at El Dorado Way, and Laguna Seca Golf Course) by taking the ratio of mean annual precipitation (MAP) for each of these gages to the MAP for the NOAA Monterey gage for the same period of record and then multiplying that ratio times the long term average MAP for the NOAA Monterey gage.

Figure 3-2 provides the MAP at these gages on the 1977 Isohyetal map, allowing a quick comparison between the 1977 MAP estimates and those obtained from the gage data. Several observations can be made from Figure 3-2 and Table 3-4:

- The MAP for each gage is similar to the values shown on the isohyetal map in the 1977 Master Drainage Plan at only a few points: MPWMD Harris Court, NOAA del Monte, and Laguna Seca Golf Course. These gages are located along the centerline of the watershed.

- Gages located away from the watershed centerline have large variations from the isohyetal map. The reasons for this variation are not obvious; possibilities include: much longer records are now available for some gages – resulting in shifts in gage statistics, the 1977 map utilized gages whose records are no longer available, and more gage locations are available now.

- The table shows large differences in MAP for gages in close proximity, making interpretation of the results problematic.

- The spatial distribution of the gage sites is inadequate for defining new isohyet contours and, therefore, for generating a revised isohyet map.

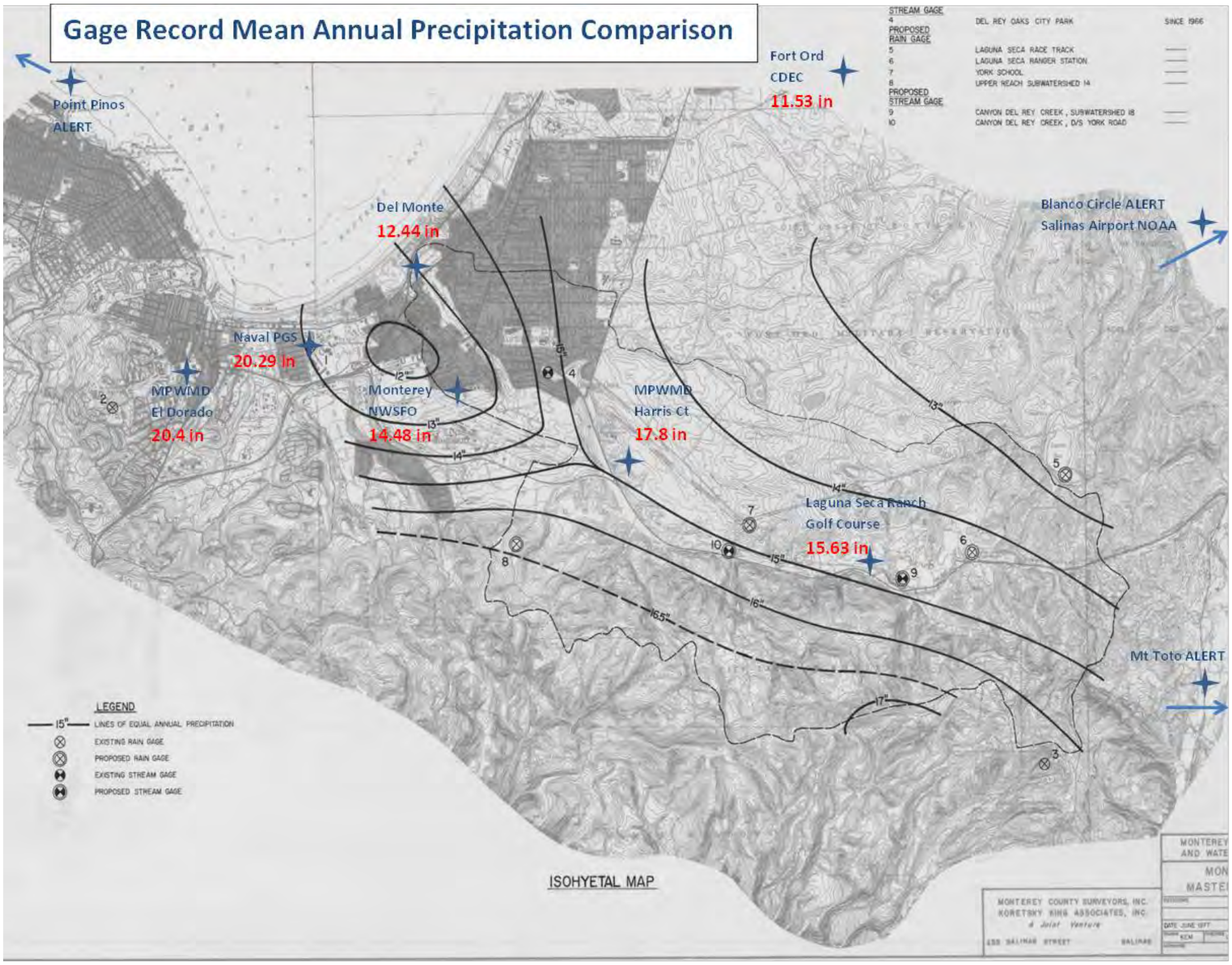


Figure 3-2: Mean Annual Precipitation statistics overlain on the 1977 isohyet map.

The PRISM (Parameter-elevation Regressions on Independent Slope Model) climate mapping system produces estimates of long term climate parameter statistics and time series for any location in the United States. The technical basis for the PRISM methodology is published in Daly, et al, 2008. The PRISM data can be found at http://prism.oregonstate.edu/normals/, while descriptions of the PRISM data sets can be found at: http://prism.oregonstate.edu/documents . Mean annual precipitation (MAP) is one of the available parameters, making PRISM a possible source for long term annual precipitation estimates. The PRISM data server was queried for points within the Canyon Del Rey watershed. The resulting MAP data is shown as isohyetal lines in Figure 3-3. The PRISM results, when compared with the gage data, appear to under-predict the effects of orientation and elevation and generally reduce the spatial variability of rainfall within the watershed. The correlation between gage annual means and PRISM results is also relatively low. However, the PRISM system uses all of the long term precipitation gage records in the vicinity of the study area and, as a result, is the most complete estimate of mean annual precipitation.

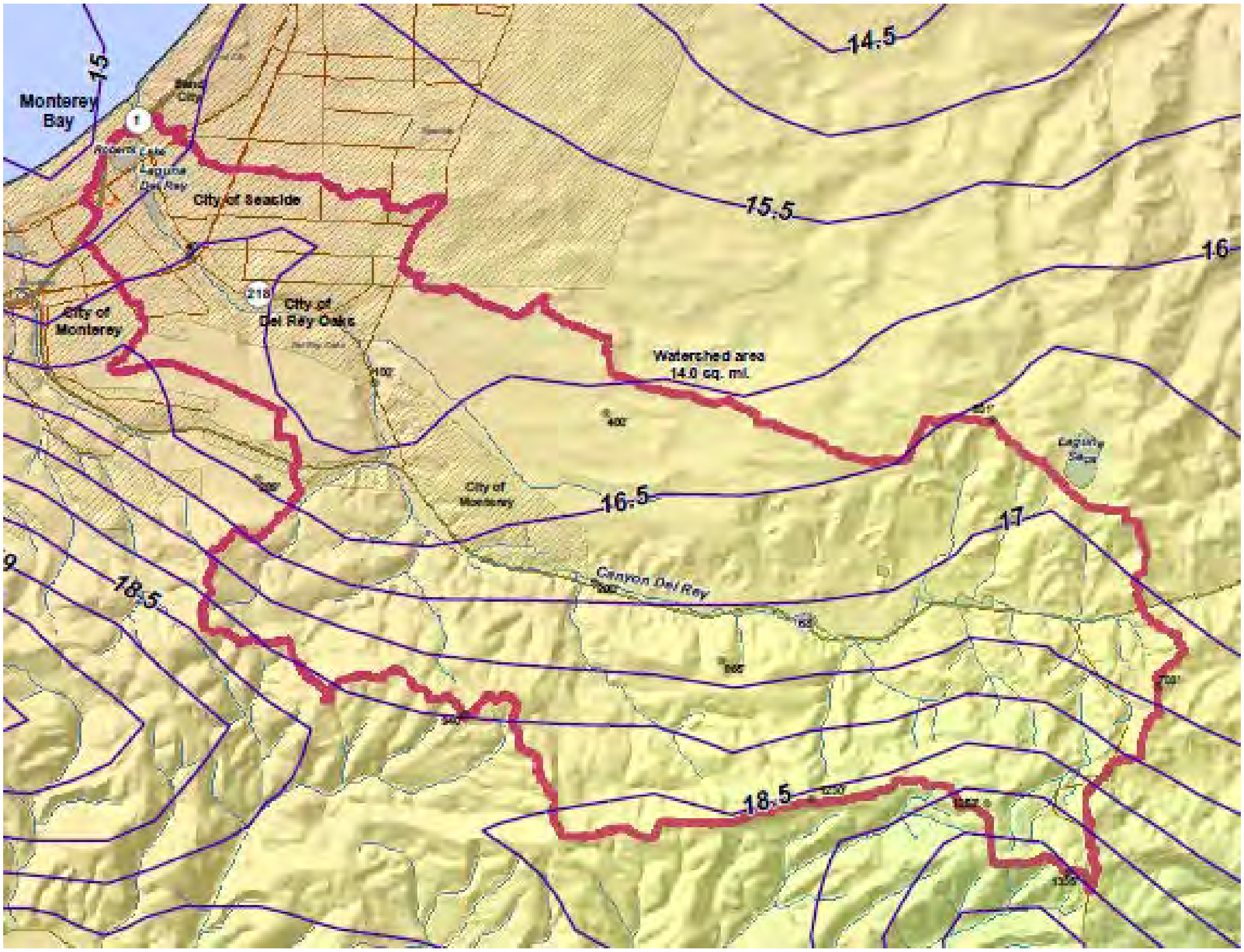


Figure 3-3: Mean Annual Precipitation Isohyets for Canyon del Rey.

3.5 Depth-Duration-Frequency estimation from NOAA Atlas 14 results

Rainfall depth estimates were generated from NOAA Atlas 14 output for each sub-watershed within the Canyon del Rey watershed. The centroid of each sub-watershed was used for the estimation location, which was input into the NOAA Atlas application. The depth values were extracted for return periods of 10 and 100 years and durations of 15 minutes through 24 hours. Table 3-5 provides a summary of generated depths for each of the sub-watersheds for 10 year and 100 year return periods and 24 hour durations.

Table 3-5: 10 year and 100 year, 24 hour duration rainfall depth estimates.

TOTAL 24 HOUR RAINFALL DEPTHS (*inches)*

Sub-watershed	10-year	100-year	Sub-watershed	10-year	100-year
Sub_LS	3.42	5.50	**Sub_17**	3.38	5.47
Sub_01	3.49	5.60	**Sub_18**	3.50	5.65
Sub_02	3.56	5.72	**Sub_19**	3.32	5.39
Sub_03	3.47	5.58	**Sub_20**	3.32	5.39
Sub_04	3.51	5.65	**Sub_21**	3.27	5.30
Sub_05	3.57	5.74	**Sub_22**	3.21	5.22
Sub_06	3.48	5.61	**Sub_23**	3.24	5.27
Sub_07	3.50	5.68	**Sub_24**	3.17	5.16
Sub_08	3.56	5.74	**Sub_25**	3.21	5.22
Sub_09	3.51	5.66	**Sub_25b**	3.21	5.21
Sub_10	3.44	5.54	**Sub_25c**	3.16	5.13
Sub_11	3.47	5.60	**Sub_26**	3.15	5.12
Sub_12	3.51	5.66	**Sub_27**	3.16	5.13
Sub_13	3.43	5.54	**Sub_27b**	3.08	5.00
Sub_14	3.47	5.61	**Sub_28**	3.27	5.31
Sub_15	3.43	5.54	**Sub_FP**	3.08	5.00
Sub_16a	3.47	5.61	**Sub_29**	3.04	4.95
Sub_16b	3.43	5.54	**Sub_29b**	3.04	4.95
			Sub_30	2.97	4.82

4 HYDROLOGIC ANALYSES AND MODELING

4.1 Available data

Available stream flow gage data is limited to peak flow records for 1967-1978 and 2003-present and 15 minute stream flow data for 2003-2013. All records are for the Arroyo del Rey gage at Del Rey Oaks. Figure 4-1 shows the peak flow at this gage for the years of record. No large storm events are included in the years of record (in particular, the 1995 and 1998 events are missing), resulting in relatively low peak flows.

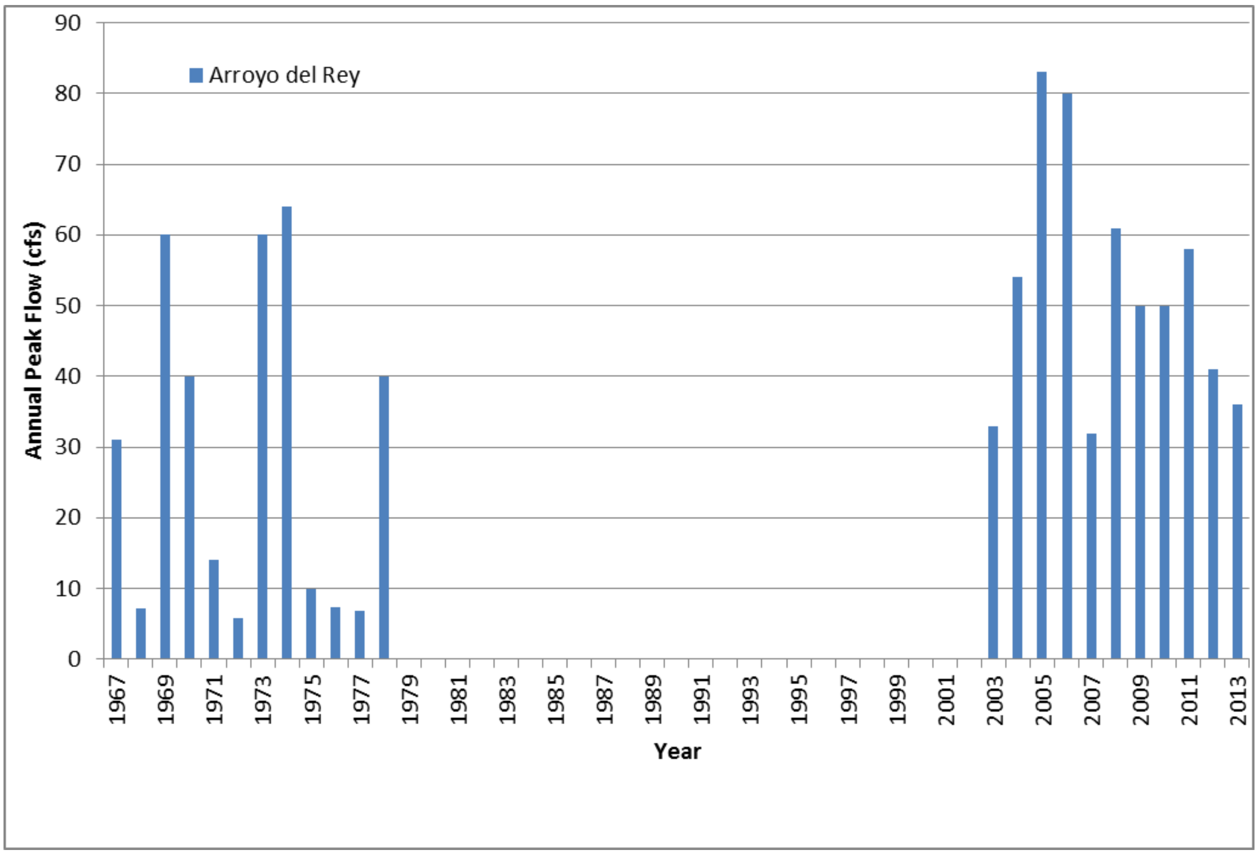


Figure 4-1: Annual peak flows for Arroyo del Rey at Del Rey Oaks gage.

Based on the available gage data, a return period analysis can be made, producing the relationship in Oversized Figure 3. While this relationship may be representative of frequent events (recurrence intervals of 5 years and less), it is not descriptive of less frequent events.

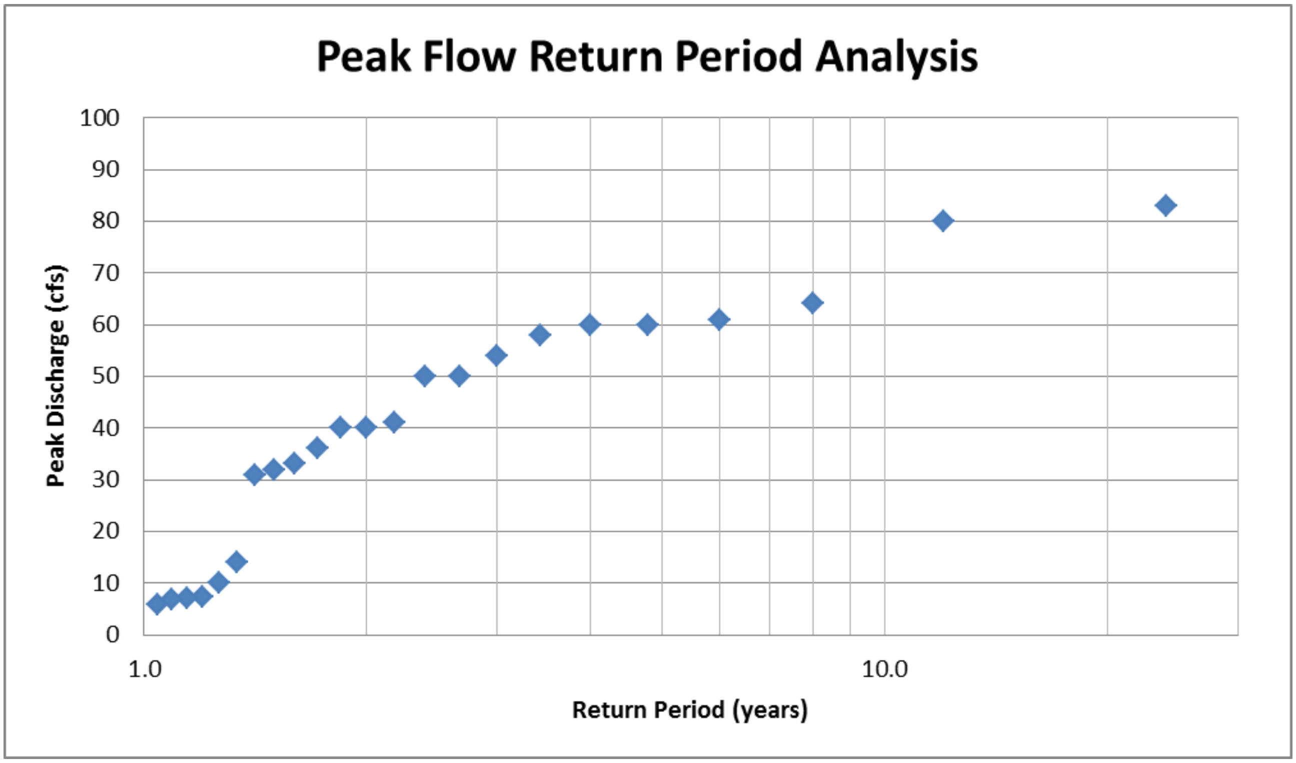


Figure 4-2: Arroyo del Rey at Del Rey Oaks annual peak flows plotted against return period.

4.2 Description of alternative methodologies

The 1977 drainage plan used the following methods to develop runoff estimates:

- Define 28 sub-watersheds based on drainage divides, slope, land use
- Create a mean annual precipitation (MAP) isohyetal map from rainfall gage data
- Develop MAP for sub-basins from USGS MAP data (from Rantz)
- Estimate total storm precipitation from regional Depth Duration Frequency tables
    - 100 year return period event used for primary structures
    - 10 year return period event used for secondary structures
- Create design storm runoff for each sub-watershed using synthetic unit hydrograph method
- Obtain rainfall excess (volume of runoff) using: loss rates from USGS tables and times of concentration adjusted for urbanization
- Route runoff through the basin using Muskingum method, including effects of temporary storage above structures

For this study, both precipitation gage and stream flow gage data were collected and analyzed for application to the hydrologic analyses. Neither of these data sets was deemed adequate for use in developing design storm flows, due to short periods of record and inadequate areal coverage of the study area. As was true for the 1977 study, synthetic hydrologic methods are necessary.

Alternative hydrologic computation methods include:

- Frequency Analysis of Recorded Peak Flows for Study Stream
    - Adequate long, consistent time series record not available
- Correlation with Frequency of Recorded Peak Flows in Nearby Watershed
    - A 40 year stream gage record on El Toro Creek is available but no suitable gage within Canyon del Rey is available for correlation
- Regional Rainfall Frequency Analysis
    - PRISM and NOAA Atlas on line datasets available and accepted
- Rational Method
    - Accepted today only for very small watersheds
- Synthetic Unit Hydrograph
    - Method of choice for many settings; can be readily adjusted for variety of watershed conditions; provides complete hydrograph
    - Implementation via HEC-HMS, a widely used and accepted simulation package
- Continuous Simulation Modeling Using Detailed Moisture Accounting
    - Most robust method, representing detailed variations
    - Costs not within in current project scope

Considering the above methods, the most appropriate approach involves: development of design storm precipitation hyetographs, computation of runoff and stream flow from the rainfall for each sub-watershed, and routing of the runoff through the channel network. For this approach, selection of a rainfall loss method is required. Alternative methods include:

- Initial and Constant
    - Appropriate only for watersheds lacking soil details
- Housing and Urban Development Methodology
    - Similar to SCS method, but oriented specifically to central coastal region of California
- SCS Curve Number

    - Curve numbers assigned to different soil-cover complexes; pervious losses built into curve numbers
    - Works well for highly pervious soils
- Soil Moisture Accounting (continuous, long term simulation)
    - Most complex; costs not included in project scope

Rainfall temporal distributions must also be developed and storm return periods selected. Methods for developing rainfall distributions include:

- Individual rainfall distributions for each storm duration and frequency, based on historical storms
    - Available storm rainfall data is inadequate to enable this method
- Balanced rainfall distribution with one distribution for all events
    - Includes 3, 12, 24 hour peaks in one hyetograph
    - Conservative; usually adequate for flood planning

4.3 Modeling methodology applied for this work

The following methodology was selected from the methods previously described. This methodology incorporates generally accepted best practices for flood analysis, management, and design which can be executed with available information regarding the local rainfall and watershed conditions.

- Storm rainfall depths obtained from the NOAA Atlas 14 regional rainfall frequency analysis application
    - Comprehensive and well documented; makes maximum use of available rainfall data
- Synthetic Unit Hydrograph for hyetograph development
    - Provides full storm hydrograph; allows for routing and variable losses
- Balanced storm hyetograph for 24 hour rainfall event
    - Includes shorter duration events; commonly accepted for flood control planning
- 10 year and 100 year return period events
    - Represent appropriate range of risk; typically used in flood management planning and design
- SCS Curve Number method for rainfall loss estimation
    - Widely accepted for use with permeable soils
- Muskingum routing of flows through channel system
    - Properly represents runoff timing, storage, and travel lag times in natural channels

- Use HEC-HMS simulation platform to develop stream flow hydrographs in locations within the study area
    - Widely accepted as appropriate for runoff simulation and routing
- Calibrate HEC-HMS against Del Rey Oaks and Frog Pond gage data
    - Rainfall and stream flow gage data available for several events
    - Improves and demonstrates representativeness of simulation results

4.4 HMS model development

The HEC-HMS simulation platform used in this study is thoroughly described in the program user manual available at

http://www.hec.usace.army.mil/software/hec-hms/documentation/HEC-HMS_Users_Manual_3.5.pdf

and the technical reference manual available at

http://www.hec.usace.army.mil/software/hec-hms/documentation/HEC-HMS_Technical%20Reference%20Manual_(CPD-74B).pdf.

In this platform, a stream channel network and associated watershed is described as a series of sub-watersheds with connecting flow paths in a dendritic construction. Runoff is calculated from precipitation in each sub-watershed using parameters including slope, sub-watershed geometry, percent impervious area, soil type, ground cover, and antecedent moisture. A runoff hydrograph is produced at the downstream end of each sub-watershed for a specific rainfall history (hyetograph). The hydrograph is then routed from the downstream end of the sub-watershed to a channel junction, combined at the junction with flows from other sub-watersheds and junctions, and then routed to a further downstream junction. Flow routing is calculated in the Muskingam-Cunge method using parameters including channel roughness, length, slope, and cross section.

Oversized Figure 3 depicts the HEC-HMS model used to simulate runoff and stream flow in the Canyon del Rey basin. The model is built using runoff elements (sub-basins), stream channel routing elements (reaches), stream confluence elements (junctions), and water storage or detention elements (reservoirs). All of these elements are shown in the figure. Water sources, sinks and diversions can also be simulated, but are not used in this study. The connectivity between sub-basins, reaches, junctions, and reservoirs are shown in the figure.

Runoff related parameters, including slope, ground cover, soil type, percent impervious, and surface roughness were developed from aerial photographs, topographic mapping, and geologic mapping. Specific input parameters for the HEC-HMS simulation platform were assigned, based on the above attributes, to each sub-watershed. The parameters used for the watersheds are provided in Table 4-1.

Table 4-1: Runoff related HEC-HMS input parameters for Canyon del Rey sub-watersheds.

Sub-Watershed ID	Area (sq miles)	Time Lag (min)	Curve Number	Percent Impervious
Sub_LS	0.293	2	45.6	55
Sub_01	0.2	21.4	61.3	8
Sub_02	0.757	37.2	56.4	6
Sub_03	0.391	29	64	2
Sub_04	0.083	11	61.9	10
Sub_05	0.454	28.8	54	2
Sub_06	0.358	26.8	63.9	6.1
Sub_07	0.134	7.3	64.1	3
Sub_08	0.606	29.9	53.8	10
Sub_09	0.295	20	51.7	5
Sub_10	0.481	25.2	58.7	8
Sub_11	0.538	26.9	52.5	20
Sub_12	0.14	9.9	60.1	5
Sub_13	0.154	19	54.2	8
Sub_14	0.231	12.6	50.6	3
Sub_15	0.244	21	45.4	15
Sub_16a	0.101	11.5	48.8	0.5
Sub_16b	0.162	22.5	51	1
Sub_17	0.233	12.8	47.4	25
Sub_18	1.506	41.6	50.1	1.5
Sub_19	0.127	11.8	52.1	15
Sub_20	0.5	23.7	50.7	1
Sub_21	0.192	13.3	57	35
Sub_22	0.015	4	61.5	25
Sub_23	0.71	25	53	3.5
Sub_24	0.25	25.6	58.9	3.1
Sub_25	0.131	17.3	60.5	54
Sub_25b	0.018	5.4	56.2	75
Sub_25c	0.103	14.3	53.3	10
Sub_26	0.507	38.7	51.7	5
Sub_27	0.146	8.5	52.3	55
Sub_27b	0.056	12.2	42.6	20
Sub_28	1.876	60.5	28.8	2
Sub_FP	0.105	8	24.6	65
Sub_29	0.365	10.7	21.8	30
Sub_29b	0.385	12.4	28.4	35
Sub_30	1.506	17.4	22.6	70

Stream flow routing parameters, including channel length and geometry, hydraulic roughness, and channel slope, were developed from field reconnaissance, surveying of key cross sections, topographic mapping, and data from local agencies. Specific input parameters for the HEC-HMS simulation platform were assigned, based on the above attributes, to each routing reach. The parameters used for the reaches are provided in Table 4-2.

Table 4-2: Stream flow routing related HEC-HMS input - Canyon del Rey basin.

Reach	Length (ft)	Slope (ft/ft)	Manning's n	Shape
R_02_03	545	0.022	0.05	Trapezoid
R_06_07	807	0.0223	0.075	Trapezoid
R_07_08	1120	0.011	0.075	Trapezoid
R_11_12	1117	0.0143	0.075	Trapezoid
R_12_14	2122	0.029	0.075	Trapezoid
R_16a_15	2665	0.0056	0.075	Trapezoid
R_15_17	2086	0.012	0.075	Trapezoid
R_17_19	2064	0.0116	0.075	Trapezoid
R_19_20	1846	0.013	0.085	Trapezoid
R_23_25	3334	0.0093	0.15	Trapezoid
R_26_27	1650	0.00485	0.075	Trapezoid
R_27_27b	945	0.0106	0.075	Trapezoid
R_29	2900	0.0152	0.075	Trapezoid
R_29b	1060	0.0622	0.075	Trapezoid
R_29_30	268	0.0373	0.075	Trapezoid

A large number of detention basins currently exist in the watershed. Table 4-3 provides a list of the basins, with their location described. Some of the basins developed naturally and certain of those basins were further defined by culverts acting as outlet structures. Other basins were built specifically as storm water detention basins with engineered outlet structures.

Basins were characterized in the model by a stage-storage table and outlet parameters. Two of the basins were not included in the HEC-HMS model. Table 4-4 provides information about how these basins were represented in the HEC-HMS model. The maximum storage capacities shown in the table were calculated using survey derived elevations and topographic mapping. Since the detailed geometries of the basins were not surveyed, these volumes are necessarily approximate. As water flows into each basin, the basin begins to fill. As water level in the basin rises, water begins to flow out of the basin, with outflow increasing as the water level in the basin increases. When a basin overflows, then the outflow relationship changes to represent overbank or overtopping flow.

Table 4-3: Detention basins within the Canyon del Rey watershed.

Facility ID	Location
LS_B_01	Lake at Laguna Seca Raceway.
04_B_01	South of Hwy 68 at S.P.C.A. facility.
04_B_02	South of Hwy 68 at S.P.C.A. facility.
05_B_01	South of Hwy 68, approx. 1'650 feet west of S.P.C.A. entrance road.
06_B_01	North of Hwy 68, approx. 500 feet west of S.P.C.A. entrance road.
07_B_01	North of Hwy 68, approx. 1,000 feet east of Boots Road.
08_B_01	South of Hwy 68. Approx. 250 feet southeast of Boots Road.
08_B_02	South of Hwy 68. Approx. 250 feet southeast of Boots Road. Not modeled.
09_B_01	Approx. 200 feet south of where Boots Road and Whip Road meet near Hwy 68.
10_B_01	Pasadera golf course pond, approx. 200 feet south of Las Laderas Drive.
10_B_02	Pasadera golf course pond, approx. 230 feet west of Las Brisas Drive.
10_B_03	Pasadera golf course pond, approx. 200 feet southeast of Pasadera Country Club.
11_B_01	Pasadera golf course pond, approx. 180 feet west of Mirasol Ct. Not modeled.
11_B_02 10_B_04	Pasadera golf course pond, at the intersection of Pasadera Drive and Via Del Milagro. Modeled as one (10_B_04).
11_B_03	1'400 feet west of Pasadera Drive and 180 feet north of Hwy 68. Part of the Laguna Seca Golf Ranch.
12_B_01	1'650 feet west of Pasadera Drive and 270 feet north of Hwy 68. Part of the Laguna Seca Golf Ranch.
12_B_02	2'050 feet west of Pasadera Drive and 270 feet north of Hwy 68. Part of the Laguna Seca Golf Ranch.
14_B_01	Canyon del Rey reach west of Pasadera Road and South of Hwy 68.
19_B_01	Directly west of where Wilson Road and York Road meet.
21_B_01	North of Hwy 68. Approx. 1'300 feet east of Ragsdale Drive.
22_B_01	North of Hwy 68. Approx. 1'000 feet east of Ragsdale Drive.
24_B_01	West side of Hwy 218. Approx. 1'400 feet south of the Hwy 68 and Hwy 218 interchange.
24_B_02	West side of Hwy 218. Approx. 1'400 feet south of the Hwy 68 and Hwy 218 interchange.
25_B_01	Approx. 650 feet northwest of the Ragsdale Drive and Lower Ragsdale drive T intersection. South of the Harris Ct business development.
25_B_02	Directly south of the Hwy 68 and Hwy 218 interchange. South of the Monterra Subdivision.
26_B_01	South of Hwy 68 and west of 218 at interchange. North of the Monterra subdivision entrance.
27b_B_01	Directly east of Hwy 218 at Pheasant Ridge Road.
29_B_01	Frog Pond Wetland Preserve.
29_B_02	Northeast of the Monterey Airport. North of N road.
29b_B_01	Park behind Safeway, west of hwy 218 and south of Wilson Way.
30_B_01	Laguna Del Rey and Roberts Lake combined. North and south of Del Monte Blvd.

Table 4-4: Detention basin parameters used in the HEC-HMS model.

Basin ID	Sub-watershed location	Peak Storage Elevation Before Overflow (ft)	Max Storage Capacity (acre-feet)	Modeling Method	Outlet Type
LS_B_01	Sub_LS	748	12.8	Outflow Structures	Culvert
04_B_01	Sub_4	413	0.2	Outflow Structures	Spillway, horizontal grate, & orifice
04_B_02	Sub_5	400	0.1	Outflow Structures	Culvert
05_B_01	Sub_5	388	14.7	Outflow Structures	Culvert
06_B_01	Sub_6	388	28.7	Outflow Structures	2 Culverts
07_B_01	Sub_7	356	7.9	Outflow Structures	Culvert
08_B_01	Sub_8	348	2.3	Outflow Curve	Horizontal grate
09_B_01	Sub_9	375	1.7	Outflow Structures	Weir & orifices
10_B_01	Sub_10	464	2.4	Outflow Curve	Horizontal grate
10_B_02	Sub_10	449	0.7	Outflow Curve	Horizontal grate
10_B_03	Sub_10	409	1.3	Outflow Curve	Horizontal grate and weir
10_B_04	Sub_11	358	3.4	Outflow Curve	Horizontal grate
11_B_03	Sub_12	318	0.4	Outflow Structures	Spillway
12_B_01	Sub_12	318	1.6	Outflow Structures	2 Culverts
12_B_02	Sub_12	314	1.2	Outflow Structures	2 Culverts
14_B_01	Sub_14	304	64.6	Outflow Structures	Culvert
19_B_01	Sub_19	194	0.2	Outflow Structures	Spillway
21_B_01	Sub_21	142	1.3	Outflow Structures	Weir & 2 orifices
22_B_01	Sub_22	140	0.1	Outflow Structures	Weir
24_B_01	Sub_24	142	4.4	Outflow Curve	Spillway and riser culvert
24_B_02	Sub_24	128	1.2	Outflow Structures	3 Culverts
25_B_01	Sub_25b	226	0.7	Outflow Structures	2 Culverts
25_B_02	Sub_25	122	7.6	Outflow Structures	5 culverts
26_B_01	Sub_26	210	4.0	Outflow Curve	3 Riser culverts & spillway
27b_B_01	Sub_27b	90	70.1	Outflow Structures	Culvert
29_B_01	Sub_FP	82	32.5	Outflow Structures	Box culvert
29_B_02	Sub_29	108	3.5	Outflow Structures	2 Culverts & Spillway
29b_B_01	Sub_29b	34	43.7	Outflow Structures	Culvert
30_B_01	Sub_30	14	177.6	Outflow Structures	2 Box culverts

The total precipitation depths for the 10 and 100 year events, described in Chapter 3 and Table 3-5, provided the basis for developing balanced 24 hour storm hyetographs. These hyetographs provided the temporal rainfall pattern used in the model for each sub-basin. Consequently, runoff and routing simulations used a 24 hour period. Given the relatively small size of the watershed (14.3 square miles) and the relatively short maximum stream length (6.9 miles), a 24 hour period was sufficient to adequately represent variations in both runoff and stream flow during the selected design events.

Balanced 24 hour storm hyetographs were generated using standard methods. An example of a typical application of this method can be found at: http://onlinemanuals.txdot.gov/txdotmanuals/hyd/hyd_apxf.pdf. Specifically, rainfall depths are obtained for durations ranging from 15 minutes to 24 hours from the NOAA Atlas 14 application. The differences between rainfall depths are then plotted, with the first (and largest) difference plotted at 12 hours and then succeeding differences plotted at alternating later and earlier times until all values are used and the 24 hour hyetograph is completely specified. In this way a hyetograph which represents the 24 hour storm as well as the lesser duration storms is defined. While this hyetograph does not represent any particular storm event, it is representative of the rainfall depths which can be expected for storms of 24 hour and lesser duration. Figure 4-3 provides an example hyetograph for a 100 year, 24 hour rainfall event in one of the sub-watersheds in Canyon del Rey. Rainfall depths shown are for 15 minute periods.

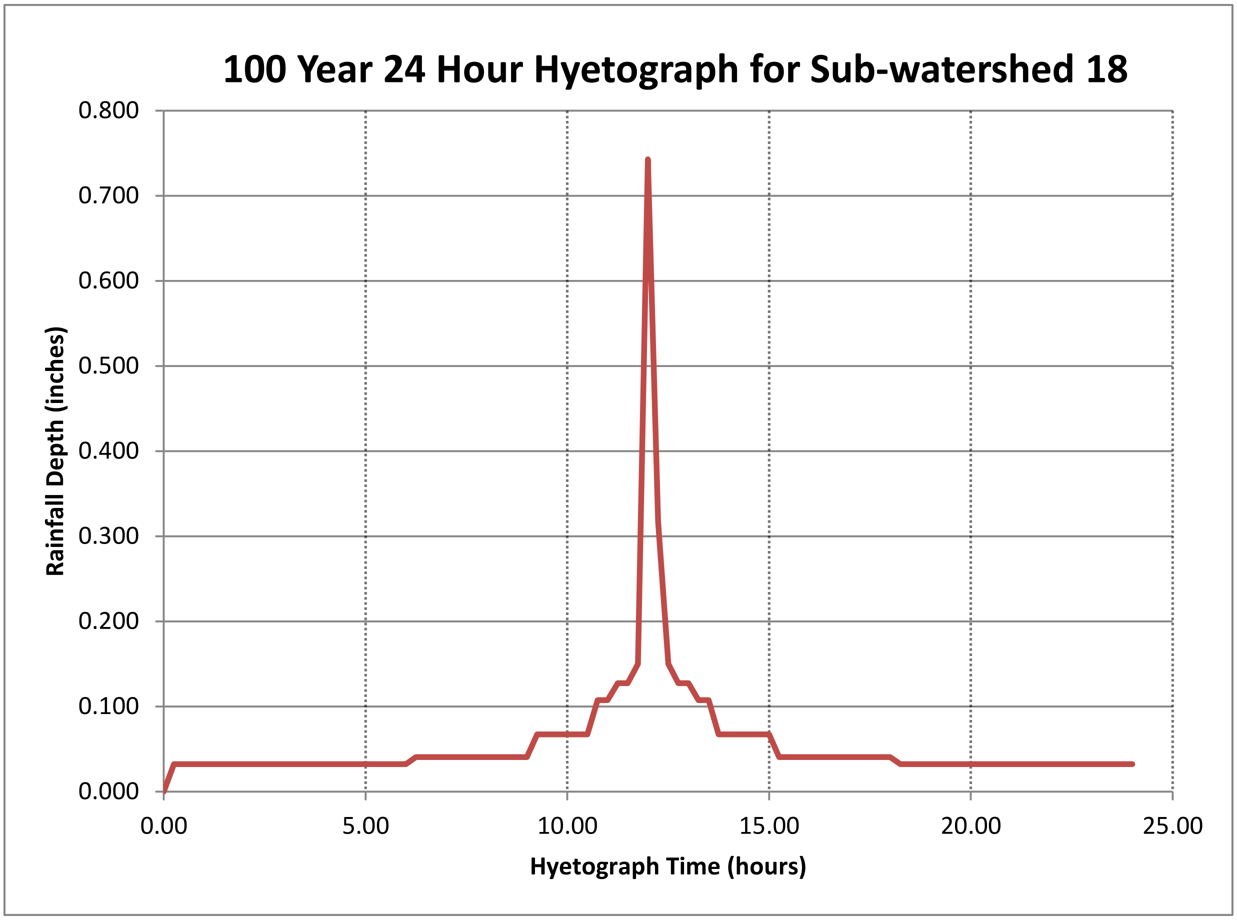


Figure 4-3: Example 100 year, 24 hour rainfall hyetograph, sub-watershed 18.

4.5 Conditions modeled

The highly pervious nature of watershed soils, particularly on the north side of the valley enables the watershed to absorb and retain large amounts of rainfall before substantial runoff is initiated. However, a long duration rainfall event or series of rainfall events will saturate the soils and cause much higher runoff to result from additional rainfall events. The 24 hour hyetograph that is used in this study is insufficiently long to create fully saturated soil conditions and thus can under-predict runoff. This behavior was confirmed in simulations which were initiated with minimal antecedent rainfall. Comparison of this behavior with available stream gage data indicated that more substantial antecedent rainfall (and high soil saturation) was needed to achieve results similar to gage data. Therefore, the SCS moisture accounting calculations were set to use Antecedent Moisture Condition I instead of condition II.

Impervious versus pervious conditions in each sub-watershed were assessed by calculating paved area for each sub-watershed using GIS data for land cover. The results were than adjusted based on inspection of aerial photography for the watershed. It was found that model results were quite sensitive to percent impervious specification, due to the highly pervious nature of the soils. Trial and error adjustment of percent impervious was used in the model calibration process.

The constructed model was used to simulate the following conditions:

- 10 year, 24 hour storm with existing land use and flood management infrastructure
- 100 year, 24 hour storm with existing land use and flood management infrastructure
- 10 year, 24 hour storm with existing land use and proposed flood management infrastructure improvements
- 100 year, 24 hour storm with existing land use and flood management infrastructure improvements

Runoff and routing simulations using HEC-HMS were used to provide flow data for hydraulic calculations and assess performance of detention facilities and ponding areas. These data were produced for both existing conditions and potential future conditions. After hydraulic assessments were made and potential upgrades to the flood management infrastructure identified, the effects of such changes on runoff and routing of flows were calculated using the model.

4.6 HEC-HMS model calibration

The HEC-HMS model was calibrated by comparing model results with measured stream flow at the CSUMB “Frog Pond” gage. This stream flow gage record included adequate data for two short storm events: on April 3-4, 2006 and March 3-4, 2005. Corresponding data was available from the Fort Ord rain gage.

Antecedent moisture conditions (AMC) were adjusted to decrease rainfall loss rates in the watershed; AMC II conditions were used initially and then changed to AMC I to allow for the effect of multiple and longer duration rainfall events on soil moisture. Percent impervious calculations were also reviewed using aerial photographs and field investigation, resulting in increases in percent impervious for many sub-watersheds. These changes increased sub-watershed runoff and stream discharge results in the model. The calibration results are summarized in Table 4-5. Figure 4-5 and Figure 4-6 show the correspondence between measured flow and HEC-HMS model results for the two events.

Both peak flow rates and total discharge volume correspond well with the gage results for the two rainfall events. The shapes of the HEC-HMS hydrographs correspond quite well with the gage record graphs. The model does appear to be somewhat more responsive to rainfall variations, as indicated by the somewhat larger response to early rainfall and the faster decline in flow after rainfall rates diminish. This level of calibration was deemed satisfactory for the current study purposes.

Table 4-5: HEC-HMS model calibration results.

Calibration Results- April 2006 Storm		
	Peak Flows (cfs)	**Total Volume (ac-ft)**
Known flow gage	80	191
HEC_HMS flow	96	214
Calibration Results - March 2005 Storm		
	Peak Flows (cfs)	**Total Volume (ac-ft)**
Known flow gage	83	79
HEC-HMS flow	78	80

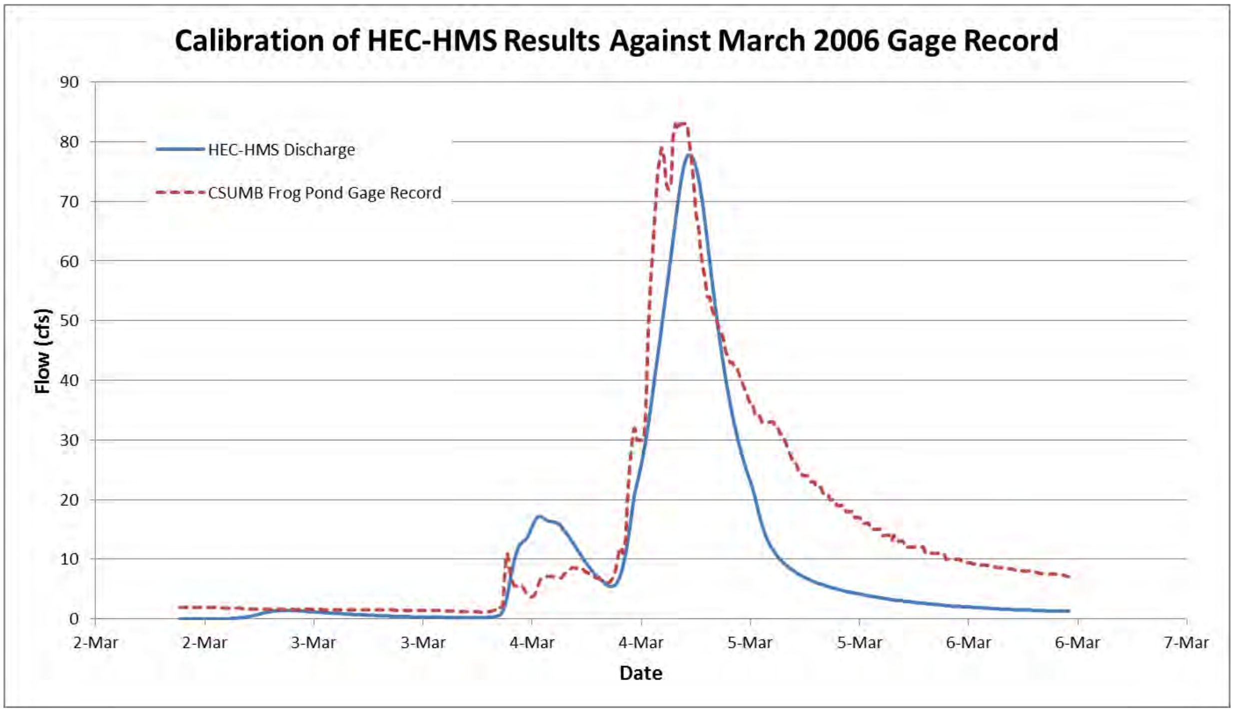


Figure 4-4: Stream flow at Frog Pond Gage for the March 2006 Calibration Event.

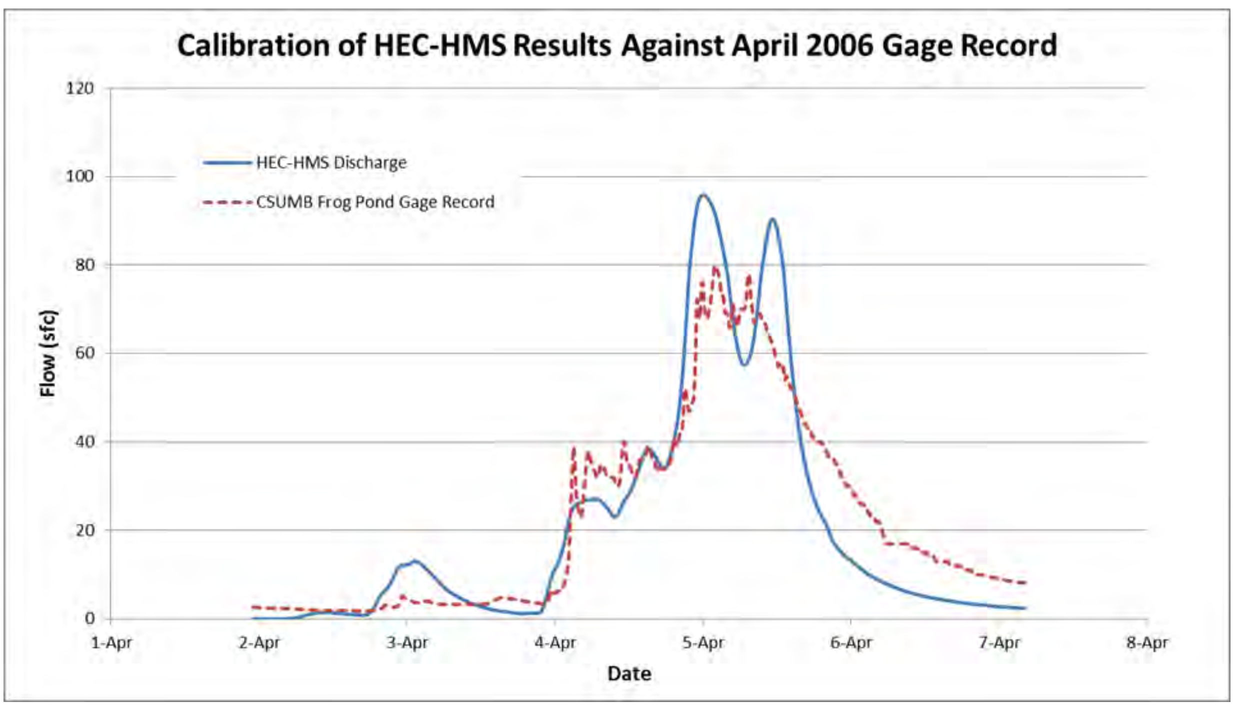


Figure 4-5: Stream flow at Frog Pond Gage for the April 2006 Calibration Event.

4.7 Runoff modeling results

The HEC-HMS model of the watershed was used to produce runoff rates and volumes for the sub-watersheds, flow results for stream channels, operational data for the storage basins, and performance data for the culverts. Runoff statistics for each of the sub-watersheds is provided in Table 4-6. Peak flow and total flow volume in the stream channels (routing reaches), at confluences of channels (junctions), and from storage basins (basins) are provided in Table 4-7. Figure 4-6 provides HEC-HMS output hydrographs for reach 29, which is immediately downstream of the "frog pond" basin.

A graph of peak flow at each stream channel location for the 10 year and 100 year events is provided in Figure 4-7. The locations along the channel from most upstream to most downstream (outlet) are identified with the station (facility) ID number. While stream flow generally increases from upstream to downstream, significant variations in stream flow can be seen and are caused by tributary flows from sub-watersheds and storage in basins within the channel sections.

Operating statistics for the storage basins – peak discharge, total outflow, peak storage, and peak water surface elevation – are shown for the 10 year and 100 year events in Table 4-8. The details of the basins are described in Chapter 6.

The impact of culverts at stream crossings on routing of flow is included in these results. Details of culvert geometry are provided in Chapter 6. The performance and adequacy of each culvert will be discussed in Chapter 7.

Statistics for the performance of the basins are shown in Table 4-9, which presents information on attenuation of the peak discharge by the basin and the portion of the basin nominal capacity that is utilized during a storm event. Peak attenuation varies from negligible to 94%, depending on the outlet characteristics of the basin, storage volume available, volume of the storm hydrograph entering the basin, and the shape of the flow hydrograph. Storage volume utilized during the storm events varies from 2% to 878% of the nominal capacity of the basins. Nominal capacity is defined as the volume of water in the basin when the water level reaches the crown of the outlet culvert. Utilized capacity exceeds nominal capacity when the outlet culvert is surcharged.

The wide range in utilization of basin volumes and the effectiveness of the basins in attenuating storm runoff peaks emphasizes the reality that few of the basins were designed. Most basins resulted from road crossings and culverts designed and built to enable traffic and protect roadways and people. None-the-less, seven of the basins reduced storm peak flows by 50% or more and nearly all of the basins were filled to more than nominal capacity during the storm events. Consequently, these basins are an important contributor to flood flow management within the Canyon del Rey watershed.

Table 4-6: Canyon del Rey sub-watershed runoff before routing.

Sub-watershed ID	10-year Peak Runoff (cfs)	10-year Runoff Volume (ac-ft)	100-year Peak Runoff (cfs)	100-year Runoff Volume (ac-ft)
Sub_LS	143	29.9	240	51.7
Sub_01	22	8.6	76	21.9
Sub_02	42	23.4	178	67.5
Sub_03	40	15.2	139	41.8
Sub_04	13	4.0	39	9.8
Sub_05	14	9.4	93	32.8
Sub_06	45	16.1	141	41.4
Sub_07	23	5.7	80	15.4
Sub_08	42	20.5	157	54.8
Sub_09	11	6.3	63	20.5
Sub_10	42	17.5	154	46.8
Sub_11	65	25.5	173	57.0
Sub_12	16	5.1	62	14.2
Sub_13	10	4.4	44	12.6
Sub_14	5	3.7	47	13.9
Sub_15	24	7.5	49	17.8
Sub_16a	1	0.9	15	4.8
Sub_16b	3	2.0	25	8.8
Sub_17	42	11.5	86	23.8
Sub_18	22	18.8	174	81.1
Sub_19	14	4.5	43	11.1
Sub_20	6	5.2	70	24.7
Sub_21	53	13.9	119	27.3
Sub_22	4	0.9	11	2.0
Sub_23	18	11.6	136	42.3
Sub_24	13	5.8	71	18.8
Sub_25	55	13.4	106	24.3
Sub_25b	13	2.4	23	4.0
Sub_25c	8	2.7	30	7.4
Sub_26	13	7.9	72	27.5
Sub_27	73	14.1	132	25.0
Sub_27b	8	1.9	15	3.8
Sub_28	16	6.4	25	10.6
Sub_FP	64	11.2	107	18.2
Sub_29	86	17.7	146	28.8
Sub_29b	101	21.8	170	35.5
Sub_30	772	166.2	1313	269.7

Table 4-7: Stream flow statistics for 10 year and 100 year simulated events.

HEC-HMS Station ID	Existing Conditions 10-year Peak Flow	Existing Conditions 10-year Runoff Volume (ac-ft)	Existing Conditions 100-year Peak Flow	Existing Conditions 100-year Runoff Volume (ac-ft)
J_01_02	59.9	31.9	241.4	89.4
R_02_03	59.8	31.9	238.5	89.3
J_03_04	110.1	50.8	412.5	140.5
06_B_01	54.3	41.3	377.7	170.6
R_06_07	54.1	41.1	375.2	170.3
07_B_01	56.4	46.1	389.2	175.5
R_07_08	56.3	45.8	371.7	174.8
J_08_09	77.3	72.6	494.1	249.7
J_10	139.3	114.9	684.8	351.2
R_11_12	138.4	114.3	669.5	350.1
11_B_03	138.1	113.1	660.9	347.4
12_B_01	145.4	116.2	662.2	358.1
12_B_02	144.7	114.2	660	354.3
R_12_14	143.1	113.4	648.9	352.8
14_B_01	143.4	120.6	480.4	325.1
J_16a	144.3	121.5	484.9	330.0
R_16a_15	144.1	119.4	471.1	325.6
J_15	149.1	126.9	482.6	343.4
R_15_17	149	125.7	477.4	340.7
J_17	156.4	137.1	489.1	364.4
J_19a	180.5	158.0	583.2	454.3
R_17_19	180.4	156.0	572.3	450.1
J_19	183.8	160.5	578.2	461.1
R_19_20	183.6	158.1	576.1	456.5
J_19_20	205	175.9	619.4	506.2
J_20_23	218.3	188.5	670.7	550.4
R_23_25	217.9	175.7	662.1	526.0
25_B_02	227.3	193.8	702.5	553.1
J_25_25c_26	236.5	204.1	760.4	586.6
R_26_27	236	202.0	745.7	582.0
J_27	240.7	216.1	768.9	607.0
R_27_27b	240.5	215.1	764.6	604.9
27B_B_01	232.3	208.9	756.4	583.3
29_B_01	197	189.0	723.9	552.0
R_29	197	186.0	712.6	546.3
J_29_fp_29b	203.2	207.8	731.1	581.7
J_29b	208.8	224.8	752.8	609.6
R_29_30	208.8	223.6	752.7	609.3
29b_B_01	208.7	222.3	701	599.5
30_B_01	246.8	273.8	752.4	664.5
Outfall	246.8	273.8	752.4	664.5

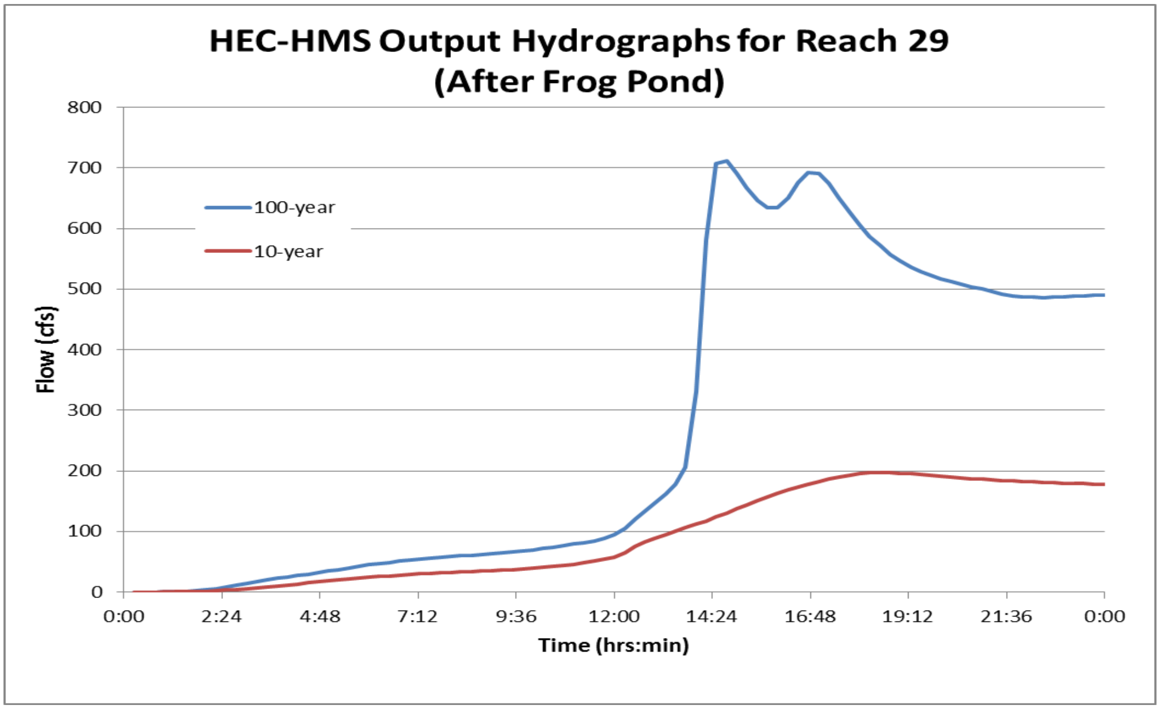


Figure 4-6: Sample HEC-HMS output hydrographs for Reach 29.

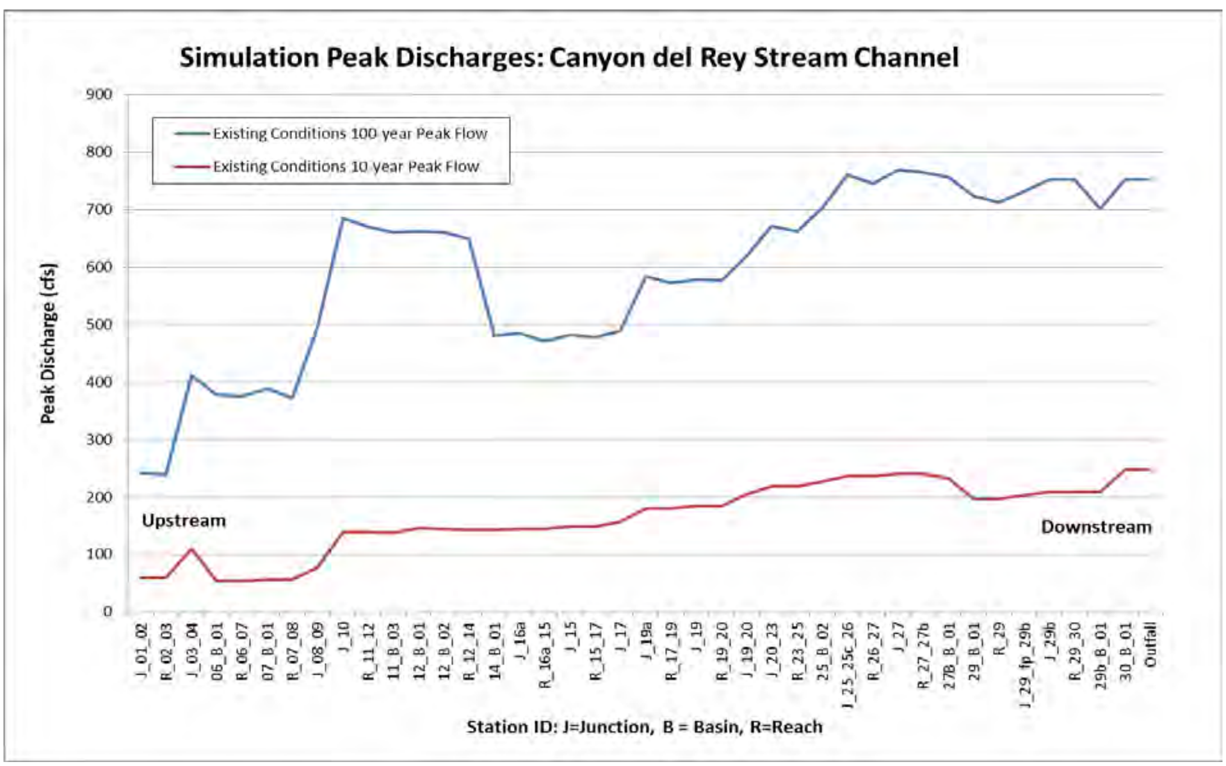


Figure 4-7: Simulation peak discharge results for Canyon del Rey.

Table 4-8: Storage basin operating statistics for the 10 year and 100 year events.

Basin ID	10-year Peak Discharge (cfs)	10-year Total Outflow (ac-ft)	10-year Peak Storage (ac-ft)	10-year Peak Elevation (ft)	100-year Peak Discharge (cfs)	100-year Total Outflow (ac-ft)	100-year Peak Storage (ac-ft)	100-year Peak Elevation (ft)
LS_B_01	10	7.8	22.2	749	14	14.4	37.38	750.5
04_B_01	13	3.7	0.38	414	39	9.5	0.45	415
04_B_02	12	3.7	0.06	399	35	9.4	0.79	400
05_B_01	2	1.5	12.80	388	24	12.8	24.97	390
06_B_01	54	41.3	37.43	389	378	170.6	48.43	390
07_B_01	56	46.1	0.48	347	389	175.5	12.05	358
08_B_01	41	20.5	2.48	348	158	54.6	2.99	349
09_B_01	9	6.3	0.21	370	61	20.3	1.03	373
10_B_01	38	17.3	0.76	463	119	46.2	3.66	465
10_B_02	33	17.1	0.65	449	131	45.9	2.70	452
10_B_03	32	17.5	1.24	409	107	45.8	2.77	410
10_B_04	64	42.3	2.92	358	199	101.5	11.66	362
11_B_03	138	113.1	0.31	318	661	347.4	0.66	319
12_B_01	145	116.2	1.52	318	662	358.1	3.29	320
12_B_02	145	114.2	1.37	314	660	354.3	2.49	316
14_B_01	143	120.6	1.48	276	480	325.1	64.28	304
19_B_01	14	4.5	0.32	195	41	11.1	0.41	195
21_B_01	20	12.6	3.85	144	44	25.0	7.26	145
22_B_01	3	0.9	0.25	141	9	1.9	0.33	142
24_B_01	7	5.6	0.85	137	28	14.5	5.22	143
24_B_02	7	5.1	1.67	129	20	13.4	3.01	130
25_B_01	7	2.4	0.77	226	12	4.0	1.02	227
25_B_02	227	193.8	5.11	121	703	553.1	15.05	124
26_B_01	11	7.6	0.53	205	93	26.1	1.69	207
27b_B_01	232	208.9	12.76	89	756	583.3	27.53	92
29_B_01	197	189.0	43.80	83	724	551.9	65.18	85
29_B_02	14	6.1	2.06	107	23	10.2	2.99	108
29b_B_01	205	211.5	1.58	22	694	581.9	15.78	29
30_B_01	258	282.4	154.27	13	758	679.7	253.13	16

Table 4-9: Storage basin performance statistics for the 10 and 100 year events.

		10-year		100-year	
Basin ID	Nominal Storage Capacity (ac-ft)	% Attenuation through Basin	% of Nominal Storage Capacity Utilized	% Attenuation through Basin	% of Nominal Storage Capacity Utilized
LS_B_01	12.8	93%	174%	94%	293%
04_B_01	0.2	2%	213%	2%	249%
04_B_02	0.1	7%	69%	10%	878%
05_B_01	14.7	85%	87%	75%	170%
06_B_01	28.7	66%	130%	33%	169%
07_B_01	7.9	2%	6%	2%	152%
08_B_01	2.3	2%	109%	-1%	131%
09_B_01	1.7	16%	12%	3%	60%
10_B_01	2.4	9%	32%	23%	156%
10_B_02	0.7	13%	97%	-10%	403%
10_B_03	1.3	2%	96%	19%	213%
10_B_04	3.4	17%	85%	7%	339%
11_B_03	0.4	0%	85%	1%	179%
12_B_01	1.6	1%	96%	2%	207%
12_B_02	1.2	0%	112%	0%	204%
14_B_01	64.6	7%	2%	29%	99%
19_B_01	0.2	1%	139%	6%	179%
21_B_01	1.3	63%	306%	63%	576%
22_B_01	0.1	24%	250%	20%	327%
24_B_01	4.4	46%	19%	61%	118%
24_B_02	1.2	6%	137%	26%	247%
25_B_01	0.7	47%	109%	49%	144%
25_B_02	7.6	3%	67%	1%	197%
26_B_01	4.0	20%	13%	-29%	42%
27b_B_01	70.1	4%	18%	1%	39%
29_B_01	32.5	17%	135%	7%	200%
29_B_02	3.5	41%	100%	26%	100%
29b_B_01	43.7	0%	4%	6%	37%
30_B_01	177.6	74%	85%	54%	100%
	Nominal storage capacity is impounded volume when water surface is at spill crest				

5 STORM DRAINAGE CRITERIA USED IN THIS STUDY

5.1 General

This discussion of design criteria is limited to the philosophy and criteria used in this study. Criteria and requirements for implementation of future decisions regarding land development and facility upgrades may be the subject of a future drainage design manual for the District.

Design of improvements to storm drainage facilities should, in order to most effectively reduce flood related risks and damage, be based on more than rote formulas and standard methodologies. The impacts of choices and designs on the behavior of the natural system need to be investigated and included.

One of the most important benefits of numerical simulation in hydrology is the ability to explore and represent details of the natural processes which cannot be captured in fixed formulae and “rules of thumb”. The results of synthetic rainfall analysis and hydrologic simulation of the Canyon del Rey watershed are presented in previous chapters. We consider briefly here, as a prelude to design criteria selection, the interactions between culvert design, detention storage, and increases in runoff due to development.

The HEC-HMS model of the watershed and existing facilities was used to simulate a range conditions, including amount of impervious area (due to development), the discharge capacities of culverts, and the impoundment volumes active during flood events. The results are summarized in Figure 5-1 and Figure 5-2. These figures provide, respectively, peak flows and runoff volumes along the main stem for the 10 year and 100 year events under three alternative conditions. The simulated conditions are: a) existing facilities and existing development, b) existing development but no storage within the basin, and c) no development and no storage within the basin. Condition (a) is the current condition used to determine adequacy of facilities. Condition (b) simulates hydrologic behavior of the watershed and stream system with existing development but no detention storage – as if all of the culverts and outlet structures in the watershed had the capacity to pass any flow rate. Condition (c) represents a watershed with no development and no storage – this is roughly the natural condition before man’s activities modified the watershed.

The effect of storage in the basins, created primarily by culverts under roadways, can be seen by comparing conditions (a) and (b). The basins reduce peak flows by roughly 60% for both the 10 year and 100 year events. The large step function change in peak flow at the lakes is due to the large flows from the urbanized areas tributary to the lakes. The effect of urbanization on runoff can be seen by comparing conditions (b) and (c). Urbanization increases runoff for the 10 year event by roughly 125% in watersheds other than the intensely urbanized area and by roughly 435% in the intensely urbanized areas. The existing detention storage in the basins reduces peak flows under existing urbanized conditions to the same level as the natural condition for the

10 year event (compare conditions (a) and (c)). The existing basins reduce peak flows to 45% below natural conditions for the 100 year event, effectively reducing flood flows below what would occur naturally. An evaluation of runoff volumes in Figure 5-2 leads to similar conclusions.

This analysis demonstrates the importance of detention storage in managing flows during flood events. Any modifications to culverts and outlet works, particularly along the main stem of Canyon del Rey creek, have the potential to change storage performance and alter both peaks flows and runoff volumes during storm events. Such changes could increase flood risks and damages. Increased flows have the potential to change sediment movement, bank erosion, channel incision, and channel stability. Sediment movement will be discussed in detail in Chapter 8.

Decisions regarding culvert capacity increases, consequently, must consider impacts on detention storage, peak flows, and runoff volume.

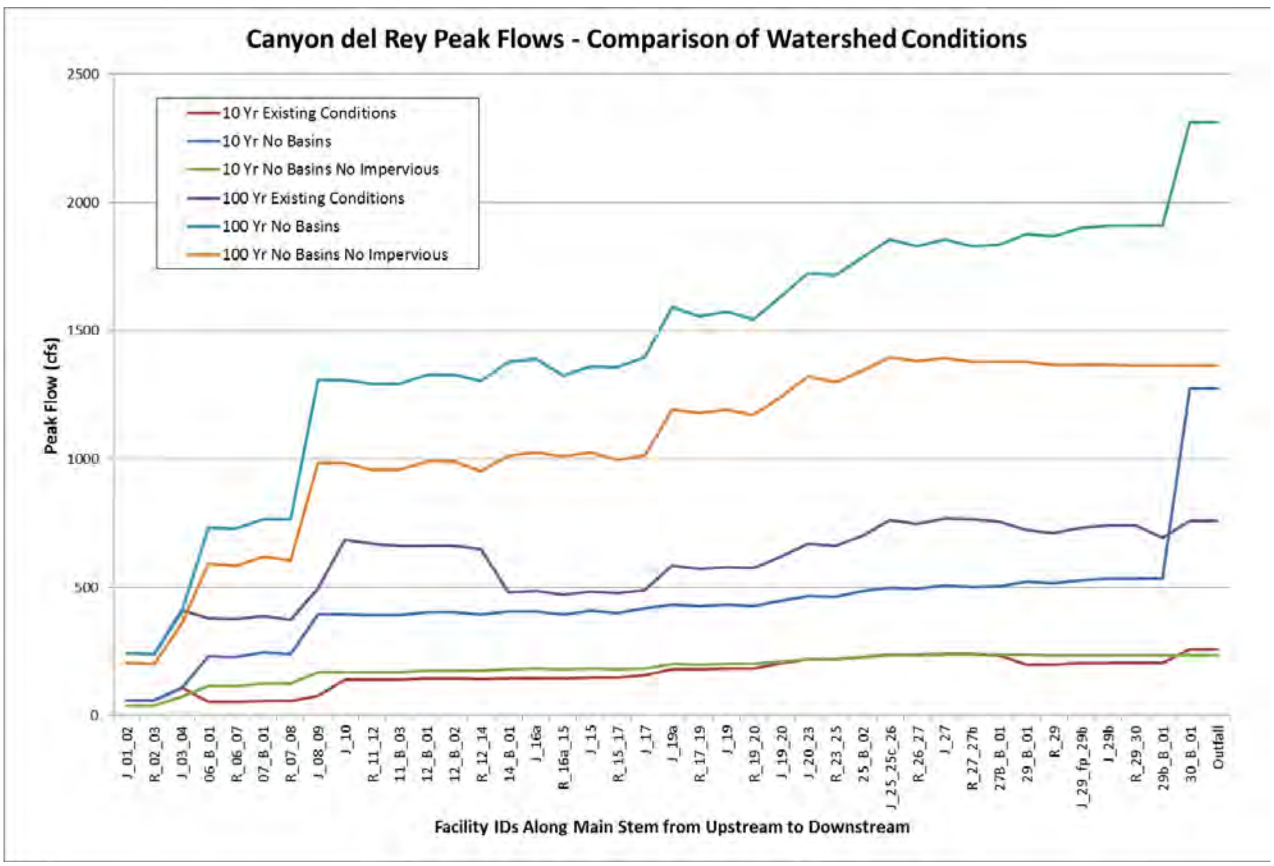


Figure 5-1: Peak flow rates along main stem for alternate conditions.

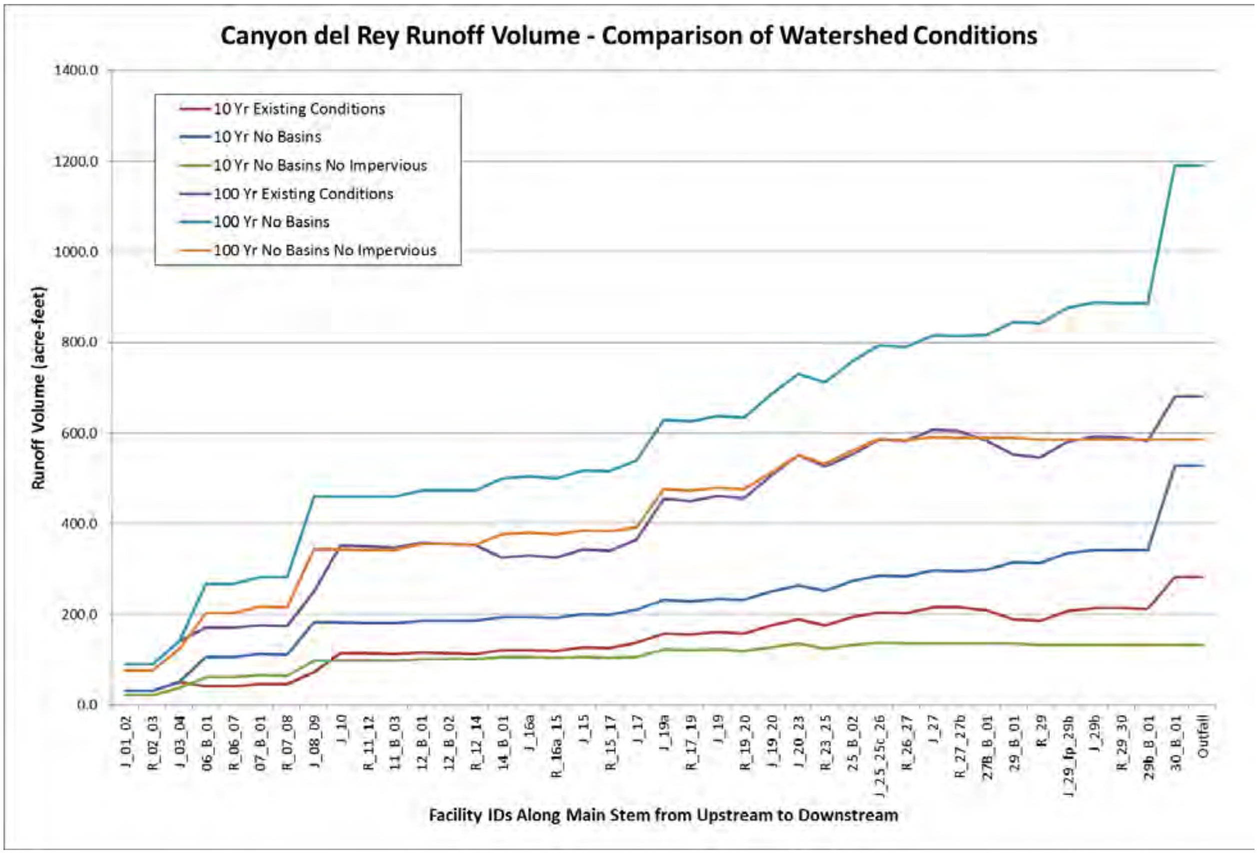


Figure 5-2: Runoff volumes along main stem for alternative conditions.

5.2 Hydrologic analysis approach

Rainfall patterns were developed for specific storms based on regional rainfall frequency analysis, due to a lack of adequate local rainfall records. Refer to Chapter 3 for details.

Due to the highly variable watershed conditions, including soil type, ground cover, slopes, and extent of development, simple hydrologic calculations are not appropriate. While manual unit hydrograph methods have the potential to be sufficiently accurate and locally representative, hydrologic simulation packages such as HEC-HMS are readily available, relatively easy to apply, and sufficiently detailed to represent the highly variable watershed conditions. Detailed representation of rainfall hyetographs and runoff hydrographs are necessary to properly handle routing through the sub-watersheds, storage in the basins, and discharge from one channel reach to another. In this study HEC-HMS was used to represent the response of the watershed to specific rainfall patterns. Details of the hydrologic modeling methodology and results are provided in Chapter 4.

5.3 Hydraulic analysis approach

Hydraulic analyses were performed for each of the culverts listed in Chapter 4 and described further in Chapter 2. These analyses were performed using the Federal Highway Administration HY-8 Culvert Hydraulic Analysis Program. This program, further described in Chapter 6, automates standard calculations used for culvert design.

Hydraulic analyses were not executed for the natural stream channels, except as needed for morphological and sediment transport analyses, described in Chapter 8. The operations of basins were simulated in HEC-HMS using elevation-volume curves for each basin. The results of those simulations, in terms of utilization of available storage volume and effect of storage on outflow hydrographs, are provided in tables in Chapter 4.

5.4 Hydraulic design methodology and criteria

Evaluation of existing culvert adequacy and development of upgrade recommendations is described in Chapter 6. The resultant recommendations are provided in Table 6-3.

California Department of Transportation criteria for design of culverts specify the following:

- The upstream water surface elevation shall not exceed the top of the culvert inlet for the 10 year peak flood flow, and
- The upstream water surface elevation shall not exceed an elevation which would cause objectionable backwater depths or outlet velocities.

California Department of Fish and Game criteria for design of culverts specify the following:

- The upstream water surface elevation shall not exceed the top of the culvert inlet for the 10 year peak flood flow, and
- The upstream water surface elevation shall not exceed 50 percent of the culvert height or diameter above the top of the culvert inlet for the 100 year peak flood flow.

As discussed in section 5.1, the effect of detention storage along the main stem of Canyon del Rey creek is substantial, reducing both peak flows and runoff volumes for both the 10 year and 100 year storm events. The potential impacts of increased culvert capacity on detention storage need to be considered along with improvements in safety, traffic flow during events, and protection of the roadway crossings. A compromise was established for this work, consisting of the following criteria:

- During the 10 year storm event, the water level upstream of the culvert should not exceed the top of the culvert inlet, and

- During the 100 year storm event, the water level upstream of the culvert should not exceed a depth of 0.5 feet above the lowest roadway crest elevation.

The intention of these criteria is to maintain as much detention storage as is feasible while allowing emergency vehicles to traverse the roadway crossing and while reducing the potential for erosion related damage to the culvert and roadway berm. These criteria do not explicitly account for embankment stability during overflow events. They also do not account for the existing condition of each embankment or its suitability to withstand erosion associated with overflow.

6 HYDRAULIC ANALYSES

6.1 Hydraulic performance calculation methods

Hydraulic capacity calculations were produced for many, but not all, of the culverts in the watershed. Culverts which are on private land and privately maintained were generally not analyzed. Table 6-1 provides design details for the culverts analyzed.

The culvert design details were used in the Federal Highway Administration HY-8 Culvert Hydraulic Analysis Program to determine the hydraulic capacity of each of the culverts. Details of this program, including a quick start guide, can be found at http://www.fhwa.dot.gov/engineering/hydraulics/software/hy8/. For a particular culvert the following parameters were input:

6.2 Facility capacity estimates

Peak flow rates generated by the HEC-HMS modeling for the reaches associated with each of the culverts were compared with the hydraulic analysis results to determine whether the existing culverts provided adequate conveyance capacity. The bases for that comparison for each of the culverts are provided in Table 6-2. This table provides both the HEC-HMS predicted flow rates and the calculated capacities. The HEC-HMS reaches used for the predicted flow rates are provided in the last column. In some cases, a culvert is located in the middle of a reach or sub-watershed, such that peak flows were prorated based on drainage area contributory to the culvert.

The adequacy of a culvert was determined by calculating the water surface elevation required to drive the 10 year and 100 year peak flow rates through the existing culvert. If the 10 year water surface elevation was higher than the culvert inlet pipe crest <u>or</u> the 100 year water surface elevation was 0.5 ft or more above the lowest point along the crest of the road crossing, then the capacity of the culvert was deemed inadequate.

Table 6-1: Culvert design parameters used in hydraulic analyses.

Culvert	Culvert Length (ft)	Diam. (ft)/ W x H	Type	Shape	Invert Elev. (ft)	Outlet Elev. (ft)	Road elev. (ft)
01_C_01	95.68	18"	CMP	circular	444.64	443.4	460
01_C_02A	41.20	18"	CMP	circular	424.39	424.12	426.45
01_C_02B	40.26	18"	CMP	circular	423.84	423.43	426
01_C_03	74.77	24"	CMP	circular	424.44	422.36	426.4
02_C_01	105 & 110	28" x 20"	double barrel CMP	oval	414.52	413.17	417.03
02_C_02	30.00	18"	CMP	circular	402.59	401.72	404.4
02_C_03	50.88	18"	CPE	circular	398.21	397.02	400.3
03_C_01	59.17	48" x 30"	CMP	oval	404.32	404	408.01
03_C_02	55.85	40"	HDPE-S	circular	394.35	393.02	398.67
04_C_01	71.20	24"	CMP	circular	395.99	391.67	398.7
04_C_02	59.40	24"	HDPE-S	circular	388.43	385.64	391.7
05_C_01	60.32	24"	CMP	circular	384.61	384.47	389.1
06_C_01A	98.25	48"	CMP	circular	383.64	379.96	388.2
06_C_01B	98.25	30"	CMP	circular	383.58	382.15	388.2
07_C_01	100.00	24"	HDPE-S	circular	361.59	347.86	370.3
08_C_02	118.44	52"	RCP	circular	326.88	325.16	346
09_C_01A	478.83	40"	HDPE-S	circular	367.01	333.7	40
10_C_01	164.00	36"	CMP	circular	342.14	339.59	360.4
10_C_02	104.97	60"	RCP	circular	331.69	330.46	346
10_C_03	745.55	36"	RCP/CMP	circular	352.68	338.39	361
12_C_01	109.27	48"	CMP	circular	294.85	293.78	315.5
14_C_01	162.18	48"	CMP	circular	265.94	262.27	303
15_C_01	124.57	48"	CMP	circular	225.34	215.33	233.5
16_C_01	56.23	24"	CMP	circular	271.77	269.51	275.5
17_C_01	35.07	14.4' x 8'	Concrete Earth Floor	Box w/dome roof	189.22	188.74	204.26
18_C_01	55.36	6' x 4'	RCB	Box	196.66	196	202.5
21_C_01	65.26	triple 28" x 24"	Synthetic Fiberglass	Oval	164.16	163.26	169
25_C_01A	130.10	double 48"	RCP	circular	115.59	112.6	123.5
25_C_01B	130.10	triple 18"	RCP	circular	113.86	110.09	123.5
25_C_02	120.34	double 48"	RCP	circular	112.73	111.31	118.53
25_C_03	59.00	14' x 7.7'	RCB	Box	110.23	110.23	120.65
26_C_01	67.13	36"	HDPE-S	circular	120.87	117.5	124.63
27_C_01	43.40	14' x 8'	RCB	Box	108.8	108.45	120.1
27_C_02	27.10	14' x 6.7'	RCB	Box	109.85	109.55	119.4
27_C_03	379.75	87.6"	CMP	circular	103.6	98.3	111.7
27_C_04	41.10	6' x 8'	RCB	Box	88.32	88	98.2
28_C_01	91.50	10.1' x 8'	RCB	Box	81.9	81.4	91.3
28_C_02	102.8	3' x 3'	RCB	Box	83.46	79.76	101
29_C_01	67.5	6' x 8'	RCB	Box	76.52	75.63	84.25
29_C_03	14	user defined	Wood w/concrete walls	Bridge	62.87	60.68	71
29_C_04	12	user defined	Wood w/concrete walls	Bridge	59.66	58.44	69.54
29_C_05	13	48"	CMP	circular	51.1	50.88	55
29_C_05A	10	12' x 8'	concrete	bridge	55.1	54.88	65
29_C_06	11.7	user defined	concrete	bridge	45.8	45.6	57.9
29_C_07	40.66	6' x 8.25'	RCB	Box	42.27	40.1	51
29_C_08	706.3	8' x 8'	RCB	Box	16.54	12.79	30
30_C_01	136.9	6' x 6'	RCB	Box	10.77	10.43	46.12
30_C_02	10.75	100' x 7'(in middle)	wood	arched bridge	10.3	10	14.5
30_C_03	91	double 16' x 7'	RCB	Box	6.2	6.1	15.3
30_C_03B	17	double 21.36' x 7'	RCB	Box	6	6	16.57
30_C_04	51.3	double 8' x 6'	RCB	Box	9.3	9	16.4
30_C_05	768.9	Quad 6' x 6'	RCB	Box	8.66	7.3	17.1
LS_C_01	2640	15"	CPE	circular	743.14	507.75	751

Table 6-2: Comparison of culvert capacities with 10 and 100 year flows.

Culverts 30_C_02, 30_C_03, and 30_C_03B are within the lakes and therefore flow rates are not computed.

Culvert	Culvert Capacity (cfs)	10-year Flow (cfs)	100-year Flow (cfs)	Modeled Outflow from:
01_C_01	25	16	55	Prorated
01_C_02A	7	33	115	Prorated
01_C_02B	8	33	115	Prorated
01_C_03	13	4	15	Prorated
02_C_01	31	42	178	Sub_2
02_C_02	7	2	8	Prorated
02_C_03	10	2	8	Prorated
03_C_01	41	95	362	Prorated
03_C_02	65	100	379	Sub_3 + R_02_03
04_C_01	16	12	35	04_B_02
04_C_02	19	2	6	Prorated
05_C_01	20	7	22	05_B_01
06_C_01A	111	54	378	06_B_01
06_C_01B				
07_C_01	43	10	36	Prorated
08_C_02	294	76	507	J_08_09
09_C_01A	70	9	61	9_B_01
10_C_01	89	56	389	07_B_01
10_C_02	422	56	372	R_07_08
10_C_03	89	64	199	10_B_04
12_C_01	220	145	660	12_B_02
14_C_01	285	144	481	14_B_01
15_C_01	130	150	483	J_15
16_C_01	21	1	15	Sub_16a
17_C_01	1282	156	489	J_17
18_C_01	198	25	195	J_16b_17_18
21_C_01	105	184	578	J_19
25_C_01A	367	227	703	25_B_02
25_C_01B				
25_C_02	236	227	703	25_B_02
25_C_03	1028	236	760	J_25_25c_26
26_C_01	78	13	72	Sub_26
27_C_01	1497	236	760	J_25_25c_26
27_C_02	901	236	760	J_25_25c_26
27_C_03	330	241	769	J_27
27_C_04	450	253	790	J_27 + prorated sub 29b
28_C_01	932	232	756	27b_B_01
28_C_02	230	16	25	Sub_28
29_C_01	334	197	724	29_B_01
29_C_03	450	203	731	J_29_fp_29b
29_C_04	899	203	731	J_29_fp_29b
29_C_05	62	203	731	J_29_fp_29b
29_C_05A	935			J_29_fp_29b
29_C_06	885	203	731	J_29_fp_29b
29_C_07	409	203	731	J_29_fp_29b
29_C_08	805	205	694	29b_B_01
30_C_01	898	366	968	29b_B_01 + Prorated 30
30_C_02	3035			30_B_01
30_C_03	740			30_B_01
30_C_03B	1920			30_B_01
30_C_04	537	258	758	30_B_01
30_C_05	1389	258	758	30_B_01
LS_C_01	16.4	9.5	14	LS_B_01

6.3 Effects of facilities on existing and future flows

Certain facilities listed in Table 6-1 were included in the HEC-HMS model, where the impounding of water by culvert restrictions has the potential to alter flow rates and volumes along the main stem of the creek. The HEC-HMS model was run for both existing and proposed conditions. Proposed conditions are defined by the recommended upgrades to culverts. Recommended culvert upgrades are discussed in Chapter 8. No changes in watershed development, land use, or storm water collection systems were included.

Recommended upgrades to culverts are shown in Table 6-3. These upgrades are based on the increase in capacity needed to pass the modeled 100 year peak discharge with a maximum depth above the roadway of 0.5 feet. All culverts that were deemed inadequate based on the 10 year peak discharge were also inadequate based on the 100 year peak discharge. In some cases, the resulting depth is lower than these criteria because standard culvert sizes were specified.

Table 6-3: Recommended upgrades to existing culverts.

Culvert	Replacement Recommendations
01_C_02	Replace with 10 ft2 area culvert or ditch. 2' X 5' box culvert.
02_C_01	Replace with 16 ft2 area box culvert. 2' X 8' box culvert.
03_C_01	Replace 18 ft2 area box culvert. 3' X 6' box culvert.
03_C_02	Replace with 24 ft2 are box culvert. 4' X 6' box culvert.
10_C_01	Add 48" concrete pipe or equivalent total capacity of 20 ft2.
12_C_01	Add parallel 60" RCP.
14_C_01	Add parallel 30" RCP, or equivalent total capacity of 18 ft2.
15_C_01	Replace with 40 ft2 area box culvert. High priority.
21_C_01	Replace with 70 ft2 area box culvert. High priority.
25_C_01	Replace with 65 ft2 area box culvert. Will reduce detention storage.
25_C_02	Replace with 81 ft2 area box culvert.
27_C_03	Replace with 90 ft2 area box culvert. 12' X 7.5' box as suggested in the 1977 report.
27_C_04	Add parallel 6' X 8' box as suggested in the 1977 report.
29_C_01	Add parallel 6' X 8' box as suggested in the 1977 report.
29_C_03	Replace with 100 ft2 box culvert. Private facility.
29_C_07	Add parallel 100 ft2 box culvert. 6' X 8' box as suggested in the 1977 report.

Figure 6-1 provides plots of the 10 year and 100 year peak flows predicted by the HEC-HMS model along the main stem of Canyon del Rey Creek from the upper most sub-watershed (at the left of the graph) to the outlet from Lake Roberts. Two sets of predictions appear on the graph: one for existing conditions and the other for proposed conditions. Figure 6-2 provides the same plots for total runoff volume.

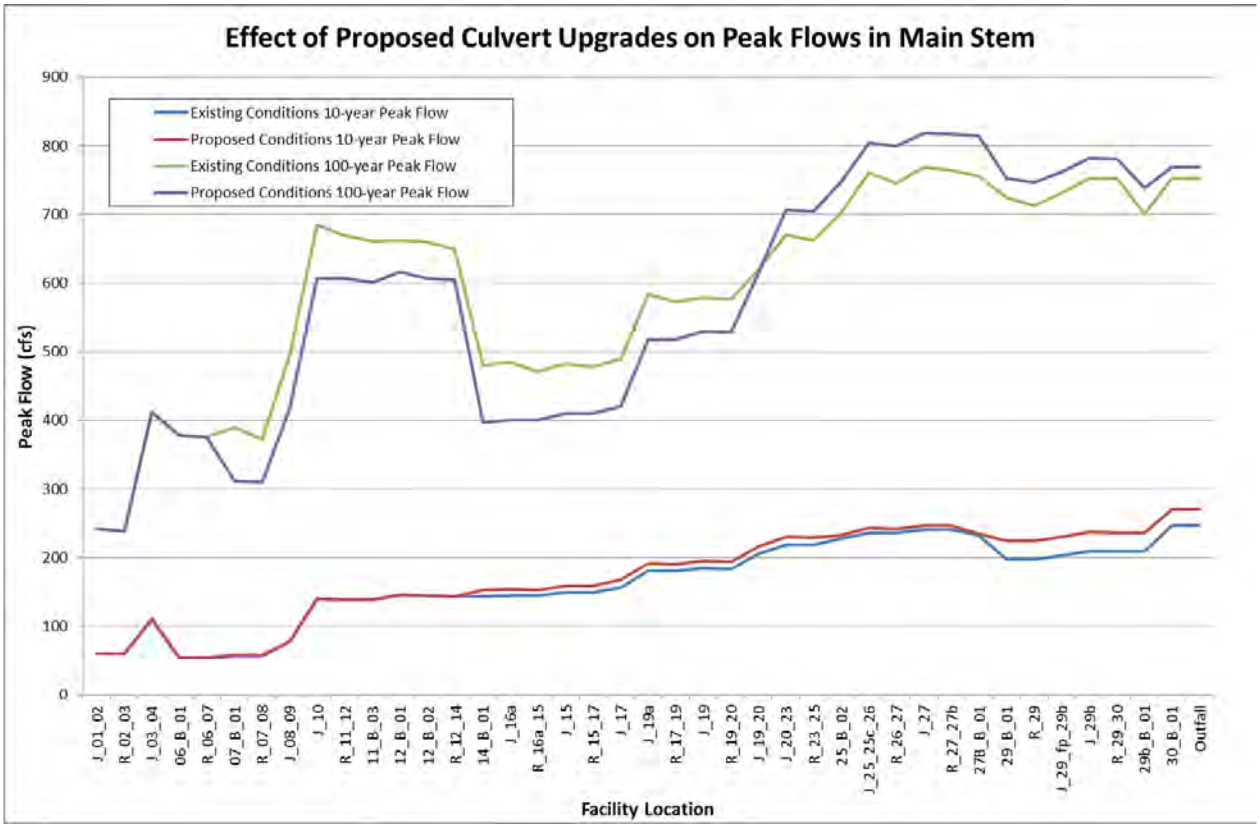


Figure 6-1: Effect of proposed culvert upgrades on future peak flows.

The impact of changes in storage due to enlargement of culvert capacity at several locations can be seen in these graphs. Reductions in water storage at these locations during both the 10 year and 100 year events result in higher runoff volume. The effect, as would be expected, is more pronounced for the 100 year event. Changes in peak discharge due to enlargement of culverts are more complex, particularly for the 100 year event. Timing of peak flows in the main stem relative to peak flows entering the main stem from sub-basins is altered by reductions in storage volume and passage of higher flows through the affected culverts. For some locations peak flows increase by no more than 20%, while at other locations peak flows decrease by no more than 7%. The overall effect of increases in culvert capacity is to increase peak flows and increase runoff volumes during the storm events, both by relatively modest amounts. Increased flows, in turn, will have some effect on stream bank stability. Stream morphology and sediment transport will be discussed in Chapter 7.

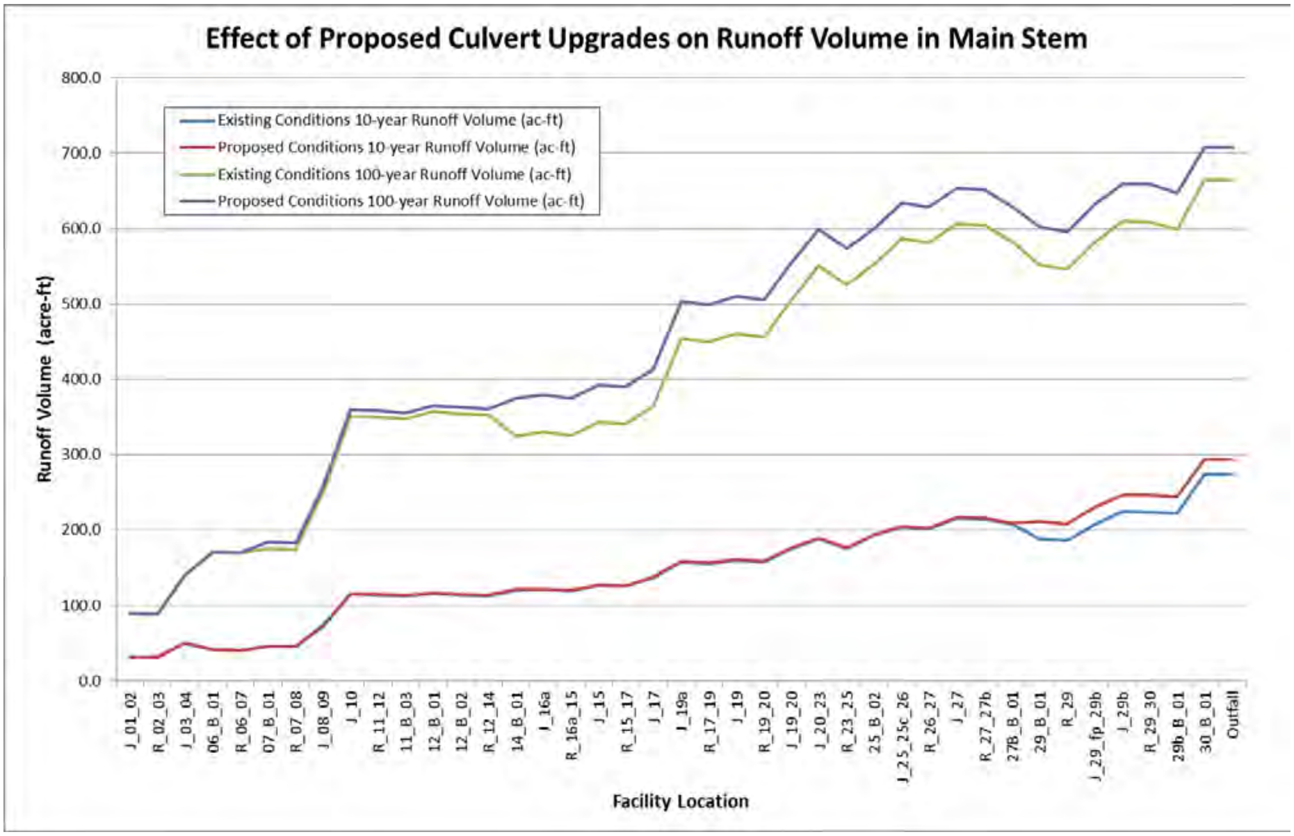


Figure 6-2: Effect of proposed culvert upgrades on future flow volumes.

7 EROSION AND SEDIMENTATION

7.1 Purposes of the geomorphic study

Balance staff worked with MPWMD staff and other cooperators to identify sources, loadings, and storage of sediment in the watershed. Questions addressed included:

1) What are the past, present, and expected future sediment loads from the watershed?

2) Where are the sources of the sediment?

3) Are the drainage facilities for new developments that have been required since the 1977 drainage plan was completed functioning as intended?

The questions called for a strategy of using multiple independent lines of evidence which can (a) yield answers with immediate applicability, (b) be expanded upon in the future, and (c) attempt to quantify existing baseline conditions, such that the success of the 2014 master drainage plan update can be assessed and refined in the future. Following field reconnaissance, we initially approached these questions with a tiered study plan, as follows.

- First, develop an archival or historical assessment of sediment erosion and deposition, and then attempt to quantify the rates of deposition in basins constructed at known times or eroded from migrating, incising channels over known dates

- Second, as conditions allow, measure sediment transport at the MPWMD gage and at the mouth of Roberts Lake,

- Analyze particle-size distributions of sediment in Laguna Grande and Roberts Lake, plus those at the two sediment-transport gages, and

- Develop estimates of sediment loadings into and out of the Laguna Grande/Roberts Lake complex, over a range of year types and watershed conditions, and

- Make informed recommendations regarding dredging and beach augmentation.

INITIAL PARADIGM FOR SEDIMENT TRANSPORT

The 1977 drainage plan identified the Canyon del Rey watershed as a naturally pervious landscape, particularly north of stream. South of the stream, soils were also sandy and transmissive, but thinner and less pervious. The primary sediment sources are often south of the stream, particularly when sedimentation from episodic events (see below) are factored in. The geomorphic evidence suggests that most sediment is mobilized and transported to the main channels at high rainfall intensities during periods of watershed saturation.

In addition, regarding Roberts Lake and Laguna del Rey, the 1977 report indicates sand is possibly transported from the watershed to the ocean via the lagoon. This implies the lagoon fills with sediment pulses which continue on to the beach and ocean, over the outlet weir at Roberts Lake and under the highway through the culvert.

To estimate sediment loading, the authors of the 1977 report used indirect methods to estimate annual sediment yield. One method looked at the lake levels versus mean sea level, which yielded high results and was qualified as a less accurate estimate. Acknowledging the uncertainties with the estimated sediment load from the lake bed elevation estimates, a method of similitude was used to estimate annual yield. The similarly-sandy Colma Creek watershed in the Bay Area was used for similitude and comparison, using the 1970 water year, one with near-average rainfall and rainfall intensities. The resulting estimated annual sediment yield in the 1977 report was 50 tons per square mile, or 700 tons per year at the MPWMD gage site.

Regarding depositional zones, the 1977 drainage plan identified two significant deposition zones:

- Upstream of Fremont Blvd (Safeway center) on lower watershed
- Roberts Lake and Laguna del Rey

Since 1977, watershed conditions have changed significantly due to residential and industrial development.

GEOMORPHIC EVOLUTION

Sediment transport and deposition through the main channels of the Canyon del Rey hydrographic network are complex products of both pre-historic and historic processes and events. For most readers, it will prove very helpful to review the effects of the past 20,000 to 100,000 years and of the past 200 years (see next two sections) to better understand why certain segments of the channel are deeply incised while others have been depositional reaches for centuries, if not longer. Many of these insights are new, developed during this study. They also point toward changes in drainage and sediment management which may be needed in the foreseeable future of perhaps 50 to 100 years.

The geomorphic history of the past 100,000+ years contributes to development of discrete sedimentation chambers in the Canyon del Rey watershed. Key processes and events contributing to the semi-segregated chambers include:

a. *Late-Pleistocene Valley Incision and Refilling:* Sea-level decline and the cooler, wetter climate of the last two major glaciations led to sea level declines to a maximum about 412 feet in the Monterey Bay area. Most major streams, including Canyon del Rey incised down to the glacial age sea level, leaving steep-walled canyons much deeper than the current valley floors, with thalwegs typically 160 to 180 feet below sea level at the modern coastline. In all likelihood, the glacial longitudinal profile of Canyon del Rey of 20,000 years ago was steeper, with depths tapering upstream to meet today's valley floor. If Canyon del Rey were like several other Monterey Bay Area streams, such as Scott and Waddell Creeks or the Salinas River, the beds of the glacial-age channels would taper upstream to meet the present-day profiles at elevations of roughly 200 to 240 feet, corresponding to the location of the Laguna Seca turnoff from Highway 68. We believe that almost all of the valley floor west of the Laguna Seca turnoff is younger than 20,000 years; additionally, there are areas where much younger deposits have re-configured the valley floor.

b. *Work Park Landslides:* Much of the northern side of Canyon del Rey Valley between Fremont Blvd and Frog Pond Wetland Preserve is a complex of ancient rotational landslides heading at the top of bluff above Highway 218 (Clark and others, 1997). Bedrock in this area is Monterey shale, buried at depths of only several tens of feet beneath terrace deposits and sand dunes. As in most valleys which were incised into the shale bedrock during the glacial sea-level minima, large landslide complexes filled the valleys which undermined the shaley slopes[3] (see Appendix G, Figure G-5). Canyon del Rey remains steeper in this reach, where the rubble within the large slides has tended to stabilize the valley floor, leaving a steeper longitudinal slope (see Figure 7-1).

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[3] The closest analogy for large landslides in the shales may be the southern side of the Carmel Valley, particularly between Las Garzas and Potrero Creeks, where similar large valley-lateral slope failures form most of the southern slope of the valley. Other shale valley slopes which failed in valleys cut down to the lowered sea level are massive landslides in the lower portions of Potrero, San Jose, and (in Santa Cruz County) Majors, Scott and Waddell Creeks (Hecht and Rusmore, 1973). Almost all streams in the region which drain to the Pacific or Monterey Bay exhibit these near-coast landslide complexes, if they are underlain by shale or mudstone bedrock (generally mapped as Monterey formation or Santa Cruz mudstone) have large similar near-coast landslide complexes.

c. *Landslides from the southern side of the valley:* Large landslides, again with Monterey-shale bedrock underpinnings, have added sediment to the valley floor, (a) through erosion of the slide mass (e.g., Boots Road), (b) formation of large alluvial fans which discharge to the Canyon del Rey main channel and/or are being eroded at their toes, and (c) deposition behind landslide debris or natural levees which temporarily (in a geomorphic sense) dam the channels and impose deposition.

Examples of each type of deposition are shown in Appendix G, keyed to the (a), (b) (c) description above.

Sometimes, it is not entirely clear what processes have created the deposition which creates an irregular (or 'crenulated') longitudinal profile. For example, Professor Doug Smith of CSUMB has shared with us a well log for a valley-floor well near Highway 218 on the parcel east of General Jim Moore Drive (GJMD, formerly called the North-South Road), between Frog Pond and Tarpy's Corner (Table 7-1):

Table 7-1: Well Log for abandoned well east of GJMD and east of Frog Pond.

Depth (feet)	Description	Interpretation
0' to 3'	sand	Historical deposition (?)
3' to 15'	black clay	Pre-historical ponding and deposition
15' to 46'	sand and gravel	Pleistocene deposition
46'	shale	Bedrock or landslide deposits, possibly re-worked by proto-Canyon del Rey channel

The bedrock underlying the valley here is at a depth of (at least) 46 feet, overlain by deposits of sand and gravel, which likely were deposited as basal alluvium of an ancient Canyon del Rey main channel draining to a much lower Monterey Bay (see Table 7-1). Fifteen feet of black clay likely represents deposits of suspended sediment ponded behind a landslide presumably in Work Park, or deposits in a drowned valley gradually filling in as sea level rose following the maximum extent of glaciation (see Figure 7-1 and Figure 7-2). The three feet of sand at the top of the well log may be sediment from historic changes in the Canyon del Rey channel, or they might also include some pre-historic but geomorphically recent deposits as the channel finally filled the ponded area -- perhaps because deposition had finally filled the available storage area in that compartment, and that sediment from upstream could now be moved downstream to begin filling it even further.

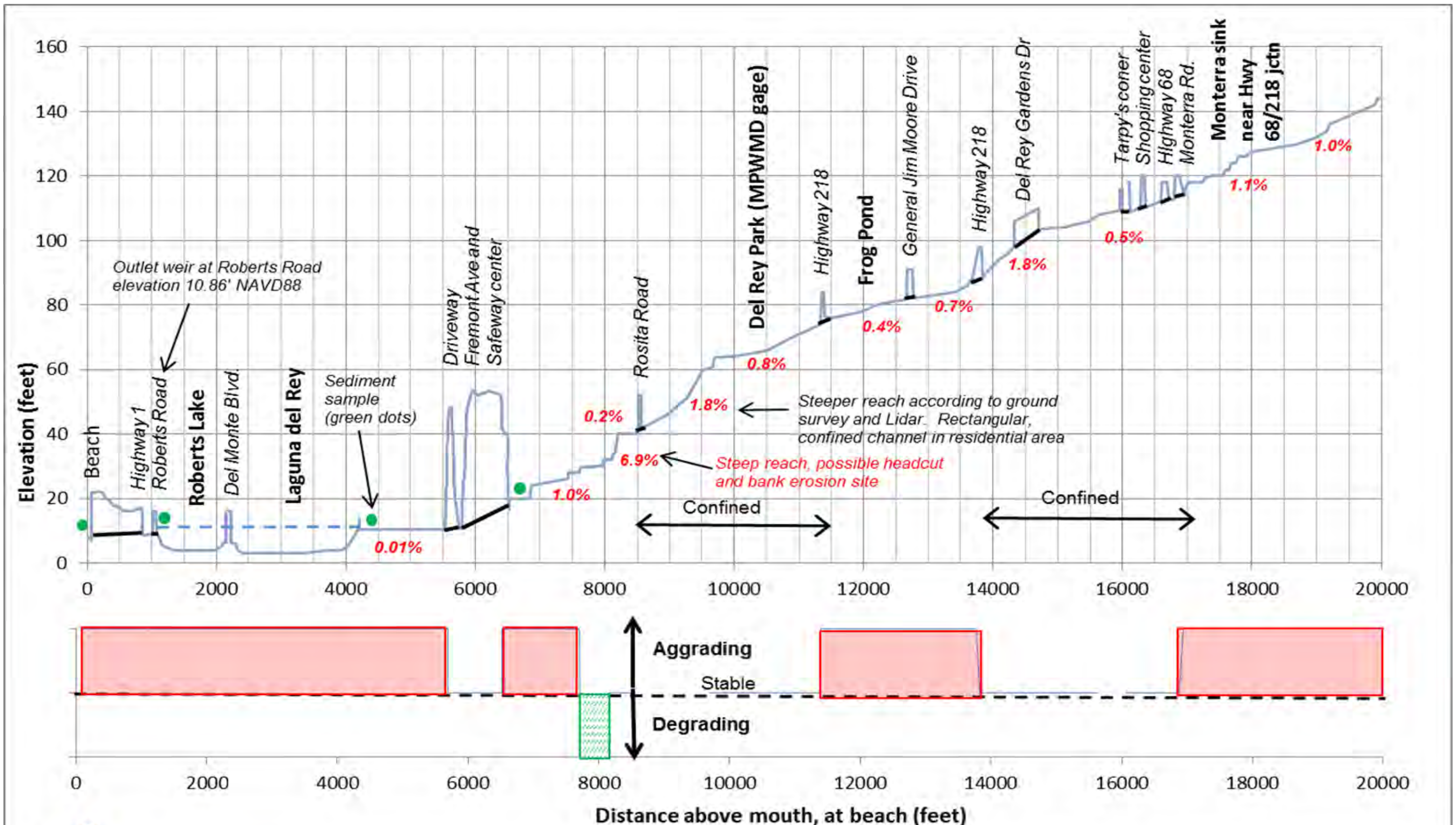

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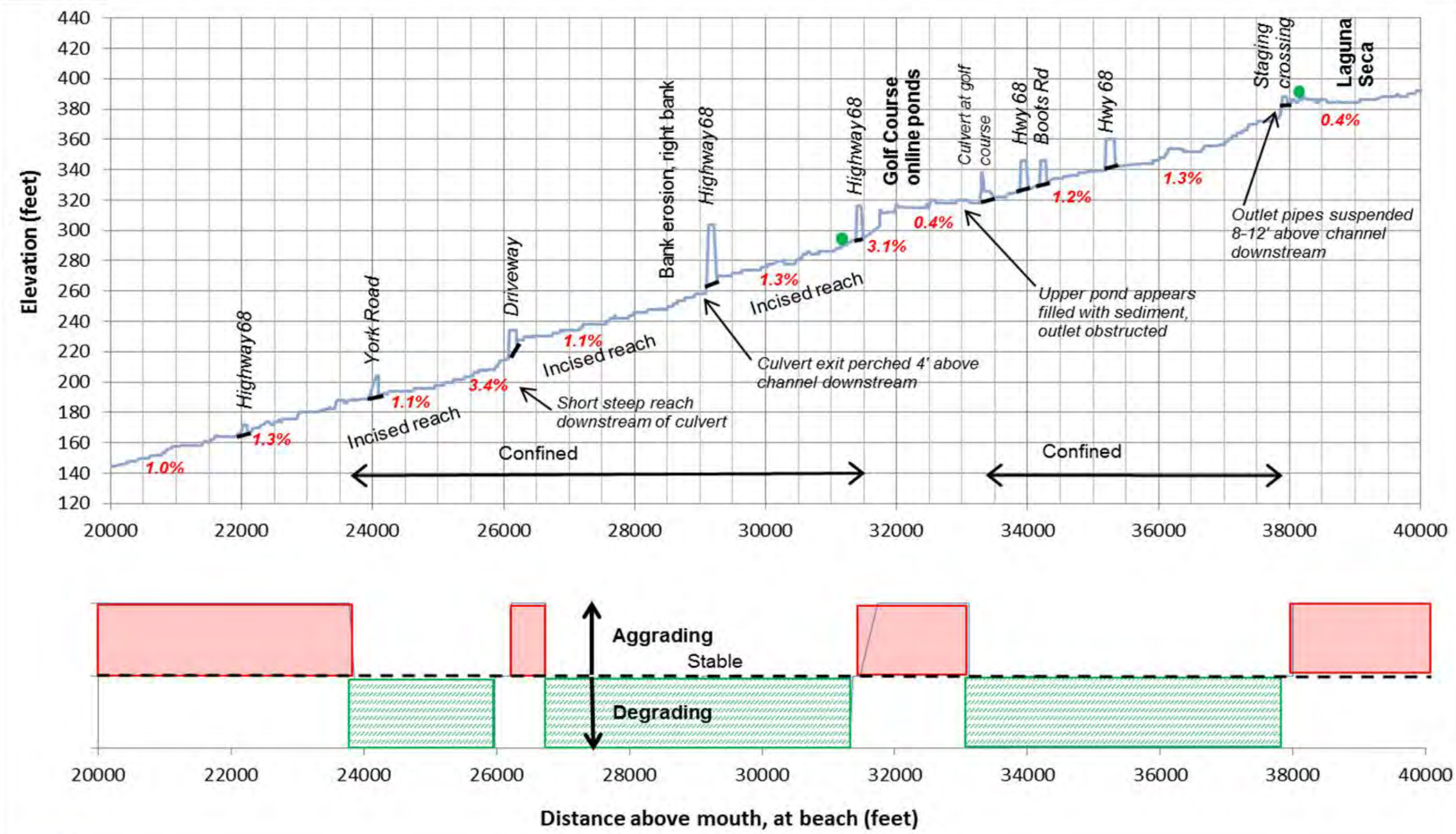
Figure 7-1: Profile and geomorphic interpretation of lower reach of Canyon del Rey, Monterey County, California.
Aggrading and degrading (incising) reaches shown schematically only. Profile data from 2007 LiDAR map from AMBAG.

212050 CdR profile-geomorph-sed loads.xlsx



212050 CdR profile-geomorph-sed loads.xlsx

Figure 7-2: Profile and geomorphic interpretation of upper reaches of Canyon del Rey Monterey County, California.
Aggrading and degrading (incising) reaches shown schematically only. Profile data from 2007 LiDAR map from AMBAG. Vertical exaggeration is about half as shown for lower reaches.

The geomorphic evidence seems clear that the Canyon del Rey watershed has been progressively (and probably continuously, in a geologic sense) depositing sediment near the axis of the valley.

According to Cain (1995), Laguna Grande was originally constructed in the late 1870s by excavating an 11-acre marsh for a recreational lake, as part of construction of Hotel del Monte (see Figure 7-3). Over time, the lake has been dredged. The original intent of dredging is not clearly known, but it is speculated that development from 1950 to 1970 created a large pulse of legacy sediment that ultimately ended up trapped above Fremont Avenue and in the lakes. This prompted a dredging operation to deepen the lakes for capacity and to deter vegetation growth in shallow water.

Laguna del Rey was a natural marsh dredged to create an 11-acre lake. When the hotel opened in June 1880, it was christened Lake Como, and rowboats supplied to guests were called gondolas in an attempt to evoke the Italian Riviera. The name was used for only a few months before the lake was dubbed Laguna del Rey. (Photograph by R. Arnold; courtesy of Pat Hathaway.)

Figure 7-3: Historic Photo of Laguna del Rey showing original lake and Hotel del Monte, circa 1880 per Cain (2005).

REVISIONS NEEDED BASED ON FIELD OBSERVATIONS

Field evidence shows that runoff and sediment-transport regime is highly defined by a compartmentalized system and episodic (high flow) events that mobilize sediment and may reconfigure or re-align the channel.

A key observation is that there seems to be minimal deposition in Roberts Lagoon and Laguna Grande since the 1983 dredging, based on bathymetry measurements and acoustical profiling by CSUMB. Both impoundments are relatively unchanged since the last dredging operation in 1983[4]. The CSUMB bathymetric survey was commissioned as part of the current report. The resulting output is shown on Figure 2-4. The highly accurate survey actually shows treads and tracks from heavy equipment, presumably a remnant from original dredging operation in 1983, and likely an indication of less than 1 or 2 inches of deposition over the past 30 years[5]. This leads to a finding that

[4] The date of the last dredging of the lakes is thought to be 1983.

[5] Deposition in the lakes includes not only fluvial sediment delivered from the watershed, but also other sources, such as sand blowing in from the beach and the dunefield to the northwest. This is further discussed in the sedimentologic analysis below.

sediment from the watershed is not appreciably delivered to the beach and ocean through Laguna Del Rey and Roberts Lake.

The results of the CSUMB study are supported by three other lines of evidence:

- The delta at the head of Laguna Grande has prograded very slowly into the lake. If significant silt, sand, and fine gravel were being transported by Canyon del Rey, a discernible expansion of the delta into the lake would be observed (see Figure 7-4). Other coastal channels with low rates of sediment delivery show evidence of distinct and quantifiable delta growth into their respective downstream lakes; one example is Antonelli's Lagoon in Santa Cruz, where sediment yields of 50 tons/sq mi/yr (similar to what was estimated for Canyon del Rey in the 1977 report) defined a discernible delta (see Hecht, 1980).

- No discernible deposition in other locations of near-zero flow, such as backwater corners of Laguna Grande, or in the lees of islands.

- Little change in the particle sizes of samples taken from the bed surfaces of the two lakes; downstream fining would be expected if substantial sediment loads were passing through the system.

In addition, this past water year, a hopeful time for storm measurements, has been very dry. The largest storms occurred in December 2012 in the beginning of the water year. Total rainfall for water year 2013 at San Clemente Dam is estimated as 14.6 inches, compared to 21.3 inches for an average year, about 69 percent of an average, well below the average year. As a result, the original proposed plan to conduct flow and sediment load measurements and produce annual sediment yield based on these measurements was not available. The new approach used indirect measurements and deconstructed sediment transport histories from a study of sediment samples, geomorphology, geology, and system infrastructure. There are distinct points along the Canyon del Rey flow path that are intercepted by hydraulic controls.

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Figure 7-4: Historic progression of delta in Laguna del Rey.

Another observation that shaped our analysis is observation of long incised and confined channel reaches, with evidence of bank slumping and erosion. Road crossing culverts and drop inlet culverts were observed to apparently intercept incision and reset the incision processes.

Also, as built information of sediment basins was limited, if not unavailable. This affected the process estimating sediment transport rates based on basin data, leveraging an indirect approach.

A refocused approach to sediment transport and trapping within the upper watershed was therefore implemented to evaluate upstream conditions.

REVISED APPROACH

The revised approach considers the compartmentalized hydrologic system of Canyon del Rey. The sediment transport regime in the current system is a sequence of filling and spilling sediment compartments, starting in the upper subwatersheds, leading to less sediment in the lower watersheds. Typical processes of sedimentation in a compartment are shown on Figure 7-5. An additional process of aggradation from bankline and in-channel vegetation is shown on Figure 7-5 to amend findings from Brown and Jackson (1973). Heavy vegetation in a flowing channel tends to slow flow and promote additional aggradation and sediment trapping, particularly at the upstream end of a basin near the deltaic deposits.

Episodic events are viewed to fill the upper basin compartments, facilitating sediment transport when the hydraulic structures are overwhelmed. The resulting transport scenario is typically low rates of transport with periodic high sediment loads advancing down the system when a compartment is overwhelmed.

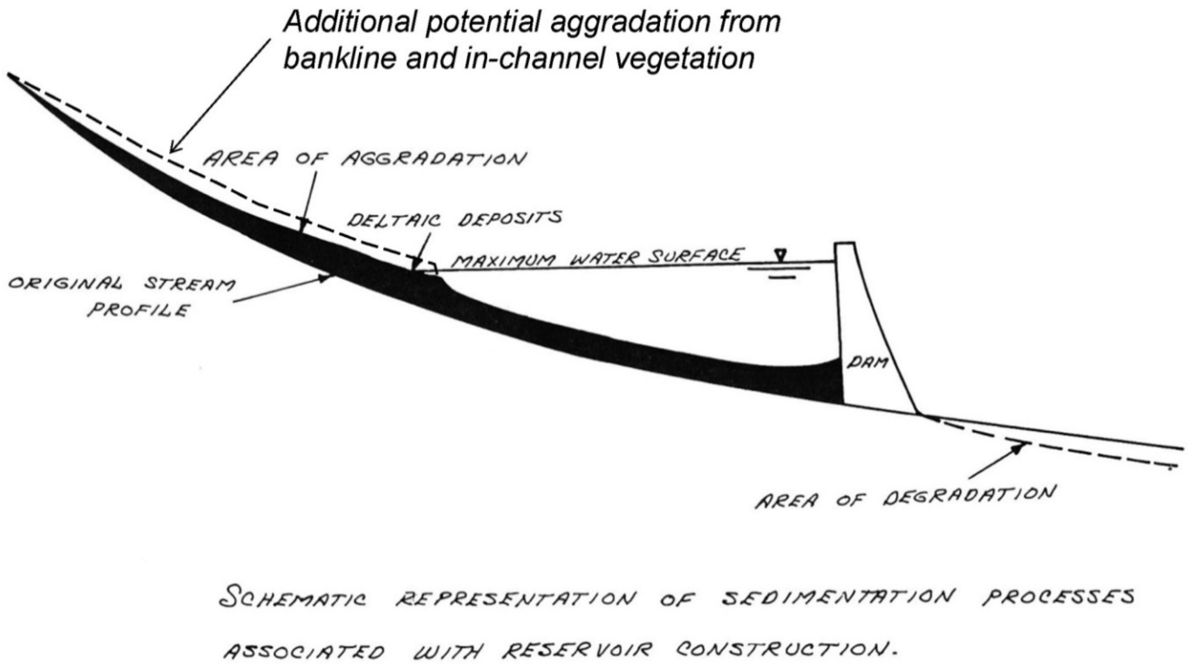
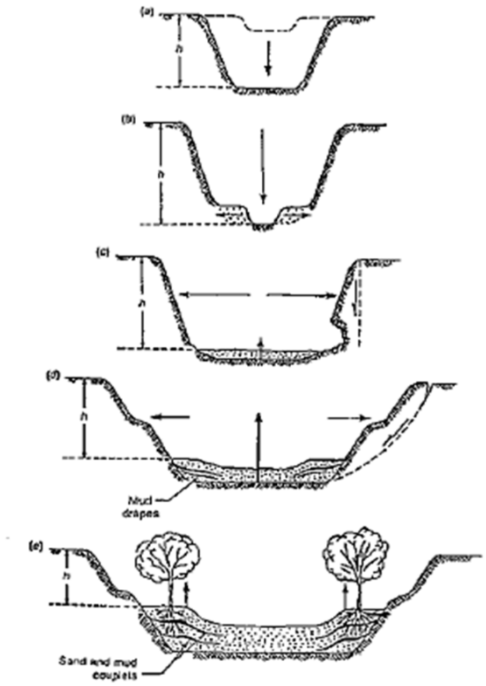


Figure 7-5: Conceptual profile of aggradation process upstream of a dam per Brown and Jackson (1973).

In addition, as sediment is trapped successively in the compartments moving downstream, fluvial processes are influenced by 'hungry water' that draws sediment from the channel bed and banks. These reaches are viewed to be in various states of incision, as described by Schumm (1984) and shown on Figure 7-6. The incision is further exacerbated by increased peak runoff rates due to development and increased impervious area, relative to conditions in reported in 1977 and to native geomorphic conditions.



Evolution of incised channel from initial incision (a, b) and widening (c, d) to aggradation (d, e) and eventual stability (e) (modified after Schumm *et al.*, 1984). The dashed cross-section (a) represents the pre-incision channel.

Figure 7-6: Conceptual geomorphic cross sections of incision process per Schumm (1984).

In terms of sediment source, it was observed that a main source of sediment in the system is material transport from channel bank erosion. There are long reaches of deeply confined, incised channel with low slopes that tend to promote lateral stream movement and subsequent bank failure. Upland sources of sediment typically originate from the south side of the stream, with some pockets of upland sediment from the north side of the stream.

The reaches in the watershed can be described by function in terms of low range and episodic sediment transport. Each segment of stream can be classified as aggrading, degrading, or ‘stable’, with anthropogenic structural controls regulating pulses of sediment.

The Canyon del Rey watershed is unconventional and further watershed studies are recommended to better understand the processes in the individual subwatersheds and further refine estimates of sediment loading. Indirect methods of sediment loading by the subwatershed and compartment basis were applied for this study. For each compartment, the sediment loading was compared to the estimated capacity remaining in the compartment.

METHODS USED IN ASSESSING COMPARTMENTS

An historical analysis was first performed. This included developing a timeline of historical events and watershed conditions, followed by analysis of aerial photos and historic topographic maps to interpret geomorphic changes in the watershed.

The historic analysis was followed by examination to distinguish compartments within the Canyon del Rey watershed using geology mapping, soils mapping, and structure locations. Field reconnaissance was performed to confirm compartment delineation. We also examined cutbanks in incised reaches of the valley floor to discern depositional patterns over time. Definition of the compartments included the following data and criteria.

7.2 Historical and archival analysis

To further explore background on the CdR watershed several data sources were reviewed to distinguish the history of the watershed and changes since the 1977 stormwater Master Plan. Major events in the watershed were identified. Channel morphology was described using analysis of the stream profile, plan mapping, and field reconnaissance. Analysis of archival data included historic USGS topographic maps and historical aerial photography. Most archival photography was obtained from UC Santa Cruz's Special Collections.

MAJOR EVENTS IN THE WATERSHED

The Canyon del Rey watershed has experienced a period of urban growth starting as early as 1880 with the appearance of the Hotel del Monte. The most dynamic period of urbanization was from 1949 to 1953 (see Figure 7-7). By the mid-1970s, the level of urbanization was estimated to be approaching current conditions.

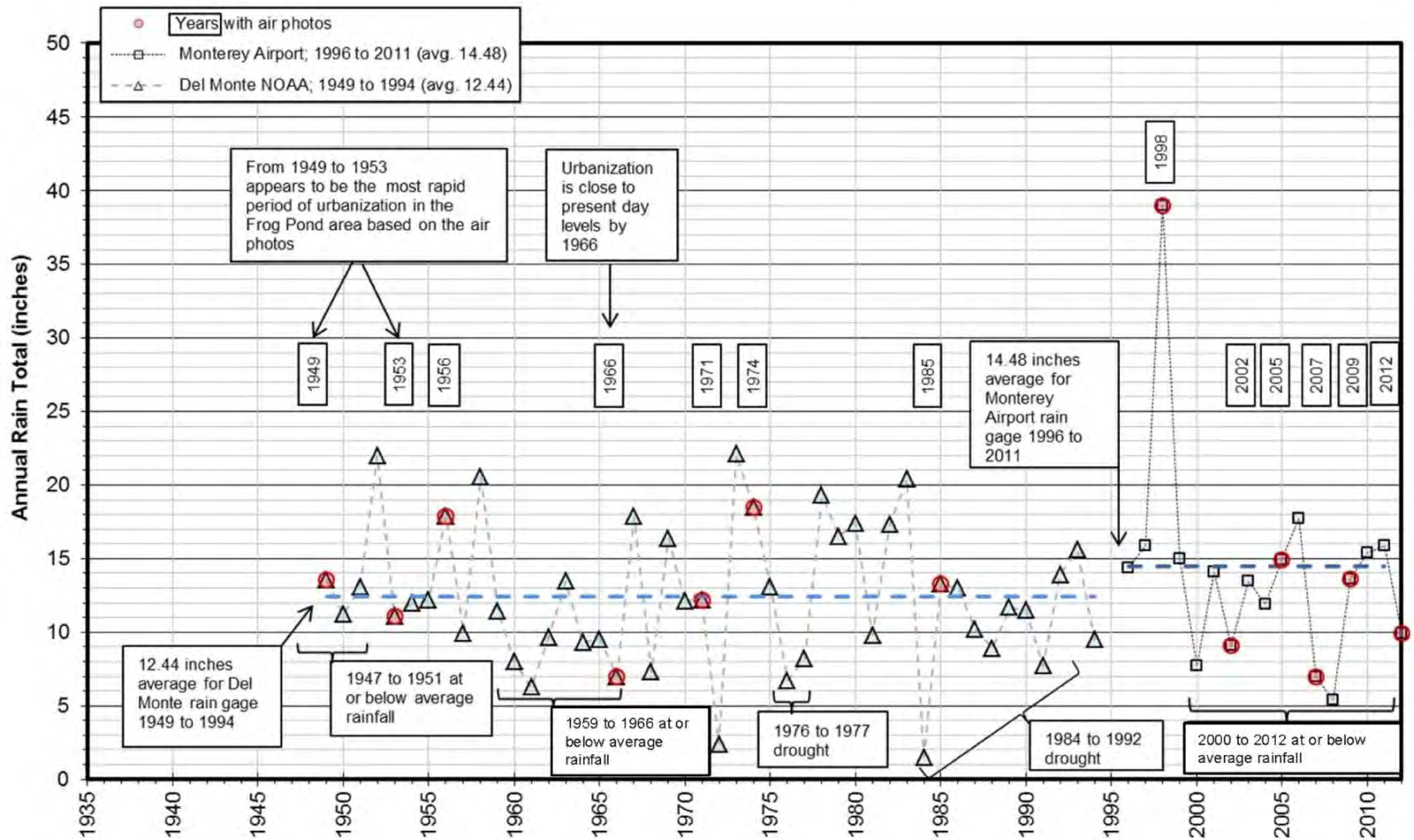


Figure 7-7: Time line of major sedimentological events in Canyon Del Rey Watershed.

Historic water year rainfall records shown for Monterey area including Del Monte NOAA from 1949 to 1994 and Monterey Airport NWSFO from 1996 to 2011.
Source:http://gis.ncdc.noaa.gov/map/viewer/#app=cdo&cfg=cdo&theme=precip&layers=11&node=gis

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GEOLOGY

A description of the geomorphic history is provided above in this section. To expand on the geomorphic history, geology mapping was used to identify sediment sources, trapping locations or compartments, and transport reaches (see Appendix G). Specifically, alluvial deposits (Qa) were located, as well as the older deposits (Qar/Qoa/Qos/Qm), with the intent to identify the extents of geologically recent deposition areas at the transition from Qa to older deposits. In addition, locations of Santa Margarita sandstone were located and mapped as potential sediment sources, typically mapped to the south of the Canyon del Rey channel, which follows Chupines fault line. Further definition of sediment sources were locations of landslides, identified as Qls.

The predominant geology of the watershed north of Canyon del Rey channel is permeable Paso Robles formation (Qtp). Sediment source is less likely north of the creek, with the exception of gullies near Laguna Seca and in areas designated as the Badlands soil type. The role of the northern watershed appears to infiltration and interaction with groundwater levels (Yates and others, 2002), which affects base flow, storm flow peaks (higher ground water = higher peak flows and channel shear stress), and slope stability within the deeply incised creek channel (higher ground water and pore water pressure = more prone to bank erosion).

SOILS

Soils data was procured from the USDA (see Appendix G). Compartment transitions were initially estimated by mapped locations of soils classified as Aquic Xerofluvents, Rindge muck, Elder soils, water, Badlands, as associated with locations of deposition and alluvial material. Delineations of compartments based on soils mapping and interpretation were field confirmed.

STRUCTURES

A detailed hydrologic analysis is provided in Chapters 1 through 6, with accounting of structure types and capacities. The sediment loading and transport analysis utilizes the same nomenclature for the structures and identified major compartments and geomorphic changes, as influenced by infrastructure and stream interceptions.

SEDIMENT-DEPOSITION COMPARTMENTS

Based on analysis of mapping and field confirmation of soils, geology, and structures, locations and extents major compartments were defined and mapped (see Table 7-2). In addition, a profile of Canyon del Rey was developed to identify reach slopes, impoundments/compartments, incised reaches, aggrading reaches, and transport or source reaches (see Figure 7-1 and Figure 7-2). The stream profile and capacity of the compartments were estimated used LiDAR data from 2010 (see Figure 7-8, Figure 7-9, Figure 7-10, Figure

7-11, Table 7-2, Table 7-3, and Table 7-4). As shown on Table 7-2, eight major compartments were identified to trap sediment. Within compartment 6, we have identified Compartment 0 (see Figure 7-11), which is interpreted to currently contribute less sediment load due highly permeable sand in the area (see Appendix G, Figure G-3). No appreciable sediment transport is estimated in Compartment 0 at its current level of development. However, given potential future development in this area (see Section 7.4), sediment load from upland areas was included in this analysis.

Table 7-2: Summary and description of active major compartments in Canyon del Rey watershed.

ID	Description	Station at outlet	Incremental subwsheds	Outlet/Control	Incr. wshed area sq. mi.	Geology and soil influences
1	Upstream of Laguna Seca staging crossing (06_C_01)	379+50	1-6, LS	culvert	2.5	Paso Robles north, Santa Margarita sandstone along the stream, & Monterey formation south with paleo-landslide areas
2	Boots Road (08_C_01 & 09_C_01)	341+00	8, 9	weir	0.9	Paso Robles, Santa Margarita sandstone, & Monterey formation (white diatomite & shale)
3	Golf Course Ponds (12_C_01)	314+85	7, 10-12	culvert	1.3	Mostly Paso Robles, and alluvium (Qa)
4	Sediment sink downstream of York Road above Highway 68 (21_C_01)	221+00	13-20	culvert	2.8	Paso Robles & Qoa to north; Monterey formation south (white-weathering siliceous shale)
5	Monterra sink upstream of Highway 68 and 218 junction (25_B_02)	169+50	21-25, 25b	culverts	1.9	Paso Robles and Monterey formations to south, Qoa throughout, Aromas sand north (Qar); many paleoslides and channel-less valleys on south side
6	Frog Pond /GJM (29_C_01)	114+00	26-28, FP	Weir at Frog Pond; culvert at Hwy 218	2.7	Older alluvium Qoa and Aromas sand (Qar) throughout
7	Work Park to Safeway Center / Fremont Blvd (29_C_08)	65+20	29, 29b	box culvert	0.6	Monterey siliceous shale along the stream, landslide deposits upstream, older coastal dunes (Qod) and coastal terrace deposits (Qc or Qct)
8	Roberts Lake and Laguna del Rey (30_C_04)	10+75	30	weir	1.6	Coastal terrace deposits (Qc)
				total watershed area	**14.3 sq. mi.**	

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Figure 7-8: Canyon Del Rey watershed sediment sources and sinks (lower watershed).
Sediment compartments have been approximated through a combination of field observation, aerial photo and LiDAR interpretation. Polygons in green identify major current sources of sediment and red polygons identify major compartments of sediment deposition. Photo: Google Earth, 2012

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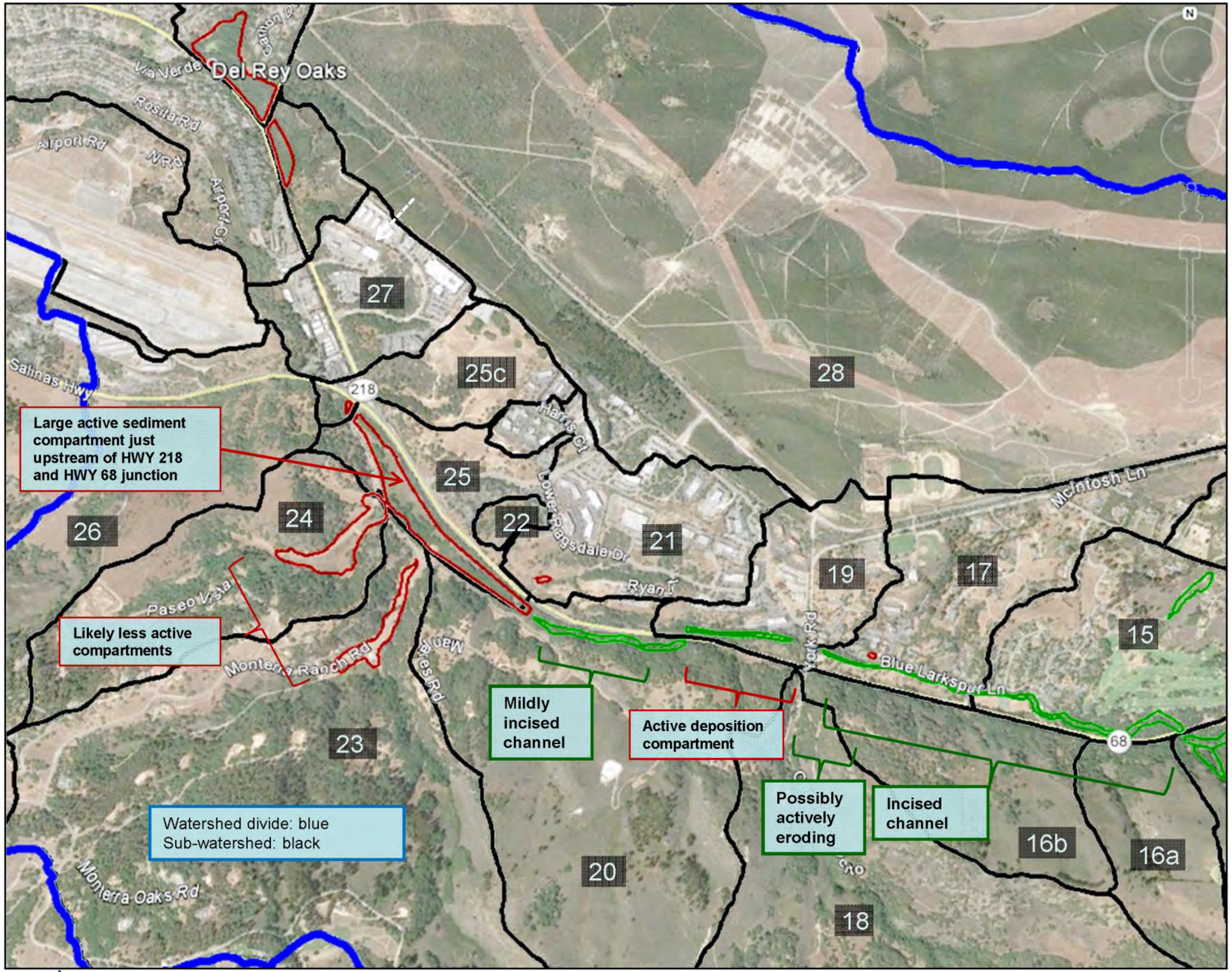

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Figure 7-9: Canyon Del Rey watershed sediment sources and sinks (middle watershed).

Sediment compartments have been approximated through a combination of field observation, aerial photo and LiDAR interpretation. Polygons in green identify major current sources of sediment and red polygons identify major compartments of sediment deposition. Photo: Google Earth, 2012

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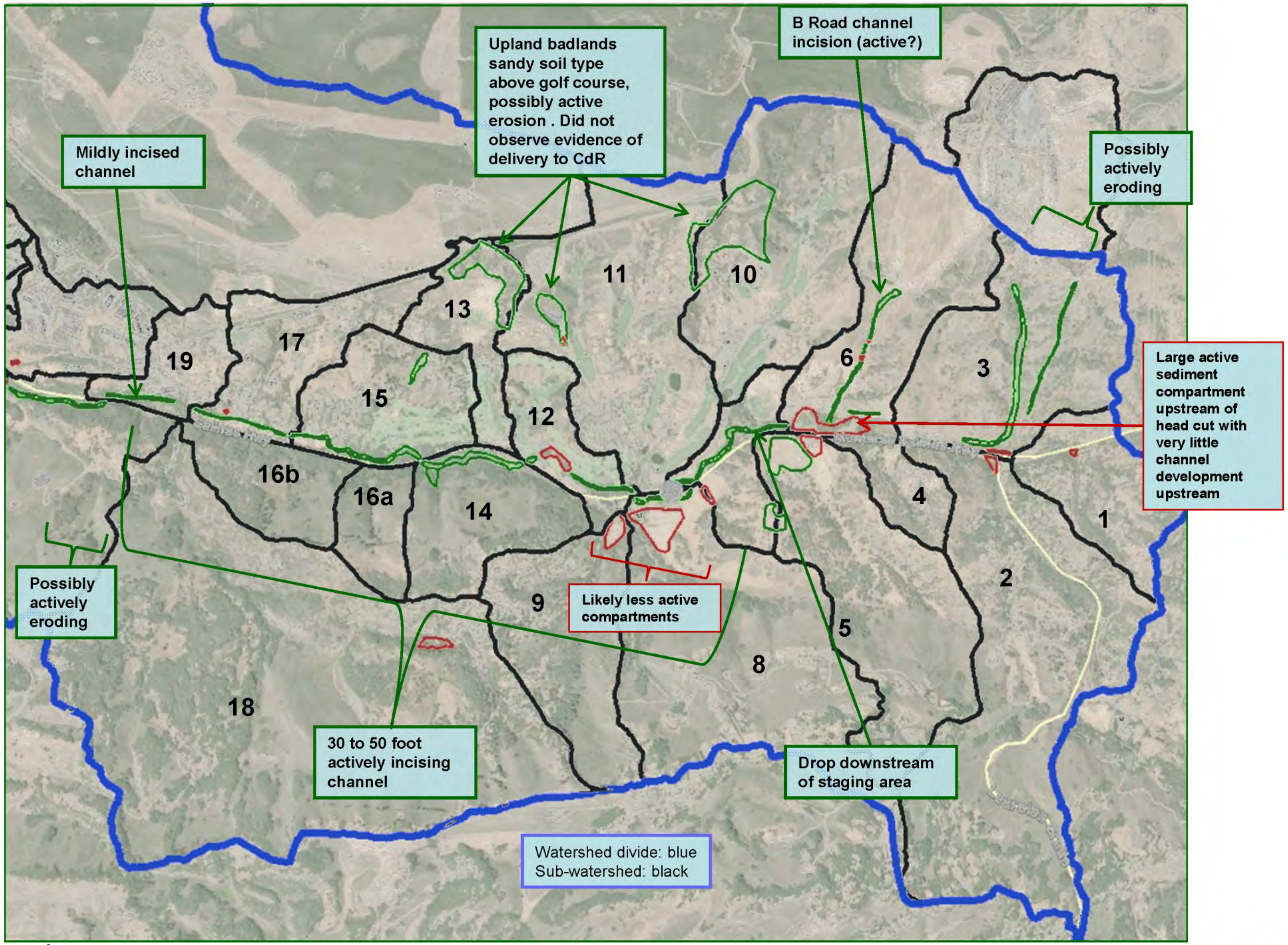

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Figure 7-10: Canyon Del Rey watershed sediment sources and sinks (upper watershed). Sediment compartments have been approximated through a combination of field observation, aerial photo and LiDAR interpretation. Polygons in green identify major current sources of sediment and red polygons identify major compartments of sediment deposition. Photo: Google Earth, 2012.

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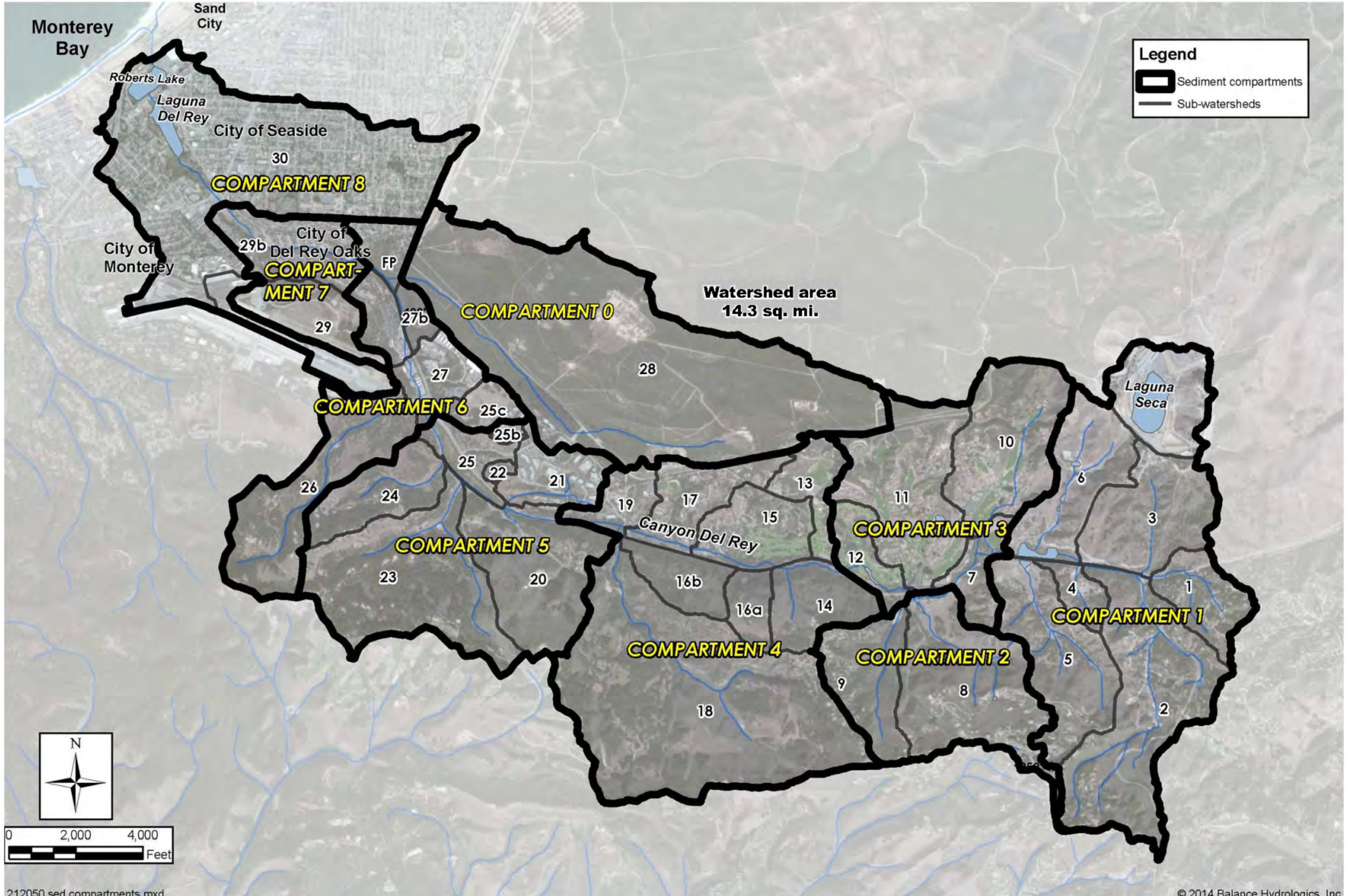

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Figure 7-11: Compartments mapped on aerial photograph, with subwatershed boundaries, Canyon Del Rey, Monterey County

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Table 7-3: Summary of incised reaches and characteristics based on LiDAR analysis and field observations[a].

Incision reach[b]	Length ft	Min depth ft	Max depth ft	Average depth[d] ft	Est. annual net lateral expansion ft	Estimated downcutting[e] ft	Estimated load (total)[f] tons
Laguna Seca staging crossing - Hwy 68 u/s of Boots Road	2550 feet 353+00 to 378+50	20	30	27	0	0	-
Upstream of onstream golf course ponds	2500 feet 326+00 to 352+00	12	20	15	0.1	0	173
Downstream of Hwy 68 and golf course ponds, slide area on left bank	2100 feet 292+50 to 313+50	25	55	35	0.1	0	338
Upstream of private road crossing at east end Blue Larkspur Lane to Hwy 68 crossing	2800 feet 262+50 to 290+50	8	40	10 lower 30 upper	0.1	0.2	464
Upstream of York Road to private road crossing east of Blue Larkspur Lane	1950 feet 241+00 to 260+50	10	20	15	0.1	0.2	278
Downstream of York Road to point upstream of Hwy 68	600 feet 234+00 to 240+00	5	10	7	0.1	0	19
Tarpy's Corner to General Jim Moore (confined[c] reach with multiple culverts)	3800 feet 128+00 to 166+00	5	10	6	0.1	0	105
Rosita Road crossing through Work Park to Hwy 218 at Frog Pond (confined)	2600 feet 86+00 to 112+00	5	10	6	0.1	0	72
Short reach below armored nickpoint, downstream of Rosita, u/s Safeway Center	450 feet 77+50 to 82+00	5	15	8	0.1	0	17
Total Estimated load from incision and downcutting = 1,465 tons							

a. Measurements of length of incision, depth, and channel base width performed on LiDAR base map. Data checked against surveyed elevations from Whitson Engineers and in the field to confirm qualitatively.
b. Numerous short, small incising and filling reaches upstream of Los Laureles Grade appear to be in balance.
c. Confined reaches characterized by lengths of channel that have steep upslopes that extend upward on both sides of the base channel width, which may include narrow flood plains.
d. Depth beneath valley floor per LiDAR measurements, as checked with survey data and field confirmation.
e. Estimated current rate of downcutting, given current grade controls.
f. Total tons estimated based on average depth, length of reach and annual net lateral expansion. Density of sediment assumed to be 92 lbs/cf.

Table 7-4: Summary of compartments, estimated sediment loads, and capacity, Canyon del Rey.

		Sediment load				Estimated capacity left			
ID	description	Upland estimated annual load tons/sq.mi.	Upland estimated annual load tons	Channel estimated annual load tons	Total estimated annual load[a] tons	Estimated capacity left AF	Estimated capacity left[b] tons	Estimated volume remaining[c] years	Notes
1	Upstream of Laguna Seca staging crossing (06_C_01)	50	127	0	127	28.7	57,508	454	Capacity to Elev. 288.0 (road spill)
2	Boots Road (08_C_01 & 09_C_01)	50	45	0	45	1.7	3,406	76	ranges from 0.6 to 1.7 AF at spill to top of wall at Whip Rd) , NIC baseball field
3	Golf Course Ponds (12_C_01)	50	65	173	237	6.4	12,824	54	Combined pond capacities
4	Sediment sink downstream of York Road above Hwy 68 (21_C_01)	50	138	1099	1237	1.0	2,004	2	1 AF+ at road elevation +/-
5	Monterra sink upstream of Hwy 68 and 218 junction (25_B_02)	50	96	0	96	15.7	31,459	328	Capacity at road elev for main alluvial fan, NIC 10 AF (1000 tons) for side basins
6	Frog Pond /GJM (29_C_01)	50	135	177	311	7.0	14,026	45	Estimated as 200,000 sf @ 1.5' deep
7	Work Park to Safeway Center / Fremont Blvd (29_C_08)	50	30	17	47	1.5	3,006	65	1.5 AF+, Estimated as 30,000 sf @ 2' of deposition
8	Roberts Lake and Laguna del Rey (30_C_04)	50	79	0	79	160.0	320,602	4,061	Estimated to spillway at Roberts Lake

a. Mean annual sediment load (or sediment delivery) includes upland and incisional erosion. It does not include sediment delivered directly from episodic events, such as landslides, post-wildfire erosion, or erosion associated with very major floods, for which data are not presently available. See text.

b. Estimated capacity according stage-storage calculations based on LiDAR mapping. Conversion factor for sediment is 92 lbs per cubic foot or 1.24 tons per cubic yard (about 2004 tons per acre-foot)

c. Years of capacity approximated as (estimate capacity left) / (total estimated annual sediment load). No attempt is made to adjust for clearing, treatment, or channel adjustment.

SEDIMENT SOURCES

In the 1977 report, sediment yields were estimated largely on the basis of measurements by Jim Knott (1973) of USGS in sandy soils of similar parent material in the pre-urbanization Colma Creek watershed near San Mateo. We now understand that there are three classes of sediment in the Canyon del Rey watershed which should be distinguished if useful estimates of sediment yields are to be developed:

1. *Upland sources*, which include rills, gullies, and other surfaces outside of the mapped channels. The unit sediment yield of 50 to 100 tons per square mile from the 1977 appears reasonable, and is consistent with

subsequent work in sandy soils in the region, such as measured rates of deposition in Antonellis Lagoon prior to construction of UCSC (Hecht, 1980), transport rates in non-incising watersheds on the north side of the Carmel Valley (Matthews, 1983), and the sandy watersheds of the northern Santa Lucia Mountains (Hecht and Napolitano, 1995). Maps showing known locations of erosional point sources are included in Appendix G.

2. *Channel incision or widening*, which occurs in scattered locations throughout the watershed. We developed an estimate of the sediment yield associated with channel stability in Table 7-3, above. These loads were tabulated based on channel reach and then reorganized by compartment and reported in Table 7-4, along with estimated load from upland sources.

3. *Sediment from exceptional, episodic events*, such as fires, landslides, and truly major storms. Although these rarely occur, episodes can frequently account for half or more of long-term sedimentation in northern Monterey County (e.g., Hecht, 1981; Williams and Mathews, 1986; Hampson, 1995, Hecht, 2000). Episodic sedimentation is often omitted from calculations of sediment yield because such events may not occur during the period in which sediment-transport is typically measured. Based on data from nearby streams and the exposures of the sediments along the Canyon del Rey channels, episodic events have been and are particularly important in this watershed under both pre-European and current conditions. The outcrops showing multiple events which have left beds 3 to 5 feet thick on the floor of Canyon del Rey indicate that drainage and sediment management in this watershed should include plans to manage the roads, channels, and improvements under such conditions. Estimating the frequency and volume of such events is beyond the current scope of work.

Of perhaps equal importance in choosing future management directions is to quantify the locations and amounts of deposition. Under existing conditions, deposition roughly equals sediment delivery, as accumulation of sediment in Laguna Grande/Roberts Lake is essentially undiscernible. Hence, upland plus incisional erosion by definition equal compartment sedimentation. These factors are further discussed in the Implications section of this chapter, below.

SEDIMENT-TRANSPORT MEASUREMENTS

Due to the very dry water years, no substantial bedload- or suspended-sediment measurements could be made. No major storm events produced sufficient runoff to mobilize sediment in a manner justifying transport measurements. For reference, the hydrograph at the MPWMD gage at Work Park in Del Rey Oaks for water year 2013 is shown on Figure 7-12. The project deadline was extended, making it possible to collect sediment samples through the end of February 2014, but similar very dry conditions prevailed. In lieu of storm measurements, bedload samples were taken at strategic points to estimate characteristics of sediment transported in the system and likely depositional locations.

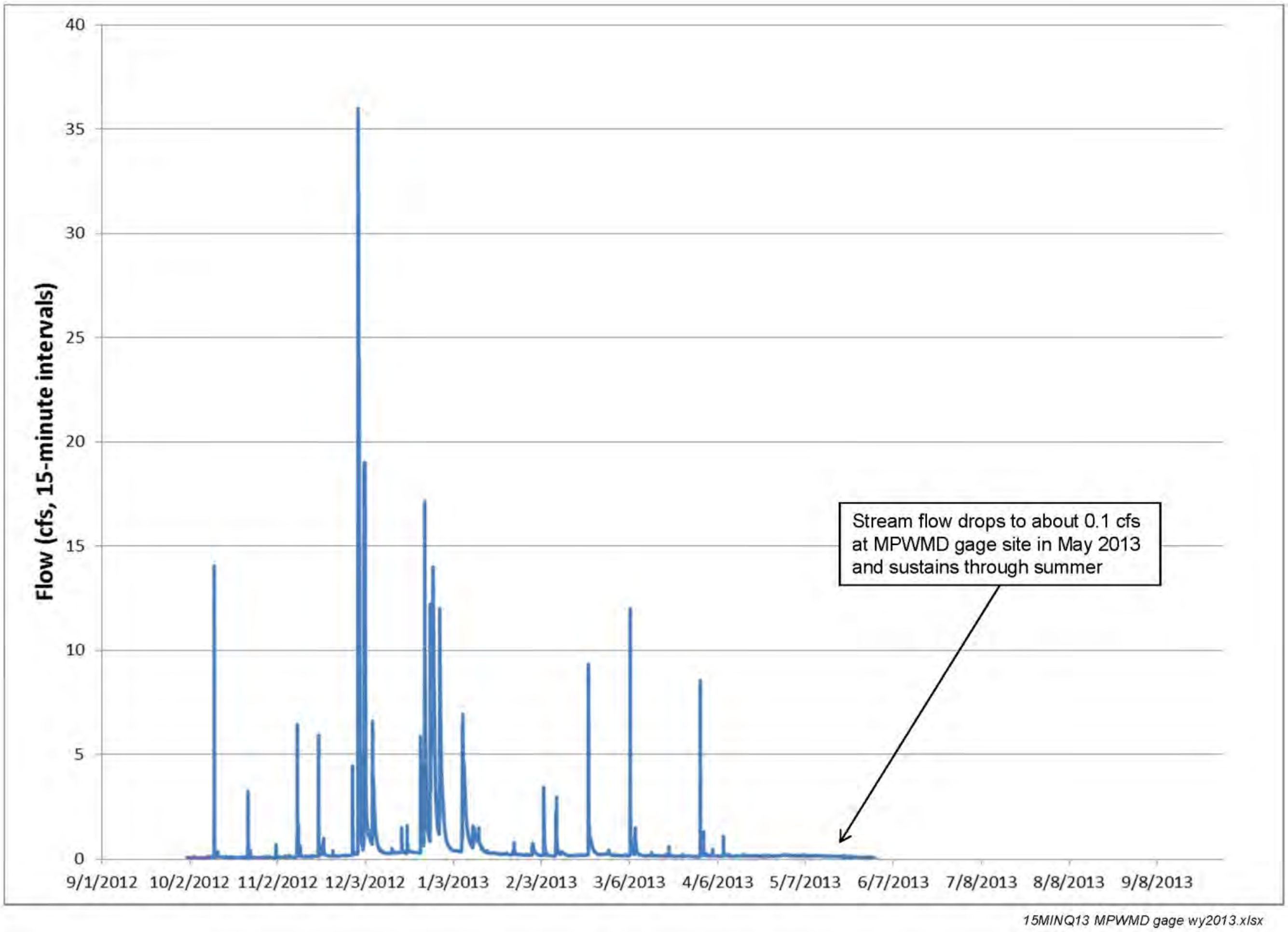

Figure 7-12: Flow at MPWMD gage at Del Rey Park for water year 2013. Flow data courtesy of Greg James of the MPWMD.

Particle Size Analysis of Bed Samples and Beach Sand

Samples of bed material[6] were collected and sieved to quantify particle sizes entering and leaving basins/compartments in the lower Canyon Del Rey watershed, and to support other sedimentological metrics to help characterize the system The results of four samples are discussed below. These samples are classified as either upstream or downstream of the basins of interest. See Figure 7-13 for locations of samples sites.

[6] Bed material is the composition of the bed of a stream, and differs from bedload, which is sediment in transit, and supported by the bed. Bedload is commonly much smaller than bed material.

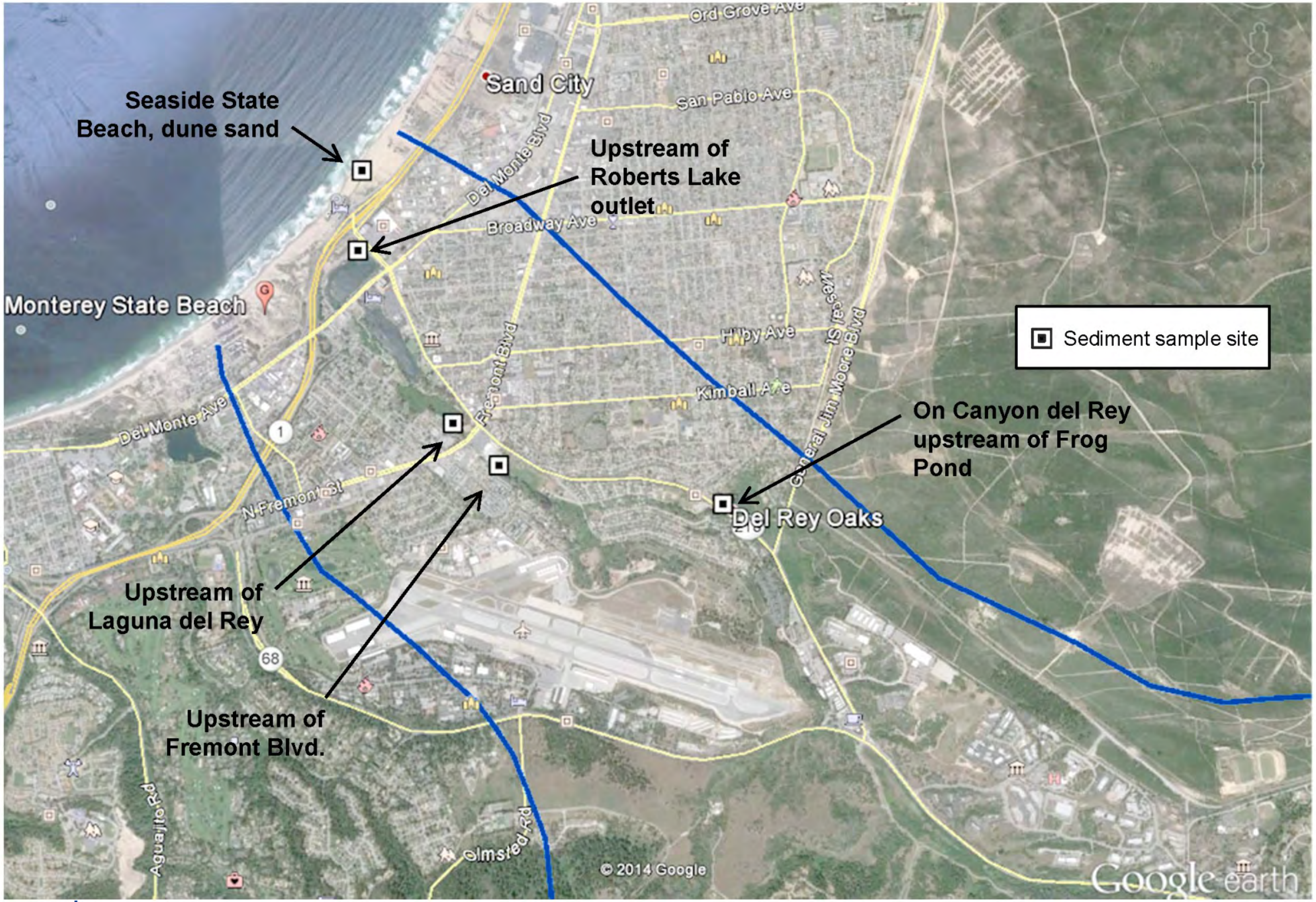

Figure 7-13: Locations of sediment sample sites in lower Canyon del Rey.

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7.3 Evidence from the field

The observed conditions differ sufficiently from the initial conceptual framework for the drainage study that reviewing what we can learn from field observations to check the reasonable of the findings, and perhaps to extrapolate what may occur in the future.

EVIDENCE FROM BANK EXPOSURES

CdR has incised into the valley floor at a number of locations between Tarpy's Corner and Las Laureles Grade, sometimes as deeply as 25 to 30 feet. We looked into what might be seen in these eroding banks, and how it might confirm our inferences regarding sediment source and delivery processes, or redirect how these might be used to plan a sustainable drainage program.

We found that the sediments beneath the valley floor seemed to be predominantly from three sources which we could often (but not always) distinguish:

Overbank deposits from floods: Thinly bedded, generally fine-grained or fine-sand sediments, often alternating light and dark in color, these were likely deposited prior to incision, when the channel was much more shallow.

Inferred south-side sources: Light-colored deposits, often 1 to 4 feet thick, with visible concentrations or bands of angular chunks of light brown or white shale. In most cases, these deposits likely originated as debris flows from canyon-like tributaries on the south side of the valley, or possibly from rapidly incising into the canyon floors and channel-less swale which deliver most of the sediment from the south side of the valley.

Inferred north-side sources: Sandy deposits composed of medium and coarse angular sands containing a fair amount of clay and silt. White or greyish in color, these seem to originate from the 'Badlands Areas' and other portions of the Paso Robles formation, as well as from debris flows or incising channels typical of the of canyons and channel-less swales of the north side of the valley. Where exposed on the floor of Canyon del Rey. These light-colored strata are often 1 to 3 or 4 thick.

Further, we observed in these exposures what we interpret as a continuous depositional sequence, with no obvious breaks in the sequence. We found little or no sign of newer channels cutting through the older deposits, or of reworking of the sediments. We also did not find evidence of primary mudflow deposits which had not been eroded and reworked by the channel. Also, we found no sign of bedrock beneath these flat-lying stream deposits, suggesting that the 40 feet plus of valley-floor deposits recorded in the well near Frog Pond (Table 7-1) may be representative of the depth of fill. All of these observations are consistent with a long history of persistent deposition in compartments, where sediment could be deposited in slow-velocity water spread over much of the valley floor. If so, the flat and wide valley floor shown in the earlier topographic maps was largely unchanged from the gradual filling of the valley that had taken place for many thousands of years. In our view, the compartments were kept from filling because the tributary deposition at narrow points in the valley kept raising the base level of the spillways between the compartments. It is also possible to consider the seemingly even-aged stand of oaks on the valley floor east of York Road (Figure 7-6) as having germinated in the deposits left in that compartment after an event of unknown age perhaps a century or two ago. The date of this event is perhaps not as significant as the extent of its deposits, which seem to have covered much of the valley floor.

In summary, portions of CdR upstream of the Highway 68/218 intersection (Tarpy's Corners) have been -- for many thousands of years -- a series of naturally-formed compartments, separated by low depositional fans acting as dams. The dams, only a few feet high, are commonly formed where alluvial fans from tributaries have prograded onto the valley floor, often extending all the way across the valley, sometime meeting another fan emanating from a tributary on the other side. Other processes, such as landslides, debris flows, or even logjams, can also lead to impounding rises which form compartments. Under natural conditions, these compartments accumulate sediment gradually, as relatively low volumes of sediment have been introduced from the uplands except during years of very high rainfall and rainfall intensities, or runoff events following wildland fires. Over the years, each individual compartment has trapped sediment and attenuated flows. Storms passing through individual compartments lost much of their sediment and peak flows were significantly attenuated. The amount of sandy and silty sediment moving downstream to the next compartment was much reduced. The hydrologic modeling described in Chapter 3 shows a very high ratio of 100-year to 10-year peak runoff events, suggesting that on very rare occasions (perhaps only once or twice per century) flows were sufficient to pass through multiple compartments and reach Laguna Grande; however, the extreme events may have been those which built the alluvial fans and other constricting sediment accumulations. Under these natural conditions, only rarely would high, sediment-laden flows pass all the way through the watershed.

This overall pattern continues under existing conditions. Greg James from MPWMD notes that peak flows exceeding 40 to 50 cubic feet per second (cfs) are rare, with only a handful recorded in the 40+ years of measuring peak flows at the MPWMD gage. Yet conditions have changed, such that the Canyon del Rey channel has been incised to depths of 20 feet or more by changes in storm runoff and sediment yields. Where the sequence of accumulated sediments have been incised or exposed in recent years, their composition shows that the individual deposits have originated from both sides of the valley. Further, about half of the sedimentary sequence seems to be composed of beds up to 4 feet thick of alluvium. In all likelihood, these thicker beds have been reworked from episodic events, such as post-wildfire or post-landslide deposition. "Regular flood deposits", which have deposited thinly-laminated strata, are interleaved through this sequence. This historical pattern will likely continue into the future, modified by human activity. Drainage planning should recognize that large-scale deposition will occur from time to time, perhaps at expected recurrences of perhaps 50 to 100 years, or perhaps longer. Additional sedimentation and incision associated with human activity, will also affect deposition, which also may be concentrated in one or more the compartments.

EVIDENCE FROM SEDIMENTOLOGY AND MINERALOGY

The lower portion of the watershed is more altered, where some compartments may not be a clearly bounded. In a sedimentologic reconnaissance effort, bed sediments from the streams and samples from the dunes were used to infer processes and history of the channel, and material which it moves.

Samples from the bed were collected from 4 sites downstream from Tarpy's Corners:

- From Canyon del Rey about 10 yards upstream from the outlet of Frog Pond
- From the channel approximately 100 yards upstream from culvert beneath the Safeway store at the corner of Highway 218 and Fremont Street
- Upstream from Laguna Grande, about halfway upstream to Fremont Street
- Approximately 50 feet upstream of the outlet weir of Roberts Lake

Also collected were samples from:

- Active dunes near the mouth of Canyon del Rey, and
- Paleodunes in the Pebble Beach area, pre-dating any possibility of human influence.

Samples were collected from the upper 6 inches of the bed or dune, at locations upstream from evidence of recent roadwork or deposition. After collection, the sediments were dried, sieved and examined for rounding and gross mineralogy at the Balance laboratory.

Results are presented in Appendix I, and summarized in Figure 7-14. The observations indicate that sediments throughout the lower portion of the creek are angular or subangular, rather than the rounded and subrounded grains characteristic of the dunes. The bed sediments are substantially coarser, as well. White shale chips appeared at the site above Frog Pond, perhaps reflecting relative recent input of shale, possibly from the south side of Hwy 218, where it forms most of the south bank of the channel; the proportion of white shales are higher in the two samples downstream, upstream from Laguna Grande, strongly suggestive of shale input from other sources. At Roberts Lake, the shales have weathered to grey, suggesting much older delivery to the channel. Perhaps most surprising is that the size, angularity, and mineralogy of the sample from near the Roberts Lake outlet weir were overwhelmingly angular, indicating deposition from the stream, with likely little input from the local dunes.

Figure 7-14 shows the results of sieving each sample and plotting the cumulative weight percentage of each size fraction. Results are presented and documented further in Appendix I. Among the key findings are:

1. All four samples within the Canyon del Rey watershed are composed overwhelmingly of stream-transported sediment, demonstrating sorting, particle-size, and angularity/roundness data characteristic of stream sediments.

2. Very little of the sediment at any site had the characteristic size, sorting, mineralogy or roundness typical of dune sands.

3. Particle sizes within the lower half of the watershed (downstream from junction of Highways 218 and 67) are large relative to upper site, suggesting that bed material originates from the banks and bed of the stream in its lower half. It is doubtful that material of the sizes observed could have transported through the Monterra compartment upstream of the junction.

4. Shale chips were predominantly angular, implying that they had not been transported a long distance.

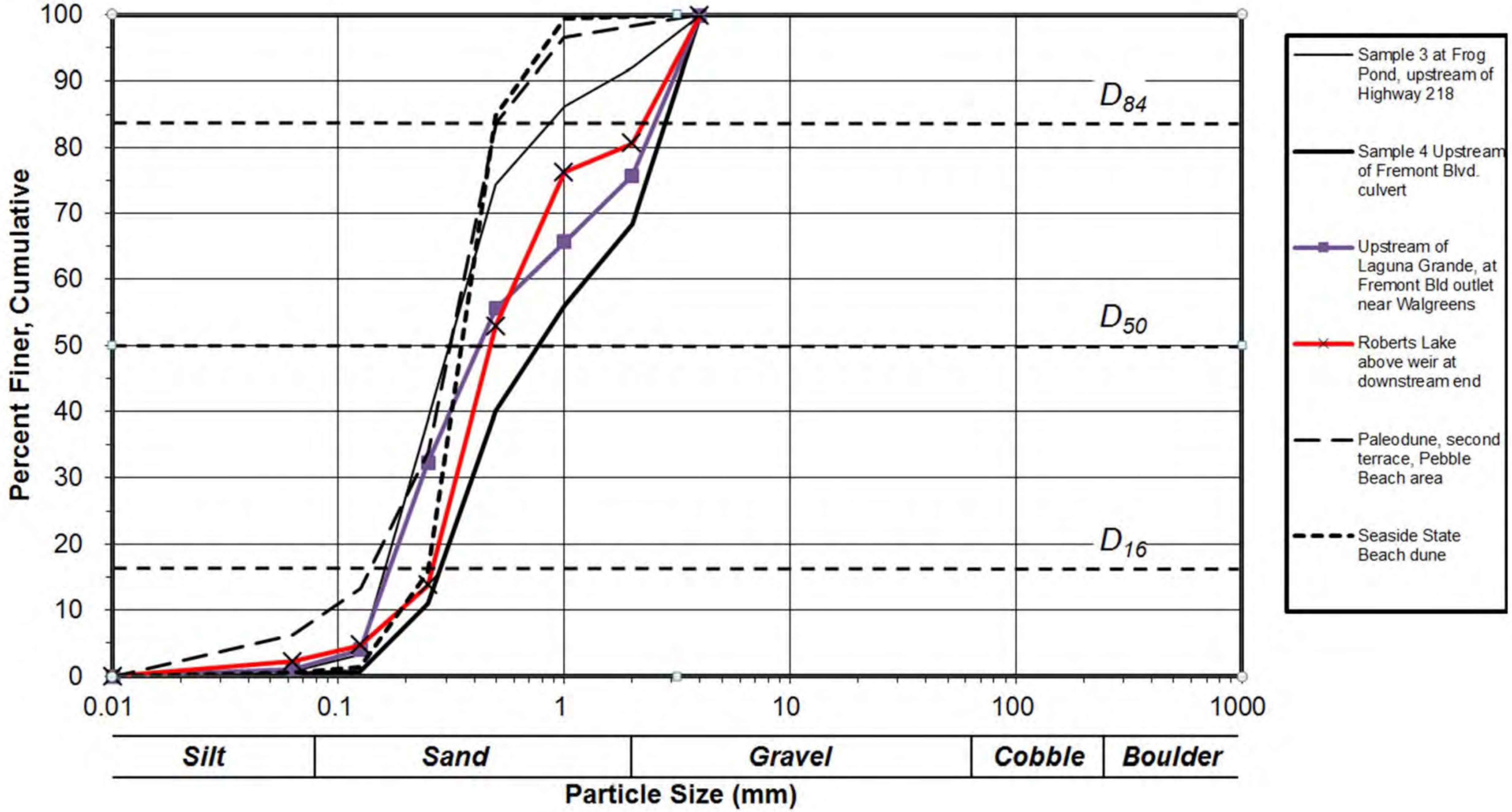

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Figure 7-14: Sediment size distribution of Canyon Del Rey bed-material samples and surrounding dunes downstream from Tarpy's corner.

Fluvial samples are represented with solid lines, dune samples with dashed lines. Note the general downstream coarsening of bed material in Canyon del Rey. The dune samples are more well sorted than the fluvial samples, especially in the coarser fractions. The dune samples are finer, and are coarsely skewed or symmetric, while the fluvial samples are finely skewed. Skewness and sorting variations indicate different transport mechanisms (Prothero and Schwab, 1996). Table 1 provides detailed grain size statistics.

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7.4 Management implications of the sediment study

Two alternative strategies for managing sediment are available to the managing agencies:

a. A longitudinally integrated emphasis, in which sediment is purposely passed downstream through channel segments of varying stability to Laguna Grande, from which it can periodically be dredged, with the predominantly sandy sediment used for beach nourishment or as clean fill for other projects.

b. The native geomorphic solution in which sediment will be managed on a compartment by compartment basis, resulting in much-reduced sediment delivery to the Laguna Grande and Roberts Lake, and moderate attenuation of peak flows as the flat valley floor is used for detention storage.

This section of the report outlines how the observations obtained during this investigation may be applied to implementing the integrated or compartment approaches, or (potentially) a combination of the two.

KEY PHYSICAL FINDINGS

Four key physical findings of this report can shape evaluation of the two alternatives:

- The apparent minimal post-1983 sediment delivery to Laguna Grande and Roberts Lake

- Intrinsic emphasis upon high-recurrence events as demonstrated by modeling and which can be inferred from the gaging record.

- A long geomorphic record of episodic deposition – thick sedimentation units exposed in the floor of the valley, principally upstream from York Road – indicating that lenses of sediment 3 to 5 feet thick were periodically deposited in individual compartments.

- Evidence that depositional compartments are a native geomorphic response to the sandy watershed, and are presently effective in inhibiting sedimentation of Laguna Grande.

Sediment will continue to enter the Canyon del Rey valley both gradually and episodically. The chronic sediment generated by routine storms will pass through the stream system, or be retained on the valley floor. Episodic delivery of sediment -- as runoff during very major storms, post-fire runoff, landslides, debris flows and perhaps other rare events -- will enter the valley at discrete locations and then collect on the floor of the compartments. The fate of the sediment, the stability of the channel downstream, and the extent of deposition in Laguna Grande/Roberts will differ between the two approaches.

Longitudinally Integrated Approach

Management of sediment would emphasize passing sediment downstream to Laguna Grande. This management approach would be implemented by breaching barriers and lowering the roughness of channel segments between the compartments. Chronic sediment generated by typical storms will pass through the system. Sediment associated with episodic events would primarily move through the tributaries and main stem as pulses of varying durations, which can vary from a single storm or season to several events. Peak flows will be slightly attenuated. The combination of more sediment moved at higher flows could result in a wider and shallower main-stem channel downstream, possibly resulting in additional bank erosion where the banks are sandy or where deep-rooted vegetation may be insufficient to prevent bank retreat.

Under this approach, management of drainage and sediment will be similar to practices applied on other streams of roughly similar size, such as Toro, Gabilan, or Prunedale creeks.

Compartment Approach

Management of sediment would emphasize retaining it on the valley floor as close to the source as feasible. Some of the sediment will move downstream into the next sequential compartments, but most would remain within the compartment to which it was delivered. Relatively little delivery to Laguna Grande would occur. The intervening channel segments would not be stressed with as much sediment and with slightly lower peak flows. The valley floor would come to gradually be covered by sediment to a depth of up to a foot or more. If the source channel for an episodic event is on south side of the valley, it is possible that Highway 68 may be overtopped or affected in some way. After the event, sediment can be removed, or left in place, partially exhausting the capacity of the compartment. Inundation levels on the floodplain within the affected compartment may end up increasing by a small amount, requiring re-mapping of the floodplain at intervals similar to those of the episodic events, perhaps several decades to several centuries. Attenuated peak flows and less sediment would enter the main-stem channel downstream from the affected compartment, with likely fewer downstream effects than might be the case with the longitudinally integrated approach.

Blended Approach

It may prove possible to use a blended approach in which compartments are used in the upper portion of the watershed, with an integrated channel downstream from either the highway bridge just below Frog Pond or the intersection of Highways 218 and 68.

RECOMMENDATIONS

Recommending one approach over the other goes beyond the scope of this project. The use of a novel – albeit native – drainage management approach (the compartment approach) calls for a broader planning perspective. Effects on habitat, existing policies and regulations, and public safety all warrant greater consideration before a suitable approach can be adopted.

However, it may make sense to keep managing sediment in Canyon del Rey using the conceptual approach of preserving compartment functionality, particularly in portions of the watershed which are less urbanized. We believe that the compartments or blended approach will better serve the Monterey Bay community if the flood mapping and several other institution hurdles can be overcome.

THE ROLE OF DREDGING OF LAGUNA GRANDE AND ROBERTS LAKE

Dredging of Laguna Grande/Roberts Lake is reported to have occurred in 1983. Additionally, Laguna Grande was deepened and expanded in 1870, presumably using horse-drawn equipment to form 'Lake Como' (see Figure 7-3). We have not heard of nor found evidence of other dredging activities of meaningful scale, nor do the effects of dredging appear in the historical maps and aerial photography presented in Appendix H. Further, minimal deposition is discernible in the high-precision bathymetric mapping conducted by CSUMB (Figure 2-4). A meaningful analysis of sedimentation should usefully account for substantial deposition prior to the 1870 and 1983 events, with very little post-dredging deposition.

PAST RESPONSE TO URBANIZATION

Appendix H depicts the rapid growth of Seaside, plus North Monterey and Del Rey Oaks, during the decades following World War II. While 1913 maps show only a handful of homes in the areas surrounding Laguna Grande, the lower watershed had reached more than 75 percent urbanization by the early 1980s, principally through the growth of Seaside and expansion of the Monterey airport. The hydrology of the lower watershed had fundamentally changed by that time, from an area contributing only a few percent of incident rainfall as runoff to most rain being drained to storm drains, many of which discharged to the lower Canyon del Rey watershed. With the additional runoff, much additional sand was transported to the lower portion of the watershed.

LIKELY RESPONSE TO FUTURE URBANIZATION

Given the limited area in the lower watershed which might be further urbanized, the likelihood of another pulse of sedimentation entering the lakes is small, unless a choice is made to accelerate movement of water and sediment through the compartments of the upper watershed (see "Implications" section, below). Measures already taken to reduce downstream effects of urbanization are expected to further reduce delivery to the lakes.

One significant exception is potential delivery from the FORA lands east of General Jim Moore Drive, presently undeveloped. These drain primarily to the "Southside tributary", a topographic catchment of about 2.8 square miles along and north of the South Boundary Road (see Figure 7-11, Compartment 0, within Compartment 6), and through Frog Pond Wetland Preserve (FPWP) to Canyon del Rey. Projected urbanization or compaction of surfaces in this area can potentially lead to a pulse of sediment entering Canyon del Rey through FPWP. The current FORA plan calls for development of 600 to 700 acres within this area, which is within the Sphere of Influence of Del Rey Oaks. The most current plans (2007), prepared prior to the current economic slowdown, are oriented toward visitor-commercial uses which can generate substantial concentration of storm runoff. Recent evaluation of conditions on either side of South Boundary Road (Geisler and Smith, 2014) demonstrates high vulnerability of soils in that area to culverts draining the road and to runoff from the City of Monterey corporation yard.

8 RECOMMENDED FACILITY IMPROVEMENTS

8.1 General

Recommended improvements to facilities and the cost of those improvements are provided in this section. The existing facilities are described in Chapter 2, with photographs assembled in Appendix C and field inspection notes provided in Appendix B. Both the photographs and notes are organized sequentially by facility number. The locations of the facilities are shown on the sub-watershed map panels provided in Appendix A. The facility descriptions in Chapter 2 also indicate which map panel shows the particular facility.

Digital file submittals, which are not an integral part of this report, include AutoCAD drawings of each sub-watershed which provide considerably more detail regarding location, orientation, and elevation of each facility. Appendix F provides a summary of the digital files that are available. Recommended improvements

Table 8-1 provides a list of recommended upgrades for specific culverts that were found to be inadequate for safely conveying the 100 year peak flows. Certain of these recommendations match improvements recommended by the 1977 report. These recommended improvements are proposed primarily to increase high flow carrying capacity, so that roads are not excessively overtopped by high water and safe conditions are maintained. The improvements are specifically not proposed to decrease detention of high flows, as such detention is integral to flood management in the watershed.

8.2 Additional rain and stream gages

The 1977 Plan provided specific recommendations regarding addition of rain gages and stream gages within the watershed, designed to provide more complete hydrologic data suitable for future storm water analyses and planning. While some additional meteorological data is available today in the watershed, hydrologic data remains sparse. The 1977 recommendations mostly remain appropriate and would provide highly useful information. New rain gages could include:

- at Laguna Seca Race Track (elevation 750 feet);
- at a central point along highway 68, if the Pasadera Golf Course weather station does not provide adequate rainfall information;
- at the southeasterly boundary of the watershed, perhaps at the junction of Laureles Grade Road and El Toro Road (elevation 850 feet); and
- at an accessible location in one of the southwestern sub-watersheds (26 or 23) at moderate elevation (400-600 feet).

Assuming that the Frog Pond gage operated by CSUMB continues to provide usable stream flow data, an additional gage could be usefully sited at the York Road crossing.

Table 8-1: Recommended culvert upgrades.

Culvert	Replacement Recommendations
01_C_02	Replace with 10 ft2 area culvert or ditch. 2' X 5' box culvert.
02_C_01	Replace with 16 ft2 area box culvert. 2' X 8' box culvert.
03_C_01	Replace 18 ft2 area box culvert. 3' X 6' box culvert.
03_C_02	Replace with 24 ft2 are box culvert. 4' X 6' box culvert.
10_C_01	Add 48" concrete pipe or equivalent total capacity of 20 ft2.
12_C_01	Add parallel 60" RCP.
14_C_01	Add parallel 30" RCP, or equivalent total capacity of 18 ft2.
15_C_01	Replace with 40 ft2 area box culvert. High priority.
21_C_01	Replace with 70 ft2 area box culvert. High priority.
25_C_01	Replace with 65 ft2 area box culvert. Will reduce detention storage.
25_C_02	Replace with 81 ft2 area box culvert.
27_C_03	Replace with 90 ft2 area box culvert. 12' X 7.5' box as suggested in the 1977 report.
27_C_04	Add parallel 6' X 8' box as suggested in the 1977 report.
29_C_01	Add parallel 6' X 8' box as suggested in the 1977 report.
29_C_03	Replace with 100 ft2 box culvert. Private facility.
29_C_07	Add parallel 100 ft2 box culvert. 6' X 8' box as suggested in the 1977 report.

9 FACILITY IMPROVEMENT COST ESTIMATES

9.1 Cost estimation methodology

Concept-level plans were developed for each of the identified upgrade projects for the purpose of project scoping and cost estimation. The scope of each culvert upgrade is described in Table 9-1, below.

The estimates utilize unit pricing for the major work items such as structures, pipes, inlet/outlet protection, and pavement replacement. Bid item scope, where an “item code” is given, generally follows the 2010 edition of the Caltrans Standard Specifications and Standard Plans. Unit costs for these bid items were developed based on an analysis of costs reported in the Caltrans Contract Cost Database (CCDB) and bid results from similar, selected projects completed in Caltrans Districts 4 and 5. Details of those projects are provided in the separate electronic record submittal.

A concept sketch was developed for each culvert upgrade for the purpose of general project scoping, estimating quantities for the major items of work, and developing budgets for temporary traffic and environmental controls and final landscaping and restoration. These concept sketches and quantity calculations are provided in the separate electronic record submittal.

Temporary controls, including temporary traffic control, construction area signs, staged construction, excavation storing, temporary environmental pollution controls, construction of temporary access roads, and temporary creek diversions, were included as lump sum items. Temporary controls account for between 5% and 35% of the total estimated cost.

Electrical and landscape work were similarly included as lump sum items. Landscape items are referred to generally in the estimates as one of the following (listed in order of increasing cost): highway planting (basic erosion control and seeding); planting and irrigation (highway planting plus container plants and temporary irrigation); and creek/riparian restoration and planting. In relative terms, highway planting accounts for 1% to 2% of the total project cost, and creek/riparian restoration and planting accounts for between 8% and 15% of the total estimated project cost.

Minor work items, supplemental work and contingencies are each included as a percentage mark-up to the work items identified above. “Minor items” are those items which are not specifically enumerated, due to the preliminary nature of the estimate, but which are anticipated to be included in the final construction documents. Supplemental work is work which could be identified and added to the project after bidding, during the construction process. The “contingencies” category accounts for potential scope items which are not anticipated at this conceptual stage.

Detailed cost estimates for each of the identified projects are provided in Appendix E.

Plans and bid results for several Caltrans projects of similar scope and cost were obtained and compared to the projects evaluated in this study. This comparison informed selection of unit prices used in the cost estimation within this study. A review of these projects for total project scope and cost, unit costs for individual work items, and costs for temporary environmental and traffic controls and landscape work was included. The bid summaries for these projects are provided in the electronic submittal that accompanies this report.

9.2 Facility improvement costs

The preliminary cost estimates for the identified culvert upgrades are provided in Table 9-1, below.

Table 9-1: Preliminary construction cost estimates.

ID	Conceptual Project Scope	Estimate of Probable Construction Cost
01-C02	Remove two (2) existing 18" CMP culverts located in north shoulder of and running parallel to Highway 68 at Laureles Grade. Construct 5'W x 2'H x 130'L RCB, and install RSP inlet and outlet protection. Includes traffic signal conduit relocation and reconstruction of existing bus stop.	$ 158,000
02-C01	Remove existing double 20"x28" CMP culvert which crosses Highway 68 just west of Laureles Grade. Construct 2'H x 8'W x 110'L RCB, and install RSP inlet and outlet protection. Existing culverts are shallow and existing utility crossings are anticipated to require similarly shallow RCB. Staged construction.	$ 599,000
03-C01	Remove existing 30"x48" CMP culvert which crosses under secondary Laguna Seca Recreation Area access road. Construct 3'H x 6'W x 70'L RCB, and install RSP inlet and outlet protection.	$ 187,000
03-C02	Remove existing 40" HDPE culvert which crosses under Laguna Seca Recreation Area entrance road. Construct 4'H x 6'W x 80'L RCB, construct concrete wing walls and grade control apron on inlet side, and install RSP outlet protection.	$ 253,000
10-C01	Jack 48" dia x 170'L RCP culvert parallel to existing 36" CMP culvert which crosses Highway 68. Construct concrete head walls and RSP inlet and outlet protection. Perform creek restoration and planting.	$ 574,000

12-C01	Construct temporary roads to access construction areas. Jack 60" dia x 110'L RCP culvert parallel to existing 48" CMP culvert which crosses Highway 68. Construct concrete head walls and RSP inlet and outlet protection. Perform creek restoration and planting.	$ 537,000
14-C01	Construct temporary roads to access construction areas. Jack 48" dia x 160'L RCP culvert parallel to existing 48" CMP culvert which crosses Highway 68. Construct concrete head wall at inlet and RSP outlet protection. Perform creek restoration and planting.	$ 566,000
15-C01	Remove existing 48" CMP culvert which crosses under emergency access road located off Blue Larkspur Lane. Construct 5'H x 8'W x 110'L RCB, construct concrete wing walls on inlet side, and install RSP outlet protection.	$ 352,000
21-C01	Remove existing double 24"x28" culvert which crosses Highway 68. Construct double 5'H x 7'W x 68'L RCB, head walls, and RSP inlet and outlet protection. Staged construction.	$ 417,000
25-C01	Remove existing 2-48" and 3-18" culverts which cross under Monterra Ranch entrance road. Construct 6'H x 12'W x 135'L RCB, construct inlet control structure, and install RSP outlet protection.	$ 573,000
25-C02	Remove existing double 48" RCP culvert which crosses Highway 68 just west of the Highway 218 intersection. Construct 7'H x 12'W x 120'L RCB, head walls, and RSP outlet protection. Staged construction.	$ 683,000
27-C03	Remove existing 88" CMP culvert located in the west shoulder of and running parallel to Highway 218 at the entrance to Del Rey Gardens Drive. Provide temporary shoring and creek diversion and construct 7.5'H x 12'W x 380'L RCB, head walls, and RSP inlet and outlet protection.	$ 1,645,000
27-C04	Construct 8'H x 6'W x 42'L RCB culvert parallel to existing 8'H x 6'W x 42'L RCB culvert which crosses Highway 218 and provide RSP inlet protection. Staged construction.	$ 341,000
29-C01	Construct 8'H x 6'W x 42'L RCB culvert parallel to existing 8'H x 6'W x 42'L RCB culvert which crosses Highway 218 and provide RSP outlet protection. Staged construction.	$ 324,000
29-C03	Remove existing privately owned 18' span wood deck bridge and concrete abutments. Construct new abutments and 24' span wood deck bridge and concrete abutments and relocate associated private utilities.	$ 139,000
29-C07	Construct 8'H x 6'W x 42'L RCB culvert parallel to existing 8'H x 6'W x 42'L RCB culvert which crosses Rosita Road and provide RSP outlet protection.	$ 324,000

Notes:

1. Estimates include supplemental work and contingencies.

2. Estimates dos not include “soft costs”, i.e., project management, engineering, environmental, permitting, inspections, or testing.
3. Costs are provided in year 2014 dollars. Costs should be escalated for later years.

10 RECOMMENDATIONS

10.1 Utilization of this report and electronic submittals

Large amounts of data were collected, organized and archived electronically during this study. Data sets include:

- rainfall and stream flow gauge locations and records;
- geographic information including land use, soils, ground slopes and impervious cover;
- facilities data including location, dimensions, configuration, and physical condition;
- stream channel morphology and condition;
- facilities upgrade information including concept designs, preliminary cost calculations, unit costs;
- HEC-HMS hydrologic model set up and parameter definitions; and
- HEC-HMS model predictions of stream flow hydrographs at multiple locations with the watershed and for multiple return period and duration rainfall events.

These data sets have been transmitted to the MPWMD. We recommend that these data sets be placed on an active data server and made available to District and local city staff members as well as engineers and planners working on projects in the watershed. Appendix F, attached to this report, provides a list of available data.

10.2 Lake management and preservation recommendations

Bathymetric surveys of Roberts Lake and Laguna Grande were used to define the extent of sediment deposition in the lakes. These surveys produced clear indications that very little sediment has accumulated in either lake over the past several decades. The lack of sediment deposition in the lakes correlates with the extensive evidence of sediment deposition in the watershed, the low peak flows reaching the lakes, and the lack of sediment transport through the creek.

Changes in the runoff due to fires, urbanization or upgrades to flood facilities have the potential to increase sediment transport into the lakes, accelerate deposition of sediments and change lake conditions. Possible changes include shoaling, impaired water quality, eutrophication, and weed growth. Decisions regarding land development, wild fire management, road improvements, and upgrades to the flood conveyance facilities should be made with full understanding of potential impacts on sediment transport into the lakes.

10.3 Facility improvement priorities and execution

The flood management facility improvements recommended in this plan are estimated to cost, in aggregate, $6.5 million. With limited construction budgets, it is important to focus efforts on the most important improvement actions, based on the magnitude of problems with a structure, the expected efficacy of the improvement, and the cost of the improvement. Highest priority proposed improvements are as follows.

- Culvert 21_C_01 (highway 68 at Ryan Ranch): capacity is sufficient to pass safely 57% of the peak 10 year flow and 18% of the peak 100 year flow

- Culvert 15_C_01 (highway 68 near Laguna Seca Golf Ranch): capacity is sufficient to pass safely 87% of the peak 10 year flow and 27% of the peak 100 year flow; drop inlet design is restrictive

- Culverts 3_C_01 and 3_C_02 (highway 68 at Laguna Seca access road): capacity is sufficient to pass safely 43-65% of the peak 10 year flow and 11-18% of the peak 100 year flow

- Culvert 27_C_03 (Del Rey Gardens entrance from highway 218): capacity is sufficient to pass safely all of the peak 10 year flow and 43% of the peak 100 year flow; capacity needs to match that of upstream culverts

Many other existing culverts have inadequate capacity to safely pass the 100 year peak flow; a few additional culverts (01_C_02A, 01_C_01B, 02_C_01) have inadequate capacity to pass the peak 10 year flow. These projects are the next priority.

10.4 Impact of facility improvements on flood flows

The HEC-HMS hydrologic model was used to simulate flood flows under a hypothetical condition where no restrictions on flow and no detention storage exist in the watershed (see figures 5-1 and 5-2 and associated text). This condition is the extreme case where all culverts and controls on detention basins are removed from the watershed, thus maximizing peak flows and runoff volume. The model predicts that removing all storage would increase peak 10 year and 100 year flow at the discharge to Laguna Grande by approximately 250% and 290%, respectively. Total storm volumes for the 10 year and 100 year events increase by 160% and 150%, respectively.

Additional model simulations were made to predict the effect of the proposed culvert upgrades on storm related flows in the creek (see figures 6-1 and 6-2 and the associated text). Maximum percentage increases in peak flows are predicted for basin 14_B_01 (120%) during the 100 year event and for basin 29_B_01 (115%) during the 10 year event. These increases are relatively modest because most detention storage is unaffected by the recommended facility improvements.

These model predictions exemplify the potential impact of improving conveyance on storm related flows in the creek and highlight the importance of detention storage within the watershed.

10.5 Flow control measures for future development

Currently applicable runoff management and flood control regulations provide the fundamental means to manage the impacts of development and other changes in the watershed. In addition to the regional regulations, oversight of any modifications to existing detention basins (both created by culverts and designed with outlet works) will be essential to maintaining storage capacity. Further development in the watershed, particularly in the vicinity of the creek channel, has the potential to disrupt the equilibrium conditions that maintain channel morphology and stability, as well as change the dynamics of sediment deposition and erosion. Such changes should be studied carefully before those changes are permitted. Provided that current detention storage is maintained, there is no obvious need for additional detention storage facilities or channel protection works.

10.6 Recommendations regarding sediment management

Since episodic events, including landslides and wildfires, appear to be a major contributors of sediment to the drainage channels in Canyon del Rey due both to (a) soil properties, which result in much higher unit runoff for 100-year storms than for 10-year events, and (b) geomorphic compartments, which retain sediment near the locations where it enters the valley floor. Exposures of the valley floor show that episodic sedimentation accounted for 50 to 60 percent of sediment accumulating on the valley floor, even before European land-use practices affected the Canyon. Anticipating such events, including providing room for sediment storage or disposal, will likely reduce the frequency of sediment movement in the watershed and, ultimately, into the lakes.

The many engineered and natural detention basins within the watershed serve to both control high flows and trap mobilized sediment. Maintenance and management of these basins will allow continued functioning, as designed, to reduce flooding, prevent channel migration and instability, and limit siltation of the lakes. Such maintenance will be particularly important after large rainfall events, landslides, wildfires, and any other episodic events.

Watershed management activities designed to reduce erosion, particularly in the steep and poorly vegetated upland areas, can be used to reduce and control sediment production and flow to the detention basins and stream channels. Such activities are likely to reduce detention basin and channel maintenance activities and costs.

Given the limited area in the lower watershed which might be further urbanized, the likelihood of future pulses of sediment entering the lakes is small. Measures already taken to reduce downstream effects of urbanization are expected to further reduce delivery to the lakes.

One significant exception is potential delivery from the FORA lands east of General Jim Moore Drive, which are presently undeveloped. These lands drain primarily to the “South Boundary tributary”, a topographic catchment along and north of the South Boundary Road, and through Frog Pond Wetland Preserve (FPWP) to Canyon del Rey. Projected urbanization or compaction of surfaces in this area can potentially lead to a pulse of sediment entering Canyon del Rey through the frog pond. Management of development in this area would likely reduce future sediment migration and lake deposition.

Assuming that watershed conditions are managed, no need for dredging of Laguna Grande and Roberts Lake during coming decades is anticipated. In addition, the lakes are not likely to be a regular source of dredged material for beach nourishment. These conclusions are based on the very low and intermittent supply of sediment to the lakes from the watershed.

10.7 Use of this Master Drainage Plan in ongoing planning and design of storm

The HEC-HMS model of the Canyon del Rey watershed and creeks, together with the precipitation predictions, provide an easily accessed and relatively simple to use method for predicting the hydrologic impacts of changes to the watershed. The model input files and related spreadsheets are provided in the separate electronic submittals. Changes to input data can be readily made to represent proposed development or changes in flood management facilities. The HEC-HMS model, when run with the appropriate changes, will provide detailed flow predictions which can be compared with the results shown in this report.

The descriptions of flood management facilities, including the appendices and electronic submissions, contain a wealth of information about each of the flood management facilities, including current condition. A number of the culverts have identified problems with deterioration, erosion of the channel at the culvert outlet, and/or accumulation of sediment deposits that partially or fully occlude the culvert entrance. For culverts that have identified problems (see filed notes in Appendix B and field photographs in Appendix C) but are not going to be upgraded, it is recommended that proper maintenance be performed. In addition, culverts that have identified siltation or erosion problems should be inspected periodically (every 3-5 years) and maintenance performed as needed to maintain full culvert function.

Detention basin functionality depends on maintenance of adequate storage volume. Over time sediment will enter the basins and deposit there, decreasing available storage volume. Detention basins must be regularly inspected for excess sediment deposition and sediment removed to maintain capacity. Areas within the creek channel system and specific detention basins which are most prone to sediment deposition are detailed in Chapter 8. These designations can be used to inform a detention basin management program.

Reaches of the creek which are designated as eroding in Chapter 8 of this report are likely to suffer continuing creek channel instabilities such as down-cutting or channel migration. Periodic inspection of these reaches will be helpful in defining channel changes and the need for restoration.

10.8 Future revisions and updates to this plan

Revisiting and updating of this plan is recommended on a ten year cycle. This will ensure that the plan remains reasonably up to date and useful in planning of further urbanization and flood management facility repairs and upgrades.

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APPENDIX 5-A

INTEGRATED REGIONAL WATER MANAGEMENT INTER-REGIONAL COORDINATION SUMMARY REPORT

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Interregional Coordination between the Greater Monterey County and Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM Regions

Summary Report (April 18, 2014)

Project 5. Integrated Regional Water Management Inter-Regional Coordination:

Greater Monterey County and Monterey Peninsula, Carmel Bay, and South Monterey Bay Regions

Abstract: The Greater Monterey County Integrated Regional Water Management (IRWM) region shares a border with the Monterey Peninsula, Carmel Bay, and South Monterey Bay (Monterey Peninsula) IRWM region. Along this border, the 45-square-mile Ord Community is a geographical transition zone containing areas and resources that are managed by many agencies, including some that are in both IRWM Regional Water Management Groups (RWMG). Fundamental challenges are: 1) determining which regional IRWM Plan proposed projects should be described in each IRWM Plan; 2) prioritizing projects in each region; 3) how to cooperate between regions in order to ensure that Ord Community projects do not fall into a "no man's land" between the regions; and 4) moving projects forward that benefit both regions. This report describes the relationship between the regions, identifies resource challenges, and outlines areas of potential coordination between the regions.

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on behalf of the

Regional Water Management Group of the Monterey Peninsula, Carmel Bay, and South Monterey Bay

Version Date: April 18, 2014

Contents

Introduction and Background

In the physical transition zone between the Greater Monterey County and the Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM planning regions, a fundamental issue affecting water resource management is that the Ord Community is served water from the Salinas Valley Groundwater Basin (SVGB), which is in the Greater Monterey County region, while approximately one third of the area and water demand for the Ord Community is within the Monterey Peninsula region (see Figure 1: Jurisdictional Boundaries in the Ft. Ord Area). Another geographical peculiarity is that a portion of the Ord Community overlies the Seaside Groundwater Basin (SGB), which is a place of water supply storage and extraction for the Monterey Peninsula; however, the Ord Community portion overlying the SGB is not supplied from the SGB. This arrangement was agreed to in 1993 with the transfer of the responsibility for water supply from the United States Army (the Army) to the Monterey County Water Resources Agency (MCWRA).[1]

It is critical for both IRWM regions to have an understanding of the physical and jurisdictional interactions between the planning regions and for each region to understand each other's objectives and priorities. The following sections describe the work conducted by Monterey Peninsula Water Management District (MPWMD) on behalf of the Monterey Peninsula RWMG and by Susan Robinson, Program Manager for the Greater Monterey County IRWM Plan on behalf of the Greater Monterey County RWMG, to provide both regions with the basic information necessary to understand proposals within the regional and inter-regional context and to prioritize future management actions. Bulleted items indicate information to be developed or updated for the joint chapter.

The purpose of the Project Summary Report is to document how the two regions have coordinated:

- to help identify inter-regional opportunities and projects;
- to promote the cooperative development of projects that benefit both regions;
- to ensure consistency in project evaluation; and
- to promote cooperation and coordination between regions in the development and sustainable management of water resources (see pages 20, 24 and 41 of Final Guidelines).

The original nexus of this component of the IRWM planning process was the recognition in 2010 by both regions that Ord Community needs and resources were shared between the regions. For the 2010 DWR Planning Grant solicitation, both regions submitted a proposed scope of work that included addressing inter-regional issues. Subsequently, MPWMD agreed to take the lead with support from the Greater Monterey County region. At the time that the Planning Grant work was initiated, the Monterey Bay Regional Water Program/Project, the goal of which was to address water supply issues within both the Greater Monterey County and Monterey Peninsula regions, was moving through the approval process. That project is no longer being pursued by regional stakeholders, as discussed further, below. However, there are other projects being pursued by stakeholders in the region that have similar objectives, would achieve similar results if implemented, and involve regional integration, cooperation, and collaboration.

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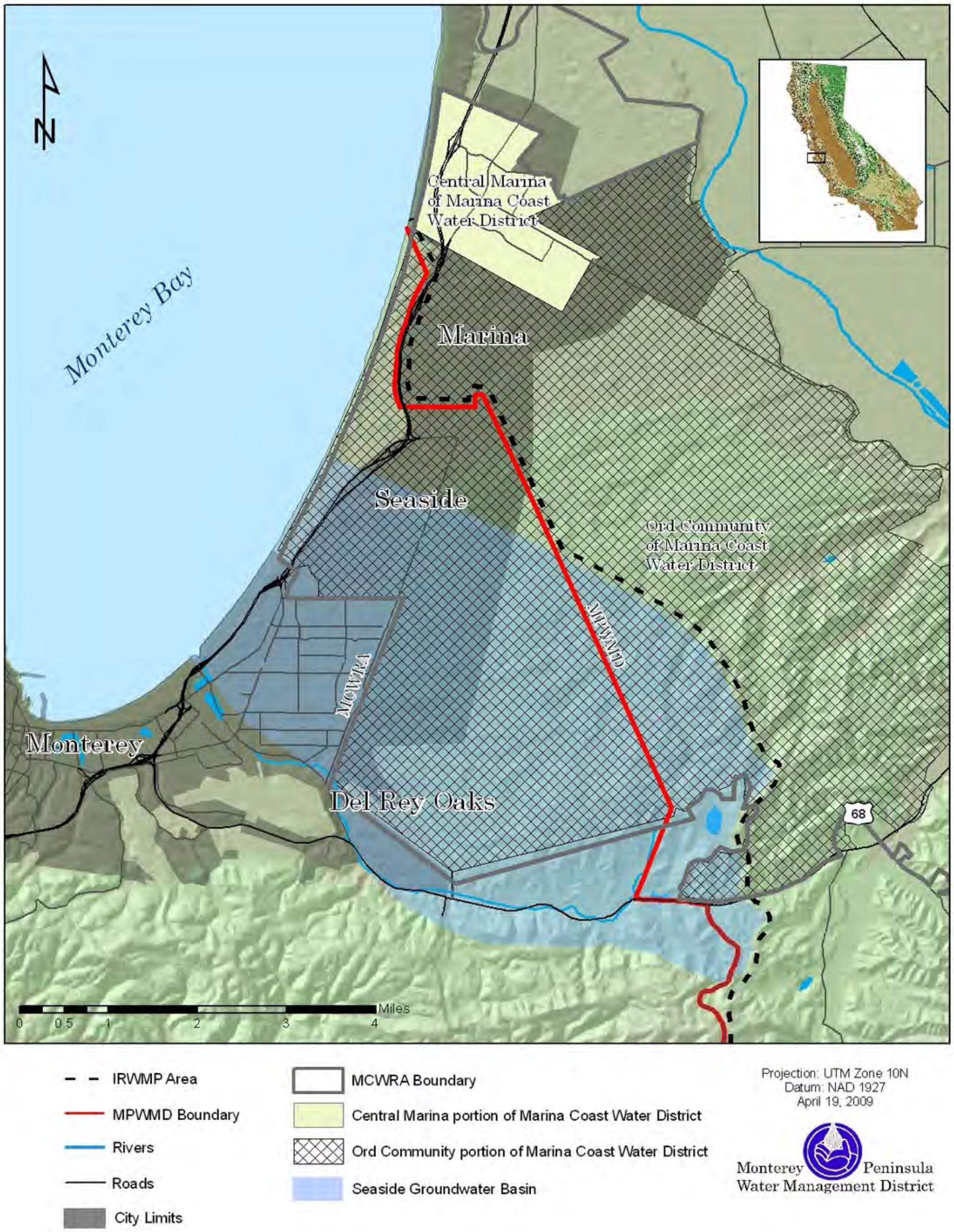
[1] The Marina Coast Water District (MCWD) subsequently won the right to provide water and sewer service to the Ord Community.

Figure 1: Jurisdictional Boundaries in the Ft. Ord Area



Relationship between IRWM Regions

This section summarizes the information presented in the Regional Acceptance Process and other communications to California Department of Water Resources (DWR) about the formation of the two regions.

The primary area where overlap may occur between the Greater Monterey County IRWM Plan and the Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM Plan is in the vicinity of the Seaside/Salinas Valley Groundwater Basin divide and in particular, the management of the Seaside Basin as a place of storage and extraction (see Figure 1: Jurisdictional Boundaries in the Ft. Ord Area). The Seaside Basin and Fort Ord area constitutes a geographic area within which a significant opportunity exists for stakeholders in the two IRWM planning regions to collaborate and coordinate on projects of interest to both regions.

In Bulletin 118, DWR considers the Seaside Groundwater Basin (Basin 3-4.08) to be a sub-basin of the Salinas Valley Basin (Basin 3-4). Physically, a regional analysis of groundwater levels found that the boundary between the Seaside and Salinas Valley Groundwater Basins is represented by a groundwater flow divide, which is simply the high point in the regional water-level surface between pumping depressions in Seaside, the Salinas Valley, and the El Toro Creek area. The lack of wells and water extraction in proximal areas of the former Fort Ord lands and highland areas adjacent to the Salinas Valley may encourage this divide, which acts as a “ridge” of higher groundwater levels between lower groundwater level areas in adjacent areas of Seaside and Salinas Valley. Because a large portion of these lands is controlled by the Bureau of Land Management (BLM) or are not arable lands, it is unlikely that groundwater extraction in this area would increase in the foreseeable future. It is beyond the scope of this report to describe these interactions, but extensive information may be found in the following documents:

- *Laguna Seca Subarea Phase III Hydrogeologic Update*, Prepared for the Monterey Peninsula Water Management District by Eugene B. Yates, Martin Feeney, and Lewis I. Rosenberg, November 2002
- *Seaside Groundwater Basin: Update on Water Resource Conditions*, prepared for the Monterey Peninsula Water Management District by Eugene B. Yates, Martin Feeney, and Lewis I. Rosenberg, April 14, 2005
- *Seaside Groundwater Basin Salt & Nutrient Management Plan* prepared for the Monterey Peninsula Water Management District by Hydrometrics WRI, April 2014.

Potable water is provided to customers in the Seaside basin by several dozen water distribution systems. Water production and delivery are reported annually to MPWMD by all water system operators. Over 90% of the water is delivered by a single purveyor (Cal-Am). Cal-Am operates several water distribution systems in the area, some of which are interconnected. The main system serves the Carmel Valley, Monterey Peninsula, and coastal subareas of the Seaside basin. Presently, water is obtained from approximately 17 wells along the Carmel River and eight wells in the Seaside coastal subareas. The Carmel Valley wells extract groundwater from the Carmel Valley alluvium and operate year-round. Wells in the Seaside coastal subareas are used primarily in late spring, summer, and fall. Cal-Am also operates several other water distribution systems in the Laguna Seca Subarea that it acquired from previous operators during the past 15 years, including the Hidden Hills, Ryan Ranch, and Bishop systems. The first two of these have interties with the main system, but the Bishop system does not.

The City of Seaside operates a single well in the Seaside Groundwater Basin to serve residential customers in part of the city. The principal nonpotable use of water in the basin is irrigation of golf courses. The Laguna Seca and Pasadera golf courses are in the Laguna Seca Subarea and are supplied by nearby wells. The Bayonet and Black Horse golf courses are located on the former Fort Ord military base north of Seaside and are currently being supplied with irrigation water from Marina Coast Water District (MCWD) under a five-year agreement that is set to expire in 2015.

MCWD provides municipal supply water to existing and future developed areas on the former Fort Ord military base. Within the Seaside basin, this includes the residential areas and schools surrounding the Bayonet and Black Horse golf courses. The water is obtained from wells near Marina, in the Salinas Valley Groundwater basin. Although there is currently a general prohibition on groundwater exportation from the Salinas Valley, Section 52-9 "Powers of Agency" of the MCWRA Act enabling legislation states:

> *The Agency has perpetual succession and may do any of the following:*
>
> *(u) Prevent the export of groundwater from the Salinas River Groundwater Basin, except that use of water from the basin on any part of Fort Ord shall not be deemed an export. Nothing in this act prevents the development and use of the Seaside Groundwater Basin for use on any lands within or outside that basin.*

There are a number of proposals that would link water resources in the Salinas Valley with supplies to the Seaside Groundwater Basin. Currently wastewater from the Monterey Peninsula region is conveyed to the Salinas Valley and reused for irrigating crops. There are ongoing discussions among agencies with responsibilities over these supplies, which include desalinated water, brackish groundwater near the coast, and recycled water. In addition, surface flow from the Salinas River under the unexercised SWRCB Permit No. 11043 issued to MCWRA is being considered for supplying additional water to MCWD. The following section details these water supply projects and plans.

Boundary Region Description

Fort Ord was established as a U.S. Army post by the Department of Defense in 1917 and proposed for closure in 1991 by the Base Realignment Commission. In 1994, the state legislature created the Fort Ord Reuse Authority (FORA) to oversee the reuse and redevelopment of the former military base, which includes more than 45 square miles of the former Fort Ord (also referred to as the Ord Community). A small portion of the former Ft. Ord remains under Army control and is now called the Presidio of Monterey Annex. Other property within the former Fort Ord falls under the following jurisdictions: the Bureau of Land Management, the cities of Seaside, Marina, Monterey, and Del Rey Oaks, the County of Monterey, the University of California, California State University at Monterey Bay, and the Presidio of Monterey Annex. The California Department of Parks and Recreation administers the Fort Ord Dunes State Park area that stretches along the western portion of the former Fort Ord between Highway 1 and the ocean.

Physical Setting

Former Fort Ord lands lie between Canyon del Rey and Toro Creek to the south, the Salinas Valley to the northeast, and the Pacific coast to the west. The landscape slopes gradually down toward the northwest through moderately dissected rolling hills from approximately 900 feet above sea level near Impossible Canyon to sea level. On the eastern portion of the base lie canyons and ridges that drop steeply into the bottom of the Salinas Valley. The northeast portion of the base borders ancient sand dunes within the City of Marina.

Most of the area is underlain by young terrestrial deposits. The stratigraphy includes Eolian deposits, Upper Tertiary Santa Margarita Sandstone, Plio-Pleistocene Paso Robles Formation, and Quaternary Aromas Sandstone. Interdune areas have internal drainage, whereas the dissected areas drain to the Salinas Valley either directly, or by way of Toro Creek along Highway 68 (Smith et al., 2002). A very small amount of stormwater runoff from the Fort Ord lands may enter Canyon Del Rey near the southwest corner of the former base; however, this is likely to be from roadway runoff during intense storms.

The western portion of the base, where most development has occurred, contains deposits of Type A soils with infiltration rates of 6 to 20 inches per hour. The 85th percentile 24-hour rainfall depth is estimated at 0.7 inches (PRISM Climate Group). Currently, all rainfall percolates into this area and there is no stormwater runoff to the ocean through the barrier beach, as the last of the storm drain outfalls built for the Army base have been removed by CSUMB. Type B soils are present over the remainder of the base and have a permeability of 0.6 to 6 inches per hour. This latter area has locally resistant beds, but the overall geologic substrate has a high erosion and mass-wasting potential, as evinced by the great number of gullies, and the local presence of badlands topography and shallow landslides (Smith et al., 2002; 2004).

Because all stormwater runoff from impervious areas in the Ord Community percolates, it tends to recharge the shallow dunes aquifer in the SVGB and the shallow dunes aquifer and the upper portion of the Paso Robles formation overlying the SGB.

Jurisdictional Boundaries

Within the area shared by the two IRWM regions, responsibility for and management of groundwater, potable water, wastewater, recycled water, stormwater, desalinated water, and resources dependent on all of these waters, are divided among many stakeholders. These stakeholders range from private water distribution systems to federal agencies involved in the reuse of the former Fort Ord. However, most management responsibilities lie with the Cities of Seaside and Marina, California American Water (Cal-Am), Marina Coast Water District (MCWD), MPWMD, County of Monterey, Monterey County Water Resources Agency (MCWRA), Monterey Regional Water Pollution Control Agency (MRWPCA), Fort Ord Reuse Authority (FORA), the Bureau of Land Management (BLM), and the Department of Defense (primarily, the U.S. Army).

MCWD provides potable water and sanitary sewer collection services to existing and most future developed areas of the Ord Community. Within land overlying the SGB, this includes the residential areas and schools surrounding the Bayonet and Blackhorse golf courses. The Seaside Community Services District is currently the designated entity to provide wastewater collection service to areas east of General Jim Moore Boulevard and south of Eucalyptus Road (through a service area amendment issued by the Monterey County Local Agency Formation Commission in 1997). Water is obtained from wells near “central” Marina (the area outside of the former Fort Ord military base), in the SVGB. Both Cal-Am and the City of Seaside operate municipal supply systems in the SGB to serve residential customers within the City of Seaside (but not residents of the Ord Community overlying the SGB). Water is produced from the SGB under the supervision of a Watermaster appointed by the Superior Court. The Watermaster is comprised of overlying pumpers including the City of Seaside and Cal-Am, MPWMD, and MCWRA.

Wastewater from the Ord Community is taken to the Regional Treatment Plant operated by MRWPCA along with other communities’ wastewater, where a majority of it is recycled and used to irrigate crops in the Castroville area through the Castroville Seawater Intrusion Project (CSIP). Use of recycled water with the CSIP reduces the need for groundwater production in the Salinas Valley aquifers closest to the coast that are impacted by seawater intrusion.

Recently, there has been a focus on recreation associated with the creation of the Fort Ord Dunes State Park west of Highway 1 and the Fort Ord National Monument in the eastern half of the former Army base. Competing ballot initiatives in the November 2013 sought to modify portions of the Base Reuse Plan by re-designating how certain lands could be used. Neither measure passed, so the Reuse Plan was not amended. However, the issues raised during the election campaign remain, including water availability, preservation or development of open space, jurisdictional claims, and the economics of base redevelopment. These issues are shared by both IRWM regions.

Water Supplies

Monterey Peninsula. The Monterey Peninsula has a current water supply replacement need of about 9,750 AFY with an additional 3,400 AFY needed for 20-year General Plan development (2014 MPWMD estimate). The Monterey Peninsula region's water supplies are legally constrained by orders from the SWRCB to cut back production from Carmel Valley and an adjudication of the SGB (currently the two primary supplies for the Monterey Peninsula). Physically, the water supply system is also old in many areas and requires re-plumbing in order to deliver water from the north (in Seaside) to the southern and eastern portions of the region. The region has evaluated up to about 150 alternatives over more than 50 years to increase supplies, but only the following projects have proven to be viable and thus have been constructed:

(1) Aquifer Storage and Recovery - cooperatively implemented by MPWMD and Cal-Am, this project includes the diversion of excess winter/spring flows from the Carmel River system for recharge of, storage in and subsequent recovery from the SGB;

(2) Carmel Area Wastewater District/Pebble Beach Community Services District/Pebble Beach Company Recycled Water Projects - provision of tertiary-treated, recycled wastewater for irrigation of golf course and some other recreational areas within Pebble Beach; and

(3) Sand City Desalination Plant - provides 300 AFY to the community, including 94 acre-feet that have been committed long-term for use in areas outside the City.

The Ord Community has been allocated 6,600 AFY from the SVGB, of which just over 5,600 AFY has been committed; however, many of these commitments are intended for future developments that have not been built. As shown in **Attachment 2**, over 4,000 AFY has remained unused since the allocation system was created and water use tracked. FORA manages its groundwater allocation and sub-allocations through a Development and Resource Management Plan that annually tracks water use. The Reuse Plan anticipated that a total of 9,000 AFY would be needed to provide water for redevelopment of the former Fort Ord; therefore, a balance of 2,400 AFY of water is needed to augment the 6,600 AFY of available groundwater. A more recent analysis in the MCWD Urban Water Management Plan based on jurisdictional surveys projects that total demand in 2030 for the Ord Community will be about 8,200 AFY, which is 800 AFY less than the original Reuse Plan. It is likely that the economic downturn beginning in 2007 has influenced the perceived future demand.

Greater Monterey County. All of the water supplied to the Ord Community area of the Greater Monterey County IRWM region originates from the Salinas Valley Groundwater Basin, specifically wells in the 400-foot and deep aquifers. Two of the aquifers in the SVGB are in a condition of long-term overdraft (the 180- and 400-foot aquifers) near the coast, with seawater intrusion in the 180-foot aquifer extending more than 7 miles inland to the outskirts of the City of Salinas. MCWRA has taken steps to address this, including use of recycled water for agricultural irrigation (through the wastewater recycling facility, called the Salinas Valley Reclamation Project, and the CSIP) and use of Salinas River water to supply the CSIP area irrigators using an inflatable (rubber) dam to make seasonal impoundments from which to divert water. However, to date, seawater intrusion has not been reversed although the rate of intrusion appears to be slowing (MCWRA, 2013). MCWRA requires that MCWD take no more than 5,200 AFY from the 180- and 400-foot aquifers in order to reduce the risk of exacerbating seawater intrusion.

Although MCWD can develop additional hydraulic capability to meet demand (i.e., install more wells) by tapping the “deep aquifer” in the SVGB to supply the allocated amount for the Ord Community, there is concern that recharge mechanisms in this aquifer may not be adequate to support additional extraction – in other words the deep aquifer could become overdrafted by additional production. MCWD has pursued a Seawater Desalination Project and a Recycled Water Project, and is also pursuing surface water rights in the Salinas Valley to meet its obligations to supply the Ord Community. Additional background on MCWD’s water supply planning for the Ord Community is provided in **Attachment 1**, including past efforts at developing regional water supply projects that provide mutual benefits to both the Greater Monterey County and Monterey Peninsula IRWM regions. The following section describes additional inter-regional water management planning efforts that have occurred due to the IRWM programs.

Water Supply Projects and Plans Related to Both IRWM Regions

The following water supply-related projects and studies are considered relevant to both the regions and/or are related to the water supply issues of the two regions.

Monterey Peninsula Water Supply Project (MPWSP)

The MPWSP proposal consists of a Cal-Am-only 9.6 million gallon per day (MGD) desalination project at a location different from the Coastal Water Project or a combination of a Cal-Am 6.4 MGD desalination project and a groundwater replenishment project (Groundwater Replenishment Project), described below.

The Cal-Am project proposal to locate a desalination plant in north Marina to supply the Monterey Peninsula region is one of the largest in California. It includes the following features: subsurface slant source water intake wells; extraction of brackish water from the SVGB; and discharge of hyper-saline brine concentrate into the Monterey Bay National Marine Sanctuary (MBNMS). A critical aspect of the Cal-Am desalination proposal is to determine what effect that extraction of subsurface water near the coast would have on Salinas Valley Groundwater Basin aquifers. Due to seawater intrusion into the aquifers, agricultural interests in the Salinas Valley are strongly opposed to removal of any water from the 180- or 400-foot aquifers near the coast and currently, MCWRA has a prohibition against new wells in the 180-foot aquifer. In addition, extraction of seawater using slant wells extending below the seafloor requires wells to be installed and operated in areas potentially affected by climate change and the associated coastal erosion triggered in part by both large storm events and rising sea levels. Discharge of brine to the MBNMS must meet newly proposed Ocean Plan Amendment standards that include dilution of the brine to no more than 5% above natural salinity at 100 meters from the discharge point (the zone of initial dilution).

The review and project selection process for the Cal-Am proposal is being conducted at the local level through a Governance Committee formed with Cal-Am, the Monterey Peninsula Regional Water Authority (MPRWA), the Monterey

Peninsula Water Management District, and the Monterey County Board of Supervisors (an example of inter-regional coordination). The Governance Committee was formed to ensure efficient and effective public input to the project.

The MPRWA is a Joint Power Authority (the Authority) that consists of the six Monterey Peninsula cities of Carmel-by-the-Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, and Seaside, and the County of Monterey. The purpose of the MPWRA is to study, plan, develop, finance acquire, construct, maintain, repair, manage, operate, control and govern water projects either alone or in cooperation with other public or private non-member entities. In addition, the MPRWA established a Technical Advisory Committee to assist in carrying out the purposes and objectives of the Authority.

The CPUC will eventually rule on whether a Groundwater Replenishment Project (see description below) would be implemented to reduce the scale of the desalination and be part of the water supply solution for the Monterey Peninsula. Hearings for the Groundwater Replenishment Project are scheduled for December 2014. As Lead Agency, the CPUC will also rule on the MPWSP EIR as part of the ratemaking process for the Cal-Am project. Certification of an EIR and issuance of a Certificate of Public Convenience and Necessity is anticipated in 2015.

Monterey Peninsula Groundwater Replenishment Project.

The proposed Monterey Peninsula Groundwater Replenishment Project (Groundwater Replenishment Project) would create a reliable source of water supply by taking highly-treated water from a new advanced water treatment plant, and injecting it into the Seaside Groundwater Basin using a series of shallow and deep injection wells. The Groundwater Replenishment Project is being proposed by the Monterey Regional Water Pollution Control Agency (MRWPCA) in partnership with the MPWMD. See http://www.mpwaterreplenishment.org for more information and maps. Once injected into the Seaside Basin, the treated water would mix with the groundwater present in the aquifers and be stored for future use. The primary purpose of the proposed project is to provide 3,500 acre-feet per year (AFY) of high quality replacement water to the Seaside Basin to allow Cal-Am to extract the same amount for delivery to its customers in the Monterey District service area, thereby enabling Cal-Am to reduce its diversions from the Carmel River system by this same amount.[2] Cal-Am is under a state order to secure replacement water supplies and cease overpumping of the Carmel River by January 2017. The proposed project components include the following (the geographic location in relationship to the two regions is provided in parenthesis):

- source water collection and conveyance - some proposed source waters, such as Lake El Estero Storage Management Water, would originate from land located within the Monterey Peninsula IRWM region and some

[2] CalAm is an investor-owned public utility with approximately 38,500 connections in the Monterey Peninsula area.

alternative source waters are located in the Greater Monterey County IRWM region[3],

- treatment facilities - including both existing and proposed facilities to be located within the Greater Monterey County IRWM region at the MRWPCA's regional treatment plant,
- treated water conveyance system, including pipelines and pump station - conveyance systems would be located and pass through both IRWM regions to carry the high quality, advanced-treated water between the regional treatment plant and the SGB,
- injection wells for recharging the SGB – these would be located within the city of Seaside's portion of the former Fort Ord south of Eucalyptus Road and east of General Jim Moore Boulevard, and
- potable water distribution system improvements outside of, and south of, the Ord Community within the cities of Seaside, Monterey, and Pacific Grove.

The Groundwater Replenishment Project would assist both the Greater Monterey County and the Monterey Peninsula regional stakeholders, including RWMGs, in complying with numerous state and federal policies aimed at improved water resource management and associated societal benefits. In addition to the project objectives, the Groundwater Replenishment Project may provide public benefits and important progress toward meeting the following statewide environmental goals, policies and orders:

- The State Water Resources Control Board (SWRCB) supports the use of reclaimed water to reduce discharges of wastewater. In particular, Order WQ 84-7 says dischargers in water-short areas that propose to release treated wastewater to the ocean must evaluate the potential for water reclamation. This order was specifically recognized within the SWRCB Cease and Desist Order issued to Cal-Am (see section 19.1). The Groundwater Replenishment Project would assist in compliance with this statewide order by creating a water supply use for treated wastewater that is presently discharged to the ocean during periods when the Salinas Reclamation plant doesn't use all the secondary effluent to produce tertiary-treated wastewater for agricultural irrigators in the CSIP areas.
- The SWRCB's Recycled Water Policy (adopted May 2009 and amended April 2013) states: "We strongly encourage local and regional water agencies to move toward clean, abundant, local water for California by emphasizing appropriate water recycling." It also says, "Included in these goals is the substitution of as much recycled water for potable water as possible by 2030." The policy also states, "Groundwater recharge with recycled water for later extraction and use in accordance with this policy and state and federal water quality law is to the benefit of the people of the state of California. The State Water Board and Regional Water

[3] There are several raw or source waters that would require agreements from Salinas Valley stakeholders, such as MCWRA and the City of Salinas, and others would require appropriative water rights from the SWRCB.

Boards will exercise the authority granted to them by the Legislature to the fullest extent possible to encourage the use of recycled water, consistent with state and federal water quality laws." The Groundwater Replenishment Project would satisfy this statewide policy (see: http://www.swrcb.ca.gov/water_issues/programs/water_recycling_policy/, accessed April 11, 2014).

- In 2006, Gov. Arnold Schwarzenegger signed AB 32, the Global Warming Solutions Act of 2006, which set the 2020 greenhouse gas emissions reduction goal into law. It directed the California Air Resources Board to begin developing discrete early actions to reduce greenhouse gases while also preparing a scoping plan to identify how best to reach the 2020 limit. Groundwater Replenishment requires much less electricity that desalination requires for the same amount of processed water. Therefore, the Groundwater Replenishment Project would help satisfy this statewide goal.
- The City of Salinas's Industrial Wastewater Treatment Facility is currently unable to meet its National Pollutant Discharge Elimination System/Waste Discharge Requirements of the Regional Water Quality Control Board on a year-round basis (City of Salinas, Industrial Wastewater Treatment Facility, 2013 Annual Report, Waste Discharge Number R3 2003 0008, WDID NO. 3 27011003, January 30, 2014). The Groundwater Replenishment Project proposes to utilize that water to augment wastewater flows to the Regional Treatment Plant to enable year-round, advanced treatment and recharge operations.

Potential sources of water for recycling include stormwater and urban runoff, and agricultural wash water that is treated, evaporated, and percolated near the Salinas River at Davis Road (about four miles upstream of the ocean). In addition, a detailed alternatives analysis is being prepared for both the Groundwater Replenishment Project Environmental Impact Report and for a U.S. Bureau of Reclamation WaterSMART Grant Feasibility Study and State Water Resources Control Board Facility Plan that includes analyzing the diversion and reuse of polluted waters in the Salinas Reclamation Ditch, the Tembladero Slough, and Blanco Drain. These sources are impaired waters on the Central Coast Region of the RWQCB list of 303(d) streams and include a variety of contaminants associated with agricultural and urban runoff. More details of the analysis of these projects will be available in the Fall of 2014. These alternatives are also discussed below under "Future Wastewater Recycling and Water Quality Projects."

Salinas and Carmel River Basins Study

In February 2014, the Monterey Peninsula Water Management District, the Monterey Regional Water Pollution Control Agency, the Monterey County Water Resources Agency, and the San Luis Obispo County Public Works Department submitted a WaterSMART grant proposal to the U.S. Bureau of Reclamation (Reclamation) for an inter-regional water supply planning study called a Basin Study.

According to Reclamation, basin studies entail basin-wide efforts to evaluate and address the impacts of climate change on future water supplies and sea level rise. Funding is available for comprehensive water studies that define options for meeting future water demands in river basins in the western United States where imbalances in water supply and demand exist or are projected. Each study would include four key segments:

- State-of-the-art projections of future supply and demand by river basin.
- An analysis of how the basin's existing water and power operations and infrastructure will perform in the face of changing water realities.
- Development of options to improve operations and infrastructure to supply adequate water in the future.
- Recommendations on how to optimize operations and infrastructure in a basin to supply adequate water in the future. (U.S. Bureau of Reclamation website, http://www.usbr.gov/WaterSMART/bsp/, accessed on April 10, 2014)

The study proposed by the three IRWM planning regions (Greater Monterey County, Monterey Peninsula, and San Luis Obispo County) is titled the Carmel and Salinas River Basins Study and its goals include providing an opportunity to improve collaboration between the project partners, collectively estimating and planning for changing conditions, and cooperatively identifying regional water supply opportunities in both basins. The Ord area is a key link between two of the regions as discussed elsewhere in this report and would benefit from this study as it is situated between key areas of water demand. The Ord Community overlies the Seaside Groundwater Basin (with its unique subsurface storage characteristics) and overlies and utilizes the northern area (or Pressure subarea) of the Salinas Valley Groundwater Basin.

The complexity and numerous challenges of operating the Salinas and Carmel River Basins and sub-basins have resulted in studies by the US Bureau of Reclamation (Reclamation), US Geological Survey (USGS), the US Army Corps of Engineers (Corps), US Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA), Monterey Bay National Marine Sanctuary (MBNMS) and state and local agencies. The proposed Basin Study will help water management agencies having jurisdiction in one or both basins to better collaborate and develop long-term strategies that build on an extensive array of existing analyses to focus on the imbalances between water supply and demand under the projected impacts of climate change, such as sea level rise and variations in marine influence. The goal of the study is to understand, anticipate and adapt to climate change effects on coastal resources and to support management practices that will yield sustainable water surface and groundwater supplies capable of meeting the needs of agriculture, municipal users, the environment, and recreation. A significant amount of recent and on-going work funded by the non-federal partners will contribute to the "in-kind services" cost share (in excess of $1.2 million planned and a total of $4.7 million since June 2013). In addition, the nonfederal partners are committed to participating and collaborating with Reclamation on data and technical needs, stakeholder engagement through the ongoing IRWM plan groups, and performing model runs with existing watershed and groundwater models to determine the projected impacts of climate change scenarios, as well as improvements due to proposed adaptation strategies.

Information on the San Luis Obispo County region's IRWM program can be found at the following website: http://www.slocountywater.org/site/Frequent%20Downloads/Integrated%20Regional%20Water%20Management%20Plan/IRWM%20Plan%20Update%202014/.

Regional Urban Water Augmentation Project (RUWAP)

The RUWAP is a joint water supply planning effort of the Marina Coast Water District and the Fort Ord Reuse Authority. The project proposes construction and operation of both a desalination component and a recycled water distribution component. The desalination component would include a plant producing between 1,273 and 1,500-acre-foot-per-year of potable water at the Marina Coast Water District Armstrong Ranch property, north of the city of Marina in Monterey County. The RUWAP desalination project component was proposed to extract seawater and potentially brackish water, produce desalinated water, and convey it to the existing District distribution systems. During the 2008-2011 timeframe, MCWD pursued a regional collaborative version of the RUWAP called the Monterey Bay Regional Desalination Project that would have provided water to areas of the Greater Monterey County and Monterey Peninsula regions. That project is no longer being pursued. Additional details about the RUWAP are provided in **Attachment 1**, Overview of the Ord Community Water Supply Planning.

Future Wastewater Recycling and Water Quality Projects

Future water supply and water quality enhancement projects also have the potential to enhance water supplies for the Salinas Valley, including the Ord Community, and to enhance water quality and habitat in the northernmost portions of the Salinas Valley and the Monterey Bay. The following potential water resources strategies could be future components of one or more regional water solutions projects. Some of these are currently being evaluated by the relevant agencies as components of recycled and potable water supply projects:[4]

1. Shared use of infrastructure for multiple benefit projects, such as RUWAP Recycled Water and/or Monterey Peninsula Groundwater Replenishment Projects, for delivering recycled water to urban irrigation users in the Marina Coast Water District's service area.
2. Provision of excess raw source water collected by Groundwater Replenishment Project facilities or facilities constructed by other local jurisdictions to existing or future agricultural irrigation users within the Castroville area of northern Salinas Valley. Excess Groundwater Replenishment-collected runoff and wastewaters would be treated by the primary and secondary wastewater systems and the Salinas Valley

[4] These opportunities are being pursued outside of the current planning process for the Monterey Peninsula Groundwater Replenishment Project Environmental Impact Report. The current proposed project for that EIR does not include these components, except as alternatives to the proposed project.

Reclamation Project tertiary treatment system prior to storage and delivery to CSIP.

3. Increased reuse of wastewater effluent disposed via the MRWPCA's ocean outfall through increased wintertime diversion and recycling of secondary effluent.
4. Diversion, treatment, and reuse of polluted waters from several source water bodies listed on the regions list of impaired water bodies, Clean Water Act Section 303 (d) for the benefit of irrigation users or for use to augment potable supplies through groundwater replenishment (i.e., indirect potable reuse).

Regarding item #3, above, the State Water Resources Control Board prioritizes protection of the quality of the ocean waters for use and enjoyment by the people of the state, and requires control of the discharge of waste to ocean waters in accordance with the provisions contained in the California Ocean Plan 2012 (SWRCB, effective August 19, 2013). The Ocean Plan specifically seeks to limit discharges to the ocean. Increased water recycling for potable reuse associated with the Groundwater Replenishment Project has the dual benefit of reducing wastewater discharge pollutant loads and, by decreasing the size of a proposed desalination plant required to meet local water supply need, the discharge of desalination brine to the MBNMS can be reduced. These future water supply projects could capture a variety of sources for beneficial drinking water use that would otherwise flow to the ocean.

Regarding item #4 above, the Central Coast Regional Water Quality Control Board is in the process of amending its Basin Plan to include Total Maximum Daily Loads (TMDL) that will apply to several of the surface water bodies in the vicinity of the proposed project that are affected by existing "impaired" flows (RWQCB, Notice of Opportunity to Comment on the Proposed Approval of an Amendment to the Water Quality Control Plan for the Central Coastal Basin to Establish Total Maximum Daily Loads in the Lower Salinas River and Reclamation Canal Basin, and the Moro Cojo Slough Subwatershed for Nitrogen Compounds and Orthophosphate, September 3, 2013). The Groundwater Replenishment Project or one or more of these futures projects would potentially capture, treat and reuse one or more of the impaired flows as source waters for influent to the existing RTP, then for further treatment and reuse using the SVRP tertiary treatment plan, and/or the proposed Groundwater Replenishment advanced treatment facility.

Surface Water / Recycled Water Storage

The MCWD service area is located near the Salinas River, and MCWD Board of Directors has considered purchasing surface water rights in the Salinas River Basin as a means of meeting long-term (beyond 2030) demands. MCWD has previously been in negotiations with a senior (pre-1914) water right holder. No decisions have been made as to the purchase of surface water supplies, but that option is potentially available to meet additional demands beyond the 20-year planning horizon. A constraint to use of surface water is that it is unlikely to be a year-round supply due to demands by agricultural users and instream flow requirements for fisheries. Also, a second phase of the SVWP, examined at a program level in the SVWP EIR, calls for surface water to be made available to coastal urban water agencies in the future.

Monterey County Water Resources Agency holds water right permit #11043 for 135,000 AFY of Salinas River surface water that was to be revoked by the State Water Resources Control Board (SWRCB) in August 2013. Through MCWRA staff and counsel efforts, a settlement agreement was signed and the Permit will be valid, as long as the Agency adheres to a strict, aggressive set of milestones for water project implementation. The milestones end with a project being developed and delivering water by July 2026. The water allocated to the Permit will be used to continue to remedy seawater intrusion in the Salinas Valley.

MCWD and MCWRA are also considering the potential to construct a seasonal surface water and/or recycled water storage reservoir on MCWD land south of the Regional Treatment Plant. Currently, adequate water supplies are available in the winter time; however, peak demands occur in the summer. A surface storage reservoir would reduce the seasonal inconsistencies between supply and demand (Brian True, personal communication, April 2014 and MCWRA, Regional Advisory Committee Meeting April 17, 2014 Agenda and Packet, April 2014).

Conclusion. The above projects can provide a significant opportunity for stakeholders in both IRWM planning regions to collaborate and coordinate on water management projects with potential long-term benefits for both regions.

Inter-Regional Prioritization Processes

In 2011 and 2012, the Monterey Peninsula and Greater Monterey County IRWM planning regions met separately to develop their respective IRWM Plan objectives. The following describes the activities of each region regarding prioritization of their regions' objectives.

Monterey Peninsula Region Objectives Prioritization

At the July 2012 Stakeholder meeting, stakeholders were asked to provide general comments and input to a draft set of goals and objectives revised in accordance with the 2011/2012 Guidelines from DWR and new regional circumstances and conditions. To gather meaningful feedback, the participants were also provided written forms and asked to rank draft objectives as high, medium or low priorities for the Monterey Peninsula region. In addition, the Objectives Feedback form was provided to the full list of stakeholders via email to enable those who could not attend the meeting to provide feedback on the draft objectives. The results of the July 25, 2012 stakeholder meeting, including the Objectives Feedback/Prioritization Exercise Results, are available in the Monterey Peninsula IRWM Plan, Chapter 3, Goals and Objectives.

Based upon stakeholder input (including verbal and written comments) and the Objectives Feedback/Prioritization Exercise, the draft objectives were modified and re-ordered. The 2012 objectives review process resulted in twenty five (25) total objectives, including eight (8) considered "high priority." The result of the objectives review and prioritization effort is shown in **Attachment 3**, under the column labeled: "Monterey Peninsula, Carmel Bay, and South Monterey Bay Region."

Greater Monterey County Region Objectives Prioritization

After much debate and careful consideration, the RWMG made a decision to not prioritize objectives. The rationale for this decision is as follows. The Greater Monterey County IRWM region is a broad geographic area made up of a very diverse group of stakeholders. The RWMG itself reflects that diversity. The RWMG has aimed to be as inclusive as possible of all stakeholders in the region, encouraging their active participation in the IRWM planning process and promising serious consideration of their concerns and needs. The 57 objectives included in the IRWM Plan were based on the "issues and conflicts" perceived to exist throughout the region, as described by different groups of stakeholders in all corners of the region. The RWMG therefore recognizes that each of the objectives carries special weight and significance for at least some groups of stakeholders. By prioritizing some objectives over others, the RWMG feels they would effectively be prioritizing the needs of certain stakeholders over others. In order to maintain inclusivity, and to avoid the possibility of alienating certain groups of stakeholders or discouraging their participation in the IRWM planning process, the RWMG has therefore decided not to prioritize objectives. The project ranking system reflects that decision (Greater Monterey County RWMG, *Greater Monterey County Integrated Regional Water Management Plan*, March 2013).

Inter-Regional Coordination of Prioritization Efforts. After each region developed their individual objectives (and prioritization, as applicable), representatives of both regions developed a comparison of objectives, which is presented in **Attachment 3**. The comparison was presented at a meeting of RWMG and Ord Community representatives on February 7, 2013 (see Attachment 4 which contains the agenda, presentation, draft matrix of objectives, and summary meeting notes). In general, the two regions have similar, but region-specific, objectives in the broad categories of water supply, water quality, flood management, environmental protection, and climate change. As shown in **Attachment 3**, the revised draft matrix of objectives, the two regions have both developed objectives covering the key statewide priorities of the IRWM planning program. Some key differences in the objectives include the following:

Water Supply

- The Greater Monterey County region's objectives are heavily influenced by the large agricultural industry throughout Monterey County's Salinas Valley; therefore, numerous objectives are focused on issues related to agriculture production, and the environmental and water supply issues of that industry.
- Each region prioritized water supplies; however, the Monterey Peninsula includes specific requirements for meeting replacement and future demands.

Water Quality

- The Monterey Peninsula focuses more on protecting water quality for habitat and Areas of Special Biological Significance, while the Greater Monterey Plan has more of an emphasis on reducing the impacts associated with agriculture production on water quality.

Flood Protection, Floodplain Management, and Erosion Prevention

- Each region seeks to protect infrastructure and property; however, the Monterey Peninsula includes protecting habitat and taking into consideration sea level rise.

Environmental Protection and Enhancement

- The Monterey Peninsula region includes climate change in its discussion of environmental protection and in its own goal category. The Greater Monterey County region includes protection of existing pristine natural resources in its climate change category. The Greater Monterey County region includes specific objectives addressing research and monitoring, sedimentation, native/non-native species, purchasing fee titles/easements and wildfire that are not included in the Monterey Peninsula region.

Climate Change

- The Greater Monterey County region addresses implementation of efforts such as carbon sequestration that are not addressed in the Monterey Peninsula region.

Regional Communication and Cooperation

- The Monterey Peninsula region has a more comprehensive goal statement with objectives that relate to building relationships, cooperating, collaborating integrating, and public outreach, education, and communication (including with DACs). The Greater Monterey County region has more specific details, including focusing on collaboration and reducing regulatory inconsistencies to facilitate compliance and permitting.

Disadvantaged Communities

- The Greater Monterey County region has an entire goal category dedicated to DAC objectives while the Monterey Peninsula region includes discussion of DACs in the Regional Communication and Cooperation category, above.

Ord Inter-Regional Project Coordination Activities

To adequately incorporate the priorities and select projects for the Ord Community, this report is intended to be included in the development and update of the Monterey Peninsula IRWM Plan. During the development of the updated plan, the RWMG representatives conducted additional outreach to numerous Ord Community stakeholders and engaged RWMGs and stakeholders with interest and purview in the Ord Community to meet and discuss issues. The following tasks were carried out in connection with the development of this Project Report, and in parallel with the development and update of the IRWM Plan:

- A sub-committee was established of members of the RWMG and plan preparers (Susan Robinson and Alison Imamura, DD&A) from each region that were familiar with the Ord Community area. The purpose of the sub-committee was to identify objectives and priorities and plan for Ord Inter-Regional Project activities. Both regions' representatives agreed to actively solicit projects within the Ord Community, and set a meeting to prioritize objectives. This planning occurred during meetings in January and April 2012.
- The Monterey Peninsula RWMG Representative, Larry Hampson, attended a Fort Ord Reuse Authority Water and Wastewater Oversight Committee Meeting in April 2012 to present an overview of the Monterey Peninsula IRWM Plan process and the purpose and goals of the Inter-Regional Coordination Project. Additional participation in the Inter-Regional process, including stakeholder meetings, was solicited.
- Stakeholders that have not been represented in one or the other IRWM Plan were invited to an Ord Inter-Regional Stakeholder Meeting on February 7, 2013. A list of key Ord Community Stakeholders that were invited by email and personal phone call to attend the meeting is provided in **Attachment 4** (in addition they were invited to the February 6, 2013 general stakeholder meeting about project review process for the Monterey Peninsula region).
- A focused Ord Community inter-regional public/stakeholder meeting was held on February 7, 2013 to take input on issues and to comment on priorities and objectives for the Ord Community. Meeting agendas, presentation materials, and meeting notes are provided in **Attachment 3**. Fifteen people attended the meeting, including officials from

the Army, Marina Coast Water District, City of Monterey, and the Monterey Regional Water Pollution Control Agency. The Greater Monterey County region RWMG was represented by Bridget Hoover (Monterey Bay National Marine Sanctuary) and Susan Robinson (Coordinator for Greater Monterey County). Both IRWM regions investigated any environmental justice concerns associated with the reuse of Fort Ord including noting that several areas of Fort Ord have unexploded ordnance, pre-World War II lead paint contamination, and groundwater plumes of toxic substances. However, the primary focus was on improving water supply infrastructure and augmentation of the water supply to meet anticipated Ord Community requirements.

- The issues, objectives, priorities, and projects for the Ord Community, which lies astride the common regional boundary, were identified during the meeting through the use of a draft matrix shown in **Attachment 3**, Comparison of Objectives. In addition, the meeting participants identified additional issues, constraints, and objectives for the Ord Community as described in the Summary meeting notes from the meeting that are included in **Attachment 4**.
- Certain project components described above can most appropriately fit within one region or the other; however, several have a place in both IRWM plans. Using the respective ranking system and prioritization process from each region, these components will be prioritized within the respective region.
- This project report will be presented to each of the Monterey Peninsula IRWM RWMG members prior to and as part of public hearing for plan adoption of the plan by the MPWMD Board. The draft project report will also be provided to Greater Monterey County RWMG and they will be asked to update their plan to include the results of this project.
- Each IRWM Plan will be updated to include the results of this inter-regional coordination effort, including a summary within relevant sections of the plan and attaching this report to the plan, if appropriate.
- A total of four meetings were held with representatives of the Ord Community (including one Ord-specific inter-regional meeting and three MP IRWM stakeholder meetings that included numerous representatives of the Ord Community as documented in **Attachment 5**).

Conclusions and Recommendations

The Monterey Peninsula Groundwater Replenishment Project, the Ord Community Water Supply solution (i.e., RUWAP or another solution), and the Reclamation Basin Study hold the most promise for a truly integrated water management effort with multiple benefits that would involve inter-regional cooperation between the Monterey Peninsula and the Greater Monterey County region. In the case of the Basin Study, the inter-regional coordination would extend to the San Luis Obispo IRWM Region. Other projects can provide a significant opportunity for stakeholders in both IRWM planning regions to collaborate and coordinate on water management projects with potential long-term benefits for both regions.

References

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MCWRA, *Coastal Salinas Valley Seawater Intrusion Program and Update,* February 2013.

RWQCB, *Notice of Opportunity to Comment on the Proposed Approval of an Amendment to the Water Quality Control Plan for the Central Coastal Basin to Establish Total Maximum Daily Loads in the Lower Salinas River and Reclamation Canal Basin, and the Moro Cojo Slough Subwatershed for Nitrogen Compounds and Orthophosphate*, September 3, 2013

SWRCB, *California Ocean Plan 2012 found in Section 13000 of Division 7 of the California Water Code [Stats. 1969, Chap. 482] pursuant to the authority contained in Section 13170 and 13170.2 [Stats.1971, Chap. 1288] Effective August 19, 2013 (at http://www.swrcb.ca.gov/water_issues/programs/ocean/, accessed April 12, 2014)*

SWRCB, *Recycled Water Policy*, adopted May 2009 and amended April 2013. (at http://www.swrcb.ca.gov/water_issues/programs/water_recycling_policy/ , accessed April 11, 2014.

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APPENDIX 6-A

CONCEPT PROPOSALS SUBMITTED TO PLAN

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Project Proponent	Project Title	Type of Entity	Contact Person	Geographic Location	Project Eligibility: Prop 84 IRWM Criteria	Project Eligibility: IRWMP Resource Management Strategies	Summary Description of Project
City of Carmel-by-the-Sea	Carmel-by-the-Sea Pilot Wet-Dry Weather Diversion Program	Public agency	Agnes Martelet	Carmel-by-the-Sea, within the watershed of Carmel Bay	Water reuse and recycling for non-potable reuse and direct and indirect potable reuse, Regional water conveyance facilities that improve integration of separate water systems, Storm water resource management, Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff	Reduce Water Demand - Urban Water Use Efficiency, Improve Operational Efficiency and Transfers – Water Transfers, Increase Water Supply – Storm Water Capture and Management, Improve Water Quality – Urban Runoff Management, People and Water – Outreach, Engagement, and Education – Regional Cooperation	The goal of this Project is to capture and treat runoff to eliminate or substantially reduce the pollutants that enter the Carmel Bay ASBS. This project proposes to install a diversion facility at the City's 4th Avenue and Ocean Avenue storm drains, which capture most of our residential areas on the north side of the City and our downtown area. These diversion facilities will capture dry weather, first flush and small storm runoff from approximately 170 acres. This would divert dry weather flows and first flush runoff from approximately 50% of the City's watersheds that drain directly to the Pacific Ocean at Carmel Beach. Runoff captured will flow to the sewer collection system and ultimately to the Carmel Area Wastewater District's Wastewater Treatment Plant where the water will be treated and beneficially reused for irrigation of landscape at the Pebble Beach property. Capture of dry weather flows and small storm runoff is expected to significantly reduce the volume of pollutants that reach the ASBS, as smaller more frequent storm events typically mobilize the majority of urban pollutants.
City of Carmel-by-the-Sea	Carmel by-the-Sea Forest Hill Park Creek Restoration	Public agency	Agnes Martelet	Carmel by-the-Sea, within the watershed of Carmel Bay	Storm water resource management, Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff.	N/A	The goal of this project is to restore the natural hydrology of the stream that flows through Forest Hill Park on the north side of the City of Carmel-by-the-Sea and provide sediment capture to improve water quality flowing to the Carmel Bay ASBS from the City's largest watershed. The restoration would consist of stabilization of the creek channel, which is eroding and impacting tree roots and nearby pedestrian walkways. Restoration may involve installing natural or constructed weirs to provide runoff energy dissipation, and restoration of native riparian species. Stabilizing the creek will help decrease the excess fine sediment that flows down the drainage system and out to the Carmel Bay ASBS via the City's storm drainage system. Reducing sediment loads that flow into the storm drain system and to Carmel Bay from the City will also help reduce loading of heavy metals that bind to sediments such as lead and particulate copper.
City of Carmel-by-the-Sea	City of Carmel by-the-Sea Park Branch Library- Devendorf Rainwater Capture	Public agency	Agnes Martelet	Carmel by-the-Sea, in the Carmel Bay watershed	Water reuse and recycling for non-potable reuse and direct and indirect potable reuse, Water-use efficiency and water conservation, Local and regional surface and underground water storage, including groundwater aquifer cleanup or recharge projects, Storm water resource management, Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff	N/A	The goals of this project are to harvest and use dry weather flows and storm water from the Park Branch Library site for irrigation of neighboring Devendorf Park. This project also proposes to install permeable pavement at the Park Branch Library to allow storm water to pass through the pavement into the ground below. This reduces runoff, recharges groundwater, and acts as a filtration mechanism to prevent pollutants from entering the Carmel Bay ASBS. Harvesting dry weather flows and storm water for use in irrigation conserves and reuses water.
City of Monterey	Hartnell Gulch Restoration and Runoff Diversion Project	Public agency	Jeff Krebs P.E., Principal Engineer	The Hartnell Gulch area located behind City library at 625 Pacific Street, and the adjacent parking lot south of the Library lot.	Water reuse and recycling for non-potable reuse and direct and indirect potable reuse, Watershed protection, restoration, and management projects, including projects that reduce the risk of wildfire or improve water supply reliability, Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff	N/A	The proposed project is comprised of two components including (1) creek rehabilitation, and (2) dry weather flow diversion to sanitary sewer. The creek rehabilitation will consist of removal of invasive plants, revegetation with native plants, and stabilization of the existing eroded channel. The grade of the channel bed will be raised several feet throughout the project area and bank stabilization and buried grade controls will be constructed to limit future instream erosion. Additionally, a drop structure at the downstream end of the project area will limit future instream erosion. Raising the streambed will provide opportunity for increased public access with construction of pedestrian walkways alongside the creek bank and three pedestrian bridges that span the creek. The second part of the project consists of diverting dry weather runoff from the tributary watershed to the sanitary sewer for recycling at the Monterey One Water Regional Treatment Plant, to augment water supply.

Project Proponent	Project Title	Type of Entity	Contact Person	Geographic Location	Project Eligibility: Prop 84 IRWM Criteria	Project Eligibility: IRWMP Resource Management Strategies	Summary Description of Project
Monterey County	Carmel River Floodplain Restoration and Environmental Enhancement Project (FREE)	Public agency	Dan Bertoldi	The CRFREE Project area is situated immediately south of the Carmel River and flanks both sides of the Highway 1 corridor in the Carmel area near the Carmel River Lagoon.	Local and regional surface and underground water storage, including groundwater aquifer cleanup or recharge projects, Storm water resource management, Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff	N/A	The Carmel River Floodplain Restoration and Environmental Enhancement Project is a multi-agency, nature-based, green infrastructure effort to restore river and floodplain function. The project will restore a mosaic of riparian habitat types and reduce flood risk to the surrounding residential and business community. The project proposes to reconnect the Carmel River to its historic floodplain by notching levees along the south bank of the river and creating fluvial microtopography in the adjoining agricultural field. Hydrologic and habitat connectivity to the river mouth at the Carmel River Lagoon will be achieved by elevating the Highway 1 transportation corridor on a causeway and allowing high flows to flush through the south arm of the ecologically unique lagoon wetlands. In addition to restoring habitat and reducing flood risk, the project will protect coastal farmlands and agricultural features on historic fields in the project footprint, while increasing public access to adjacent parks and open space. Numerous partner agencies, organizations and community groups have pledged their support for the project.
Monterey County	County Service Area 50 (Rio Way Tract #2) Stormwater and Flood Control Project	Public agency	Lynette Redman, Management Analyst III	Project is generally located in the southern portion of the Carmel Watershed, along Rio Road and adjacent to Lower Carmel River (Mission Fields neighborhood west of Hwy 1).	Storm water resource management	N/A	Monterey County Resource Management Agency is the lead agency for the County Service Area 50 – Rio Way Tract #2 (CSA 50) interior drainage and perimeter levee improvements project ("Project"). Project elements include interior drainage and perimeter levee improvements to provide FEMA protection level flood control measures to remove the area from the flood plain. Flood control components include perimeter improvements to the existing Mission Fields, Crossroads, and Val Verde levees along the river. Stormwater improvements including quality, storage, conveyance improvements and upgrades to existing storm water pumping stations. Project beneficiaries include property/business owners and residents in the project area as well as Monterey County due to protection provided to private property and the public infrastructure. Preliminary budgetary estimates are approximately $12,000,000 for all components of the Project.
Monterey One Water	Coral Street Pump Station Climate Resiliency Project	Public agency	Jennifer Gonzalez, Engineering Manager	This project will take place at M1W's Coral Street Pump Station, located directly across the street from 1123 Ocean View Boulevard near Coral Street in Pacific Grove, CA. Additional construction, parking, or staging may be required within City of Pacific Grove rights of way on Ocean View Boulevard and/or Coral Street and at the City's Esplanade Park.	Water reuse and recycling for non-potable reuse and direct and indirect potable reuse, Water-use efficiency and water conservation, Local and regional surface and underground water storage, including groundwater aquifer cleanup or recharge projects, Regional water conveyance facilities that improve integration of separate water systems, Watershed protection, restoration, and management projects, including projects that reduce the risk of wildfire or improve water supply reliability, Storm water resource management, Conjunctive use of surface and groundwater storage facilities, Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff, Climate change adaptation and mitigation	N/A	Coral Street Pump Station is a subsurface wastewater pump station located on the ocean side of Ocean View Boulevard (across from 1123 Ocean View Boulevard in Pacific Grove, near Coral Street). As a result of its location, the station is subject to the ever-increasing climate change effects, including sea level rise, coastal erosion, and storm surges, that result in inundation of the wet well, and thus, electrical reliability challenges. The Coral Street Pump Station Climate Resiliency Project will involve engineering design, environmental review, permitting, and construction to waterproof the facilities by relocating key electrical components to a new location at nearby Esplanade Park. The goal of the project is to build the M1W collection system resiliency by increasing reliability into the future including considering ever-increasing climate change conditions at the site of the pumps station. In October 2018, the City of Pacific Grove and Monterey One Water met to begin to formalize a land transfer agreement to make the relocation feasible.

Project Proponent	Project Title	Type of Entity	Contact Person	Geographic Location	Project Eligibility: Prop 84 IRWM Criteria	Project Eligibility: IRWMP Resource Management Strategies	Summary Description of Project
Monterey One Water	Seaside Pump Station Climate Change and Erosion Adaptation Study	Public agency	Jennifer Gonzalez, Engineering Manager	The Project will assess the feasibility of alternatives to M1W's Seaside Pump Station's current location and design to determine what, if any, managed retreat strategy would be best employed to address the station's climate change vulnerability and operational challenges. Seaside Pump Station is located at 1 Bay Street, Sand City and within the coastal zone. Future construction work may also occur within the Cities of Seaside and Monterey if pipeline and pump station relocation is the preferred strategy.	Water reuse and recycling for non-potable reuse and direct and indirect potable reuse, Water-use efficiency and water conservation, Local and regional surface and underground water storage, including groundwater aquifer cleanup or recharge projects, Regional water conveyance facilities that improve integration of separate water systems, Watershed protection, restoration, and management projects, including projects that reduce the risk of wildfire or improve water supply reliability, Storm water resource management, Conjunctive use of surface and groundwater storage facilities, Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff, Climate change adaptation, habitat/ecological restoration	N/A	Seaside Pump Station is situated within coastal dune habitat approximately 26 feet above MSL, 200 feet inland from the ocean on a property with a shallow grade sloping northwest towards the Monterey Bay. As is the case with Coral Street Pump Station, another of M1W's coastally-adjacent pump stations, its location makes Seaside Pump Station increasingly vulnerable to climate-change impacts including coastal erosion and sea level rise. Separately, the station suffers operational challenges and excess energy use related to available pump capacity versus actual flow resulting in costly and labor-intensive maintenance, repair, and replacement caused by vibration and cavitation. These operational challenges have been exacerbated by California's prolonged droughts which are expected to occur more frequently with climate change. The recent drought caused Monterey Peninsula water users to achieve significant indoor water conservation and thus lower wastewater flows. The Seaside Pump Station Climate Change and Erosion Adaptation Study would include conducting a feasibility and alternatives analysis for solutions for protecting the M1W collection system in this area. Solutions would improve climate resiliency by protecting M1W near-shore infrastructure from sea level rise, storm surges, and erosive site conditions reducing the risk of failure of the station and thus protecting marine water quality. Options that would be evaluated include: a. **Sand Replenishment/Beach Nourishment:** Southern Monterey Bay has the highest rate of coastal erosion in the State; various coastal communities, including nearby City of Monterey considered sand nourishment as a tactic for protecting coastally-located assets from the effects of beach erosion. Although the site may be an ideal location for this application, the potential positive beach accretion resulting from the agreement reached between the Coastal Commission and CEMEX to sunset sand mining activities at their Marina location should be considered. This mine has been implicated as one of the major factors in the high rate of coastal erosion in southern Monterey Bay. Should it be determined that the station should remain in its current location, M1W would initiate design and engineering to upgrade and/or reconfigure the station to more optimally receive and convey current and future potential wastewater and storm water flows. b. **Inland Station Retreat/Land Swap Agreement:** During construction of Seaside Pump Station, California State Parks and Monterey One Water entered into an agreement for future land swap. Dated March 1991, that agreement states that in the event that Monterey One Water and State Parks agree that coastal erosion necessitates the relocation of the existing station, pipelines, and appurtenant facilities, State Parks will exchange the existing station site for one approximately equal in size within the confines of the parcel. State Parks would restore the site to native coastal dune habitat and enhance public beach access. c. **Station Removal and Flow Reroute:** In addition to long-term climate change vulnerability, Seaside Pump Station has historically had challenges with station design and pump capacities relative to actual flows. For this reason, maintenance of existing pumps and reliability of operations have led staff to consider the feasibility of rerouting the wastewater flow to an alternate existing pump station to allow for the removal of Seaside Pump Station altogether. This project alternative would include in-depth hydraulic modelling and analysis. The project will be designed to accommodate new flows, including storm water from the City of Seaside's nearby 90-inch storm water outfall and other urban dry weather and storm flows that may be diverted to M1W's infrastructure from the cities of Pacific Grove and Monterey. Any additional flows will then become influent to the Regional Treatment Plant (RTP) for beneficial reuse for indirect potable reuse on the Monterey Peninsula through the Pure Water Monterey (PWM) Project, and non-potable agricultural reuse in the Castroville Seawater Intrusion Project (CSIP) area. Diversion of flows to M1W from urban runoff would reduce pollutant loads to Monterey Bay and flooding in low-lying areas. Additionally, the Project will assess the feasibility of alternatives to M1W's Seaside Pump Station's current location and design to determine what, if any, managed retreat strategy would be best employed to address the station's climate change vulnerability and operational challenges.
Sand City/Seaside	Trash Capture and Urban Diversion Project for the Cities of Seaside and Sand City	Public agency	Mr. Fred Meurer, City Administrator	The project is located within the city limits of the City of Sand City and fully within the Monterey Peninsula, Carmel Bay and South Monterey Bay IRWM region.	Water-use efficiency and water conservation, Local and regional surface and underground water storage, including groundwater aquifer cleanup or recharge projects, Watershed protection, restoration, and management projects, including projects that reduce the risk of wildfire or improve water supply reliability, Storm water resource management, Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff, Regional projects or programs as defined by the IRWM Planning Act	Reduce Water Demand – Urban Water Use Efficiency, Improve Operational Efficiency and Transfers – Infrastructure Reliability, Increase Water Supply – Storm Water Capture and Management, Improve Water Quality – Pollution Prevention – Urban Runoff Management, Practice Resources Stewardship – Ecosystem Restoration – Land Use Planning and Management – Watershed Management, Improve Flood Management – Flood Risk Management, People and Water – Outreach, Engagement, and Education	Completion of design/construction of a green/complete street for two streets in Sand City, Contra Costa and Catalina, respectively. The project will provide multiple community, water resource and other environmental benefits. The concept design, initial sizing, initial quantified performance and cost have been completed and are attached with this proposal. The concept design is currently being supported by Prop. 1 Technical Assistance and design will be completed to between 30%-60% design. The implementation request includes completion of design and project construction. The project is a retrofit of the existing street condition to integrate green infrastructure elements such as bioretention/biofiltration and permeable pavement. The project development and conceptual design has been completed as part of a Prop. 1 Stormwater Technical Assistance effort administered by the State Water Resources Control Board intended to support disadvantaged communities develop projects to put forward as part of a Prop. 1 Stormwater Implementation grant proposal.

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APPENDIX 6-B

LIST OF PROJECTS SUBMITTED FOR RANKING

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Project Scoring/Ranking Summary Table
MP IRWM Plan (project scoring version date: May 30, 2019)

May 30, 2019

"Raw Scores" (Shaded Cells) will automatically populate with the project information from Relevant Project Solicitation sheets within this file

"Weighted Scores" will automatically calculate

	IRWM PLAN COMPLIANCE CRITERIA																		PROJECT MERIT CRITERIA			
	Objectives		Resource Management Strategies		Strategic Considerations					Benefits to DAC & Native Americans		Environ-mental Justice		Climate Change Adaptation		Reduction in GHG			Technical Feasibility			
					Region/Nexus	Work Plan, Budget, Schedule	Benefits & Program Preferences	Cost														
Projects	Raw Score	Weighted Score	Raw Score (Max 34)	Weighted Score	Raw Score	Raw Score	Raw Score	Raw Score	Weighted Score	Raw Score (Max 5)	Weighted Score	Raw Score (Max 5)	Weighted Score	Raw Score (Max 5)	Weighted Score	Raw Score (Max 5)	Weighted Score	Plan Compliance Total Weighted Score	Raw Score (Max 30)	Weighted Score	GRAND TOTAL PROJECT SCORE	PROJECT POINT %
Coe Avenue Recycled Water Distribution Pipeline	21.7	18.6	11.0	7.2	9.0	3.0	3.0	2.0	19.4	0.0	0.0	5.0	5.7	5.0	5.7	3.0	3.4	**60.0**	30.0	34.2	**94.2**	**26%**
Ramona Avenue Stormwater Runoff Infiltration Project	16.6	14.3	7.0	4.6	4.0	2.0	2.0	2.0	11.4	5.0	5.7	5.0	5.7	4.0	4.6	1.0	1.1	**47.4**	30.0	34.2	**81.6**	**23%**
Del Monte Manor Park LID Improvements Project	27.0	23.2	11.0	7.2	7.0	3.0	1.0	0.0	12.5	5.0	5.7	5.0	5.7	5.0	5.7	1.0	1.1	**61.2**	30.0	34.2	**95.4**	**27%**
West End Stormwater Management Improvements	25.6	22.0	16.0	10.4	7.0	6.0	5.0	2.0	22.8	5.0	5.7	5.0	5.7	5.0	5.7	2.0	2.3	**74.6**	10.0	11.4	**86.0**	**24%**

DRAFT (version date: May 30 2019)

PROJECT OVERVIEW

General Project Information

Project Title:	Coe Avenue Recycled Water Distribution Pipeline
Project Location:	City of Seaside: Coe Avenue between General Jim Moore Blvd and Pacific Crest
Estimated Cost:	$650,000

Brief Project Description (1 to 2 sentences):

The proposed Project involves the construction of approximately 3,000 linear feet of new recycled water (RW) distribution main in Coe Avenue in the City of Seaside. This new distribution line will allow for the delivery of RW from the RUWAP (Regional Urban Water Augmentation Project) trunk main in General Jim Moore Blvd to RW

Project Proponent Information

Contact Name:	Andrew Racz, PE - Associate Engineer
Affiliation:	Marina Coast Water District
Address:	11 Reservation Road, Marina, CA 93933
Phone Number:	831-883-5933
Email:	aracz@mcwd.org

Other participating and/or partner agencies/organizations (if applicable):

Monterey One Water; the pipeline will deliver water produced at the Advanced Water Treatment Facility which is currently under construction at the M1W Regional Treatment Plant.

DETAILED PROJECT INFORMATION

Description

Please provide a description of your project (including the location) and its purpose, what will be constructed and/or implemented, how the project will function, the area(s) and/or entities that will be affected by or will benefit from the project, and any potential obstacles to implementation.

In 2018, the Marina Coast Water District (MCWD, District), in cooperation with Monterey One Water (M1W), completed construction of the RUWAP (Regional Urban Water Augmentation Project) recycled water trunk main. This nearly 8-mile long pipeline will deliver advanced-treated recycled municipal wastewater from the Advanced Water Treatment Facility (AWTF) at the Regional Treatment Plant (RTP) to the Pure Water Monterey Groundwater Replenishment Project (GWR) injection wellfield in the Seaside Groundwater Basin for indirect potable reuse. It will also supply treated recycled water to urban irrigators along the pipeline's alignment who can reuse this water directly. When the project is fully operational (year 2020), it is estimated that it will provide over 5,500 AFY of recycled water to direct and indirect end users, expanding the Monterey Peninsula region's water supply and reducing the need to pump groundwater from the over drafted Seaside Basin. MCWD is funding the RUWAP Project through Clean Water State Revolving Fund loans, with projected benefits expected to exceed costs by a
>2:1 ratio over the project's lifetime.

Potential direct end-users of recycled water are located throughout MCWD's service area in the cities of Seaside and Marina, as well as unincorporated Monterey County and former Fort Ord lands. In order to serve these potential customers, the next phase of RUWAP for MCWD requires the construction of various distribution mains extending from the trunk main to the properties where irrigation with recycled water will occur. MCWD has

IRWM Objectives - IRWM Plan Standard 3

Water Supply (WS)

Assists region to meet WS-1 (automatically calculated)	**1**	WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.**	
ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)		Enter the number 1 in the appropriate category. **Do not choose more than one category**. Larger water supply quantities yield more points up to total of 3 normalized points.	
		1	*up to 550 AFY*
		0	*at least 1100 AFY (10%)*
		0	*at least 1650 AFY (20%)*
		0	*at least 2200 AFY (30%)*
		0	*at least 2750 AFY (40%)*
		0	*at least 3300 AFY (50%)*
		0	*at least 3850 AFY (60%)*
		0	*at least 4400 AFY (70%)*
		0	*at least 7200 AFY (80%)*
		0	*at least 8100 AFY (90%)*
		0	*at least 9000 AFY (100%)*
Bonus Points = (auto calculate)	**0.2727**	3 max	
Assists region to meet WS-2 (automatically calculated)	**1**	WS-2. Maximize use of recycled water.*	
ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)		Enter the number 1 in each category.as appropriate (up to 2 raw points; 1.5 normalized points)	
		1	*provides recycled water to one or more properties within the region*
		0	*expands source water to either CAWD or MRWPCA*
		1.5 max	
		WS-3. Develop opportunities for stormwater capture and reuse pursuant to the Stormwater Resource Plan.	
Assists region in meeting WS-4, then Score 1 -->	0	WS-4. Evaluate, advance, or create water conservation throughout the Region.*	
Assists region in meeting WS-5, then Score 1 -->	1	WS-5. Improve water supplies to achieve multiple benefits, beneficial uses and environmental flows.	
Assists region in meeting WS-6, then Score 1 -->	1	WS-6. Seek long-term sustainable supplies for adopted future demand estimates.	

Water Quality (WQ)

Assists region to meet WQ-2 (automatically calculated)	**1**	WQ-1. Improve inland surface water quality for environmental resources (e.g. steelhead), including headwaters and tributaries of streams, and to protect potable water supplies.*

Enter the number 1 in each category as appropriate (up to a total of 6 raw points; 3 normalized points):

0	*increases regional monitoring or contributes to statewide water quality monitoring*
1	*assists in meeting Basin Plan objectives or NPDES permit limits*
0	*removes trash from storm water*
0	*eliminates or reduces soil erosion, contaminant sources*
1	*eliminates or reduces the risk of a source of non-storm water discharge*
0	*implements low impact development (LID) features, techniques, and practices within existing developed areas*

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

3 max

	WQ-2. Improve ocean water quality, including, but not limited to, Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.*

Enter the number 1 in each category as appropriate (up to a total of 9 raw points; 3 normalized points):

0	*implements regional monitoring or contributes to statewide water quality monitoring*
0	*assists in implementing ASBS compliance plans*
0	*removes trash from storm water*
0	*eliminates or reduces soil erosion in watersheds discharging to the ocean*
1	*eliminates or reduces the risk of a source of non-storm water discharge*
0	*implements low impact development (LID) measures within existing developed areas*
0	*reduces pollutant load during design storm events from one or more storm water point source by 90% compared to 2011-2012*
0	*reduces pollutant load during design storm events from 2 or more stormwater point sources by 90% compared to 2011-12*
0	*achieves Table B Instantaneous Max. Water Quality Objectives in Ch. II of the Ocean Plan on average*

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

(auto calculate) 3 max

Assists region to meet WQ-3 (automatically calculated)	**1**	WQ-3. Protect and improve water quality in groundwater basins, especially where at risk from seawater intrusion

Enter the number 1 in each category as appropriate (up to a total of 2 raw points; 3 normalized points):

0	*increases groundwater basin monitoring or contributes to statewide water quality monitoring.*
1	*prevents, reduces, or minimizes groundwater quality degradation through reduction in pollutant loads, remediation, reclamation and reuse, or through enhancement of groundwater levels/volumes thereby reducing the potential for seawater intrusion.*

Bonus points = (auto calculate)	**1.5**	3 max

Flood Protection

Assists region to meet FP-1 (automatically calculated)	**0**	FP-1. Develop regional projects and plans necessary to protect critical infrastructure and sensitive habitats from flood damage and sea level rise, in particular, along the Carmel Bay and South Monterey Bay shoreline.*	
ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)		nter the number 1 in the appropriate category. **Do not choose more than one ategory**. Removal of more properties from the floodplain yields more points up to otal of 3 normalized points.	
		0	*removes up to 10 properties from a 100-year flood zone*
		0	*removes 11 to 50 properties from the 100-year flood zone*
		0	*removes 101 or more properties from a 100-year flood zone*
Bonus points = (auto calculate)	**0**	1.8 max	
Assists region in meeting FP-2, then Score 1 -->	0	FP-2. Develop approaches for floodplain restoration or adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).	
Assists region in meeting FP-3, then Score 1 -->	0	FP-3. Promote floodplain restoration that protect quality and availability of water while preserving or restoring ecologic and stream function.	
ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)		FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.*	

sion (CSE)

CSE-1, then Score 1 -->		CSE-1. Manage areas along the shoreline susceptible to erosion, including long-term strategic retreat where appropriate.
Assists region in meeting CSE-2, then Score 1 -->	0	CSE-2. Identify opportunities to restore natural stream function, including meandering, in the lower 15 miles of the Carmel River and selected
Assists region in meeting CSE-3, then Score 1 -->	0	CSE-3. Reduce or prevent adverse downcutting in the main stem Carmel River and its tributaries.

Watershed Management (WM)

Assists region in meeting WM-1, then Score 1 -->	0	WM-1. Reduce human-induced sources of non-point fine sediment runoff.
Assists region in meeting WM-2, then Score 1 -->	0	WM-2. Restore natural fire frequency in headwater forests.
Assists region in meeting WM-3, then Score 1 -->	0	WM-3. Restore the natural hydrologic flow regime in disturbed watersheds where appropriate, including low impact development strategies in
Assists region in meeting WM-4, then Score 1 -->	0	WM-4. Re-establish a natural level of sediment supply within the Carmel River and its tributaries.

Environmental Protection and Enhancement (EV)

Assists region in meeting EV-1, then Score 1 -->	0	EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds*; including, but not limited to, promoting the steelhead recovery by meeting accepted or approved environmental flows within the regional watersheds.
Assists region in meeting EV-2, then Score 1 -->	0	EV-2. Assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*
Assists region in meeting EV-3, then Score 1 -->	0	EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.
Assists region in meeting EV-4, then Score 1 -->	0	EV-4. Identify opportunities for open spaces, trails and parks long streams and other recreational areas in the watershed that can be incorporated into

Assists region in meeting EV-5, then Score 1 -->	0	EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.
Assists region in meeting EV-6, then Score 1 -->	0	EV-6 Promote watershed activities for fire fuel management and adaptive management strategies to protect water quality and water supplies from

Climate Change (CC)

Assists region in meeting CC-1, then Score 1 -->	1	CC-1. Implement adaptation measures and mitigation solutions to climate change effects, including increased large storm intensity and/or frequency, sea level rise, drought and wildfire.
Assists region in meeting CC-2, then Score 1 -->	1	CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.
Assists region in meeting CC-3, then Score 1 -->	1	CC-3. Increase energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.

Regional Communication and Cooperation (RCC)

Assists region to meet RC-1 (automatically calculated)	**1**	RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts.	
		Enter the number 1 in each category as appropriate (up to a total of 5 raw points; 3 normalized points):	
		1	Partnerships – The project is proposed by a partnership of multiple organizations enabling use of shared expertise and resources.
		0	Resource Management Strategy – The project includes a RMS that is not already being implemented in the region thereby would provide diversification of strategies.
		1	Beneficial Uses – The project supports several different beneficial uses (see CCRWQCB, *Basin Plan* Chapter 2, 2001)
		1	Geography – The project implements a watershed-scale, regional-scale, or inter-regional project.
		0	Hydrology – The project addresses multiple watershed functions within the hydrologic cycle.
Bonus points = (auto calculate)	**1.8**	3 max	
Assists region to meet RC-2 (automatically calculated)	**1**	RC-2. Foster collaboration among regional entities as an alternative to litigation through ongoing meetings of the RWMG and regional data sharing.	
		Enter the number 1 in each category as appropriate (up to a total of 5 raw points; 3 normalized points):	
		1	PROVIDED INFORMATION early in project development to the public to assist in understanding the problem, alternatives, opportunities and/or solutions
ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)		1	CONSULTED & OBTAINED FEEDBACK from all regional agency and non-governmental organizations (NGOs) regarding the problem, alternatives, opportunities and/or solutions
		1	CONSULTED & OBTAINED FEEDBACK from the public regarding the problem, alternatives, opportunities and/or solutions
		1	INVOLVED & WORKED DIRECTLY WITH two or more regional agency and/or NGO stakeholders regarding the problem, alternatives, opportunities, and/or solutions
		1	COLLABORATED WITH, OR MADE PARTNERSHIPS with two or more agencies or NGOs on each aspect of the decision
Bonus points = (auto calculate)	**3**	3 max	
Assists region in meeting RC-3, then Score 1 -->	0	RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.	
Assists region in meeting RC-4, then Score 1 -->	1	RC-4. Build relationships with State and Federal regulatory agencies and water forums and agencies.	

Total Points for IRWM	**21.7**

maximum = 55.5   I get 52.8

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

ies (IRWM Plan Standard 4)

Management Strategies (RMS) that the proposed project will address.

	Reduce Water Demand	
	0	Agriculture Water Use Efficiency
	1	Urban Water Use Efficiency *
Category:	**Improve Flood Management**	
	0	Flood Risk Management *
Category:	**Improve Operational Efficiency and Transfers**	
	1	Conveyance – Regional/Local *
	0	System Reoperation
	0	Water Transfers *
Category:	**Increase Water Supply**	
	1	Conjunctive Management & Groundwater Storage *
	0	Seawater or Brackish Water Desalination *
	0	Precipitation Enhancement
	1	Recycled Municipal Water *
	0	Surface Storage – Regional/local *
Category:	**Improve Water Quality**	
	0	Drinking Water Treatment and Distribution *
	1	Groundwater Remediation/Aquifer Remediation
	1	Matching Quality to Use
	1	Pollution Prevention *
	1	Salt and Salinity Management
	0	Urban Stormwater Runoff Management *
Category:	**Practice Resources Stewardship**	
	0	Agriculture Lands Stewardship
	0	Ecosystem Restoration *
	0	Forest Management *
	1	Land Use Planning and Management
	0	Recharge Area Protection
	0	Sediment Management
	0	Watershed Management *
Category:	**People and Water**	
	0	Economic Incentives
	1	Outreach and Engagement
	0	Water and Culture
	1	Water-Dependent Recreation
Other Strategies		
	0	Crop Idling for Water Transfers
	0	Devaporation or Atmospheric Pressure Desalination
	0	Fog Collection
	0	Irrigated Land Retirement
	0	Rainfed agriculture
	0	Waterbag transport/storage technology

Total RMS Points =	**11**

Strategic Considerations (PSP Table 4 Scoring Criteria)

SC-1 - Does the project involve or address inter-regional issues or does it involve two or more agencies?

Yes; Marina Coast Water District has partnered with Monterey One Water to construction the RUWAP pipeline.

Points (Yes: 3 pts; No: 0 pts) =	3

SC-3. Does the project provide water for human consumption, cooking and sanitary purposes?

Yes; replacing portable water with recycled water for irrigation frees up water for human consumption.

Points (Yes: 1 pts; No: 0 pts) =	1

SC- 4. Does the project address a critical water resource related needs and priorities of the IRWM region as identified in the IRWM plan?

Yes; the project meets objectives related to Water Supply, Water Quality, Flood Protection, Watershed Management, Environmental Project and Enhancement, Climate Change, and Regional Communication and

Points (Yes: 1 pts; No: 0 pts) =	1

SC-5. Is the project sufficiently justified by the description given in the narrative of Section D.1? Does the narrative include requisite referenced supporting documentation such as models, studies, engineering reports, etc.? Did the narrative include other information that supports the justification for the proposed project, including how the project can achieve the claimed level of benefits?

Yes; the project is justified by the project description provided. No; the description does not include reference to models, studies, or other reports. Yes; the description discusses how the project can achieve the claimed level of

Points (Score: 3 points if "yes" to all three questions; 2 points if "Yes" to 2 questions; 1 point for "yes" to one question) =	2

SC-6. Does the project address and/or adapt to the effects of climate change? Does the project address the climate change vulnerabilities assessed in the IRWM Plan?

Yes; diversifying sources of water to include recycled municipal wastewater helps alleviate demands on aquifers and provides a new source of water that is reliable and relatively consistent bother year-round and year-over-year,

Points (Score: 2 points if "yes" to 2 questions; 1 point for "yes" to one question) =	2
Subtotal Region/Nexus (10 maximum)	**9**

SC-7. Does the Work Plan include a complete description of all tasks necessary to result in a completed project? Are all necessary and reasonable deliverables identified?

No; the Work Plan is a component of the Project Information Form. Project Information Form has not been submitted.

Points (Score: 2 points if "yes" to 2 questions; 1 point for "yes" to one question) =	0

SC-8. Collectively, are the workplan, schedule, and budget thorough, reasonable, and justified; and consistent with each other? See Table 4 for specifics.

Considerations include (one point each):
• Does the project description clearly and concisely address all required topics, including summarizing the major components, objectives and intended outcomes/benefits of the project? - YES
• Are the tasks shown in the Workplan, Schedule and Budget consistent? - NO
• Are the costs presented in the Budget backed up by and consistent with supporting justification/documentation? - YES
• Is the schedule reasonable considering the tasks presented in the workplan? - NO

Points (Score: 1 point for each yes to bullet points; 4 maximum)	2

SC- 9. Does the applicant have legal access rights, easements, or other access capabilities, to the property to implement the project; and if not, did the applicant provide a clear and concise narrative / schedule to obtain the necessary access? (Full points if N/A)

Yes; the project is located within an existing public right-of-way beneath pavement, so no land purchases or environmental studies will be required.

Points (Yes or N/A: 1 pts; No: 0 pts) =	1
Subtotal Work Plan, Budget, Schedule and Readiness (7 maximum)	**3**

SC- 10. Does the budget leverage funds with other private, Federal, or Local fund resources above and beyond cost share requirements? If additional cost share is not provided, did the applicant provide describe attempts to use other funding sources and justify why it was not included.

No; the project proponent will allocate 50% cost share from their general Capital Improvements budget for FY 2020.

Points (Yes: 1 pts; No: 0 pts) =	0

SC-11. For each of the anticipated physical benefit(s) claimed, described, and quantified in Table 4 of the Project Information Form? Is each benefit claimed logical and reasonable given the information provided in the Work Plan?

No; the Project Information Form was not submitted.

Points (Score: 2 points if "yes" to 2 questions; 1 point for "yes" to one question) =	0

SC- 12. Does the project provide multiple (more than one) benefits?

Yes; the project provides the following benefits as defined in Chapter 2 of the Central Coastal Basin Plan: Municipal and Domestic Supply, Groundwater Recharge, and Non-Contact Water Recreation

Points (Yes: 1 pts; No: 0 pts) =	1

SC- 13. Does the project provide benefits to more than one IRWM region and/or Funding Area?

The project is a distribution component of a larger water recycling project benefitting the Greater Monterey County IRWM region.

Points (Yes: 1 pts; No: 0 pts) =	1

SC- 14. If the proposed project addresses contamination per the requirements of AB 1249, does the project benefit a small disadvantaged community?

No; the project does not address the requirements of AB 1249.

Points (Yes: 1 pts; No: 0 pts) =	0

SC- 15. Does the proposed project employ new or innovative technology or practices?

Yes; the project will use water produced at the Advanced Water Purification Facilities at the M1W Regional Treatment Plant.

Points (Yes: 1 pts; No: 0 pts) =	1
Subtotal Benefits and Program Preferences (7 maximum)	**3**

SC- 16. Did the applicant provide a narrative on cost considerations that is fully explained based on information requested in the Project Information Form?

Yes; the Project Information Form was not provided, however, the proponents provided a budget justification that explains/justifies the estimated cost of the project.

Points (Yes: 2 pts; No: 0 pts) =	2

Total for DWR Scoring Criteria (25 maximum)	**17**

DAC and Native Americans and Environmental Justice (DWR Review Factors D, E and f)

Does the project provide specific benefits to disadvantaged communities and/or Native American tribal communities? If so, explain.

No; the project would not benefit disadvantage communities.

DAC &/or Native American Points (Yes: 5 pts; No: 0 pts) =	0

Does the project address any known environmental justice issues? Does the project *avoid disproportionately affecting disadvantaged communities*?

The project provides year round green space for a school serving DAC kids in Seaside as well as being the distribution component of a larger water recycling project benefitting DAC areas in the Salinas Valley. It avoids negatively impacting DAC.

Environmental Justice Points (Yes for both: 5 pts; No for either: 0 pts) =	5

Climate Change Adaptation and Mitigation (DWR Review Factors K and L)

Put an X next to any climate change adaptation or mitigation strategy the proposed project will contribute to.

Adaptation Strategies

x	Improve water supply reliability
x	Expand conjunctive use of multiple water supply sources
x	Increase water use and/or reuse efficiency
x	Provide additional water supply
x	Promote water quality protection
x	Reduce water demand
x	Advance / expand recycled water use
x	Promote urban runoff reuse
	Address sea level rise
x	Address other anticipated climate change impacts
	Improve flood control
	Promote habitat protection
	Establish migration corridors
	Re-establish river-floodplain hydrologic continuity
	Re-introduce anadromous fish populations to watershed
	Implement one or more recommendations from the *Erosion Mitigation Alternatives for Southern Monterey Bay (Alternatives Study) (ESA-PWA, May 2012)*
	Enhance and protect watershed forest and meadow systems

Please describe: The project uses diverse sources of water to produce recycled municipal wastewater to help alleviate demands on aquifers and provide a new source of water that is reliable and relatively consistent both year-round and year-over-year, despite possible drought conditions or longer-term drying

Climate Change Adaptation (Score 1 for every strategy implemented, up to 5 max) =	5

Mitigation Strategies

	Increase water use efficiency or promote energy-efficient water demand reduction
	Improve water system energy efficiency
x	Advance / expand recycled water use
x	Promote urban runoff reuse
x	Promote use of renewable energy sources
	Contribute to carbon sequestration

Does the proposed project reduce regional greenhouse gas emissions and/or improve energy efficiency compared to alternative proposed projects meeting the same regional objectives? If so, explain how.

Please describe: Wastewater recycling is less energy intensive that desalination due to the lower initial salt and contaminant concentrations. In addition, M1W has proposed the use of renewable energy at the RTP, further reducing the GHG footprint of recycled water production

Climate Change Mitigation (Score 1 for every strategy implemented, up to 5 max) =	3

Technical Feasibility (DWR Review Factor C)

Discuss the technical feasibility of the project. If possible, cite references that contain information about the proposed project and detail the technical feasibility of the project.

No technical studies were provided. This technology has been established as effective in similar situations and the project proponent has experience with similar projects.

30 points: Technical feasibility has been documented in a project-specific pilot study or previous phase or has a documented track record of success

OR

10 points: has the technology proposed been established as effective in similar situations?
10 points: Are project site conditions documented (geology/soil, ecology, hydrology, land use, public utilities)?
10 points: Do the project partners have experience with similar projects? (e.g., similar site, similar technology).

Technical Feasibility Points (See above) =	30

DRAFT (version date: May 30 2019)

PROJECT OVERVIEW

General Project Information

Project Title:	Ramona Avenue Stormwater Runoff Infiltration Project
Project Location:	Casanova-Oak knoll neighborhood on Ramona Avenue (between Dundee Avenue
Estimated Cost:	$338,000

Brief Project Description (1 to 2 sentences):

Install high flow tree box filters and dry wells at multiple locations in the Casanova-Oak Knoll neighborhood, along Ramona Avenue.

Project Proponent Information

Contact Name:	Jeff Krebs, P.E., Principal Engineer
Affiliation:	City of Monterey
Address:	580 Pacific Street, Monterey, CA 93940
Phone Number:	(831) 646-3877
Email:	krebs@Monterey.org

Other participating and/or partner agencies/organizations (if applicable):

There are not any other agencies involved.

DETAILED PROJECT INFORMATION

Description

Please provide a description of your project (including the location) and its purpose, what will be constructed and/or implemented, how the project will function, the area(s) and/or entities that will be affected by or will benefit from the project, and any potential obstacles to implementation.

This project drainage area is a portion of the Casanova-Oak knoll neighborhood and consists of approximately 21 acres that surface flows along Ramona Avenue 1,000 feet to North Fremont Street. Local drainage has caused flooding of multiple lanes along North Fremont Street, and some residential flooding at Ramona Avenue at Dundee Avenue. The project proposes to install three storm water infiltration systems within the Casanova-Oak Knoll drainage area. Each installation would consist of five 4'-diameter X 15'-deep dry wells, one high flow rate tree box filter, distribution piping and valves, and reconstruction of curb, gutter, sidewalk, and street pavement. A continuous simulation analysis utilizing local 1-hour precipitation data was used to estimate the annual volume of stormwater runoff infiltrated by the proposed systems. The results show the systems infiltrate on average 2.3 acre-feet of stormwater per year, which is 18% of the watershed's annual runoff.

IRWM Objectives - IRWM Plan Standard 3

Water Supply (WS)

Assists region to meet WS-1 (automatically calculated)	**0**	WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.**	
		Enter the number 1 in the appropriate category. **Do not choose more than one category**. Larger water supply quantities yield more points up to total of 3 normalized points.	
		0	*up to 550 AFY*
		0	*at least 1100 AFY (10%)*
		0	*at least 1650 AFY (20%)*
		0	*at least 2200 AFY (30%)*
		0	*at least 2750 AFY (40%)*
ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)		0	*at least 3300 AFY (50%)*
		0	*at least 3850 AFY (60%)*
		0	*at least 4400 AFY (70%)*
		0	*at least 7200 AFY (80%)*
		0	*at least 8100 AFY (90%)*
		0	*at least 9000 AFY (100%)*
Bonus Points = (auto calculate)	**0**		
Assists region to meet WS-2 (automatically calculated)	**0**	WS-2. Maximize use of recycled water.*	
		Enter the number 1 in each category.as appropriate (up to 2 raw points; 1.5 normalized points)	
		0	*provides recycled water to one or more properties within the region*
		0	*expands source water to either CAWD or MRWPCA*
ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)			
		WS-3. Develop opportunities for stormwater capture and reuse pursuant to the Stormwater Resource Plan.	
Assists region in meeting WS-4, then Score 1 -->	0	WS-4. Evaluate, advance, or create water conservation throughout the Region.*	
Assists region in meeting WS-5, then Score 1 -->	1	WS-5. Improve water supplies to achieve multiple benefits, beneficial uses and environmental flows.	
Assists region in meeting WS-6, then Score 1 -->	0	WS-6. Seek long-term sustainable supplies for adopted future demand estimates.	

Water Quality (WQ)

Assists region to meet WQ-2 (automatically calculated)	**1**	WQ-1. Improve inland surface water quality for environmental resources (e.g. steelhead), including headwaters and tributaries of streams, and to protect potable water supplies.*

Enter the number 1 in each category as appropriate (up to a total of 6 raw points; 3 normalized points):

0	*increases regional monitoring or contributes to statewide water quality monitoring*
1	*assists in meeting Basin Plan objectives or NPDES permit limits*
1	*removes trash from storm water*
1	*eliminates or reduces soil erosion, contaminant sources*
1	*eliminates or reduces the risk of a source of non-storm water discharge*
1	*implements low impact development (LID) features, techniques, and practices within existing developed areas*

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

WQ-2. Improve ocean water quality, including, but not limited to, Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.*

Enter the number 1 in each category as appropriate (up to a total of 9 raw points; 3 normalized points):

0	*implements regional monitoring or contributes to statewide water quality monitoring*
0	*assists in implementing ASBS compliance plans*
1	*removes trash from storm water*
1	*eliminates or reduces soil erosion in watersheds discharging to the ocean*
1	*eliminates or reduces the risk of a source of non-storm water discharge*
1	*implements low impact development (LID) measures within existing developed areas*
0	*reduces pollutant load during design storm events from one or more storm water point source by 90% compared to 2011-2012*
0	*reduces pollutant load during design storm events from 2 or more stormwater point sources by 90% compared to 2011-12*
0	*achieves Table B Instantaneous Max. Water Quality Objectives in Ch. II of the Ocean Plan on average*

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

Bonus points = (auto calculate)	**1.3333**

Assists region to meet WQ-3 (automatically calculated)	**0**	WQ-3. Protect and improve water quality in groundwater basins, especially where at risk from seawater intrusion

Enter the number 1 in each category as appropriate (up to a total of 2 raw points; 3 normalized points):

0	*increases groundwater basin monitoring or contributes to statewide water quality monitoring.*
0	*prevents, reduces, or minimizes groundwater quality degradation through reduction in pollutant loads, remediation, reclamation and reuse, or through enhancement of groundwater levels/volumes thereby reducing the potential for seawater intrusion.*

Bonus points = (auto calculate)	**0**

Flood Protection

Assists region to meet FP-1 (automatically calculated)	**0**	FP-1. Develop regional projects and plans necessary to protect critical infrastructure and sensitive habitats from flood damage and sea level rise, in particular, along the Carmel Bay and South Monterey Bay shoreline.*

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

		[illegible]nter the number 1 in the appropriate category. **Do not choose more than one** [illegible]**ategory**. Removal of more properties from the floodplain yields more points up to [illegible]otal of 3 normalized points.
	0	*removes up to 10 properties from a 100-year flood zone*
	0	*removes 11 to 50 properties from the 100-year flood zone*
	0	*removes 101 or more properties from a 100-year flood zone*
Bonus points = (auto calculate)	**0**	

Assists region in meeting FP-2, then Score 1 -->	0	FP-2. Develop approaches for floodplain restoration or adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).
Assists region in meeting FP-3, then Score 1 -->	0	FP-3. Promote floodplain restoration that protect quality and availability of water while preserving or restoring ecologic and stream function.
[illegible]	[illegible]	FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.*

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

[illegible]sion (CSE)

[illegible] *CSE-1, then Score 1 -->*	1	CSE-1. Manage areas along the shoreline susceptible to erosion, including long-term strategic retreat where appropriate.
Assists region in meeting CSE-2, then Score 1 -->	0	CSE-2. Identify opportunities to restore natural stream function, including meandering, in the lower 15 miles of the Carmel River and selected
Assists region in meeting CSE-3, then Score 1 -->	0	CSE-3. Reduce or prevent adverse downcutting in the main stem Carmel River and its tributaries.

Watershed Management (WM)

Assists region in meeting WM-1, then Score 1 -->	1	WM-1. Reduce human-induced sources of non-point fine sediment runoff.
Assists region in meeting WM-2, then Score 1 -->	0	WM-2. Restore natural fire frequency in headwater forests.
Assists region in meeting WM-3, then Score 1 -->	1	WM-3. Restore the natural hydrologic flow regime in disturbed watersheds where appropriate, including low impact development strategies in
Assists region in meeting WM-4, then Score 1 -->	0	WM-4. Re-establish a natural level of sediment supply within the Carmel River and its tributaries.

Environmental Protection and Enhancement (EV)

Assists region in meeting EV-1, then Score 1 -->	0	EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds*; including, but not limited to, promoting the steelhead recovery by meeting accepted or approved environmental flows within the regional watersheds.
Assists region in meeting EV-2, then Score 1 -->	0	EV-2. Assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*
Assists region in meeting EV-3, then Score 1 -->	0	EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.
Assists region in meeting EV-4, then Score 1 -->	0	EV-4. Identify opportunities for open spaces, trails and parks long streams and other recreational areas in the watershed that can be incorporated into

Assists region in meeting EV-5, then Score 1 -->	0	EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.
Assists region in meeting EV-6, then Score 1 -->	0	EV-6 Promote watershed activities for fire fuel management and adaptive management strategies to protect water quality and water supplies from

Climate Change (CC)

Assists region in meeting CC-1, then Score 1 -->	1	CC-1. Implement adaptation measures and mitigation solutions to climate change effects, including increased large storm intensity and/or frequency, sea level rise, drought and wildfire.
Assists region in meeting CC-2, then Score 1 -->	0	CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.
Assists region in meeting CC-3, then Score 1 -->	0	CC-3. Increase energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.

Regional Communication and Cooperation (RCC)

Assists region to meet RC-1 (automatically calculated)	**1**	RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts.	
		Enter the number 1 in each category as appropriate (up to a total of 5 raw points; 3 normalized points):	
		0	Partnerships – The project is proposed by a partnership of multiple organizations enabling use of shared expertise and resources.
		0	Resource Management Strategy – The project includes a RMS that is not already being implemented in the region thereby would provide diversification of strategies.
		0	Beneficial Uses – The project supports several different beneficial uses (see CCRWQCB, *Basin Plan* Chapter 2, 2001)
		0	Geography – The project implements a watershed-scale, regional-scale, or inter-regional project.
		1	Hydrology – The project addresses multiple watershed functions within the hydrologic cycle.
Bonus points = (auto calculate)	**0.6**		
Assists region to meet RC-2 (automatically calculated)	**1**	RC-2. Foster collaboration among regional entities as an alternative to litigation through ongoing meetings of the RWMG and regional data sharing.	
		Enter the number 1 in each category as appropriate (up to a total of 5 raw points; 3 normalized points):	
ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)		1	PROVIDED INFORMATION early in project development to the public to assist in understanding the problem, alternatives, opportunities and/or solutions
		0	CONSULTED & OBTAINED FEEDBACK from all regional agency and non-governmental organizations (NGOs) regarding the problem, alternatives, opportunities and/or solutions
		1	CONSULTED & OBTAINED FEEDBACK from the public regarding the problem, alternatives, opportunities and/or solutions
		0	INVOLVED & WORKED DIRECTLY WITH two or more regional agency and/or NGO stakeholders regarding the problem, alternatives, opportunities, and/or solutions
		0	COLLABORATED WITH, OR MADE PARTNERSHIPS with two or more agencies or NGOs on each aspect of the decision
Bonus points = (auto calculate)	**1.2**		
Assists region in meeting RC-3, then Score 1 -->	1	RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.	
Assists region in meeting RC-4, then Score 1 -->	0	RC-4. Build relationships with State and Federal regulatory agencies and water forums and agencies.	

Total Points for IRWM		maximum = 55.5
ADD up to three (3) additional points		

depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

es (IRWM Plan Standard 4)

Management Strategies (RMS) that the proposed project will address.

Category		
		Reduce Water Demand
	0	Agriculture Water Use Efficiency
	0	Urban Water Use Efficiency *
Category:		**Improve Flood Management**
	1	Flood Risk Management *
Category:		**Improve Operational Efficiency and Transfers**
	0	Conveyance – Regional/Local *
	0	System Reoperation
	0	Water Transfers *
Category:		**Increase Water Supply**
	0	Conjunctive Management & Groundwater Storage *
	0	Seawater or Brackish Water Desalination *
	0	Precipitation Enhancement
	0	Recycled Municipal Water *
	0	Surface Storage – Regional/local *
Category:		**Improve Water Quality**
	0	Drinking Water Treatment and Distribution *
	0	Groundwater Remediation/Aquifer Remediation
	0	Matching Quality to Use
	1	Pollution Prevention *
	1	Salt and Salinity Management
	1	Urban Stormwater Runoff Management *
Category:		**Practice Resources Stewardship**
	0	Agriculture Lands Stewardship
	0	Ecosystem Restoration *
	0	Forest Management *
	0	Land Use Planning and Management
	0	Recharge Area Protection
	1	Sediment Management
	1	Watershed Management *
Category:		**People and Water**
	0	Economic Incentives
	1	Outreach and Engagement
	0	Water and Culture
	0	Water-Dependent Recreation
Other Strategies		
	0	Crop Idling for Water Transfers
	0	Dewvaportation or Atmospheric Pressure Desalination
	0	Fog Collection
	0	Irrigated Land Retirement
	0	Rainfed agriculture
	0	Waterbag transport/storage technology

Total RMS Points =	**7**

Strategic Considerations (PSP Table 4 Scoring Criteria)

SC-1 - Does the project involve or address inter-regional issues or does it involve two or more agencies?

No; the project addresses flooding issues on North Fremont Avenue at Ramona Avenue, the area that drains to these streets is approximately 21 acres in size. There are not any other agencies involved.

Points (Yes: 3 pts; No: 0 pts) =	0

SC-3. Does the project provide water for human consumption, cooking and sanitary purposes?

No; the project proposed to infiltrate runoff.

Points (Yes: 1 pts; No: 0 pts) =	0

SC- 4. Does the project address a critical water resource related needs and priorities of the IRWM region as identified in the IRWM plan?

Yes; the project meets objectives related to Water Quality, Flood Protection, Watershed Management, and Environmental Protection

Points (Yes: 1 pts; No: 0 pts) =	1

SC-5. Is the project sufficiently justified by the description given in the narrative of Section D.1? Does the narrative include requisite referenced supporting documentation such as models, studies, engineering reports, etc.? Did the narrative include other information that supports the justification for the proposed project, including how the project can achieve the claimed level of benefits?

Yes; the project is justified by the project description provided. No; the description does not include reference to models, studies, or other reports. No; the description does not provide detail about how the project can achieve the claimed level of benefits.

Points (Score: 3 points if "yes" to all three questions; 2 points if "Yes" to 2 questions; 1 point for "yes" to one question) =	1

SC-6. Does the project address and/or adapt to the effects of climate change? Does the project address the climate change vulnerabilities assessed in the IRWM Plan?

Yes; this project could reduce flooding from large storms

Points (Score: 2 points if "yes" to 2 questions; 1 point for "yes" to one question) =	2
Subtotal Region/Nexus (10 maximum)	**4**

SC-7. Does the Work Plan include a complete description of all tasks necessary to result in a completed project? Are all necessary and reasonable deliverables identified?

No; the Work Plan is a component of the Project Information Form. Project Information Form has not been submitted.

Points (Score: 2 points if "yes" to 2 questions; 1 point for "yes" to one question) =	0

SC-8. Collectively, are the workplan, schedule, and budget thorough, reasonable, and justified; and consistent with each other? See Table 4 for specifics.

Considerations include (one point each):
• Does the project description clearly and concisely address all required topics, including summarizing the major components, objectives and intended outcomes/benefits of the project? - YES
• Are the tasks shown in the Workplan, Schedule and Budget consistent? - NO
• Are the costs presented in the Budget backed up by and consistent with supporting justification/documentation? - YES
• Is the schedule reasonable considering the tasks presented in the workplan? - NO (no schedule provided)

Points (Score: 1 point for each yes to bullet points; 4 maximum)	2

SC- 9. Does the applicant have legal access rights, easements, or other access capabilities, to the property to implement the project; and if not, did the applicant provide a clear and concise narrative / schedule to obtain the necessary access? (Full points if N/A)

This information is unknown; no details provided in the project application.

Points (Yes or N/A: 1 pts; No: 0 pts) =	0
Subtotal Work Plan, Budget, Schedule and Readiness (7 maximum)	**2**

SC- 10. Does the budget leverage funds with other private, Federal, or Local fund resources above and beyond cost share requirements? If additional cost share is not provided, did the applicant provide describe attempts to use other funding sources and justify why it was not included.

No; the project seeks 50% cost share from DWR.

Points (Yes: 1 pts; No: 0 pts) =	0

SC-11. For each of the anticipated physical benefit(s) claimed, described, and quantified in Table 4 of the Project Information Form? Is each benefit claimed logical and reasonable given the information provided in the Work Plan?

No; the Project Information Form was not submitted.

Points (Score: 2 points if "yes" to 2 questions; 1 point for "yes" to one question) =	0

SC- 12. Does the project provide multiple (more than one) benefits?

Yes; the project provides the following benefits as defined in Chapter 2 of the Central Coastal Basin Plan: Groundwater Recharge. Estuarine Habitat (Laguna Grande Lake)

Points (Yes: 1 pts; No: 0 pts) =	1

SC- 13. Does the project provide benefits to more than one IRWM region and/or Funding Area?

No; the project will benefit the Monterey Peninsula. Carmel Bay, and South Montrerey Bay IRWM Region.

Points (Yes: 1 pts; No: 0 pts) =	0

SC- 14. If the proposed project addresses contamination per the requirements of AB 1249, does the project benefit a small disadvantaged community?

No; the project does not address the requirements of AB 1249.

Points (Yes: 1 pts; No: 0 pts) =	0

SC- 15. Does the proposed project employ new or innovative technology or practices?

Yes; the project proposes to install deep dry wells and tree box filters,

Points (Yes: 1 pts; No: 0 pts) =	1
Subtotal Benefits and Program Preferences (7 maximum)	**2**

SC- 16. Did the applicant provide a narrative on cost considerations that is fully explained based on information requested in the Project Information Form?

Yes; the Project Information Form was not provided, however, the proponent provided a budget justification that explains/justifies the estimated cost of the project.

Points (Yes: 2 pts; No: 0 pts) =	2

Total for DWR Scoring Criteria (25 maximum)	**10**

DAC and Native Americans and Environmental Justice (DWR Review Factors D, E and f)

Does the project provide specific benefits to disadvantaged communities and/or Native American tribal communities? If so, explain.

Yes it will reduce flooding to and pollution from a DAC identified in the DWR map.

DAC &/or Native American Points (Yes: 5 pts; No: 0 pts) =	5

Does the project address any known environmental justice issues? Does the project *avoid disproportionately affecting disadvantaged communities*?

Yes to both

Environmental Justice Points (Yes for both: 5 pts; No for either: 0 pts) =	5

Climate Change Adaptation and Mitigation (DWR Review Factors K and L)

Put an X next to any climate change adaptation or mitigation strategy the proposed project will contribute to.

Adaptation Strategies

	Improve water supply reliability
	Expand conjunctive use of multiple water supply sources
	Increase water use and/or reuse efficiency
	Provide additional water supply
x	Promote water quality protection
	Reduce water demand
	Advance / expand recycled water use
	Promote urban runoff reuse
	Address sea level rise
x	Address other anticipated climate change impacts
x	Improve flood control
x	Promote habitat protection non-DAC benefit
	Establish migration corridors
	Re-establish river-floodplain hydrologic continuity
	Re-introduce anadromous fish populations to watershed
	Implement one or more recommendations from the *Erosion Mitigation Alternatives for Southern Monterey Bay (Alternatives Study) (ESA-PWA, May 2012)*
	Enhance and protect watershed forest and meadow systems

Please describe: The project would lessen the impacts of flooding by infiltrating runoff into groundwater. Infiltration would prevent polluted runoff from entering Laguna Grande Lake

Climate Change Adaptation (Score 1 for every strategy implemented, up to 5 max) =	4

Mitigation Strategies

	Increase water use efficiency or promote energy-efficient water demand reduction
	Improve water system energy efficiency
	Advance / expand recycled water use
	Promote urban runoff reuse
	Promote use of renewable energy sources
	Contribute to carbon sequestration

Does the proposed project reduce regional greenhouse gas emissions and/or improve energy efficiency compared to alternative proposed projects meeting the same regional objectives? If so, explain how.

Please describe: The project would not reduce regional greenhouse gases or improve efficiency.

Climate Change Mitigation (Score 1 for every strategy implemented, up to 5 max) =	1

Technical Feasibility (DWR Review Factor C)

Discuss the technical feasibility of the project. If possible, cite references that contain information about the proposed project and detail the technical feasibility of the project.

No technical studies were provided. This technology has been established as effective in similar situations. The City does not have experience with dry wells.

30 points: Technical feasibility has been documented in a project-specific pilot study or previous phase or has a documented track record of success

OR

10 points: has the technology proposed been established as effective in similar situations?
10 points: Are project site conditions documented (geology/soil, ecology, hydrology, land use, public utilities)?
10 points: Do the project partners have experience with similar projects? (e.g., similar site, similar technology).

Technical Feasibility Points (See above) =	30

Monterey Peninsula Integrated Regional Water Management Plan Update
Project Solicitation Form

DRAFT (version date: May 30, 2019)

PROJECT OVERVIEW

General Project Information

Project Title:	Del Monte Manor Park LID Improvements Project
Project Location:	The project is located at the Del Monte Manor, a low income housing development
Estimated Cost:	$560,000

Brief Project Description (1 to 2 sentences):

The Del Monte Manor Park LID Improvements Project, located on an affordable family rental housing complex, will reconstruct a portion of an existing drainage basin located on the parcels southwestern corner with stormwater capture and treatment facilities. The facility's purpose is to help mitigate flooding issues at the Del Monte Manor, treat and infiltrate runoff from the surrounding area, and improve the aesthetics of the drainage basin.

Project Proponent Information

Contact Name:	Scott Ottmar, Senior Engineer
Affiliation:	City of Seaside
Address:	440 Harcourt Ave, Seaside, CA 93955
Phone Number:	831-899-6885
Email:	sottmar@ci.seaside.ca.us

Other participating and/or partner agencies/organizations (if applicable):

There are not any other agencies involved.

DETAILED PROJECT INFORMATION

Description

Please provide a description of your project (including the location) and its purpose, what will be constructed and/or implemented, how the project will function, the area(s) and/or entities that will be affected by or will benefit from the project, and any potential obstacles to implementation.

The Del Monte Manor Park LID Improvements Project, located within a severely disadvantaged community low income rental housing complex, will reconstruct a portion of an existing drainage detention basin located on the parcel's southwestern corner with stormwater capture and treatment facilities. The drainage basin is adjacent to a playground that serves the housing complex. The project aims to mitigate flooding impacts to the playground and open space, treat and infiltrate an average of 14 acre feet per year of runoff from the surrounding area, and improve the flora and aesthetics of the drainage detention basin. The project will reduce urban runoff pollutant loads by routing runoff in the tributary catchment to a proposed pre-treatment bioswale and sub-surface infiltration infrastructure. The bioswale would utilize native plants for treatment, aesthetic and educational benefit. The bioswale and sub-surface infrastructure would function as a volume-based stormwater control measure which would retain and infiltrate stormwater into the fast-draining native dune sand. Overflow from the system would be piped to the existing storm drain system in Yosemite Street. The use of sub-surface infrastructure maximizes the use of the drainage area for much needed recreational space for the low income housing complex.

The proposed project is ranked #1 within the Monterey Peninsula Region Stormwater Resource Plan, finalized on December 20, 2018. A 10% preliminary concept design was performed as part of the Stormwater Resource Plan development which demonstrated feasibility of the project. The City of Seaside has completed 30% level design documents.

Tasks needed to complete the project include environmental review, surveying, final design, and construction. It is anticipated that the project is Categorically Exempt from the California Environmental Quality Act (CEQA) in accordance with Title 14 of the California Code of Regulations, Chapter 3, Article 19, Section 15302 (c) "Replacement or Reconstruction" of the existing drainage detention basin.

IRWM Objectives - IRWM Plan Standard 3

Water Supply (WS)

Assists region to meet WS-1 (automatically calculated)	**1**	WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.**

Enter the number 1 in the appropriate category. **Do not choose more than one category**. Larger water supply quantities yield more points up to total of 3 normalized points.

1	*up to 550 AFY*
0	*at least 1100 AFY (10%)*
0	*at least 1650 AFY (20%)*
0	*at least 2200 AFY (30%)*
0	*at least 2750 AFY (40%)*
0	*at least 3300 AFY (50%)*
0	*at least 3850 AFY (60%)*
0	*at least 4400 AFY (70%)*
0	*at least 7200 AFY (80%)*
0	*at least 8100 AFY (90%)*
0	*at least 9000 AFY (100%)*

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

(auto calculate) **0.2727**

Assists region to meet WS-2 (automatically calculated)	**0**	WS-2. Maximize use of recycled water.*

Enter the number 1 in each category.as appropriate (up to 2 raw points; 1.5 normalized points)

0	*provides recycled water to one or more properties within the region*
0	*expands source water to either CAWD or MRWPCA*

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

		WS-3. Develop opportunities for stormwater capture and reuse pursuant to the Stormwater Resource Plan.
WS-4, then Score 1 -->		WS-4. Evaluate, advance, or create water conservation throughout the Region.*
Assists region in meeting WS-5, then Score 1 -->	1	WS-5. Improve water supplies to achieve multiple benefits, beneficial uses and environmental flows.
Assists region in meeting WS-6, then Score 1 -->	1	WS-6. Seek long-term sustainable supplies for adopted future demand estimates.

Water Quality (WQ)

Assists region to meet WQ-2 (automatically calculated)	**1**	WQ-1. Improve inland surface water quality for environmental resources (e.g. steelhead), including headwaters and tributaries of streams, and to protect potable water supplies.*

Enter the number 1 in each category as appropriate (up to a total of 6 raw points; 3 normalized points):

0	*increases regional monitoring or contributes to statewide water quality monitoring*
1	*assists in meeting Basin Plan objectives or NPDES permit limits*
0	*removes trash from storm water*
1	*eliminates or reduces soil erosion, contaminant sources*
0	*eliminates or reduces the risk of a source of non-storm water discharge*
1	*implements low impact development (LID) features, techniques, and practices within existing developed areas*

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

WQ-2. Improve ocean water quality, including, but not limited to, Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.*

Enter the number 1 in each category as appropriate (up to a total of 9 raw points; 3 normalized points):

0	*implements regional monitoring or contributes to statewide water quality monitoring*
0	*assists in implementing ASBS compliance plans*
1	*removes trash from storm water*
1	*eliminates or reduces soil erosion in watersheds discharging to the ocean*
1	*eliminates or reduces the risk of a source of non-storm water discharge*
1	*implements low impact development (LID) measures within existing developed areas*
0	*reduces pollutant load during design storm events from one or more storm water point source by 90% compared to 2011-2012*
0	*reduces pollutant load during design storm events from 2 or more stormwater point sources by 90% compared to 2011-12*
0	*achieves Table B Instantaneous Max. Water Quality Objectives in Ch. II of the Ocean Plan on average*

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

Assists region to meet WQ-3 (automatically calculated)	**1**	WQ-3. Protect and improve water quality in groundwater basins, especially where at risk from seawater intrusion

Enter the number 1 in each category as appropriate (up to a total of 2 raw points; 3 normalized points):

0	*increases groundwater basin monitoring or contributes to statewide water quality monitoring.*
1	*prevents, reduces, or minimizes groundwater quality degradation through reduction in pollutant loads, remediation, reclamation and reuse, or through enhancement of groundwater levels/volumes thereby reducing the potential for seawater intrusion.*

Bonus points = (auto calculate)	**1.5**

Flood Protection

Assists region to meet FP-1 (automatically calculated)	**0**	FP-1. Develop regional projects and plans necessary to protect critical infrastructure and sensitive habitats from flood damage and sea level rise, in particular, along the Carmel Bay and South Monterey Bay shoreline.*
ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)		Enter the number 1 in the appropriate category. **Do not choose more than one category**. Removal of more properties from the floodplain yields more points up to total of 3 normalized points.
	0	*removes up to 10 properties from a 100-year flood zone*
	0	*removes 11 to 50 properties from the 100-year flood zone*
	0	*removes 101 or more properties from a 100-year flood zone*
Bonus points = (auto calculate)	**0**	
Assists region in meeting FP-2, then Score 1 -->	1	FP-2. Develop approaches for floodplain restoration or adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).
Assists region in meeting FP-3, then Score 1 -->	0	FP-3. Promote floodplain restoration that protect quality and availability of water while preserving or restoring ecologic and stream function.
Assists region in meeting	1	FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.*

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

sion (CSE)

		CSE-1. Manage areas along the shoreline susceptible to erosion, including long-term strategic retreat where appropriate.
CSE-2, then Score 1 -->	0	CSE-2. Identify opportunities to restore natural stream function, including meandering, in the lower 15 miles of the Carmel River and selected
Assists region in meeting CSE-3, then Score 1 -->	0	CSE-3. Reduce or prevent adverse downcutting in the main stem Carmel River and its tributaries.

Watershed Management (WM)

Assists region in meeting WM-1, then Score 1 -->	1	WM-1. Reduce human-induced sources of non-point fine sediment runoff.
Assists region in meeting WM-2, then Score 1 -->	0	WM-2. Restore natural fire frequency in headwater forests.
Assists region in meeting WM-3, then Score 1 -->	1	WM-3. Restore the natural hydrologic flow regime in disturbed watersheds where appropriate, including low impact development strategies in
Assists region in meeting WM-4, then Score 1 -->	0	WM-4. Re-establish a natural level of sediment supply within the Carmel River and its tributaries.

Environmental Protect

Assists region in meeting EV-1, then Score 1 -->	0	EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds*; including, but not limited to, promoting the steelhead recovery by meeting accepted or approved environmental flows within the regional watersheds.
Assists region in meeting EV-2, then Score 1 -->	1	EV-2. Assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*
Assists region in meeting EV-3, then Score 1 -->	0	EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.
Assists region in meeting EV-4, then Score 1 -->	1	EV-4. Identify opportunities for open spaces, trails and parks long streams and other recreational areas in the watershed that can be incorporated into

Assists region in meeting EV-5, then Score 1 -->	0	EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.
Assists region in meeting EV-6, then Score 1 -->	0	EV-6 Promote watershed activities for fire fuel management and adaptive management strategies to protect water quality and water supplies from

Climate Change (CC)

Assists region in meeting CC-1, then Score 1 -->	1	CC-1. Implement adaptation measures and mitigation solutions to climate change effects, including increased large storm intensity and/or frequency, sea level rise, drought and wildfire.
Assists region in meeting CC-2, then Score 1 -->	1	CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.
Assists region in meeting CC-3, then Score 1 -->	1	CC-3. Increase energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.

Regional Communication and Cooperation (RCC)

Assists region to meet RC-1 (automatically calculated)	**1**	RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts.	
		Enter the number 1 in each category as appropriate (up to a total of 5 raw points; 3 normalized points):	
		0	Partnerships – The project is proposed by a partnership of multiple organizations enabling use of shared expertise and resources.
		0	Resource Management Strategy – The project includes a RMS that is not already being implemented in the region thereby would provide diversification of strategies.
		1	Beneficial Uses – The project supports several different beneficial uses (see CCRWQCB, *Basin Plan* Chapter 2, 2001)
		0	Geography – The project implements a watershed-scale, regional-scale, or inter-regional project.
		1	Hydrology – The project addresses multiple watershed functions within the hydrologic cycle.
Bonus points = (auto calculate)	**1.2**		
Assists region to meet RC-2 (automatically calculated)	**1**	RC-2. Foster collaboration among regional entities as an alternative to litigation through ongoing meetings of the RWMG and regional data sharing.	
		Enter the number 1 in each category as appropriate (up to a total of 5 raw points; 3 normalized points):	
		1	PROVIDED INFORMATION early in project development to the public to assist in understanding the problem, alternatives, opportunities and/or solutions
ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)		0	CONSULTED & OBTAINED FEEDBACK from all regional agency and non-governmental organizations (NGOs) regarding the problem, alternatives, opportunities and/or solutions
		1	CONSULTED & OBTAINED FEEDBACK from the public regarding the problem, alternatives, opportunities and/or solutions
		0	INVOLVED & WORKED DIRECTLY WITH two or more regional agency and/or NGO stakeholders regarding the problem, alternatives, opportunities, and/or solutions
is delmonte board ngo?		0	COLLABORATED WITH, OR MADE PARTNERSHIPS with two or more agencies or NGOs on each aspect of the decision
Bonus points = (auto calculate)	**1.2**		
Assists region in meeting RC-3, then Score 1 -->	1	RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.	
Assists region in meeting RC-4, then Score 1 -->	0	RC-4. Build relationships with State and Federal regulatory agencies and water forums and agencies.	

Total Points for IRWM Objectives =	**27**	maximum = 55.5

es (IRWM Plan Standard 4)

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

Management Strategies (RMS) that the proposed project will address.

	Reduce Water Demand	
	0	Agriculture Water Use Efficiency
	0	Urban Water Use Efficiency *
Category:	**Improve Flood Management**	
	1	Flood Risk Management *
Category:	**Improve Operational Efficiency and Transfers**	
	0	Conveyance – Regional/Local *
	0	System Reoperation
	0	Water Transfers *
Category:	**Increase Water Supply**	
	1	Conjunctive Management & Groundwater Storage *
	0	Seawater or Brackish Water Desalination *
	0	Precipitation Enhancement
	0	Recycled Municipal Water *
	0	Surface Storage – Regional/local *
Category:	**Improve Water Quality**	
	0	Drinking Water Treatment and Distribution *
	1	Groundwater Remediation/Aquifer Remediation
	0	Matching Quality to Use
	1	Pollution Prevention *
	1	Salt and Salinity Management
	1	Urban Stormwater Runoff Management *
Category:	**Practice Resources Stewardship**	
	0	Agriculture Lands Stewardship
	0	Ecosystem Restoration *
	0	Forest Management *
	1	Land Use Planning and Management
	1	Recharge Area Protection
	1	Sediment Management
	1	Watershed Management *
Category:	**People and Water**	
	0	Economic Incentives
	1	Outreach and Engagement
	0	Water and Culture
	0	Water-Dependent Recreation
Other Strategies		
	0	Crop Idling for Water Transfers
	0	Dewvaportation or Atmospheric Pressure Desalination
	0	Fog Collection
	0	Irrigated Land Retirement
	0	Rainfed agriculture
	0	Waterbag transport/storage technology

Total RMS Points =	**11**

Strategic Considerations (PSP Table 4 Scoring Criteria)

SC-1 - Does the project involve or address inter-regional issues or does it involve two or more agencies?

No; the project addresses flooding issues at Del Monte Manor, there are no other agencies involved.

Points (Yes: 3 pts; No: 0 pts) =	0

SC-3. Does the project provide water for human consumption, cooking and sanitary purposes?

Yes the infiltrated water percs to a groundwater basin used for potable water supply

Points (Yes: 1 pts; No: 0 pts) =	1

SC- 4. Does the project address a critical water resource related needs and priorities of the IRWM region as identified in the IRWM plan?

Yes; the project addresses Water Supply, Water Quality, Flood Protection, Watershed Management, Environmental Protection and Enhancement, Climate Change, and Regional Communication and Cooperation

Points (Yes: 1 pts; No: 0 pts) =	1

SC-5. Is the project sufficiently justified by the description given in the narrative of Section D.1? Does the narrative include requisite referenced supporting documentation such as models, studies, engineering reports, etc.? Did the narrative include other information that supports the justification for the proposed project, including how the project can achieve the claimed level of benefits?

Yes; the project is justified by the project description provided. No; the description does not include reference to models, studies, or other reports. Yes; the description discusses how the project can achieve the claimed level of

Points (Score: 3 points if "yes" to all three questions; 2 points if "Yes" to 2 questions; 1 point for "yes" to one question) =	3

SC-6. Does the project address and/or adapt to the effects of climate change? Does the project address the climate change vulnerabilities assessed in the IRWM Plan?

The project will address the effects of climate change on water supply and flooding within the City of Seaside. The project will rechange up to 14 acre feet per year of runoff into the Seaside Groundwater Basin. Additionally, the

Points (Score: 2 points if "yes" to 2 questions; 1 point for "yes" to one question) =	2
Subtotal Region/Nexus (10 maximum)	**7**

SC-7. Does the Work Plan include a complete description of all tasks necessary to result in a completed project? Are all necessary and reasonable deliverables identified?

No; the Work Plan is a component of the Project Information Form. Project Information Form has not been submitted.

Points (Score: 2 points if "yes" to 2 questions; 1 point for "yes" to one question) =	0

SC-8. Collectively, are the workplan, schedule, and budget thorough, reasonable, and justified; and consistent with each other? See Table 4 for specifics.

Considerations include (one point each):
• Does the project description clearly and concisely address all required topics, including summarizing the major components, objectives and intended outcomes/benefits of the project? - YES
• Are the tasks shown in the Workplan, Schedule and Budget consistent? - NO
• Are the costs presented in the Budget backed up by and consistent with supporting justification/documentation? - YES
• Is the schedule reasonable considering the tasks presented in the workplan? - NO (no schedule provided)

Points (Score: 1 point for each yes to bullet points; 4 maximum)	2

SC- 9. Does the applicant have legal access rights, easements, or other access capabilities, to the property to implement the project; and if not, did the applicant provide a clear and concise narrative / schedule to obtain the necessary access? (Full points if N/A)

Yes, drainage easement recorded.

Points (Yes or N/A: 1 pts; No: 0 pts) =	1
Subtotal Work Plan, Budget, Schedule and Readiness (7 maximum)	**3**

SC- 10. Does the budget leverage funds with other private, Federal, or Local fund resources above and beyond cost share requirements? If additional cost share is not provided, did the applicant provide describe attempts to use other funding sources and justify why it was not included.

No; the project site is located in a severely disadvantaged community. The City of Seaside seeks to waive the local cost share requirement.

Points (Yes: 1 pts; No: 0 pts) =	0

SC-11. For each of the anticipated physical benefit(s) claimed, described, and quantified in Table 4 of the Project Information Form? Is each benefit claimed logical and reasonable given the information provided in the Work Plan?

No; the Project Information Form was not submitted.

Points (Score: 2 points if "yes" to 2 questions; 1 point for "yes" to one question) =	0

SC- 12. Does the project provide multiple (more than one) benefits?

Yes; the project provides the following benefits as defined in Chapter 2 of the Central Coastal Basin Plan: Groundwater Recharge, Non-Contact Water Recreation, and Wildlife Habitat

Points (Yes: 1 pts; No: 0 pts) =	1

SC- 13. Does the project provide benefits to more than one IRWM region and/or Funding Area?

No; the project will benefit the Monterey Peninsula. Carmel Bay, and South Montrerey Bay IRWM Region.

Points (Yes: 1 pts; No: 0 pts) =	0

SC- 14. If the proposed project addresses contamination per the requirements of AB 1249, does the project benefit a small disadvantaged community?

No; the project does not address requirements of AB 1249.

Points (Yes: 1 pts; No: 0 pts) =	0

SC- 15. Does the proposed project employ new or innovative technology or practices?

No; the project proposes a pre-treatment bioswale and a sub-surface infiltration structure.

Points (Yes: 1 pts; No: 0 pts) =	0
Subtotal Benefits and Program Preferences (7 maximum)	**1**

SC- 16. Did the applicant provide a narrative on cost considerations that is fully explained based on information requested in the Project Information Form?

No; the application references a 30% design report with this information, but it was not provided.

Points (Yes: 2 pts; No: 0 pts) =	0

Total for DWR Scoring Criteria (25 maximum)	**11**

DAC and Native Americans and Environmental Justice (DWR Review Factors D, E and f)

Does the project provide specific benefits to disadvantaged communities and/or Native American tribal communities? If so, explain.

Yes; the project site is located in a severely disadvantaged community.

DAC &/or Native American Points (Yes: 5 pts; No: 0 pts) =	5

Does the project address any known environmental justice issues? Does the project *avoid disproportionately affecting disadvantaged communities*?

Yes the project facilitates use of park space in a DAC and does not negatively affect DAC.

Environmental Justice Points (Yes for both: 5 pts; No for either: 0 pts) =	5

Climate Change Adaptation and Mitigation (DWR Review Factors K and L)

Put an X next to any climate change adaptation or mitigation strategy the proposed project will contribute to.

Adaptation Strategies

x	Improve water supply reliability
x	Expand conjunctive use of multiple water supply sources
x	Increase water use and/or reuse efficiency
x	Provide additional water supply
x	Promote water quality protection
	Reduce water demand
	Advance / expand recycled water use
x	Promote urban runoff reuse
x	Address sea level rise
x	Address other anticipated climate change impacts
x	Improve flood control
	Promote habitat protection
	Establish migration corridors
	Re-establish river-floodplain hydrologic continuity
	Re-introduce anadromous fish populations to watershed
	Implement one or more recommendations from the *Erosion Mitigation Alternatives for Southern Monterey Bay (Alternatives Study) (ESA-PWA, May 2012)*
	Enhance and protect watershed forest and meadow systems

Please describe: The project will address the effects of climate change on water supply and flooding within the City of Seaside. The project will rechange up to 14 acre feet per year of runoff into the Seaside Groundwater Basin. Additionally, the project will incorporate design measures to mitigation potential flooding from

Climate Change Adaptation (Score 1 for every strategy implemented, up to 5 max) =	5

Mitigation Strategies

	Increase water use efficiency or promote energy-efficient water demand reduction
x	Improve water system energy efficiency
	Advance / expand recycled water use
x	Promote urban runoff reuse
	Promote use of renewable energy sources
	Contribute to carbon sequestration

Does the proposed project reduce regional greenhouse gas emissions and/or improve energy efficiency compared to alternative proposed projects meeting the same regional objectives? If so, explain how.

Please describe: The project will infiltrate on average 14 acre feet per year into the Seaside Groundwater Basin. The project provides a long term potable water supply that is less energy intensive, and produces no GHG emissions, as compared to other alternative sources of water such sea water desalination or treatment of wastewater.

Climate Change Mitigation (Score 1 for every strategy implemented, up to 5 max) =	1

Technical Feasibility (DWR Review Factor C)

Discuss the technical feasibility of the project. If possible, cite references that contain information about the proposed project and detail the technical feasibility of the project.

No technical studies were provided. This technology has been established as effective in similar situations. The City has experience with similar projects.

30 points: Technical feasibility has been documented in a project-specific pilot study or previous phase or has a documented track record of success

OR

10 points: has the technology proposed been established as effective in similar situations?
10 points: Are project site conditions documented (geology/soil, ecology, hydrology, land use, public utilities)?
10 points: Do the project partners have experience with similar projects? (e.g., similar site, similar technology).

Technical Feasibility Points (See above) =	30

Monterey Peninsula Integrated Regional Water Management Plan Update
Project Solicitation Form

DRAFT (version date: May 30, 2019)

PROJECT OVERVIEW

General Project Information

Project Title:	West End Stormwater Management Improvements
Project Location:	The project is located within the city limits of the City of Sand City and fully within the
Estimated Cost:	$2,634,000

Brief Project Description (1 to 2 sentences):

Completion of design/construction of a green/complete street for two streets in Sand City, Contra Costa and Catalina, respectively.

Project Proponent Information

Contact Name:	Mr. Fred Meurer, City Administrator
Affiliation:	Sand City
Address:	1 Pendergrass Way, Sand City, CA 93955
Phone Number:	831-394-3054
Email:	fmeurer@sandcityca.org

Other participating and/or partner agencies/organizations (if applicable):

There are not any other agencies involved.

DETAILED PROJECT INFORMATION

Description

Please provide a description of your project (including the location) and its purpose, what will be constructed and/or implemented, how the project will function, the area(s) and/or entities that will be affected by or will benefit from the project, and any potential obstacles to implementation.

The project represents a retrofit of two existing streets, Catalina and Contra Costa Streets, to integrate LID features such as bioretention that will address multiple city needs including flood control, water quality, receiving water protection and regulatory compliance. The project would include building upon the concept design to full design and construction. Stakeholder outreach, including the public, would be an integral part of the project. Sand City has not yet conducted a green/complete street retrofit and understands the multi-benefit value these type of green street projects can provide to the community and environment. The project can serve as a catalyst for the City to further implement LID/Green Infrastructure practices.

As part of the concept design development, quantification of benefits was estimated including:
1.Average annual stormwater volume reduced/infiltrated.
2.Average annual pollutant load reductions (e.g., TSS, metals)
3.Event-based facility capacity (e.g., 85th percentile, 24-hr storm event)
4.Increased number of native, drought-tolerant plants and trees.
5.Length of street modified to provide community urban greening benefits.

These estimates will be further refined as part of the full design process. Qualitative benefits were also estimated and are provided with this proposal.

IRWM Objectives - IRWM Plan Standard 3

Water Supply (WS)

Assists region to meet WS-1 (automatically calculated)	**1**	WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.**
		Enter the number 1 in the appropriate category. **Do not choose more than one category**. Larger water supply quantities yield more points up to total of 3 normalized points.
	1	*up to 550 AFY*
	0	*at least 1100 AFY (10%)*
	0	*at least 1650 AFY (20%)*
	0	*at least 2200 AFY (30%)*
	0	*at least 2750 AFY (40%)*
	0	*at least 3300 AFY (50%)*
ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)	0	*at least 3850 AFY (60%)*
	0	*at least 4400 AFY (70%)*
	0	*at least 7200 AFY (80%)*
	0	*at least 8100 AFY (90%)*
	0	*at least 9000 AFY (100%)*
Bonus Points = (auto calculate)	**0.2727**	
Assists region to meet WS-2 (automatically calculated)	**0**	WS-2. Maximize use of recycled water.*
		Enter the number 1 in each category.as appropriate (up to 2 raw points; 1.5 normalized points)
	0	*provides recycled water to one or more properties within the region*
	0	*expands source water to either CAWD or MRWPCA*
ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)		
		WS-3. Develop opportunities for stormwater capture and reuse pursuant to the Stormwater Resource Plan.
Assists region in meeting WS-4, then Score 1 -->	0	WS-4. Evaluate, advance, or create water conservation throughout the Region.*
Assists region in meeting WS-5, then Score 1 -->	1	WS-5. Improve water supplies to achieve multiple benefits, beneficial uses and environmental flows.
Assists region in meeting WS-6, then Score 1 -->	0	WS-6. Seek long-term sustainable supplies for adopted future demand estimates.

Water Quality (WQ)

Assists region to meet WQ-2 (automatically calculated)	**1**	WQ-1. Improve inland surface water quality for environmental resources (e.g. steelhead), including headwaters and tributaries of streams, and to protect potable water supplies.*

Enter the number 1 in each category as appropriate (up to a total of 6 raw points; 3 normalized points):

0	*increases regional monitoring or contributes to statewide water quality monitoring*
1	*assists in meeting Basin Plan objectives or NPDES permit limits*
1	*removes trash from storm water*
1	*eliminates or reduces soil erosion, contaminant sources*
1	*eliminates or reduces the risk of a source of non-storm water discharge*
1	*implements low impact development (LID) features, techniques, and practices within existing developed areas*

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

WQ-2. Improve ocean water quality, including, but not limited to, Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.*

Enter the number 1 in each category as appropriate (up to a total of 9 raw points; 3 normalized points):

0	*implements regional monitoring or contributes to statewide water quality monitoring*
0	*assists in implementing ASBS compliance plans*
1	*removes trash from storm water*
1	*eliminates or reduces soil erosion in watersheds discharging to the ocean*
1	*eliminates or reduces the risk of a source of non-storm water discharge*
1	*implements low impact development (LID) measures within existing developed areas*
0	*reduces pollutant load during design storm events from one or more storm water point source by 90% compared to 2011-2012*
0	*reduces pollutant load during design storm events from 2 or more stormwater point sources by 90% compared to 2011-12*
0	*achieves Table B Instantaneous Max. Water Quality Objectives in Ch. II of the Ocean Plan on average*

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

(auto calculate)

Assists region to meet WQ-3 (automatically calculated)	**1**	WQ-3. Protect and improve water quality in groundwater basins, especially where at risk from seawater intrusion

Enter the number 1 in each category as appropriate (up to a total of 2 raw points; 3 normalized points):

0	*increases groundwater basin monitoring or contributes to statewide water quality monitoring.*
1	*prevents, reduces, or minimizes groundwater quality degradation through reduction in pollutant loads, remediation, reclamation and reuse, or through enhancement of groundwater levels/volumes thereby reducing the potential for seawater intrusion.*

Bonus points = (auto calculate)	1.5

Flood Protection

Assists region to meet FP-1 (automatically calculated)	**0**	FP-1. Develop regional projects and plans necessary to protect critical infrastructure and sensitive habitats from flood damage and sea level rise, in particular, along the Carmel Bay and South Monterey Bay shoreline.*	
		nter the number 1 in the appropriate category. **Do not choose more than one ategory**. Removal of more properties from the floodplain yields more points up to otal of 3 normalized points.	
		0	*removes up to 10 properties from a 100-year flood zone*
		0	*removes 11 to 50 properties from the 100-year flood zone*
		0	*removes 101 or more properties from a 100-year flood zone*
Bonus points = (auto calculate)	**0**		

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

Assists region in meeting FP-2, then Score 1 -->	0	FP-2. Develop approaches for floodplain restoration or adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).
Assists region in meeting FP-3, then Score 1 -->	0	FP-3. Promote floodplain restoration that protect quality and availability of water while preserving or restoring ecologic and stream function.
		FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.*

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

sion (CSE)

		CSE-1. Manage areas along the shoreline susceptible to erosion, including long-term strategic retreat where appropriate.
Assists region in meeting CSE-2, then Score 1 -->	0	CSE-2. Identify opportunities to restore natural stream function, including meandering, in the lower 15 miles of the Carmel River and selected
Assists region in meeting CSE-3, then Score 1 -->	0	CSE-3. Reduce or prevent adverse downcutting in the main stem Carmel River and its tributaries.

Watershed Management (WM)

Assists region in meeting WM-1, then Score 1 -->	1	WM-1. Reduce human-induced sources of non-point fine sediment runoff.
Assists region in meeting WM-2, then Score 1 -->	0	WM-2. Restore natural fire frequency in headwater forests.
Assists region in meeting WM-3, then Score 1 -->	1	WM-3. Restore the natural hydrologic flow regime in disturbed watersheds where appropriate, including low impact development strategies in
Assists region in meeting WM-4, then Score 1 -->	0	WM-4. Re-establish a natural level of sediment supply within the Carmel River and its tributaries.

Environmental Protection and Enhancement (EV)

Assists region in meeting EV-1, then Score 1 -->	1	EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds*; including, but not limited to, promoting the steelhead recovery by meeting accepted or approved environmental flows within the regional watersheds.
Assists region in meeting EV-2, then Score 1 -->	1	EV-2. Assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*
Assists region in meeting EV-3, then Score 1 -->	0	EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.

Assists region in meeting EV-4, then Score 1 -->	0	EV-4. Identify opportunities for open spaces, trails and parks long streams and other recreational areas in the watershed that can be incorporated into projects.
Assists region in meeting EV-5, then Score 1 -->	0	EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.
Assists region in meeting EV-6, then Score 1 -->	0	EV-6 Promote watershed activities for fire fuel management and adaptive management strategies to protect water quality and water supplies from

Climate Change (CC)

Assists region in meeting CC-1, then Score 1 -->	1	CC-1. Implement adaptation measures and mitigation solutions to climate change effects, including increased large storm intensity and/or frequency, sea level rise, drought and wildfire.
Assists region in meeting CC-2, then Score 1 -->	1	CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.
Assists region in meeting CC-3, then Score 1 -->	0	CC-3. Increase energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.

Regional Communication and Cooperation (RCC)

Assists region to meet RC-1 (automatically calculated)	**1**	RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts.	
		Enter the number 1 in each category as appropriate (up to a total of 5 raw points; 3 normalized points):	
		1	Partnerships – The project is proposed by a partnership of multiple organizations enabling use of shared expertise and resources.
		0	Resource Management Strategy – The project includes a RMS that is not already being implemented in the region thereby would provide diversification of strategies.
		1	Beneficial Uses – The project supports several different beneficial uses (see CCRWQCB, *Basin Plan* Chapter 2, 2001)
		0	Geography – The project implements a watershed-scale, regional-scale, or inter-regional project.
		1	Hydrology – The project addresses multiple watershed functions within the hydrologic cycle.
Bonus points = (auto calculate)	**1.8**		
Assists region to meet RC-2 (automatically calculated)	**1**	RC-2. Foster collaboration among regional entities as an alternative to litigation through ongoing meetings of the RWMG and regional data sharing.	
ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)		Enter the number 1 in each category as appropriate (up to a total of 5 raw points; 3 normalized points):	
		1	PROVIDED INFORMATION early in project development to the public to assist in understanding the problem, alternatives, opportunities and/or solutions
		0	CONSULTED & OBTAINED FEEDBACK from all regional agency and non-governmental organizations (NGOs) regarding the problem, alternatives, opportunities and/or solutions
		1	CONSULTED & OBTAINED FEEDBACK from the public regarding the problem, alternatives, opportunities and/or solutions
		0	INVOLVED & WORKED DIRECTLY WITH two or more regional agency and/or NGO stakeholders regarding the problem, alternatives, opportunities, and/or solutions
		0	COLLABORATED WITH, OR MADE PARTNERSHIPS with two or more agencies or NGOs on each aspect of the decision
Bonus points = (auto calculate)	**1.2**		
Assists region in meeting RC-3, then Score 1 -->	1	RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.	
Assists region in meeting RC-4, then Score 1 -->	0	RC-4. Build relationships with State and Federal regulatory agencies and water forums and agencies.	

Total Points for IRWM Objectives =	**25.6**

maximum
= 55.5

ADD up to three (3) additional points depending on the extent to which the project assists the region in meeting this objective (See Bonus Points, below)

es (IRWM Plan Standard 4)

Management Strategies (RMS) that the proposed project will address.

		Reduce Water Demand
	0	Agriculture Water Use Efficiency
	1	Urban Water Use Efficiency *
Category:		**Improve Flood Management**
	1	Flood Risk Management *
Category:		**Improve Operational Efficiency and Transfers**
	1	Conveyance – Regional/Local *
	0	System Reoperation
	0	Water Transfers *
Category:		**Increase Water Supply**
	1	Conjunctive Management & Groundwater Storage *
	0	Seawater or Brackish Water Desalination *
	0	Precipitation Enhancement
	0	Recycled Municipal Water *
	1	Surface Storage – Regional/local *
Category:		**Improve Water Quality**
	0	Drinking Water Treatment and Distribution *
	1	Groundwater Remediation/Aquifer Remediation
	1	Matching Quality to Use
	1	Pollution Prevention *
	1	Salt and Salinity Management
	1	Urban Stormwater Runoff Management *
Category:		**Practice Resources Stewardship**
	0	Agriculture Lands Stewardship
	1	Ecosystem Restoration *
	0	Forest Management *
	1	Land Use Planning and Management
	1	Recharge Area Protection
	1	Sediment Management
	1	Watershed Management *
Category:		**People and Water**
	0	Economic Incentives
	1	Outreach and Engagement
	0	Water and Culture
	0	Water-Dependent Recreation
Other Strategies		
	0	Crop Idling for Water Transfers
	0	Dewvaportation or Atmospheric Pressure Desalination
	0	Fog Collection
	0	Irrigated Land Retirement
	0	Rainfed agriculture
	0	Waterbag transport/storage technology

Total RMS Points =	**16**

Strategic Considerations (PSP Table 4 Scoring Criteria)

SC-1 - Does the project involve or address inter-regional issues or does it involve two or more agencies?

No; the project will serve 2 streets in Sand City: Catalina Street and Contra Costa Street. No other agencies are involved.

Points (Yes: 3 pts; No: 0 pts) =	0

SC-3. Does the project provide water for human consumption, cooking and sanitary purposes?

Boosts freshwater recharge near local desal brackish water intake.

Points (Yes: 1 pts; No: 0 pts) =	1

SC- 4. Does the project address a critical water resource related needs and priorities of the IRWM region as identified in the IRWM plan?

Yes; the project addresses Water Supply, Water Quality, Flood Protection, Watershed Management. Environmental Protection and Enhancement, Climate Change, and Regional Communication and Cooperation

Points (Yes: 1 pts; No: 0 pts) =	1

SC-5. Is the project sufficiently justified by the description given in the narrative of Section D.1? Does the narrative include requisite referenced supporting documentation such as models, studies, engineering reports, etc.? Did the narrative include other information that supports the justification for the proposed project, including how the project can achieve the claimed level of benefits?

Yes; the project is justified by the project description provided. Yes; the project proponent provided an alternatives analysis to support the project. Yes; the description discusses how the project can achieve the claimed level of benefits.

Points (Score: 3 points if "yes" to all three questions; 2 points if "Yes" to 2 questions; 1 point for "yes" to one question) =	3

SC-6. Does the project address and/or adapt to the effects of climate change? Does the project address the climate change vulnerabilities assessed in the IRWM Plan?

Decentralized stormwater system designs using LID such as the West End Project, create a broader system of facilities that can capture and infiltrate stormwater at the neighborhood scale to minimize the volume and conveyance of pollutants.

Points (Score: 2 points if "yes" to 2 questions; 1 point for "yes" to one question) =	2
Subtotal Region/Nexus (10 maximum)	**7**

SC-7. Does the Work Plan include a complete description of all tasks necessary to result in a completed project? Are all necessary and reasonable deliverables identified?

Yes to both questions; the Work Plan provides a complete Project Description and deliverables are identified.

Points (Score: 2 points if "yes" to 2 questions; 1 point for "yes" to one question) =	2

SC-8. Collectively, are the workplan, schedule, and budget thorough, reasonable, and justified; and consistent with each other? See Table 4 for specifics.

Considerations include (one point each):
• Does the project description clearly and concisely address all required topics, including summarizing the major components, objectives and intended outcomes/benefits of the project? - YES
• Are the tasks shown in the Workplan, Schedule and Budget consistent? - YES
• Are the costs presented in the Budget backed up by and consistent with supporting justification/documentation? - YES
• Is the schedule reasonable considering the tasks presented in the workplan? - NO (no schedule provided)

Points (Score: 1 point for each yes to bullet points; 4 maximum)	3

SC- 9. Does the applicant have legal access rights, easements, or other access capabilities, to the property to implement the project; and if not, did the applicant provide a clear and concise narrative / schedule to obtain the necessary access? (Full points if N/A)

The Project will be constructed entirely within the City's street right-of-way and under the jurisdiction of the CIty. There are small portions of the project within a "non appealable" coastal zone overlay that may require a Coastal Development Permit (CDP). However, if required the CDP would be issued by the City and not the California

Points (Yes or N/A: 1 pts; No: 0 pts) =	1
Subtotal Work Plan, Budget, Schedule and Readiness (7 maximum)	**6**

SC- 10. Does the budget leverage funds with other private, Federal, or Local fund resources above and beyond cost share requirements? If additional cost share is not provided, did the applicant provide describe attempts to use other funding sources and justify why it was not included.

Yes; the project is located in a disadvantaged community and the City will request a match reduction to 5%.

Points (Yes: 1 pts; No: 0 pts) =	1

SC-11. For each of the anticipated physical benefit(s) claimed, described, and quantified in Table 4 of the Project Information Form? Is each benefit claimed logical and reasonable given the information provided in the Work Plan?

Yes; The Project was designed to provide capture and treatment of at least the 85th percentile, 24-hour storm event to provide treatment of the water quality design storm and mimic natural watershed processes as outlined by the Central Coast Water Quality Control Board. Additional benefit through dry well infiltration will optimize groundwater augmentation to address water supply objectives.

Points (Score: 2 points if "yes" to 2 questions; 1 point for "yes" to one question) =	2

SC- 12. Does the project provide multiple (more than one) benefits?

Yes; the project provides the following benefits as defined in Chapter 2 of the Central Coastal Basin Plan: Groundwater Recharge, Marine Habitat

Points (Yes: 1 pts; No: 0 pts) =	1

SC- 13. Does the project provide benefits to more than one IRWM region and/or Funding Area?

No; the project will benefit the Monterey Peninsula. Carmel Bay, and South Montrerey Bay IRWM Region.

Points (Yes: 1 pts; No: 0 pts) =	0

SC- 14. If the proposed project addresses contamination per the requirements of AB 1249, does the project benefit a small disadvantaged community?

Yes, The project will remove nitrates from urban stormwater runoff and is therefore consistent with AB 1249.

Points (Yes: 1 pts; No: 0 pts) =	1

SC- 15. Does the proposed project employ new or innovative technology or practices?

No; the project proposes LID features such as bioretention.

Points (Yes: 1 pts; No: 0 pts) =	0
Subtotal Benefits and Program Preferences (7 maximum)	**5**

SC- 16. Did the applicant provide a narrative on cost considerations that is fully explained based on information requested in the Project Information Form?

Yes; the Project Information Form was not provided, however, the proponents provided a budget justification that explains/justifies the estimated cost of the project.

Points (Yes: 2 pts; No: 0 pts) =	2

Total for DWR Scoring Criteria (25 maximum)	**20**

DAC and Native Americans and Environmental Justice (DWR Review Factors D, E and f)

Does the project provide specific benefits to disadvantaged communities and/or Native American tribal communities? If so, explain.

Yes. The project location is entirely within a DAC Block and will benefit 100% of the DAC community. Additionally, the City as a whole is comprised of DAC Places, Tracks and Blocks and those using Lincoln Avenue for shopping and business will benefit from the project. The project location also falls entirely within an EDA area.

DAC &/or Native American Points (Yes: 5 pts; No: 0 pts) =	5

Does the project address any known environmental justice issues? Does the project *avoid disproportionately affecting disadvantaged communities*?

Flooding in and pollution from DAC, does not negatively affect DAC

Environmental Justice Points (Yes for both: 5 pts; No for either: 0 pts) =	5

Climate Change Adaptation and Mitigation (DWR Review Factors K and L)

Put an X next to any climate change adaptation or mitigation strategy the proposed project will contribute to.

Adaptation Strategies

x	Improve water supply reliability
x	Expand conjunctive use of multiple water supply sources
	Increase water use and/or reuse efficiency
	Provide additional water supply
x	Promote water quality protection
	Reduce water demand
	Advance / expand recycled water use
x	Promote urban runoff reuse
	Address sea level rise
x	Address other anticipated climate change impacts
x	Improve flood control
	Promote habitat protection
	Establish migration corridors
	Re-establish river-floodplain hydrologic continuity
	Re-introduce anadromous fish populations to watershed
	Implement one or more recommendations from the *Erosion Mitigation Alternatives for Southern Monterey Bay (Alternatives Study) (ESA-PWA, May 2012)*
	Enhance and protect watershed forest and meadow systems

Please describe: Decentralized stormwater system designs using LID such as the West End Project, create a broader system of facilities that can capture and infiltrate stormwater at the neighborhood scale to minimize the volume and convevance of pollutants.

Climate Change Adaptation (Score 1 for every strategy implemented, up to 5 max) =	5

Mitigation Strategies

	Increase water use efficiency or promote energy-efficient water demand reduction
	Improve water system energy efficiency
	Advance / expand recycled water use
x	Promote urban runoff reuse
	Promote use of renewable energy sources
x	Contribute to carbon sequestration

Does the proposed project reduce regional greenhouse gas emissions and/or improve energy efficiency compared to alternative proposed projects meeting the same regional objectives? If so, explain how.

Please describe: The project, through the vegetative component, will act as a carbon sink and will help to reduce overall greenhouse gas emission impacts. The project alternative, as represented by conventional urban street stormwater management does not provide any benefit to greenhouse gas reductions.

Climate Change Mitigation (Score 1 for every strategy implemented, up to 5 max) =	2

Technical Feasibility (DWR Review Factor C)

Discuss the technical feasibility of the project. If possible, cite references that contain information about the proposed project and detail the technical feasibility of the project.

No project specific technical studies were provided. This technology has been established as effective in similar situations. The City does not have experience with similar projects.

30 points: Technical feasibility has been documented in a project-specific pilot study or previous phase or has a documented track record of success

OR

10 points: has the technology proposed been established as effective in similar situations?
10 points: Are project site conditions documented (geology/soil, ecology, hydrology, land use, public utilities)?
10 points: Do the project partners have experience with similar projects? (e.g., similar site, similar technology).

Technical Feasibility Points (See above) =	10

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APPENDIX 14-A

STAKEHOLDER INVOLVEMENT AND OUTREACH PLAN FOR THE 2013 IRWMP UPDATE

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STAKEHOLDER INVOLVEMENT AND OUTREACH PLAN

for the Update to the

MONTEREY PENINSULA, CARMEL BAY, AND SOUTH MONTEREY BAY INTEGRATED REGIONAL WATER MANAGEMENT PLAN

Prepared for the

Monterey Peninsula Water Management District

By

Denise Duffy & Associates

Draft dated: October 9, 2013

with minor edits May 2014

Finalized June 2014

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Stakeholder Involvement and Outreach Plan
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1. INTRODUCTION

The purpose of this Stakeholder Involvement and Outreach Plan (Plan) for the 2013 Update to the Monterey Peninsula, Carmel Bay and South Monterey Bay (hereinafter, "Monterey Peninsula" or "MP") Integrated Regional Water Management (IRWM) Plan is to work toward meeting regional goals, objectives, and state standards and priorities for the IRWM Grant Program by establishing, updating, and monitoring the efforts to involve public, stakeholders, and disadvantaged communities in the regional water planning process.

California Department of Water Resources, or DWR, IRWM Proposition 84 and 1E Guidelines (November 2012) identify the following IRWM plan standards that are considered by this Outreach Plan:

- Use of the Ahwahnee Water Principles (http://www.lgc.org/ahwahnee/h2o_principles.html), including multi-agency collaboration, stakeholder involvement and collaboration. In addition, one of the principles states: "From start to finish, projects and programs should involve the public, build relationships, and increase the sharing of and access to information."
- The "Governance" IRWM Plan standard requires that the plan include a description of how the plan addresses and ensures an adequate public outreach and involvement process, and a balanced access and opportunity for participation in the process,
- The Stakeholder Involvement Plan standard requires that the plan contain a public process that provides outreach and an opportunity to participate in the plan development and implementation to the appropriate local agencies and stakeholders, as applicable to the region, including the following:
    - Wholesale and retail water purveyors
    - Wastewater agencies
    - Flood control agencies (including those agencies who submit applications for Prop 1E funded Storm Water Flood Management Grants)
    - Municipal and county governments and special districts
    - Electrical corporations
    - Native American tribes
    - Self-supplied water users
    - Environmental stewardship organizations
    - Community organizations
    - Industry organizations
    - State, federal, and regional agencies or universities
    - Disadvantaged community (DAC) members (see detailed description in Section 3. Disadvantaged Communities)
    - Any other interested group appropriate to the region

DWR requires IRWM Programs to include provisions to, among other things, ensure equitable distribution of benefits by increasing participation of small and Disadvantaged Communities (DACs) in the IRWM planning process and to address safe drinking water and wastewater treatment needs of those communities.

This Plan and its related tasks create the framework whereby the Monterey Peninsula IRWM Planning Region can successfully satisfy the following DAC IRWM Program preferences and Statewide Priorities as specified in PRC §75026(b), CWC §10544, and in Table 1 of the Proposition 84 and 1E IRWM Guidelines (DWR, August 2010):

- Address critical water supply or water quality needs of DACs within the region.
- Address statewide priorities, including "ensure equitable distribution of benefits," which includes specifically:
  - Increase the participation of small and disadvantaged communities in the IRWM process.
  - Develop multi-benefit projects with consideration of affected DACs and vulnerable populations.
  - Identify and include projects that address safe drinking water and wastewater treatment needs of DACs.
  - Address critical water supply or water quality needs of California Native American Tribes.

The Regional Water Management Group (RWMG) identified regional communication and cooperation as one of its objective categories in its 2007 IRWM Plan, including the following detailed objectives:

- Meet or exceed State and Federal regulatory orders, provided that mandates are funded.
- Identify strategies for protecting both infrastructure and environmental resources.
- Foster collaboration between regional entities to minimize and resolve potential conflicts and to obtain support for environmentally responsible water supply solutions.
- Build relationships with State and Federal regulatory agencies and other water forums and agencies to facilitate the permitting, planning and implementation of water-related projects.
- Identify opportunities for public education about the need, complexity, and cost of strategies, programs, plans, and projects to improve water supply, water quality, flood management, coastal conservation, and environmental protection.

Meaningful public participation goals, objectives, and strategies are critical to involving the public in the process of recommending and pursuing projects and programs in their communities. This Plan was prepared to help coordinate and guide the outreach activities to reach and involve stakeholders and DACs in their communities and, by meaningful dialog, to communicate water resource issues that are important to them. This Plan includes data that are currently available about communities that meet the definition by the DWR of "Disadvantaged Community" and gives a brief overview of water issues affecting these communities (see section 3 for details and our definition of DAC). The Plan also outlines responsibilities for implementation and evaluation of outreach activities envisioned. As RWMG, TAC, stakeholder/committee meetings occur, and mapping and other data become available; this Plan will be updated and expanded to better meet the requirements, goals and objectives of the region. The planning process will thereby continue to understand and address emerging critical water issues impacting the public/communities, including DACs.

2. STAKEHOLDER IDENTIFICATION AND INVOLVEMENT

The Prop 84/ & 1E IRWM Guidelines require that the IRWM Plan contain processes that provide outreach and an opportunity to participate in plan development and implementation. In order to meet this criterion, the IRWM Plan process included an expanded stakeholder research effort to develop the list found in *Appendix A [Stakeholder List – working draft dated July 2012]*. This list was used to share information; and invite and involve stakeholders in the IRWM process. This Plan, including the stakeholder list, is proposed to be included in the 2013 Update to the IRWM Plan.

Although there are no DWR supplied protocols as each IRWM region will have differing relationships among the various stakeholders, the MP 2013 IRWM Plan Update used the Prop 84 & 1 E Guidelines to identify stakeholders and amend the list as needed during the process. The stakeholder list was used to notify interested or potentially interested stakeholders for each public meeting. The list was expanded as needed throughout the process to include not only the easily identified stakeholder, but also the less obvious stakeholder. The following methods were used to identify stakeholders:

- Open announcements of IRWM meetings that invite new stakeholders (self identification). Public meeting notices were posted in disadvantaged community public places, in newspapers and links provided on the RWMG websites.
- Recommendation of additional stakeholders from those already involved in the IRWM Plan
- Request for stakeholder lists from adjacent IRWM regions (specifically, the Greater Monterey County region which surrounds the Monterey Peninsula region)
- Identification of stakeholders through direct research of water management issues in the region, including database and on-line research, review of recent board, committee, commission and agency correspondence, meeting minutes, and documents.
- Targeted outreach to underrepresented groups, including organizations that support disadvantaged communities.

Tables summarizing the activities proposed for stakeholder, public, and DAC outreach during the 2013 IRWM Plan Update are included in *Appendix B [Outreach and Communication Tables; Working Draft Dated July 2012].* These tables document key inputs required for the plan update, a meeting summary, and an outreach and stakeholder activities log to document ongoing outreach and communications.

3. DISADVANTAGED COMMUNITIES

Disadvantaged community is defined by the California Department of Water Resources (DWR) as any community where the median household income (MHI) is below 80% of the statewide median household income (SMHI).

Recently released census data were used to identify DACs according to the current DWR standard. Annual household income information is made available by the US Bureau of the Census through annual American Community Survey (ACS) data which includes income sampling that is no longer collected in other census records.

The 2006-2010 American Community Survey (AVS) 5-year Estimates show that four census tracts within the planning region can be considered a DAC (see Figure X). According to the ACS survey, the median household income (MHI) at which at area can be considered a DAC is $48,706 (i.e., 80% of the California MHI). The following tracts were below that threshold MHI:

Tract (City)	Population	MHI (2010 inflation-adjusted dollars)	% of Families whose Income in Past 12 Months was Below the Poverty Line	% Hispanic/Latino Population
Tract 127 (Monterey):	3,137	$46,400	5.6	7.0
Tract 136 (Seaside):	4,102	$46,756	9.8	59.3
Tract 137 (Seaside):	4,690	$42,551	17.1	72.5
Tract 140 (Seaside/Sand City)	2,479	$47,759	6.1	50.7

In addition to these identified DAC tracts, there may be "hidden" DACs within larger census groupings. Because the IRWM Planning Region includes some rural and sparsely populated tracts, it is anticipated that there are additional communities not identified by tract level data searches that meet DWR's definition of a disadvantaged community. In March, 2012, the California Department of Water Resources announced that DAC identification should be based on 5-year ACS Estimates and that a mapping tool was available to IRWM regions. Alternative methods for determination of DAC status are under development and will be included in the draft revised IRWMP Implementation Grant Guidelines scheduled for release July 2012. Lack of methods to identify other disadvantaged communities that are not tracked by the ACS may be a problem because it may exclude communities that have serious water challenges and could prevent access to funding opportunities in Round 2 of IRWMP Implementation Grants.

One example of a potential DAC is the area in and around Cachagua Valley. To outreach to this group for the 2007 IRWM process, MPWMD coordinated a meeting of the Carmel River Advisory Committee in Cachagua Valley in September 2007 to solicit input on problems and issues in that sub-watershed. Based on input at the meeting, issues in this sub-watershed include the need for more water conservation measures, a lack of an existing central group or governing structure in Cachagua Valley that might be able to carry out watershed management planning, and the need to improve the water supply to meet demand during drought conditions. Additional outreach to the known and potential DACs is described in Section 5, Community Outreach.

Tract (City)	% Hispanic/Latino Population	% of Population that Speaks Language Other than English at Home
Tract 127 (Monterey):	7.0	24.6
Tract 136 (Seaside):	59.3	61.1
Tract 137 (Seaside):	72.5	75.8
Tract 140 (Seaside/Sand City)	50.7	57.3

WATER NEEDS AND CONSTRAINTS

Environmental justice concerns for DACs exist where water resource problems disproportionately impact communities that lack the capacity to address those problems themselves, due to financial, language, or other constraints. Impediments to DAC participation in the IRWM planning process are common in both urban and rural areas, including lack of accessible information on water quality and related health impacts, and lack of resources to address those issues. Outreach should address difficulties that are experienced by disadvantaged community members. The following are issues of concern that have been identified preliminarily by MPWMD and DD&A:

- ***Language and Cultural Consideration***. According to census data the population of Monterey County is 55.4 percent Hispanic/Latino; however this statistic is not necessarily applicable to the Monterey Peninsula, Carmel Bay and South Monterey Bay IRWM region. Language diversity in the region may trigger the need to develop bilingual (Spanish) outreach materials and outreach partners. The Monterey Peninsula RWMG may need to expand outreach to Native American tribal communities in a culturally sensitive way as described in the Community Outreach section of this plan. In 2010, Monterey County had a Native American population of 5,396 persons or 1.3 percent of the County population. Although tribal affiliations are expected to be diverse within the County, the Ohlone/Coastanoan - Esselen and Salinian tribes who are native to the area may request to be contacted as part of the outreach process. In 2013, Native American representatives on recent lists provided by the Native American Heritage Commisssion were contacted via email to request their involvement in the IRWM Planning Process.
- ***Affordability***. Although only four census tracts in the Region qualify as disadvantaged communities per DWR guidance (see above), increases in water or wastewater service rates that could accompany the implementation of projects included in the IRWM Plan may potentially affect these communities. A priority of the Region is to seek external grant funding or subventions to offset the cost of implementing new, and often expensive, projects. External funding assistance will help offset costs to existing rate payers in the region, especially those rate payers with a limited ability to pay, and help ensure that those rate payers are affected as little as possible. Cal-Am has begun to request an expansion of its H_2O – Help to Others Program.
- ***Water Quality/Flooding***. Monterey County Health Department, Environmental Division, the Central Coast Regional Water Quality Control Board and a number of Community Service Districts and Water Districts were contacted for information regarding areas that might be known to experience water quality problems. No disadvantaged communities have been identified that experience disproportionally poor water supply quality or flooding issues because the region is, in general, served by public water, wastewater, and drainage/flood control entities. In addition, storm water permitting, education, and other state and federal programs (including some IRWM Projects) address many non-point source water quality issues. Some communities in areas not served by public systems may also qualify as disadvantaged and are planned to be included in outreach efforts, if identified in the future.

DAC-SPECIFIC OUTREACH ACTIVITIES

The RWMG wants to ensure that the water resource management needs and interests of DACs are fully addressed in the IRWM Plan and that DAC's are provided ample opportunities for involvement in IRWM Plan development. As described in Section 1, MPWMD, with assistance by DD&A has prepared this outreach plan and DD&A provided outreach services to MPWMD. Specifically, the organizations listed in Appendix A were invited with a formal cover letter and in some cases, personal email and/or phone call to be involved in the IRWM Plan.

DAC Outreach will be conducted in a phased manner, increasing and broadening over time, if needed. Staff at MPWMD and DD&A will assist with building collaborations and partnerships to further expand outreach activities. Implementation activities will begin immediately and progress reports will be made to MPWMD as required under the terms of the grant. Outreach will begin in areas that have been previously identified as DACs. Other areas may be added upon further analysis of the IRWM DAC map data, information made available from DWR, and other public agencies and organizations for smaller areas, (anticipated in July 2012). A special effort will be made to encourage disadvantage communities to participate in stakeholder meetings, including targeted hard copy notice mailings and postings within the community, personal emails and phone calls as documented in the outreach log. See additional detail in Sections 4 and 5 of this document.

RWMG participants and stakeholders who have worked with, and understand the issues and concerns of, the Monterey Peninsula DACs will be provided with an opportunity to comment on the IRWM plan update prior to its finalization and implementation. In addition, outreach will be reviewed and evaluated periodically over the duration of the IRWM Planning Grant. Objectives and strategies may be modified over time depending on the level of DAC participation achieved, as projects are prioritized, and upon evaluation by the RWMG. Recommendations may be made by the RWMG to modify this Plan to improve outcomes to improve efforts to involve targeted areas.

The RWMG recognizes that even within DAC communities, there may be populations that are severely disadvantaged and may require additional support. DACs may also be rendered invisible in other ways, for example, low-income communities that may live within wealthier ones, unincorporated communities that are not tracked by Census, or other communities that are not well documented. This problem is especially significant in rural areas. Identifying these "hidden" DACs will be part of the DAC Outreach effort.

See summary of proposed communications with, and involvement of, the public, stakeholders, and DACs in *Appendix B [Outreach and Communication Tables; Working Draft Dated July 2012]*. This plan will be updated periodically to continue to pursue additional DAC involvement, as needed.

4. COORDINATION WITH LOCAL AGENCIES AND ORGANIZATIONS

Strong partnerships with local agencies and non-profit organizations are critically important to a successful outreach strategy. These institutions have knowledge of communities, have existing relationships with the communities that can be leveraged and built on, and may already be aware of key issues and concerns within the communities. Recognizing the importance of strong local partnerships, the outreach work will include a significant focus on identifying and developing relationships with key local agencies, non-profit organizations and other community institutions.

Throughout the conversations with local agencies, non-profit organizations, and community institutions particular focus will be on gathering insights and ideas regarding the best methods to reach their constituents; identify communities where needs are greatest; determine where opportunities for collaboration may exist; explore suggestions of potential projects where prior projects failed, and determine what approaches might be successful.

OBJECTIVES

- Inform and involve local agencies and organizations in the IRWM process.
- Communicate with identified groups, as they are likely to be familiar with the needs of the communities and be able to identify community leaders to facilitate successful outreach.
- Build upon existing relationships between local agencies/organizations.

STRATEGIES AND ACTIVITIES

- Identify local agencies, non-profit organizations and other community institutions that might be stakeholders *[done April – May 2014]*
- Update and expand the existing stakeholder contact list with current information for local agencies and organizations working on water-related issues *[done April – May 2014]*
- Contact, via phone or email, identified representatives of local agencies and organizations to deepen their understanding of the IRWM planning process, explore the possibility of partnering to conduct IRWM Plan outreach, identify key individuals and develop appropriate strategies for communicating with them *[done April – May 2014]*
- Personally invite local agency and organization representatives including representation of DACs to join as stakeholders and participate in meetings or workshops on an open-ended basis. Representatives may not have time to participate, but the invitation should be extended and remain open. If they cannot participate, let them know where to find information (e.g., website.) *[ongoing]*

5. COMMUNITY OUTREACH

In order for the MP IRWM Planning effort to successfully identify and address the needs of the stakeholder, active engagement of the stakeholders throughout the process is absolutely necessary. This engagement is what ensures that appropriate projects are identified and included in the processes. This will help ensure that proposed projects have the cooperation, knowledge and commitment of the people who live and work in the target communities, and are therefore able to be completed successfully. Public participation efforts are intended to be inclusive and democratic, and to allow time for thorough communication of issues, potential solutions, potential impacts and benefits, responsibilities, and potential partnerships. The public will have the opportunities to propose and explore new projects that will address water supply, affordability and open space needs.

OBJECTIVES

- Foster participation and engagement by underrepresented members of the public (including DAC and tribal leaders) in meetings by encouraging cultural sensitivity of the IRWM Plan.
- Involve the public, and in particular, DACs in developing projects – and where needed, adding new projects to the IRWM projects list.
- Ensure the greatest level of participation by targeted community members leading to exploration and implementation of water improvement projects fully supported by the local community

STRATEGIES AND ACTIVITIES

- Build upon existing relationships/contacts with the public agencies, representatives of water and wastewater service providers, and non-profit agencies with interests in water quality, access and affordability issues and will continue to discuss opportunities for outreach partnerships within their jurisdictions. *[ongoing]*
- Relationships with community advocacy and non-profit organizations and other community groups will be enhanced and additional groups will be contacted in DACs that are newly identified to encourage participation and collaborative outreach activities within those areas. *[ongoing]*
- Consult with public agencies, members and advocacy organizations to prioritize outreach to those communities with the greatest need. Input from public agencies and community organizations and needs data such as existing water quality conditions, income disparities, and other factors will be considered. *[ongoing]*
- Update, maintain and expand the DAC contacts list (i.e., within the larger stakeholder list) to include all agencies, organizations and individuals connected and interested in water access issues. *[ongoing]*
- Add all DAC contact information gathered through one-on-one interviews, community meetings and other outreach to the stakeholder contact list. *[ongoing]*
- Update the DAC outreach contact list regularly to include organizations involved in emerging social and environmental justice programs in the region. *[ongoing]*
- Follow-up periodically with contacts to obtain information for additional outreach and evaluation of successes or failures. *[ongoing]*
- Log all communications to avoid repetitive contacts with the same individual/group and to be aware of work done to date. See Appendix B, page 3. *[ongoing]*
- Prepare and send additional hardcopy stakeholder meeting notices to targeted community organizations that represent and/or assist disadvantaged groups and individuals. Post hardcopy notices at high visibility locations within the areas identified by the DWR guidance as disadvantaged communities. [*completed July 6, 2012*]

Appendix A

Stakeholders List (July 11, 2012)

Working Draft Stakeholders List

for the 2013 Update to the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Plan (version: July 10, 2012)

Regional Water Management Group:

Other Stakeholders (as identified as stakeholders during the 2007 IRWM Plan process or sent email confirmation in May 2012 that they would like to be included in the 2013 Update process)	
California American Water	Monterey Bay National Marine Sanctuary (NOAA)
California Coastal Commission	Monterey Coastkeeper
California Coastal Conservancy	Monterey County Hospitality Association
California Department of Fish and Game	Monterey County Public Works
California Department of Water Resources	Monterey County Service Area 50
California Native Plant Society, Monterey County	Monterey County Resource Conservation District
California Department of Parks and Recreation	Monterey County Resource Management Agency
California State Water Resources Control Board	Monterey Peninsula Chamber of Commerce
CSU Monterey Bay: Watershed Institute	Monterey Peninsula Regional Park District
Carmel Area Wastewater District	Monterey Regional Waste Management District
Carmel River Steelhead Association	NOAA Fisheries
Carmel River Watershed Conservancy	Pebble Beach Community Service District
Carmel Unified School District	Pebble Beach Company
Carmel Valley Association	Planning and Conservation League
Central Coast Regional Water Quality Control Boarrd	Seaside Basin Watermaster
City of Carmel-by-the-Sea	Surfrider Foundation
City of Del Rey Oaks	The Nature Conservancy
City of Pacific Grove	U.S. Army Corps of Engineers
City of Sand City	U.S. Forest Service
City of Seaside	U.S. Fish and Wildlife Service
Coastal Watershed Council	Ventana Wilderness Society
Fort Ord Reuse Authority	

Additional organizations to assist with Disadvantaged Community Outreach	
CHISPA	Monterey County Welfare Department
Environmental Justice Coalition for Water	Monterey Library
Foundation for Housing Assistance of Monterey Co.	Monterey Senior Center
Fort Ord Environmental Justice Network	NAACP
League of United Latin American Citizens	Oldemeyer Senior Center
Military and Veterans Affairs	Rural Communities Assistance Corporation
Monterey County Department of Health Services	Seaside Library
Monterey County Housing Authority	Seaside Family Health Center
Monterey County Social Services Department	Shelter Outreach Plus/ I Help Program

Appendix B

Outreach Communication Plan (July 11, 2012)

Plan Input Responsibilities

for the 2013 Update to the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Plan

Working Draft; Version Date: May 2014

Task #	Plan Section	STAKEHOLDER INVOLVE-MENT	Topics requiring Stakeholder's review/ consensus	Planning Projects that will Input Data, Analysis, and Projects for the Plan Update									Key	
				Project 1: Canyon Del Rey Drainage Plan	Project 2: Seaside Basin Salt & Nutrient Mngmnt	Project 3: Carmel River Steelhead Passage	Project 4: GIS/ Database/ Website	Project 5: Ord Inter-Regional Committee	Project 6: San Jose Creek Watershed	Project 7: ASBS Alter-natives	Project 8: Carmel Valley Alluvial Aquifer	Project 9: Carmel Lagoon EPB	Other Water /Wastewater Agencies (not in TAC)	Land Use Planning (i.e., cities, FORA, County)
PHASE 1: PLAN UPDATE INITIATION/DEFINITION OF PLAN PROCESS (2ND/3RD QUARTER 2012)														
1	**Governance (MOU and plan section)**	**Public Meeting #1**	**X**				Internal Working Mtg (DD&A/ MPWMD)	Ord Committee mtg #1						
2	**Region Description**			X	X	X			X	X	X	X	X	
3	**Objectives**		**X**	X	X	X			X	X	X	X		
5	**Integration**			X	X	X			X	X	X	X	X	X
14	**Stakeholder Involvement (Outreach Plan)**		**X**										X	X
PHASE 2: DEVELOP PRELIMINARY PROJECT LIST AND PROJECT REVIEW PROCESS (4TH QUARTER 2012)														
4	**Resource Management Strateges**	**Public Meeting #2**	**X**	X	X	X	Internal Working Mtg (DD&A/ MPWMD)	Ord Committee mtg #2	X	X	X	X	X	
5	**Integration**			X	X					X			X	X
6	**Proj Review Process**		**X**	X	X	X			X	X	X	X	X	
6.1	Regional Priorities		**X**	X	X	X			X	X	X	X	X	
6.2	Compare MP scoring with DWR		**X**										X	
9	**Data Mgt**												X	
12	**Relation to Local Land Use Plan**			X	X									X
13	**Relation to Local Water Plan**										X		X	
14	**Stakeholder Involvement (Outreach Plan)**		**X**										X	X
PHASE 3: STRATEGY AND PROJECT REFINEMENT (2013)														
5	**Integration**	**Public Meeting #3 (plus possible TAC meeting)**		X	X		X	X		X			X	
6	**Proj Review Process**		**X**	X	X	X	X	X	X	X	X	X	X	
6.3	Review Project Proposals		**X**	X	X	X	X	X	X	X	X	X	X	
6.4	Revise Project Proposals			X	X	X	X	X	X	X	X	X	X	
7	**Impacts & Benefits**			X	X	X	X	X	X	X	X	X	X	
8	**Plan Performance**							X					X	
10	**Finance**			X	X	X	X	X	X	X	X	X		
11	**Tech Analysis**			X	X	X	X	X	X	X	X	X	X	
14	**Stakeholder Involvement (Outreach Plan)**		**X**				X	X						X
15	**Climate Change**													
PHASE 4: FINAL PLAN PREPARATION, REVIEW (1st to 2nd Quarter 2014)														
ES	**Executive Summary/Introduction**													
NA	**Overall Plan Review**													
2013 IRWMP Plan Approval (2nd Quarter 2014)														

Meeting Plan

for the 2013 Update to the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Plan

Working Draft; *Version Date: May 2014*

Meeting Type and Number Proposed Topics of Discussion (subject to ongoing refinement)			**2013**				**2014**	
	3rd Quarter: July - September	4th Quarter: October - December	1st Quarter: January - March	2nd Quarter: April - June	3rd Quarter: July - September	4th Quarter: October - December	1st Quarter: January - March	2nd Quarter: April - June
Stakeholder Meeting #1								
Overview of Statewide/Region IRWM Planning and Update								
2013 MP IRWM Plan Update (Purpose, Components, Key Issues, Schedule)								
Proposed Governance/MOU Discussion								
Stakeholder List/Outreach Plan /to become								
Existing/Proposed Goals and Objectives								
Prioritization of Objectives								
Stakeholder Meeting #2								
Present Revised Items from Meeting #1								
Governance/MOU								
Reports from MOU approval by each RWMG member								
Planning Projects Status Report								
Draft Revised Water Management Strategies								
Draft Project Prioritization Spreadsheets								
Review Draft Plan Sections (1, 2, 3, 4, 5, 12, 13, 14, 15)								
Solicit Project Proposals (preliminary form)								
Stakeholder Meeting #3								
Present Preliminary Project Scoring/Ranking Results								
Prepare and review more plan sections								
other items to be resolved (TBD)								
Other meetings as needed								
MP IRWMP Plan Update Approval by RWMG and Project Proponents								

Outreach/Communication Log

for the 2013 Update to the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Plan

Working Draft; *Version Date: May 2014*

Outreach Activity performed	Plan Standard/Purpose	Scheduled Meeting	Non-scheduled Meeting	Small Group Meeting	Personal Call	Follow-up or Return Call	Conference Call	Group Email or Email Blast (full)	Group Email or Email Blast (targeted)	Personal Email	Press Release	Hard copy posting	Update Website
Public Notice	CA Government Code Section 6066 requirement							5/1/2012 and 5/7/2012			4/26/12 and 5/2/2012		
Meeting with L. Hampson, H. Stern (MPWMD)	Initiation/Background Information			3/26/2012									
Steve Endsey (FORA) non-scheduled meeting coordination	Inter-regional, RWMG, Local Land Use Planning		4/6/2012										
Ord Inter-regional phone call: S. Robinson, L. Hampson, H. Stern	Inter-regional						4/10/2012						
WWOC attendance by Larry Hampson	Inter-regional, RWMG, Local Land Use Planning	WWOC 4/18/2012											
Bridget Hoover (MBNMS) phone call	Inter-regional, DAC Outreach				4/25/2012								
Brian True (MCWD) phone call	Inter-regional, RWMG, Water Planning				4/24/2012								
Ross Clark (CCWG) phone call	Inter-regional/Climate Change				5/1/2012								
Called Rick Riedl (City of Seaside)	Stakeholder involvement: DAC				6/14/2012								
Called Kelly Morrow (ln?), City of Seaside	Stakeholder involvement: DAC				6/14/2012								
Emailed Carlos Ramos,(LULAC)	disadvantages communities (DAC outside reqm'ts)				6/14/2012								
Meeting notice	Initation stakeholder meeting							6/25/12			7/3/2012	7/3/2012	6/1/12
Outreach to Cachagua/San Clemente Dam groups (email to Gabriela Alberola [GAlberola@pcl.org])	disadvantages communities (DAC outside reqm'ts)									5/24 - 29/12			
Hardcopy mailing of notice to DAC organizations	disadvantages communities											7/5/2012	
Event briefs for public meeting submitted to Monterey Herald, Monterey County Weekly, Cedar Street Times, Monterey Bay Area News & Views	Stakeholder involvement										7/5/2012		
Public Stakeholder Meeting	Stakeholder involvement	7/25/2012					7/25/2012						
Stakeholder Meeting notice / meeting	Stakeholder involvement, DAC outreach, IRWM Plan Uipdate RMS and Project Review	10/24/2012						10/5/2012			10/5/2012	10/5/2012	
Stakeholder Meeting notice /meeting	See agenda (including Native A merican outraeach)	2/6/2013						Jan. 2014			Jan. 2014		
Stakeholder Meeting notice / meeting	Stakeholder involvement, DAC outreach, IRWM Plan Update Ord interregional (Project 5)	2/7/2013						Jan. 2014			Jan. 2014		

Appendix 14-B

May 21, 2018 RWMG Meeting

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Directions for Concept Proposal Form

FORM TIMES OUT AFTER 60 MINUTES - Please SAVE YOUR WORK OFTEN!

The goal of this solicitation is to create a comprehensive Project List that includes concept proposals and projects that are within the Monterey Peninsula Integrated Regional Water Management (IRWM) region. Being included on the Project List is a first step and if Proposals meet eligibility criteria, they will be included in the IRWM Plan Update and can move to Step 2, which includes submittal of detailed project information. Being included in the regional Plan may allow projects to be eligible for select grants.

It is the project proponent's responsibility to:

1. Complete a Concept Proposal for each project
2. Ensure the project(s) information is up to date
3. Respond to request for information within the established deadline
4. Request that a project be removed if it is no longer being pursued

Concept Proposals must meet the following minimum eligibility criteria to be included in the IRWM plan:

1. Assist the Monterey Peninsula region in achieving at least one of its IRWM Plan objectives.
2. Implement at least one of the region's Resource Management Strategies.
3. Provide water resource benefits to the region.
4. Be consistent with Proposition 84 IRWM Guidelines and Department of Water Resources standards and requirements.

REQUIRED: Please fill out sections 1,2,3 & 5 of your project information before submitting the form.

1. Project Proponent (Name of Organization):*	
Type of Entity:	(•) Public agency ( ) Nonprofit organization ( ) Privately owned water utility ( ) Private citizen or privately owned business ( ) Specify your own value:
2. Project Title:	
3. Name, Title, and Affiliation of Contact Person:	
4. Phone:	
5. Email:	

6. Mailing Address:

7. Project Eligibility: Geographic Location:
To be eligible for inclusion in the IRWMP, projects must lie within the geographic scope of the Monterey Peninsula IRWM Region or provide a benefit to water resource issues in the Region[1]. Please describe the location of the project and the area(s) of benefit. The preferred method is to upload a GIS layer with the project's location/envelope. If not available, please include coordinates in latitude/longitude or in the State Plan coordinate system. Select HERE to upload GIS Files.

[1]The planning Region is located in Central Coast Regional Water Quality Control Board (RWQCB) Region 3 and lies between the Salinas River groundwater basin and the Big Sur coast. The planning region is approximately 347 square miles and consists of coastal watershed areas in Carmel Bay and south Monterey Bay between Pt. Lobos on the south and Sand City on the north – a 38.3-mile stretch of the coast that includes three Areas of Special Biological Significance (Pt. Lobos, Carmel Bay, and Pacific Grove). The area encompasses the six Monterey Peninsula cities (Carmel-by-the Sea, Del Rey Oaks, Pacific Grove, Monterey, Sand City, and Seaside), and extends into portions of the unincorporated area of Monterey County in the Carmel Highlands, Pebble Beach and the inland areas of Carmel Valley and the Laguna Seca area. For a map of the planning region see: http://www.mpwmd.dst.ca.us/Mbay_IRWM/2011IG/WorkPlan.pdf

8. Project Eligibility: Prop 84 IRWM Criteria:
To be eligible for inclusion in the IRWMP, projects must yield multiple benefits and include one or more of the following elements. Please check all that apply:

- ☐ Water supply reliability, water conservation and water use efficiency.
- ☐ Storm water capture, storage, clean-up, treatment, and management.
- ☐ Removal of invasive non-native species, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands.
- ☐ Non-point source pollution reduction, management and monitoring.
- ☐ Groundwater recharge and management projects.
- ☐ Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users.
- ☐ Water banking, exchange, reclamation and improvement of water quality.
- ☐ Planning and implementation of multipurpose flood management programs.
- ☐ Watershed protection and management.
- ☐ Drinking water treatment and distribution.
- ☐ Ecosystem and fisheries restoration and protection.

9. Project Eligibility: IRWMP Goals and Objectives (* = High Priority):
To be eligible for inclusion in the IRWMP, projects must be consistent with the goals and objectives of the Monterey Peninsula IRWM region, which include the following (please check all that apply).

Water Supply (WS)	☐ WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.* ☐ WS-2. Maximize use of recycled water.* ☐ WS-3. Seek long-term sustainable supplies for adopted future demand estimates. ☐ WS-4. Optimize conjunctive use of surface and groundwater. ☐ WS-5. Evaluate, advance, or create water conservation throughout the Region in compliance with the State's 20x2020 Water Conservation Plan.
Water Quality (WQ)	☐ WQ-1. Improve ocean water quality, including Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.* ☐ WQ-2. Improve inland surface water quality for environmental resources (e.g. steelhead) and potable water supplies.* ☐ WQ-3. Protect and improve water quality in groundwater basins.* ☐ WQ-4. Meet or exceed water quality standards established by regulatory agencies and stakeholders.
Flood Protection & Erosion Prevention (FP)	☐ FP-1. Develop regional projects and plans necessary to protect existing infrastructure and sensitive habitats from flood damage, erosion, and sea level rise, in particular, along the southern Monterey Bay shoreline and Carmel Valley.* ☐ FP-2. Develop approaches for adaptive management that minimize maintenance and repair requirements (sustainable flood management systems). ☐ FP-3. Protect quality and availability of water while preserving or restoring ecologic and stream function. ☐ FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.
Environmental Protection and Enhancement (EV)	☐ EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds; promote the steelhead run. ☐ EV-2. Identify opportunities to assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when development water management strategies and projects. ☐ EV-3. Minimize adverse environmental effects on biological and cultural resources when implementing strategies and projects. ☐ EV-4. Identify opportunities for open spaces, trails and parks long streams and other recreational areas in the watershed that can be incorporated into projects. ☐ EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.
Climate Change (CC)	☐ CC-1. Evaluate adaptation measures and mitigative solutions to climate change effects. ☐ CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.

	☐ CC-3. Support efforts to increase education, research & use of energy conservation measures & alternatives to fossil fuel & non-renewable resources to reduce greenhouse gas emissions associated with water & wastewater facility operations & IRWM projects.
Regional Communication and Cooperation (RCC)	☐ RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts.* ☐ RC-2. Foster collaboration among regional entities as an alternative to litigation. * ☐ RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues. ☐ RC-4. Build relationships with State and Federal regulatory agencies and water forums and agencies.

10. Project Eligibility: IRWMP Resource Management Strategies:
To be eligible for inclusion in the IRWMP, projects must implement one or more Resource Management Strategies of the Monterey Peninsula IRWM region, which are shown on page 4. Please list all that apply.

11. Summary Description of Project:
Please include a brief summary of the project (500 words maximum, attach page, as necessary). Describe the project need, the project concept, and which entities would be involved in carrying out the project. Summarize the project status to the extent possible.

RESOURCE MANAGEMENT STRATEGIES

Reduced Water Demand

Improve Water Quality

- Agriculture Water Use Efficiency
- Urban Water Use Efficiency
- Crop Idling for Water Transfers
- Irrigated Land Retirement
- Rainfed Agriculture

Improve Operational Efficiency and Transfers

- Conveyance – Regional/Local
- System Reoperation
- Water Transfers
- Waterbag Transport/Storage Technology

Increase Water Supply

- Conjunctive Management & Groundwater Storage
- Seawater or Brackish Water Desalination
- Precipitation Enhancement
- Recycled Municipal Water
- Surface Storage – Regional/local
- Dewvaportation or Atmospheric Pressure Desalination
- Fog Collection

- Drinking Water Treatment and Distribution
- Groundwater Remediation/Aquifer Remediation
- Matching Quality to Use
- Pollution Prevention
- Salt and Salinity Management
- Urban Runoff Management

Improve Flood Management

- Flood Risk Management

Practice Resources Stewardship

- Agriculture Lands Stewardship
- Economic Incentives
- Ecosystem Restoration
- Forest Management
- Recharge Area Protection
- Water-Dependent Recreation
- Watershed Management

Other (Provide Detailed Description)

Project Solicitation and Review

for the 2013Update to the Monterey Peninsula, Carmel Bay and South Monterey Bay Integrated Regional Water Management Plan

The Regional Water Management Group (RWMG) for the Monterey Peninsula, Carmel Bay and South Monterey Bay (Monterey Peninsula) Integrated Regional Water Management (IRWM) region is soliciting projects for inclusion in the 2013 Update to the IRWM Plan. All projects must undergo a thorough review process before they can be formally included in the IRWM Plan. The goal of this solicitation is to create a comprehensive Project List that includes both concept proposals and projects that can be implemented within one to two years after IRWM Plan adoption, which is planned for November 2013. An overview of the process is provided in Figure 1.

Figure 1: Project Solicitation Process for 2013 IRWM Plan Update

Step 1: Concept Proposal Solicitation

For inclusion in the plan, project proponents must first create an account and complete a short Concept Proposal form – see the "Getting Started" tab at www.mpirwm.org. Proposals that meet eligibility criteria will be included in the IRWM Plan Update and can move to Step 2 where projects will be ranked (or prioritized). The Concept Proposal form can be completed online or downloaded, completed and emailed to the MPWMD. Projects and proposals previously included in the 2007 Monterey Peninsula IRWM Plan will not be included in the 2013 IRWM Plan unless a Concept Proposal form is completed. It is the project proponent's responsibility to:

- Complete a Concept Proposal for each project
- Ensure the project information is up to date
- Respond to request for information within the established deadline
- Request that a project be removed if it is no longer being pursued

Concept Proposals must meet the following minimum eligibility criteria to be included in the IRWM plan:

- Assist the Monterey Peninsula region in achieving at least one of its IRWM Plan objectives.
- Implement at least one of the region's Resource Management Strategies.
- Provide water resource benefits to the region.
- Be consistent with Proposition 84 IRWM Guidelines and Department of Water Resources standards and requirements.

Step 2: Detailed Project Solicitation and Scoring/Ranking

This step includes submittal of detailed project information that will allow scoring and comparison to an overall ranked list of projects. Project proponents are not required to complete Step 2 in order to be included in the IRWM Plan. However, Step 2 must be completed in order to be eligible for inclusion in an implementation grant application to the IRWM Grant Program. For projects to be ranked and prioritized, project proponents must complete and submit the detailed Project Solicitation Form available under "Getting Started" at www.mpirwm.org **no later than JUNE 7, 2013.** A Technical Advisory Committee made up of RWMG members will review project submittals and scoring for consistency with the IRWM Plan and present their recommendations to the larger stakeholder group in July. Stakeholders will be asked to reach consensus on the final ranked list of projects at that meeting.

Prior to the final date for submission, projects may be added to or removed from the Project List at any time; however, this must be done by the project proponent(s). To remove a project, the project proponent should submit a written request for removal through the website. The request for removal must include: the project title, consent to remove the project from all project lists, and should include the reason for removal of the project. In the event of multi-entity projects, all entities must agree in writing to a project's removal. In the case of multi-entity projects, a lead entity or "project proponent" must be designated.

Each project will be ranked initially based on a score developed from answers on the Project Solicitation Form, which includes a methodology for scoring that is summarized as follows. Two categories of factors are included in the scoring: (1) factors related to how well the project complies with the IRWM Plan, such as policy consistency and ability to assist the region in meeting its goals, and (2) factors related to the individual merits of the project, such as feasibility, readiness to proceed, and costs. Scores from each of these categories comprise one-half of the overall project score as shown in Figure 2. A detailed description of project scoring criteria, factors, relative weighting, and raw scoring is provided below.

IRWM Plan Compliance Factors (50% of total score)

Within the Plan Compliance category, projects will be scored based upon the following specific factors and the relative weighting is shown in Figure 3. Following each factor and shown in ***italic text*** within parentheses is the current proposed methodology to assign raw scores to projects based upon the project information submitted in the Project Solicitation Form. The appropriate weighting factor will be applied to the raw score to give a weighted score to be used in the overall ranking.

Figure 2: Relative Weighting: Plan Compliance vs. Project Merit Factors

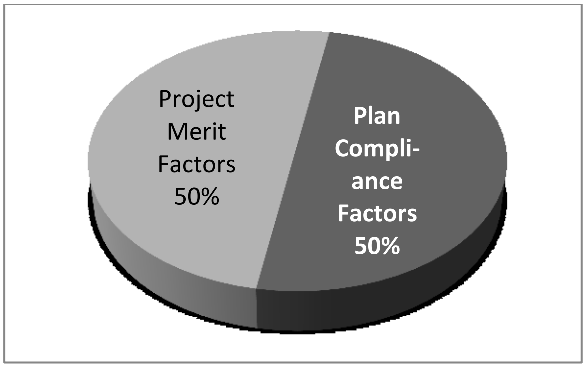
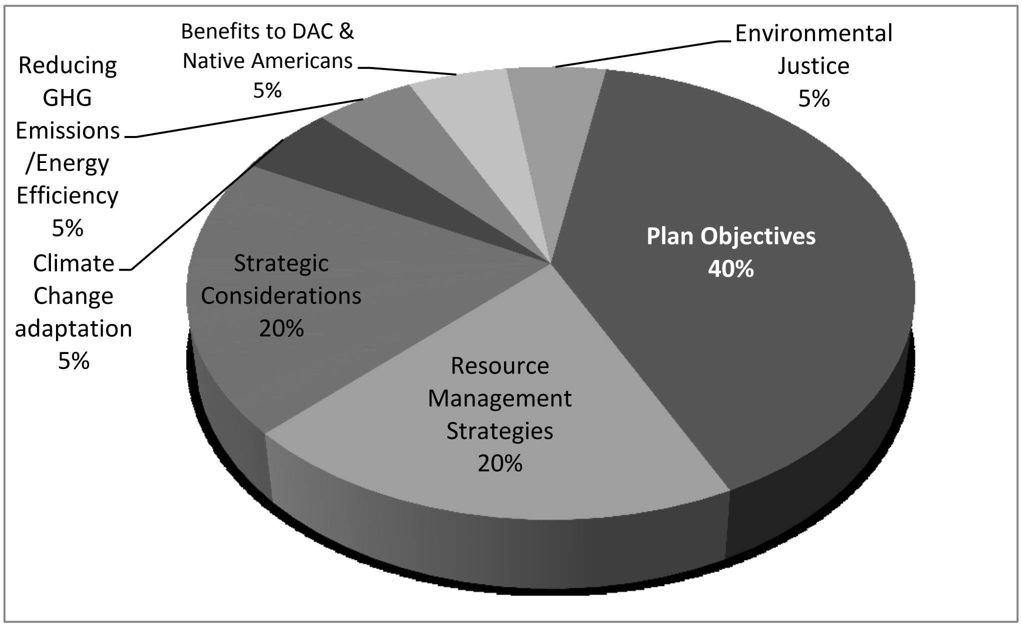


Figure 3: Relative Weighting of Plan Compliance Factors



- **How the project contributes to the IRWM Plan Objectives** (40% of Plan Compliance Factors)
  - Number of objectives and high priority objectives that the project addresses
    Up to 53 pts. Each project gets 1 pt for meeting each of 26 objectives (26 max pts). Plus, additional 3 pts maximum for the level it meets specific metrics of each of the 9 high priority objectives.

- **How the project is related to Resource Management Strategies** (20% of Plan Compliance Factors)
  - Number of different CA Water Plan Management Outcome Categories and number of strategies that the project includes.
    Total of up to 35 pts, including 1 pt per RMS, plus one pt for every CWP management outcome category after the first.

- **Strategic considerations for IRWM Plan implementation** (20% of Plan Compliance Factors)
  - Inter-Regionalism: Does the project involve active inter-regional collaboration or partnerships?
    5 pts: project addresses inter-regional issues
  - Partnerships: How many entities are actively partnering to implement the project?

5 pts: project involves three or more partners that include both government agencies and NGOs; or
2 pts: project involves two or more partners:
0 pts: project involves only one entity (no partnerships).

- Monitoring and reporting of project performance: Will the project establish and document achievement of performance criteria?
  5 pts: project presents a plan for monitoring/reporting performance
- Integration with land use planning: Is the project consistent with local plans, ordinances, and standards? Does the project integrate with local land use and water planning? Does the project increase coordination between water resources agencies and land use planners?
  5 pts: if "yes" to all three questions; 3 pts if "Yes" to 2 questions; 1 pt for "yes" to one question

- **Specific benefits to critical disadvantaged community (DAC) and/or Native American tribal communities' water issues** (5% of Plan Factors)
  - Does the proposed project provide specific benefits to solve critical DAC water issue(s)?
    Yes: 5 pts

- **Environmental Justice considerations** (5% of Plan Factors)
  - Does the project redress inequitable distribution of environmental burdens and/or improve access to environmental goods?
    Yes: 5 pts

- **Contribution of the project in adapting to the effects of Climate Change** (5% of Plan Factors)
  - Will the project contribute to regional adaptation to projected climate change impacts? Does the project implement one or more of the recommendations from the document: "*Evaluation of Erosion Mitigation Alternatives for Southern Monterey Bay*" (Monterey Bay Sanctuary Foundation and the Southern Monterey Bay Coastal Erosion Working Group, May 2012)?
    5 pts: one pt for every adaptation strategy implemented

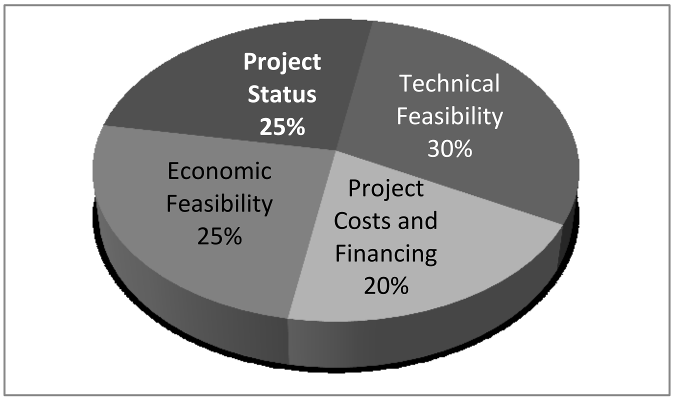
- **Contribution of the project in reducing Greenhouse Gas Emissions as compared to project alternatives** (5% of Plan Factors)
  - Compared to project alternatives, does the project reduce regional GHG emissions and/or improve energy efficiency?
    5 pts: one pt for every GHG mitigation strategy implemented

Project Merit Factors (50% of total score)

Within the Project Merit category, projects will be scored based upon the following specific factors with the relative weighting is shown in Figure 4. As with the Plan Compliance Factors, ***italic*** text following each factor describes the proposed methodology to assign raw scores for these factors based upon the project information submitted in the Project Solicitation Form (and prior to applying the weighting agreed upon at the stakeholder meeting).

- **Technical Feasibility** (30% of Project Merit Factors)
  - Is a common and widely accepted technology with well documented results being used?
  - Are geologic conditions, hydrology, ecology and other system aspects adequately described?

Figure 4: Relative Weighting of Project Merit Factors



- ➢ Are there significant data gaps?
- ➢ Are there sufficient technical data to indicate the project is likely to result in success?
- ➢ Is there enough information to support the project's estimated benefits?
  30 pts: Technical feasibility has been documented in a project-specific pilot study or previous phase or has a documented track record of success
  -- OR score for each of the following –
  10 pts: technology proposed has been established as effective in similar situations;
  10 pts: project site conditions are documented (geology/soil, ecology, hydrology, land use, public utilities;
  10 pts: project partners have experience with similar projects (e.g., similar site, similar technology).

❖ **Project Costs and Financing** (20% of Project Merit Factors)
- ➢ ***10 pts:*** A project cost estimate has been prepared and documented in the Project Form.
- ➢ ***10 pts:*** There is an identified revenue source of at least 25% match funding.

❖ **Economic Feasibility** (25% of Project Merit Factors)
- ➢ ***15 pts:*** Project benefits and costs have been defined at a level of detail that will allow cost-effectiveness analysis or benefit-cost analysis **-- OR –** ***project is a DAC project.***
- ➢ ***10 pts:*** Project has a cost-effectiveness or benefit-cost ratio greater than 1.

❖ **Project Status** (25% of Project Merit Factors)
- ➢ What steps in project planning have been completed?
  - Feasibility Studies and Conceptual Plans
  - CEQA/NEPA Completed
  - Local Cost Share Confirmed
  - Right-of-way / Land Acquisition
  - Permits Acquired
  - Construction Drawings Complete & Bids Acquired

  (***4 pts for each of the above criterion met for a possible total of 24 pts)***

For additional information, contact Larry Hampson larry@mpwmd.net or Alison Imamura aimamura@ddaplanning.com

Proposition 1 Implementation Grant Program

DWR & IRWM Round Table of Regions meeting

May 4, 2018

STATUS OF PROP 1 GRANT PROGRAMS (Water Code 79700 et seq.)

- **Chapter 7 – IRWM (DWR)**
  - Planning - $4.2M awarded to 15 regions
  - Disadvantaged Community Involvement – in final stages of awarding $51M+ to 12 Funding Areas (final proposal from San Joaquin anticipated soon)

- **Chapter 7 – Stormwater (State Water Board)**

www.waterboards.ca.gov >>financial assistance

- **Other Chapters/Funding Programs**

www.resources.ca.gov/bonds_and_grants >> statewide bonds oversight >>Funding Opportunities

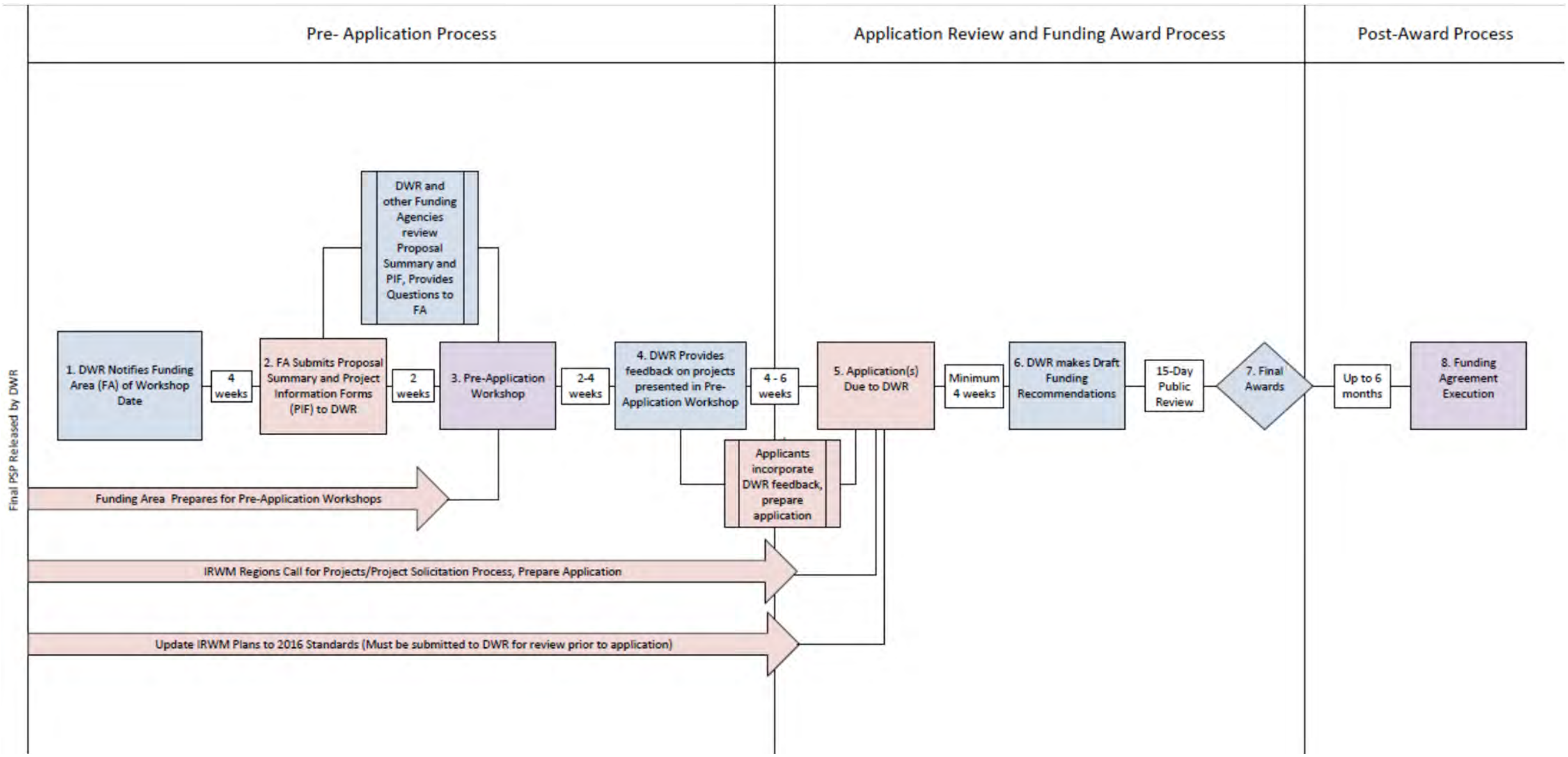
PSP DEVELOPMENT PRINCIPLES

- More engagement between DWR and Applicant during solicitation process (opportunity for clarification)
- Projects funded are quality projects for respective IRWM Region
- Maintain competition in the process
- Provide opportunity for projects developed through the DACI program to receive funding

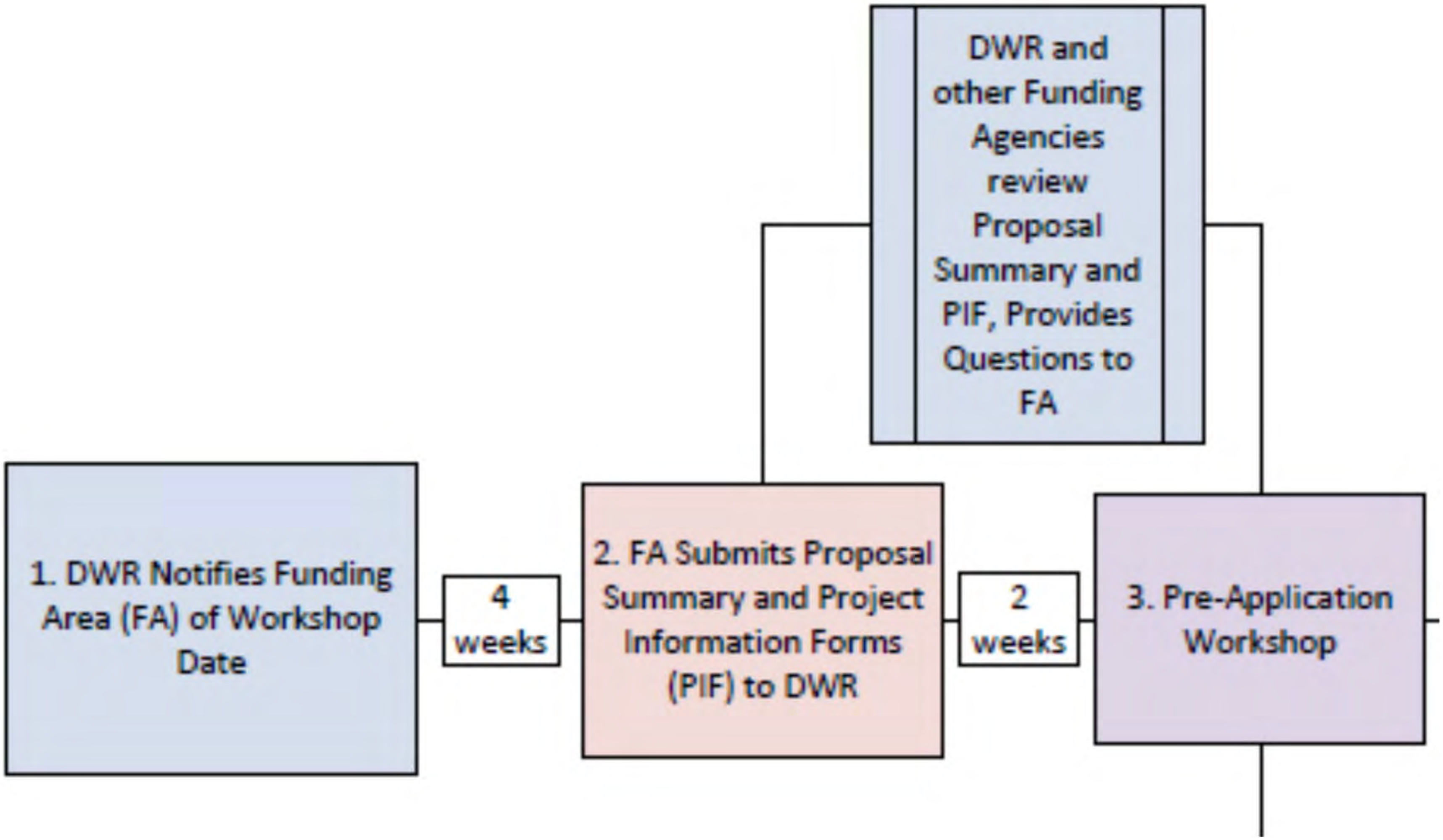
PSP CONCEPTS

1. Solicitation Process
2. Pre-Application Workshop Components
3. Proposal and Project Eligibility Requirements and Scoring Criteria
4. Funding Available in Round 1
5. Cost Share Requirements and Reimbursement Eligibility Date

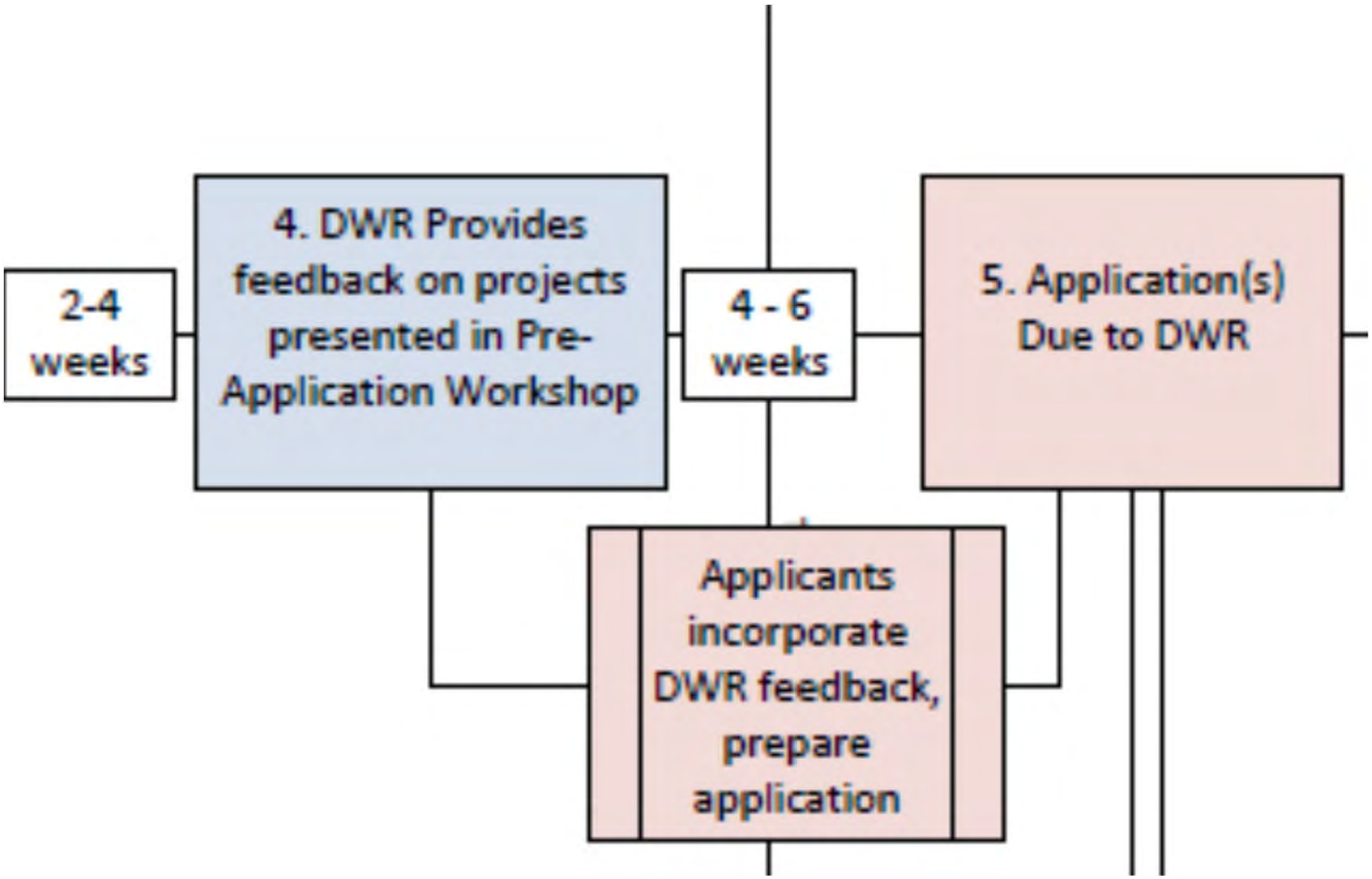
1. SOLICITATION PROCESS OVERVIEW



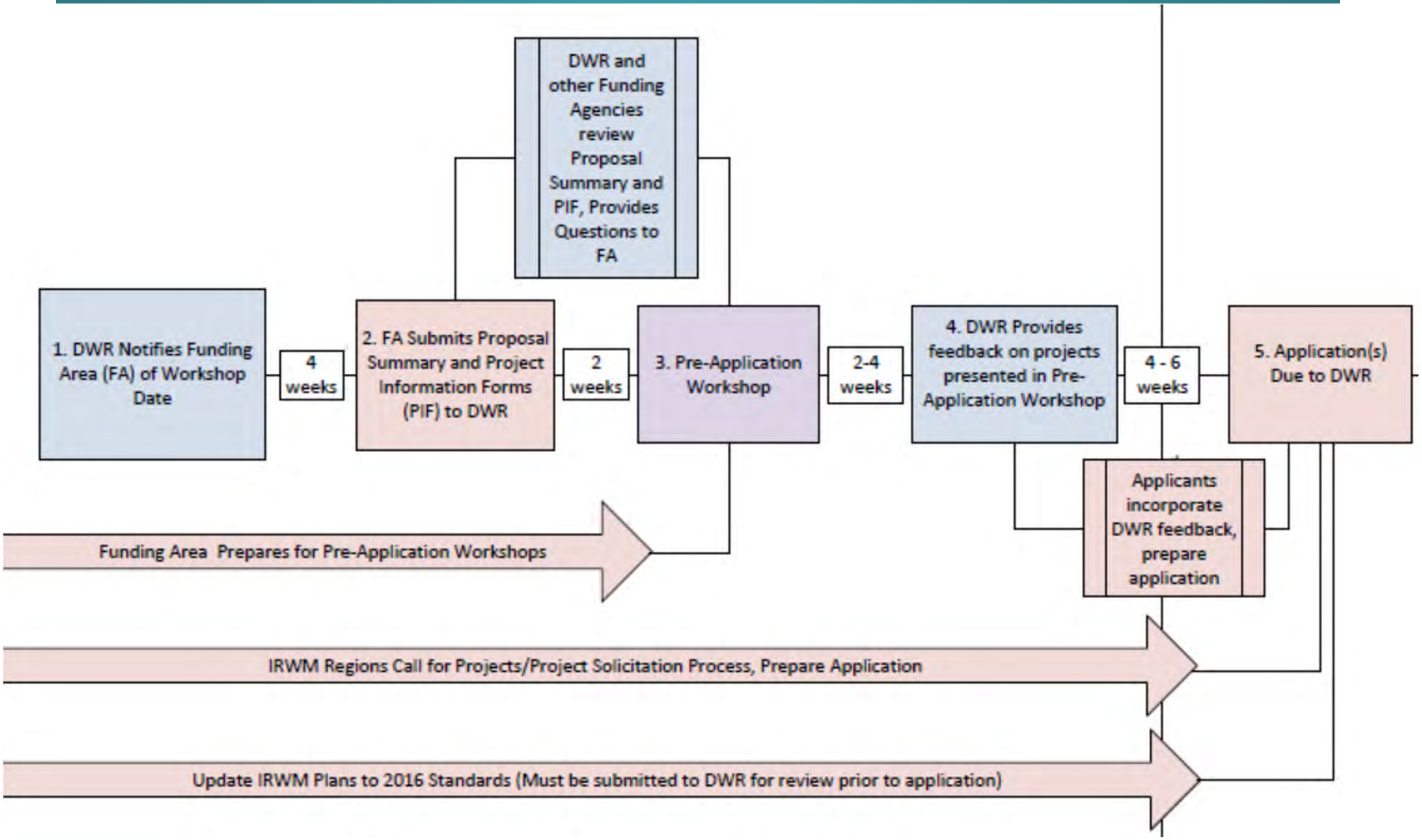
1. SOLICITATION PROCESS
Pre-Application Process



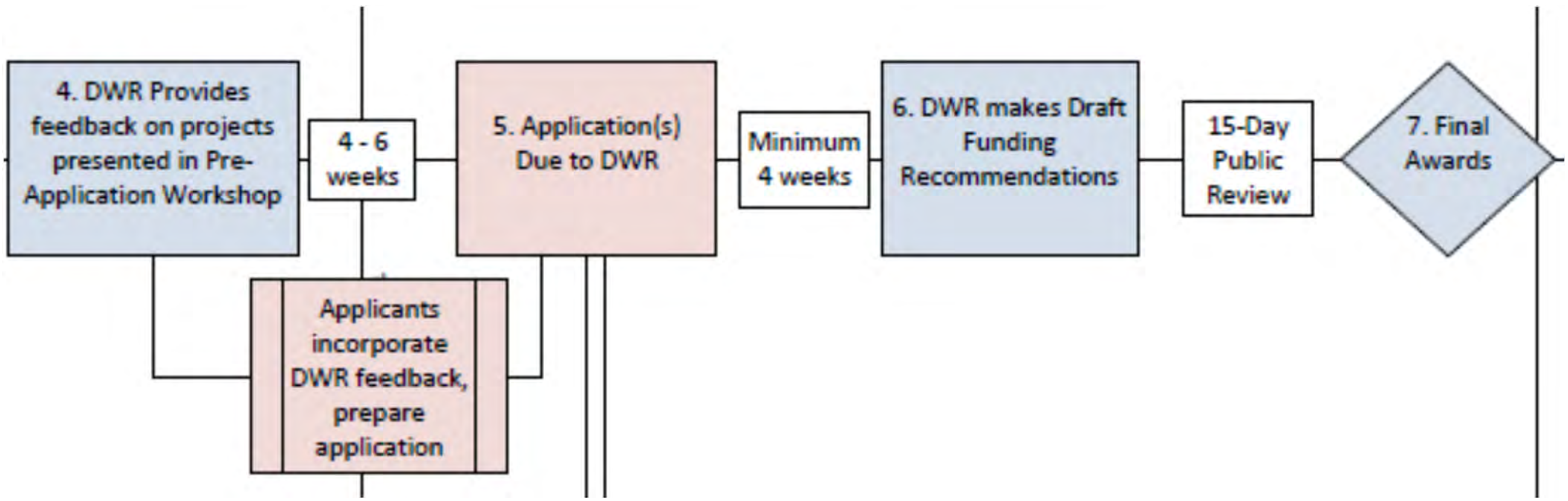
1. SOLICITATION PROCESS
Pre-Application Process



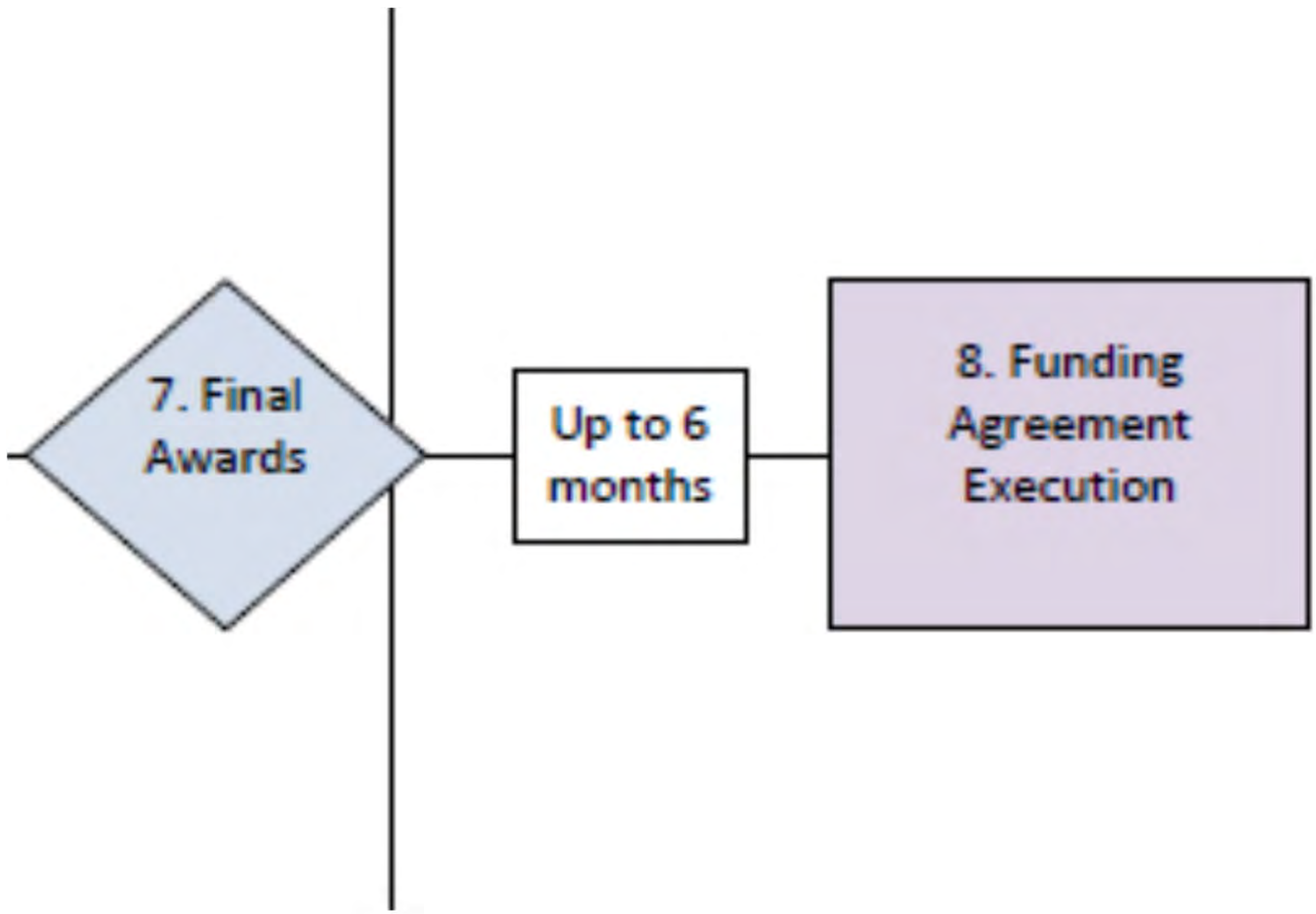
1. SOLICITATION PROCESS
Pre-Application Process



1. SOLICITATION PROCESS
Application Review & Funding Award



1. SOLICITATION PROCESS
Post Award Process



2. PRE-APPLICATION WORKSHOP COMPONENTS

Introduction Topics

- Funding Area Summary
- Regional Conditions

Submitted Forms

- Proposal Summary
- Project Information Form
  - Overview
  - Eligibility determination
  - Environmental Permit Status
  - Physical Benefits
  - Work Plan
  - Budget
  - Schedule

Table 1. Eligibility and Evaluation Criteria – Concepts*

Eligibility Criteria**		Yes/No
Proposal	Does at least one project in the proposal provide benefits that help water infrastructure systems adapt to climate change impacts? [79741 (a), 79742 (e)].	
	Does the proposal contribute to regional water self-reliance [79741 (c)]?	
	Has the IRWM Plan, updated to comply with 2016 IRWM Plan Standards, been submitted to, or previously been deemed sufficient by DWR prior to grant application submittal?	
	Does the proposed budget reflect that the grant administration budget is less than or equal to 10% of the grant amount requested?	
Project	Is the project included in the IRWM Plan?	
	Does the project address one or more of the needs and priorities of the IRWM region as defined in IRWM Plan? (meet the intent of most critical statewide needs [79707(a)]).	
	Does the project address one or more of the Statewide Priorities as identified in CA Water Action Plan and DWR Prop 1 IRWM Grant Program Guidelines (updated 2018)?	
	For construction projects: does the application confirm a lifecycle benefit for 15 years as required by Government Code 16727?	
	For applicable projects, will CEQA be complete and permits acquired within 6 months of Final Award or prior to agreement execution, whichever occurs first?	
Evaluation Criteria		**Possible Points**
Proposal	Does the proposal include one or more projects that assist the IRWM region to address the Human Right to Water (SB 685)?	tbd
Project	Does the project provide two or more benefits? (e.g., water supply, groundwater recharge, water quality improvement, ecosystem enhancement, etc.)	tbd
	Does the project provide benefits to more than one IRWM region and/or Funding Area?	tbd
	Does budget indicate leveraging of other funding sources (in addition to any required cost share)?	tbd
	Does narrative provide reasonable determination on least cost alternative?	tbd
	Does the project make use of or provide for new and innovative technologies [79707(e)]?	tbd
	Are the work plan, schedule and budget consistent with each other and appropriate to the project?	tbd

3. Eligibility Criteria – Proposal

Eligibility Criteria (Yes/No)
Climate Change Adaptation
Regional Water Self-Reliance
IRWM Plan Submitted (2016 Compliant)
Grant Administration <10%

3. Eligibility Criteria – Project

Eligibly Criteria (Yes/No)
Consistent with IRWM Plan (Updated to comply with 2016 standards)
Meets one or more need/priority of the region (IRWM Plan)
Meets Statewide Priorities
15-year lifecycle benefits (construction projects)
CEQA Complete/Permits Acquired within 6 months of Funding Award (Exceptions Apply)

3. Evaluation (Scoring) Criteria

Scored Criteria
Human Right to Water (SB 685)
Multiple Benefits
Benefits to More than one IRWM Region/Funding Area
Leveraging other funding sources
Least Cost Alternative
New or Innovative Technology
Consistent Work Plan, Budget, & Schedule

4. FUNDING AVAILABLE – ROUND 1

Table 2	Future Implementation Funding			
	Column F	Column G	Column H	Column I
Funding Area	Minimum DAC-Benefit Implement. Allocation (10%)	General Balance Implement. Allocation**	Maximum General Balance Available for Round 1 (50% of Col G)	Maximum DAC-Benefit Available for Round 1 (30% of Col F)
North Coast	$2,650,000	$19,345,000	$ 9,672,500	$795,000
San Francisco Bay	$6,500,000	$47,450,000	$ 23,725,000	$1,950,000
Central Coast	$4,300,000	$31,108,882	$ 15,554,441	$1,290,000
Los Angeles	$9,800,000	$71,540,000	$ 35,770,000	$2,940,000
Santa Ana	$6,300,000	$45,740,000	$ 22,870,000	$1,890,000
San Diego	$5,250,000	$37,773,650	$ 18,886,825	$1,575,000
Sacramento River	$3,700,000	$26,695,778	$ 13,347,889	$1,110,000
San Joaquin River *	$3,100,000	$22,414,875	$ 11,207,438	$930,000
Tulare/Kern	$3,400,000	$24,068,112	$ 12,034,056	$1,020,000
North/South Lahontan	$2,450,000	$17,043,970	$ 8,521,985	$735,000
Colorado River	$2,250,000	$14,826,530	$ 7,413,265	$675,000
Mountain Counties	$1,300,000	$9,406,094	$ 4,703,047	$390,000
Total	$51,000,000	$367,412,891	$183,706,446	$15,300,000

4. "Planning" Allocation Example

Funding Area	Proposition 1 Allocation	State Admin and Bond Costs (7%)	Previous Planning Grant Awards	DAC Involvement Awards (Minimum 10% of Col B)	Minimum DAC-Benefit Implement. Allocation (10%)	General Balance Implement. Allocation
North Coast	$26,500,000	$1,855,000	$ -	$2,650,000	$2,650,000	$19,345,000
Central Coast	$43,000,000	$3,010,000	$ 281,118	$4,300,000	$4,300,000	$31,108,882

North Coast:

$0 previously used for planning

Up to $2.65M of remaining $22M could be available for "planning"

Central Coast:

$281,118 previously used for planning

Up to $4.02M of remaining $35.4M could be available for "planning"

5. COST SHARE REQUIREMENTS AND REIMBUSEMENT DATE

- Local Cost Share
  - 50% Cost Share (Prop 1 Requirement)
  - Cost must be incurred after January 1, 2015
  - Cost share waiver for Disadvantaged Communities and EDAs

- Reimbursement Eligibility Date
  - Cost incurred after Final Funding Award Date
  - Environmental Planning and Permitting for non-DAC projects not a reimbursable cost

SCHEDULE*

- Late June 2018 – DRAFT PSP and Guidelines
- August 2018 – 3 Public Meetings
- Fall 2018 – FINAL PSP and Guidelines
- November 2018-April 2019 – Pre-Application Workshops
- January 2019 – First Application Submitted
- Early 2019 – Final Award and Grant Agreement Execution following set time period after Pre-Application Workshop

*Schedule subject to change

Table 3-2: IRWM Plan Update Prioritized Regional Objectives

Water Supply (WS)
WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.*
WS-2. Maximize use of recycled water and other reuse, including gray water systems, and stormwater capture and use.[2] *
WS-3. Seek long-term sustainable supplies for adopted future demand estimates.*
WS-4. Optimize conjunctive use of surface and groundwater.*
WS-5. Evaluate, advance, or create water conservation throughout the Region in compliance with the State's 20x2020 Water Conservation Plan.*
Water Quality (WQ)
WQ-1. Improve ocean water quality, including Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.*
WQ-2. Improve inland surface water quality for environmental resources (e.g. steelhead) and potable water supplies.*
WQ-3. Protect and improve water quality in groundwater basins.*
WQ-4. Meet or exceed water quality standards established by regulatory agencies and stakeholders. *
Flood Protection and Erosion Prevention (FP)
FP-1. Develop regional projects and plans necessary to protect existing infrastructure and sensitive habitats from flood damage, erosion, and sea level rise, in particular, along the South Monterey Bay shoreline and Carmel Valley.*
FP-2. Develop approaches for adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).*
FP-3. Protect quality and availability of water while preserving or restoring ecologic and stream function.*
FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.
Environmental Protection and Enhancement (EV)
EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds; promote the steelhead run.*
EV-2. Identify opportunities to assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*
EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.*
EV-4. Identify opportunities for open spaces, trails and parks along streams and other recreational areas in the watershed that can be incorporated into projects.
EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.*
Climate Change (CC)
CC-1. Evaluate adaptation measures and mitigative solutions to climate change effects.*
CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.*
CC-3. Support efforts to increase education, research and use of energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.*

[2] The underlined text was added based on comments from the city of Pacific Grove (Sarah Hardgrave, January 2013)

Regional Communication and Cooperation (RC)
RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts. *
RC-2. Foster collaboration among regional entities as an alternative to litigation.*
RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.*
RC-4. Build relationships with State and Federal regulatory agencies and other water forums and agencies.
NOTES: These objectives have been revised and renumbered compared to the draft objectives presented and evaluated at the 7/25/2012 Stakeholder Meeting. **High Priority Objectives based upon those objectives receiving the most points during the objectives prioritization exercise in July and August 2012 are presented in gray shading and bold type.** * = Objective is closely aligned with Statewide Priorities (see **Table 3-4**).

3.1.5 Measuring Attainment of Objectives

The IRWM Guidelines require that objectives must be measurable by some practical means to enable monitoring of the achievement of the objectives and thus the success of IRWM Plan implementation. Because the IRWM Plan is implemented primarily through projects, these measures, or “metrics” apply to projects that seek to achieve the objectives. **Table 3-4** suggests potential qualitative and quantitative measurement metrics that will be further developed when projects under the plan have been implemented. Although this Draft Plan attempts to identify the most appropriate measures for a given objective, the suggested measures do not encompass the full breadth of possible ways to measure success in meeting the Plan goals and objectives. See **Chapter 8, Plan Performance and Monitoring** for additional detail about the future process for measuring achievement of goals and objectives.

Table 3-4: Measuring Attainment of IRWM Plan Objectives

Darker shading represents high priority objectives

Objective	Qualitative Measurement	Quantitative Measurement
Water Supply		
WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.*	Identification of, and proposals for, implementation of projects and initiatives/programs that will result in achieving water supply replacements for the Carmel River system and Seaside Groundwater Basin.	Measurable increase in water supply replacement amounts (i.e., in acre-feet per year, AFY) for the Carmel River system and Seaside Groundwater Basin.
WS-2. Maximize use of recycled water and other reuse opportunities, such as graywater and stormwater capture and use.*	Identification and implementation of projects and initiatives/programs designed to increase use of recycled water on individual properties as well as by regional wastewater treatment entities.	Measurable increase of use of recycled water in lieu of potable water (AFY); number of individual properties benefitted.
WS-3. Seek long-term, sustainable supplies for adopted future demand estimates.*	Identification and implementation of projects designed to protect, enhance, and increase long-term sustainable supplies for adopted future demand estimates.	Measurable improvements in long-term sustainable supplies for adopted future demand estimates.
WS-4. Optimize conjunctive use of surface and groundwater.*	Identification of projects and initiatives/programs meant to optimize conjunctive use of surface and groundwater.	Acre-feet (AF) of water storage; number of conjunctive management projects developed; reduction in diversions in Carmel Valley Basin to achieve SWRCB limits; reduction in use of Seaside Groundwater Basin native water to legal adjudicated limit.
WS-5. Evaluate, advance, or create water conservation throughout the Region in compliance with the State's 20x2020 Water Conservation Plan.*	Identification of projects and initiatives/programs meant to evaluate, advance, or create water conservation.	Quantitative increase in water conservation; or number of new or enhanced conservation programs/projects.
Water Quality		
WQ-1. Improve ocean water quality, including Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.*	Identification of sources of existing pollutants potential increases in runoff that may impact ocean water quality, including ASBS, and implementation of innovative and effective projects or programs to improve existing runoff conditions.	An increased percentage of projects that include BMP, LID standards, or other alternatives to minimize runoff that may impact ocean water quality. Number of projects or programs implemented to improve existing runoff conditions.

Table 3-4:
Measuring Attainment of IRWM Plan Objectives
Darker shading represents high priority objectives

Objective	Qualitative Measurement	Quantitative Measurement
WQ-2. Improve inland surface water quality for environmental resources (e.g. steelhead) and potable water supplies.*	Identification of needs and opportunities to improve surface water quality for environmental resources. Design and implementation of projects or programs to improve conditions.	Number of projects or programs implemented to improve conditions. Measurable improvement in water quality (i.e., reduced pollutant concentrations) attributed (at least in part) to the implementation of new projects/programs. Pounds of pollutants eliminated from discharges.
WQ-3. Protect and improve water quality in groundwater basins.*	Identification of projects and initiatives/programs designed to protect and improve groundwater quality.	Measurable improvements to groundwater quality (i.e., lowering of salinity, pollutant concentrations) through implementation of projects/programs. Pounds of pollutants eliminated from discharges.
WQ-4. Meet or exceed water quality standards established by regulatory agencies and stakeholders. *	Progress toward meeting established water quality objectives, including TMDLs, and NPDES limits.	Number of projects that benefit water quality of 303(d) listed streams or improve water quality of permitted discharges. Pollutant load reductions in discharges.
Flood Protection and Erosion Prevention		
FP-1. Develop regional projects and plans necessary to protect existing infrastructure and sensitive habitats from flood damage, erosion, and sea level rise, in particular, along the South Monterey Bay shoreline and Carmel Valley.*	Demonstrated progress in eliminating potential for properties to flood damage.	Acreage of property (or square feet of habitable buildings) removed from flood zones identified in flood insurance study updates; reduction in annual losses/damages from flooding in dollars; number of properties removed from mapped flood hazards.
FP-2. Develop approaches for adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).*	Identification of policies and programs that will require all new development to implement adaptive management methods (i.e., LID).	Estimated reduction in annual maintenance/repair costs; presence/absence of LID program; number of projects implementing LID.
FP-3. Protect quality and availability of water while preserving or restoring ecologic and stream function.*	Identification of natural stream/river ecological and hydrological functions and eliminating/minimizing threats to function.	Acres of enhanced or reconnected floodplains; acres of newly created treatment wetland areas; acres of upland enhanced through BMPs, revegetation, number of projects implementing LID.
FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.	Identification of opportunities to provide community benefits and design of projects or programs to provide them.	Number of projects or programs implemented resulting in community benefits (miles of new trails, acres of: 1) new publicly accessible open space; 2) preserved agricultural land; or 3) increased number or appeal of recreational and tourism industry opportunities/benefits).

Table 3-4: Measuring Attainment of IRWM Plan Objectives

Darker shading represents high priority objectives

Objective	Qualitative Measurement	Quantitative Measurement
Environmental Protection and Enhancement		
EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds; promote the steelhead run.*	Identification, design, and implementation of projects or programs intended to protect and enhance sensitive species and habitats.	Acreage (or lineal feet of stream or river) of conserved, protected and enhanced sensitive species habitats, including length of stream opened during key seasons/months to fish and other aquatic species for migration and watershed areas opened to upland habitat for other species. Measured increases in numbers of species populations.
EV-2. Identify opportunities to assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*	Identification, design, and implementation of projects or programs intended to protect and enhance natural areas.	Increase in area of assessed, protected, enhanced, and/or restored natural areas.
EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.*	To consider and mitigate potential adverse effects on biological and cultural resources when implementing strategies and projects, or developing alternatives to avoid impacts.	Quantifiable measurement is specific to the project and type of resource affected. At a minimum, a no net loss policy should be implemented for potential adverse effects on sensitive biological and cultural resources (i.e., significant impacts should be mitigated).
EV-4. Identify opportunities for open spaces, trails and parks along streams and other recreational areas in the watershed that can be incorporated into projects.	Identification of opportunities to provide community recreational benefits along streams or in watersheds.	Area, miles of trails, and/or number of projects or programs implemented providing community recreational benefits along streams or in watersheds.
EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.*	Requirement to integrate Federal and State species protection and recovery plans into design of all projects, programs, or initiatives.	Number of projects implemented integrating Federal and State species protection and recovery plans.
Climate Change		
CC-1. Evaluate adaptation measures and mitigative solutions to climate change effects.*	Requirement to plan for potential future climate change impacts into design of all projects, programs, or initiatives.	Number of projects implemented incorporating consideration of future climate change impacts.

Table 3-4:
Measuring Attainment of IRWM Plan Objectives

Darker shading represents high priority objectives

Objective	Qualitative Measurement	Quantitative Measurement
CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.*	Improve access to data, reports on current science, documenting trends in climate change (rain fall, temperature, sea level rise, river flows). Development of clearinghouse of proposed and current monitoring programs related to climate change impacts.	Number of research/monitoring programs implemented to obtain greater understanding of long-term impacts of climate change in the Region, and/or monetary investment in research and monitoring programs.
CC-3. Support efforts to increase education, research and use of energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.*	Compile data reports on current science, documenting trends in resource conservation and alternative energy sources. List of proposed additions for current monitoring programs to decrease resource demands of potential projects.	Number of research/monitoring programs implemented to decrease resource demands of potential projects in the Region, and/or monetary investment in research and monitoring programs.
Regional Communication		
RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts. *	Meetings between local, regional, state, and federal entities to identify and resolve infrastructure and environmental resources problem areas.	Number and success ratio increase in proposed projects that have incorporated integrated strategies for protecting both infrastructure and environmental resources.
RC-2. Foster collaboration among regional entities as an alternative to litigation.*	Meetings convened between regional entities and stakeholders to discuss and plan regional water initiatives and/or resolve water-related conflicts. Positive indication of public support for implementation of water-related projects and/or programs that demonstrate collaborative efforts.	Number of projects, programs, or initiatives successfully designed, permitted, or implemented that promote integrated planning, improved communication between agencies & interest groups, and development of projects meeting the IRWM Plan goals.
RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.*	Implementation of programs to educate the public about water resources, with an emphasis on high priority geographic areas or demographic groups.	Number of presentations and outreach events which increase public education about water resources issues and needs; number of diverse, typically under-represented groups attending stakeholder meetings.
RC-4. Build relationships with State and federal regulatory agencies and other water forums and agencies.	Meetings convened and agreements reached between State and Federal regulatory agencies and other water agencies to facilitate the permitting, planning, and implementation of water-related projects.	Number of projects, programs, or initiatives successfully designed, permitted, or implemented as a result of improved relationships and communication with state and federal regulatory agencies.

Project Information Form (PIF)

A. PROJECT INFORMATION

1. Project Title:
2. Project Sponsor(s):
3. Does the project provide direct water-related benefits to a project area entirely comprised of Disadvantaged Communities (DAC)s and/or Economically Distressed Areas (EDA)s?
   ☐ Yes ☐ No If Yes, see question D.7. Show on map if applicable.
4. Is the Project Sponsor a Tribe, or does the project provide benefits entirely to a Tribe as defined by Proposition 1?
   ☐ Yes ☐ No If Yes, see question D.8. Show on map if applicable.
5. Provide project map. Include location of project, project benefit and/or service area, and other applicable information.

B. ELIGIBILITY REQUIREMENTS

If "No" is checked on any question in this section, STOP. Project is ineligible for this solicitation.

1. Is the project consistent with the IRWM Plan? ☐ Yes ☐ No
2. Does the project address the most critical regional water resources needs of the IRWM Region? ☐ Yes ☐ No
   a. What IRWM Plan goal(s)/objective(s) does the project address? Identify and explain.

DRAFT

3. If the project is a construction project as defined in *2018 PSP Concepts, Section 3. Proposal and Project Eligibility Requirements*, does it provide a minimum 15-year life cycle benefit as required by Government Code 16727?
   ☐ Yes ☐ NA, Not a defined project. Explain below. ☐ No

4. Does the project provide a benefit that meets at least one of the Statewide Priorities as defined in the 2016 IRWM Grant Program Guidelines?

☐ Yes ☐ No If Yes, Please identify below.

5. Will CEQA be completed within 6 months of the Final Award release? See Section E for more details.

☐ Yes
☐ NA, Project is exempt from CEQA
☐ NA, Not a Project under CEQA
☐ NA, Project benefits entirely to DAC/EDA/Tribe, or is a Tribe local sponsor
☐ No

6. Will all permits necessary to begin construction be acquired within 6 months of the Final Award release? See Section E for more details.

☐ Yes
☐ NA, Project benefits entirely to DAC/EDA/Tribe, or is a Tribe local sponsor
☐ No

C. WORK PLAN, BUDGET, and SCHEDULE

1. Work Plan: Provide a brief description of the Project. List of deliverables is not required.

<250 words maximum>

a. Direct Project Administration.

No description or details required to be provided at this time.

b. Land and Purchase/Easement. Provide a brief description of the scope of work to complete this task, if applicable.

<150 words maximum>

c. Planning/Design/Engineering/Environmental Documentation. Provide a brief description of the scope of work to complete this task, if applicable.

<150 words maximum>

d. Construction / Implementation. Provide a brief description of the scope of work to complete this task, if applicable.

<250 words maximum>

2. Budget: Provide preliminary cost estimates for each Budget Category listed in the table below. Budget subject to change.

Table 1 - Project Budget

	Category	(a) Requested Grant Amount	(b) Cost Share: Non-State Fund Source	(c) Other Fund Source*	(d) Total Cost
(a)	Direct Project Administration				
(b)	Land Purchase/Easement				
(c)	Planning/Design/Engineering/ Environmental Documentation				
(d)	Construction/Implementation				
(e)	Grand Total (Sum rows (a) through (d) for each column)				
*Identify the source of Other Funds:					

a. Cost Share Waiver Requested (DAC or EDA)? ☐ Yes ☐ No If Yes, continue below:

Cost Share Waiver Justification: Describe what percentage of the proposed project area encompasses a DAC/EDA, how the community meets the definition of a DAC/EDA, and the water-related need of the DAC/EDA that the project addresses. In order to receive a cost share waiver, the applicant must demonstrate that the project will provide benefits (minimum 25% by population or geography) that address a water-related need of a DAC and/or EDA.

<250 words maximum>

3. Schedule: Include reasonable estimates of the start and end dates, for each Budget Category listed in Table 2, to match the Budget included in this PIF. Schedule is tentative and subject to change.

Table 2 – Project Schedule			
Category		**(a)** **Start Date**	**(b)** **End Date**
(a)	**Direct Project Administration**		
(b)	**Land Purchase/Easement**		
(c)	**Planning/Design/Engineering/ Environmental Documentation**		
(d)	**Construction/Implementation**		

D. OTHER PROJECT INFORMATION

1. Operations and Maintenance: On defined construction projects, please identify a source of funding for operations and maintenance.

2. Project Physical Benefits Table:

Table 3 – Project Physical Benefits		
Anticipated Useful Life of Project (years):		
Benefit A (Required)		
Type of Benefit Claimed:		**Benefit Units:**
Benefit B (Optional)		
Type of Benefit Claimed:		**Benefit Units:**
Physical Benefits (At Project completion or Lifetime, as appropriate)		
(a)	**(b)**	**(c)**
Benefit	**Added Physical Benefit Description**	**Quantitative Benefit**
Benefit A	<15 words maximum>	
Benefit B	<15 words maximum>	
Comments: [Include narrative on additional physical benefits, as warranted.]		

3. Does the proposed project provide physical benefits to multiple regions (or funding area(s**)**?

☐ Yes ☐ No If Yes, provide a description of the impacts to the various regions.

4. Least-Cost Alternative
   a. Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified? ☐ Yes ☐ No

      If No, why? If Yes, list the methods (including the proposed project) and estimated costs.

   b. If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any advantages of the proposed project that are different from the alternative project or methods.

5. Does the project provide safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes consistent with AB 685? ☐ Yes ☐ No If Yes, please describe.

6. Does the project employ new or innovative technologies or practices, including decision support tools that support the integration of multiple jurisdictions, inducing, but not limited to, water supply, flood control, land use, and sanitation? ☐ Yes ☐ No If Yes, please describe.

7. If the project provides benefits entirely (100% by population or geographyʉ to a DAC, explain the water-related need of the DAC and how the project will address the described need. 9ȄǇſꞁʎ٢ how the area/community meets the definition of a DAC.

8. If the project provides benefits Ŝƴǘ៷Ŝſẽ ǿмлᵻ᷊ ōẽ ǇƧǇǆſꞁǘʎƻ٢Ƨ៷ ƎŜƧƎ៷ꞁǇЌẽʉ to a Tribe or a Tribe is the sponsor of the project, explain the water-related need of the Tribe and how the project will address the described need.

E. ENVIRONMENTAL

1. Please fill out the Table below, CEQA Timeline, if applicable:

Table 4 - CEQA Timeline		
CEQA STEP	**COMPLETE? (y/n)**	**ESTIMATED DATE TO COMPLETE**
Initial Study		
Notice of Preparation		
Draft EIR/MND/ND		
Public Review		
Final EIR/MND/ND		
Adoption of Final EIR/MND/ND		
Notice of Determination		

a. Please explain and justify how the timeline was developed.

2. Permit Acquisition Plan:

List all permits needed to complete project. If the project does not provide benefits entirely to a DAC, all permits needed to begin construction must be acquired within 6 months of funding award or by Agreement execution, whichever occurs first.

No.	Type of Permit	Permitting Agency	Date Acquired or Anticipated
1.			
2.			
3.			
n.			

For each permit not yet acquired, describe the following:

No.	a. Actions taken to date (include dates of any key meetings, submittals, etc.)	b. Any issues or obstacles that may delay acquisition of permit
1.		
2.		
3.		
n.		

3. Permitting Checklist: This checklist is provided as a courtesy for documentation purposes. Not all permits are listed.

   a. Does the project involve any direct effects from construction activities, or indirect effects such as growth inducement that may affect federally listed threatened or endangered species or their critical habitat that are known, or have a potential, to occur on-site, in the surrounding area, or in the service area?

      ☐ Yes ☐ No If Yes, please explain:

   b. Would the proposed project work in, over, or under navigable water of the US or discharge dredged or fill material in waters of the US?

      ☐ Yes ☐ No If Yes, please explain:

   c. Will the proposed project have the potential to affect historical, archaeological, or cultural resources?

      ☐ Yes ☐ No If Yes, please explain:

   d. Will the proposed project discharge into a water of the US?

      ☐ Yes ☐ No If Yes, please explain:

   e. Will the proposed project divert the natural flow of the river, stream, or lake?

      ☐ Yes ☐ No If Yes, please explain:

   f. Will the proposed project change the bed, channel, or bank of a river, stream, or lake?

      ☐ Yes ☐ No If Yes, please explain:

g. Will the proposed project use any material from the bed, channel, or bank of a river, stream, or lake?

☐ Yes ☐ No If Yes, please explain:

h. Will the proposed project deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake?

☐ Yes ☐ No If Yes, please explain:

i. For water supply projects, do you need to obtain a water right?

☐ Yes ☐ No If Yes, please explain:

j. Is the proposed project within the defined coastal zone?

☐ Yes ☐ No If Yes, please explain:

APPENDIX 14-C

AUGUST 14, 2018 RWMG MEETING

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Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM
Regional Water Management Group Meeting

Meeting Date and Time: August 14, 2018, 10am
Meeting Location: MPWMD Conference Room or WebEx (info below)

Agenda

1. Introductions
2. Review of 2014 IRWM plan objectives & comparison of IRWM plan objectives with other related plans, in particular the Carmel River Watershed Assessment
3. Discussion on objectives & project priorities
4. Review of the Regional Water Management Group Memorandum of Understanding, discussion on potential 2018 revisions and process/timing for new signatories
5. Brief status update on 2018 project solicitation process & schedule
6. Other updates from meeting participants

WebEx Info:

Carmel River Task Force / IRWMP
Tuesday, August 14, 2018
10:00 am | Pacific Daylight Time (San Francisco) | 2 hrs

Meeting number (access code): 622 316 559
Meeting password: 1122

When it's time, join the meeting.

Join by phone
1-877-668-4493 Call-in toll free number (US/Canada)
1-650-479-3208 Call-in toll number (US/Canada)
Toll-free calling restrictions

IMPORTANT NOTICE: Please note that this WebEx service allows audio and other information sent during the session to be recorded, which may be discoverable in a legal matter. By joining this session, you automatically consent to such recordings. If you do not consent to being recorded, discuss your concerns with the host or do not join the session.

				Critical Issues Addressed												
No	**CRTF Objectives & Associated Actions**	**IRWM Objectives Fulfilled**	**Action Type**	**1. Water Quantity**	**2. Water Quality**	**3. Flood Mgt**	**4. Estuary Lagoon**	**5. special Satus Species**	**6. Dam Mgt**	**7. Wildire Mgt**	**8. Erosion Sediment**	**9. Geomorphology**	**10. Drought /Climate**	**11. Public Safety**	**12. Public Access & Awareness**	**Related Past & Current Projects and Programs with Descriptions (from January 2018 list)**
1	**PUBLIC EDUCATION AND INVOLVEMENT**															
1A	Continue support of the Carmel River Watershed Task Force (CRTF). The CRTF meets quarterly and is open to all stakeholders in the watershed. The purpose of this group is to achieve the successful outcome of watershed projects identified in the Carmel River watershed plan, and other needs in the watershed.	RC-2, RC-3, RC-4	Watershed Partnerships	X	X	X	X	X	X	X	X	X	X		X	**1.** Watershed Coordination (RCDMC), ongoing RTF meetings (RCDMC, tbd) [1]
1B	Expand volunteer activities, and maintain the existing network of volunteers in the Carmel River Basin to provide planning, labor, outreach, and mapping services throughout the watershed. If possible, coordinate across existing volunteer programs.	RC-2, RC-3	Watershed Partnerships												X	**1.** Watershed Awareness Events (RCDMC); **2.** Carmel River Heritage Area Project (CRWC), Volunteer Monitoring Programs (CWC); **3.** Watershed Tours (CRWC)
1C	Continue and expand an outreach program to increase the public's awareness about how groundwater pumping in the alluvial aquifer and uplands directly impacts surface water flows in the Carmel River.	RC-3	Education	X									X		X	**1.** Water Conservation Programs (Cal-Am and MPWMD); **2.** Watershed Tours (CRWC); **3.** Watershed Manual (RCDMC) [2]
1D	Educate the public to comply with the county's landscaping codes, and expand water conservation programs to areas beyond the existing MPWMD boundary in the watershed. Programs may include rebates for low flow fixtures & the encouragement of drought tolerant landscaping.	RC-3	Education	X									X		X	**1.** Water Conservation Programs (Cal-Am and MPWMD); **2.** Watershed Awareness Events (MCRCD); **3.** Watershed Manual (RCDMC)
1E	Conduct outreach program to inform watershed residents about the impacts past and present activities have on streambank stability.	RC-3	Education								X	X			X	**1.** Environmental Quality Incentives Program (NRCS); **2.** Watershed Tours (CRWC); **3.** Watershed Awareness Events (RCDMC); 4**.** Watershed Manual (RCDMC) [3]

1F	Continue and expand existing resource conservation and stewardship programs for the community and actively disseminate information to residents and landowners through peer to peer groups and multi-media outreach.	WS-5, RC-3	Education												X	**1.** MEarth Projects; **2.** Watershed Education Center at Garland Park (MPRPD) "Experience Carmel River"; **3.** Interpretive Panels (BSLT); **4.** Watershed Interpretive Signage Project (CRWC); Environmental Quality Incentives Program (NRCS); Pharmaceutical Drug Collection (CRWC); Watershed Awareness Events (RCDMC); Watershed Manual (RCDMC); Watershed Tours (CRWC); [4]
1G	Develop and implement a non-native vegetation and wildlife education, monitoring, and eradication program.	EV-1, EV-2	Watershed Management					X							X	Watershed Manual (RCDMC)
1H	Develop educational public outreach materials that summarize recommendations for restoration, protection, and conservation efforts to improve and expand CRLF habitat and the habitat of other species of concern in the Carmel River watershed.	EV-1	Education					X							X	**1.** Watershed Education Center at Garland Park (MPRPD); **2.** "Experience Carmel River" Interpretive Panels (BSLT); **3.** Watershed Awareness Events (RCDMC); **4.** Watershed Manual (RCDMC); **5.** Watershed Tours (CRWC) [5]
1I	Conduct periodic trash removal and outreach events throughout the watershed to remove urban debris and trash from the Carmel River and its tributaries.	WQ-2	Watershed Management		X										X	**1.** Pharmaceutical Drug Collection (CRWC); **2.** Watershed Awareness Events (RCDMC) [6]
1J	Expand the Volunteer Water Quality Monitoring Program incorporating local schools, Snapshot & First Flush program participants, and other interested stakeholders to tie into existing programs and to include all the main tributaries.	RC-3	Education		X										X	**1.** Volunteer Monitoring Program (CWC); **2.** Pharmaceutical Drug Collection (CRWC) [7]
2	**SUPPORT OF LANDOWNER OUTREACH AND LAND ACQUISITION PROJECTS**															
2A	Acquire or accept, in fee title or easement, lands that provide multiple benefits to the watershed such as: improving natural habitat and functions, facilitating recovery of listed aquatic and terrestrial species including Steelhead trout and CRLF, reduce flood and erosion risk, and improve public access.	FP-1, FP-4, EV-1, EV-2, EV-4, EV-5, RC	Watershed Management	X	X	X	X	X	X	X	X	X	X		X	**1.** Odello East land donation (Eastwood, BSLT); **2.** Rancho Canada acquisition (TPL, MPRPD, TU, SLC); **3.** San Clemente Dam Removal Site land transfer.

2B	Support plans to expand public access to the Carmel River and watershed with willing landowners.	EV-4	Access												X	**1.** South Bank Recreation Trail (BSLT); **2.** Parks General Plans (State Parks CASP, MPRPD Palo Corona Regional Park) [8]
2C	Encourage public and private landowners to adopt and employ nutrient source reduction practices.	RC-3	Education		X			X							X	**1.** Environmental Quality Incentives Program (NRCS)
2D	Implement landowner outreach program to recruit participants with achievable projects to improve extent of CRLF habitat and the habitat of other species of concern in the Carmel River watershed.	EV-1	Watershed Partnerships					X							X	**1.** Environmental Quality Incentives Program (NRCS); **2.** Watershed Manual (RCDMC)
3	**MAINTAINANCE, RESTORATION AND ENHANCEMENT OF NATURAL STREAM HABITAT**															
3A	Maintain, restore and enhance natural stream functions & features to provide high quality habitat for steelhead, CRLF, and other species of concern.	EV-1,	Watershed Managemen t					X				X	X			**1.** Gravel Injection Project (MPWMD); **2.** Steelhead Habitat Ehancement (CRSA); **3.** Steelhead Fisheries Mitigation Measures; **4.** San Clemente Dam Removal Restoration (SCC, NMFS, Cal-Am); **5.** Carmel River FREE (BSLT, MCRMA, State Parks, MPRPD) [9]
3B	Restore and revegetate unstable banks and incised reaches of tributaries and mainstem areas based on Proper Functioning Condition (PFC) tributary assessments.	EV-1,	Watershed Managemen t		X	X		X			X	X				**1.** Bank Stabilization Projects (MPWMD); **2.** Riparian Vegetation and Materials Management (MPWMD) [10]
3C	Implement BMPs for erosion prevention to reduce sediment deposition throughout the watershed including the main tributaries and the main stem of the Carmel River.	FP-1, EV-1	Watershed Managemen t		X	X					X				X	**1.** Road Assessments (RCDMC); **2.** Watershed Manual (RCDMC); **3.** Gravel Injection Project (MPWMD)? [11]
3D	Expand programs for watershed-wide coordinated riparian vegetation restoration that includes removal of non-native vegetation and post-project monitoring and maintenance.	FP-1, EV-1	Watershed Managemen t					X			X					**1.** Post San Clemente Dam Removal Impact Monitoring (CSUMB) [12]
4	**LAGOON AND LOWER CARMEL RIVER MANAGEMENT**															
4A	Develop an adaptive management program for water quality and quantity in the lagoon.	WQ-2, FP-1, FP-2, EV-1, EV-2, EV-3, RC-1	Watershed Managemen t	X	X		X	X								**1.** CR Lagoon Restoration (State Parks); **2.** CR Lagoon Beach Clean Up (MEarth); **3.** CR Lagoon Ecosystem Protective Barrier (EPB); **4.** CR Mitigation Bank (Caltrans); **5.** Carmel River FREE [13]

4B	Support efforts to provide supplemental water to lagoon.	EV-1	Watershed Partnerships	X	X		X	X								**1.** State Parks Well Project; **2.** CR Lagoon Water Augmentation (CAWD) [14]
4C	Support the development and implementation of a lagoon/estuary and barrier beach restoration and management plan.	EV-1	Watershed Partnerships	X		X	X	X				X				**1.** CR Lagoon Ecosystem Protective Barrier (EPB); **2.** Interim Flood Management in Lower CR (Monterey Co.) [15]
5	**MULTI-BENEFIT PROJECTS**															
5A	Carmel River Floodplain Restoration & Environmental Enhancement	FP1, FP-2, FP-3, FP-4, EV-1, EV-2, EV-3, EV-4, EV-5, RC-1, RC-2	Project		X	X	X	X				X			X	(MCRMA, BSLT, State Parks, MPRPD)
6	**SUPPORT OF ALTERNATIVE WATER SUPPLY SOURCES**															
6A	Support implementation of a water supply project that minimizes the export of water from the Carmel River basin during the dry season that causes the chronic reduction in flow and meets the goals of State Water Resources Control Board Order 95/10.	WS-1, WS-3, WS-4	Watershed Managemen t	X			X	X					X		X	**1.** Water Supply Project (Cal-Am); **2.** Aquifer Storage and Recovery Phases 1 & 2 (MPWMD) [16]
6B	Develop projects to maintain or increase water storage in the watershed.	WS-3	Watershed Managemen t	X					X				X		X	
6C	Reduce the amount of water extracted from the Carmel River Basin during summer months, including implementing additional offstream storage to replace summer water use, irrigation upgrades, adding instream use to water rights holders as allowed uses (to avoid irrigation simply to retain the water right in our use it or lose it system), temporary or permanent forbearance agreements for water use .	WS-1, WS-3, WS-4	Project	X									X		X	**1.** Aquifer Storage and Recovery (ASR) project (MPWMD), Rancho Canada Forbearance (TPL, MPRPD, SLC, TU)
7	**WILDFIRE MANAGEMENT AND PREVENTION**															
7A	Develop and implement an integrated wildland fire and hazardous fuels management plan	N/A	Watershed Managemen t							X			X			
8	**FLOOD PROTECTION**															
8A	Reduce the risk of flood damage by supporting the evaluation and implementation of multi- objective flood control projects.	FP-1, FP-2, RC-1	Watershed Managemen t			X										**1.** CSA 50 Flood Flood Control Report Projects (Monterey Co.), including CRFREE; **2.** Interim Lagoon Flood Management in Lower CR (Monterey Co.); **3**. Carmel River Abutment at Rancho Canada Village (Rancho Canada) [17]
9	**WATERSHED RESTORATION PROJECTS**															

9A	Cooperate with local agencies to plan and implement watershed-wide restoration projects of riparian and upland habitat to benefit California red-legged frogs (CRLF), steelhead, and other species of concern. Funding should address development of a monitoring plan for CRLF and other benchmark species.	EV-1, EV-2, RC-4	Watershed Partnerships					X								**1.** Carmel Area State Parks General Plan Update (State Parks); **2.** MPRPD General Plan for Palo Corona and other park units, Lobos Corona Parklands Project (State Parks, MPRPD, BSLT and PLF); **3.** CR Riparian Vegetation and Materials Management (MPWMD) [18]
10	**STEELHEAD BENEFIT PROJECTS**															
10A	Continue fish rescue programs in main stem and tributaries when appropriate.	EV-1	Watershed Managemen t					X								**1.** Steelhead Rescues (CRSA); **2.** Sleepy Hollow Facility Improvements (MPWMD); **3.** Sleepy Hollow Steelhead Rearing Facility (SHSRF) Raw Water Intake & Water Supply System Upgrade [19]
10B	Support efforts to evaluate the future of Los Padres Dam and modify the Los Padres Dam spillway for downstream fish migration.	EV-1	Watershed Managemen t					X	X							**1.** Los Padres Reservoir - Management of Capacity Loss (Cal-Am); Los Padres Water Release for Habitat Management (MPWMD) [20]
10C	Develop and implement plan to identify, remove or modify fish passage barriers within the watershed	EV-1	Watershed Managemen t					X								**1.** Cachagua Creek & Potrero Creek Fish Passage Barrier Removal (Trout Unltd); **2.** San Clemente Dam Removal and River Reroute (Cal-Am); **3.** Steelhead Barrier Assessments in Potrero Creek and Garzas Creek (MPWMD) [21]
10D	Provide fish passage around dams and diversions	EV-1	Watershed Managemen t					X	X							**1.** San Clemente Dam Removal and River Reroute [22]
10E	Continue and expand the MPWMD and CRSA Large Woody Debris (LWD) program, including further LWD recruitment location studies and installation of redwood & Douglas fir root balls in reaches of the river that would benefit most from the introduction of LWD.	EV-1	Watershed Managemen t					X								**1.** LWD Installation in Carmel River Lagoon **2.** MPWMD Project - upper/mid watershed; CRSA Carmel Lagoon LWD project [23]
10F	Expand the current fisheries assessment and monitoring program to include tributaries and multiple mainstem locations to quantify steelhead habitat utilization and migration patterns throughout the Carmel River Watershed. This expansion should include funding to evaluate methods to count fish at selected monitoring stations.	EV-1	Watershed Managemen t					X								**1.** Steelhead Barrier Assessments in Potrero Creek and Garzas Creek (MPWMD); **2.** Steelhead Tagging Project (Hopkins) [24]
11	**DEVELOP ADDITIONAL DATA COLLECTION AND STUDIES FOR CARMEL RIVER MANAGEMENT**															

11A	Support studies on areas with wells located in upland areas (fractured rock) and the connection they may have to creeks and ultimately the Carmel River Alluvial Aquifer.	N/A	Watershed Managemen t	X											X	**1.** Water Extraction Study in Upland Areas (MPWMD)
11B	In cooperation with Monterey County Public Works Department, conduct assessments of all roads in the watershed. Identify and prioritize treatments that will minimize erosion and restore natural stream function.	N/A	Watershed Managemen t								X					**1.** Schulte Rd. Documentation and Data Collection BSLT Property; **2.** Schulte Road Bridge Replacement (Monterey Co. PW) [25]
11C	Continue to develop, update and support MPWMD's ground water and surface water flow model.	N/A	Watershed Managemen t	X												**1.** Schulte Road Bridge Replacement (Monterey Co. PW) [26]
11D	Develop and maintain a public-accessible database of CRLF data for the Carmel River Watershed.	RC-3	Watershed Managemen t					X							X	**1.** San Clemente Dam Removal Benefits Study [27]
11E	Develop studies for genetic characterization of CR steelhead and population assessments	N/A														
12	**MONITORING PROGRAMS**															
12A	Establish a sediment transport monitoring program in concert with the surface flow monitoring program of MPWMD for the main stem and tributaries.	N/A	Watershed Managemen t		X	X					X					**1.** CSUMB Watershed Institute monitoring program [28]
12B	Plan and implement monitoring programs of key indicator species (Benthic macroinvertebrates and birds) in areas where riparian vegetation has been restored.	N/A	Watershed Managemen t					X								**1.** Bird and Wildlife Surveys and Projects (BSLT); **2.** Bird Monitoring and Research (VWS); **3.** The CR Bird Conservation Plan (BSLT); **4.** Rancho Canada Nest Boxes, Water Quality Testing, Macro-Invert Studies, Habitat Restoration (Rancho Canada Golf Course) [29]

[1] 1. The Resource Conservation District of Monterey County chaired the CRTF for three years under a grant program. The CRWC has volunteered to continue coordinating and chairing the CRTF indefinitely. The CRTF meets quarterly to share developments and projects in the watershed and to set priorities for further work and for collaborative applications for grants.

[2] 1. Every 2 years, Cal Am applies to the Public Utilities Commission (PUC) and as part of the application they ask for funding for various conservation programs. If approved, consumers then have a small surcharge on their bill to run the conservation programs. Some of these conservation programs are:
Rebates for more-efficient indoor toilets, dishwashers and washing-machines;
Outdoor rebates for grey water systems, rainwater catchments, turf replacement, and smart irrigation; and,
Landscape grant program: Cal Am and MPWMD will go to public institutions, such as schools, and replace dirt with drought-tolerant plants or update their irrigation systems.

2. In the summer of 2012, the Carmel River Watershed Conservancy started conducting periodic public and student tours of the watershed as part of their education and outreach programs. The four and six hour tours provide visitors with the opportunity to learn about the importance and the history of the watershed while highlighting both the sustainability concerns and the projects that are being implemented to address them. The MPRPD is a partner on the public tours. The tour stops at important sites in the watershed including the DeDampierre Park, Garland Park, the Carmel River State Beach, the former San Clemente Dam site, and Los Padres Dam. Staff from the MPWMD, the MPRPD, and State Parks, may provide additional support at the various stop sites. The watershed tours were partially funded through grants from the Community Foundation, and a new AmericanWater Environmental grant is providing funds for public tours of the former San Clemente Dam site. The Baskin Foundation provided funds for watershed tours with public school students who are in a program entitled Recruitment in Science Education (RISE); these students are all from low-income families and hope to be the first in their families to attend college.

[3] 1. The EQIP provides financial and technical assistance to agricultural producers in the State of California (NRCS 2012). In the Carmel River Watershed, the NRCS works primarily with rangelands. Through this yearly program, the NRCS assists landowners with the implementation of best management practices tailored to address each site’s concerns. The NRCS assists with practices that improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland (NRCS 2012). Examples of activities in the Carmel River Watershed that are implemented through the EQUIP include fencing off riparian areas, installing troughs out of the streams, and pasture and hay planting.

[4] 1. MEarth (pronounced Me-Earth) is an environmental education nonprofit with the mission to educate and inspire through environmental stewardship. MEarth provides instruction to approximately 5,000 people of all ages, annually from all across Monterey County. Their programs operate at the award-winning Hilton Bialek Habitat, a ten-acre environmental education center which houses a one-acre organic garden/orchard, native plant nursery and demonstration gardens, native grasslands, outdoor amphitheater/bird sanctuary, pond, watershed interpretive area, greenhouses, vermicomposting and composting stations, wood-fired pizza oven/outdoor kitchen, and a LEED- certified multi-purpose "green" classroom. Established as a separate 501(c)3 nonprofit in 2008, MEarth's NatureConnect, FoodConnect, ClassroomConnect and CommunityConnect programs have introduced placed-based, hands-on environmental learning opportunities to both young people and adults from the Central Coast region. www.MEarthCarmel.org

Since the late 1990s, MEarth has received local and national funding to conduct large-scale restoration and hands-on educational experiences at several locations in the Carmel River Watershed. Funding partners such as NOAA/BWET, Audubon, California State and Regional Parks, Fish and Wildlife, the State Coastal Conservancy/Carmel River Steelhead Association, the Carmel River Watershed Conservancy and the City of Carmel have allowed thousands of young people to engage in meaningful work in the Carmel River Watershed, under the guidance of MEarth staff. Interested school or community groups can contact the MEarth office to inquire about field-trips or restoration experiences: (831) 624-1032. They are also always looking for enthusiastic volunteers!

2. The Monterey Peninsula Regional Park District (MPRPD) owns and manages 12,500 acres of open space and conservation lands, three of these properties within the Carmel River Watershed: The Cachagua Community Center (located at the headwaters of the Carmel River); the Watershed Education Center at Garland Ranch Regional Park (which includes Garland Park, Kahn Ranch and de Dampierre); and, Palo Corona Regional Park. The recently installed permanent interpretive and educational exhibits at Garland Ranch Regional Park are designed to connect students and visitors of all ages to the flora and fauna of the park and the Carmel River. Watershed Education/Visitor Center also offers a native plant drought tolerant, pollinator garden and arboretum with watershed specific vegetation.

MPRPD offers students, K-8 grade, and teachers a free “Watershed Explorers” class program and professional development workshops funded by the National Oceanic and Atmospheric Administration (NOAA)-California Bay Watershed Education (BWET) grant program. The Watershed Explorers program provides hands-on watershed education that helps students develop an understanding of watershed science and water issues. Through introductory classroom activities to scientific monitoring on the Carmel River, Watershed Explorers engages elementary and middle school students in meaningful experiences that allow them to participate in real science activities and experiments along the National Marine Sanctuary’s coast.

The Park District welcomes the public to both Garland Ranch and Palo Corona Regional Parks, where they participate in a Volunteer Naturalist led tour or a variety of activities from theLet’s Go Outdoors! (LGO!) Guide. Some of these offerings include, stargazing, wildlife watching, art and writing, watershed tours, and fire safety classes. The Park District runs numerous stewardship projects. Volunteers are encouraged to participate in activities such as non-native plant removal, trail reporting, stewardship maintenance projects, interpretive programs, and staffing the Visitor Center.

MPRPD is scheduled to receive the 190-acre Rancho Cañada Golf Course and clubhouse facility by January 2018. This accessible entrance to Palo Corona Regional Park serves as the main office location, an educational and research site, and a gateway to backcountry hiking and the Big Sur coast. MPRPD is in the process of developing a General Development Plan for Palo Corona Regional Park with public input, to be completed in late-Spring 2018.

3. Status as of January 2017: Signs completed and installed

4. 22 interpretive signs have been completed and installed, plus two new signs that announce “Entering the Carmel River Watershed (see sample below).” Thanks go to Andy Magnasco of the Carmel Valley Ranch for the installation of all these signs. Due to vandalism, six of the signs have had to be replaced by the Conservancy.

[5] 1. The Monterey Peninsula Regional Park District (MPRPD) owns and manages 12,500 acres of open space and conservation lands, three of these properties within the Carmel River Watershed: The Cachagua Community Center (located at the headwaters of the Carmel River); the Watershed Education Center at Garland Ranch Regional Park (which includes Garland Park, Kahn Ranch and de Dampierre); and, Palo Corona Regional Park. The recently installed permanent interpretive and educational exhibits at Garland Ranch Regional Park are designed to connect

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The Park District welcomes the public to both Garland Ranch and Palo Corona Regional Parks, where they participate in a Volunteer Naturalist led tour or a variety of activities from theLet’s Go Outdoors! (LGO!) Guide. Some of these offerings include, stargazing, wildlife watching, art and writing, watershed tours, and fire safety classes. The Park District runs numerous stewardship projects. Volunteers are encouraged to participate in activities such as non-native plant removal, trail reporting, stewardship maintenance projects, interpretive programs, and staffing the Visitor Center.

MPRPD is scheduled to receive the 190-acre Rancho Cañada Golf Course and clubhouse facility by January 2018. This accessible entrance to Palo Corona Regional Park serves as the main office location, an educational and research site, and a gateway to backcountry hiking and the Big Sur coast. MPRPD is in the process of developing a General Development Plan for Palo Corona Regional Park with public input, to be completed in late-Spring 2018.

[6] 1. Status as of December 2017: Completed and installed at the Carmel Police Department, Pebble Beach Maintenance Center, and Pacific Grove Police Station drop boxes.

[7] 1. Through their Livestock and Land Program, the Coastal Watershed Council monitored water quality parameters at four sites on the Carmel River. The sites monitored were Carmel River at Cachagua Community Park on Nason Rd.; Carmel River at Rosie's Bridge; Carmel River at Schulte Rd; and Carmel River near Rio Rd. and Hwy 1. This program was implemented in 2012, from January through December, for a total of 12 monitoring events. The data was collected by CWC’s staff and volunteers, and their findings are publicly available online on the Central Coast Ambient Monitoring Program (CCAMP) website and the Coastal Watershed Council’s website.

[8] 1. Status as of December 2017: Completed

2. California State Parks is in the process of developing a regional General Plan for the four state park units located in the Carmel area: Carmel River State Beach, Point Lobos State Natural Reserve, Point Lobos Ranch and Hatton Canyon. A second public workshop was held on July 22, 2015 to introduce general plan alternatives as well as conservation projects, visitor uses, and facilities that could be included. Additional public meetings will be held in the upcoming months. California State Parks intends to prepare the Preliminary General Plan and Draft EIR in late 2015 to early 2016 and a Final EIR in 2016 or 2017. They hope to have the General Plan completed by summer of 2018.

[9] 1. This is a Monterey Peninsula Water Management District (District) project, funded by the California Department of Fish and Wildlife's Fisheries Restoration Grant Program (FRGP), and with cooperation by the California American Water Company. This project is a continuation of the District's long-term commitment to improving steelhead spawning habitat in the upper river since 1994. This gravel enhancement is needed because the Los Padres Dam blocks all naturally occurring gravel behind it, thus starving the downstream riverbed of the proper sized material for steelhead spawning. This project involves placing 1,500 tons of clean, river-run, spawning gravel into the Carmel River at three locations just below Los Padres Dam.

In the spring of 2014, the gravel was delivered via truck and trailer from the Central Valley and stockpiled in the open field below the dam. During the summer/fall of 2014/2015 the gravel was placed into the river using a conveyor truck and/or loader. Over time, the gravel will disperse slowly downstream with high winter river flows, eventually seeding up to five miles of the Carmel River with much needed gravel. A proposal to add additional gravel from the San Clemente Dam removal project was submitted to CDFW and NOAA in March 2015.

2. In the lower watershed, CRSA has repaired the AG well in the West Odello Field and uses it to pump approximately 500 gallon per minute into the south arm of the Carmel River Lagoon when the lagoon starts to drop to critical low levels during the summer. This action benefits all wildlife especially steelhead trout and red-legged frogs. Additionally, CRSA has secured most of the materials necessary and has received funding to install large woody debris in the Carmel River from the Highway 1 Bridge to the lagoon to provide habitat for over-summering juvenile steelhead and upstream migrating adult steelhead. In the middle watershed, CRSA works to remove fish passage barriers by hand on all tributaries during fish rescues. CRSA also removes barriers in the upper watershed when observed and with adjacent property owner's permission. In June 2017, the Conservancy approved a grant to Trout Unlimited to prepare design plans for addressing up to three passage barriers on tributaries to the Carmel River. This includes two barriers on San Clemente Creek. TU will prepare designs to remove or modify the barriers and then intends to apply to the California Department of Fish and Wildlife for implantation funds. Settlement funds may be used for implementation if TU cannot secure other funding or if matching funds are needed in order to secure outside funding. Work has not yet begun on these designs.

3. Status as of December 2017: Ongoing

[10] 1. Projects to restore and re-vegetate unstable banks and incised reaches of tributaries and mainstream areas based on Proper Functioning Condition (PFC) tributary assessments, engineering and fluvial process determinations.

2. The riparian vegetation, the vegetation that grows along the river, is crucial for the proper physical and biological functions of the river. The riparian vegetation provides important habitat to the fish and wildlife associated with the river and plays a critical role in bank stability and floodplain function. De-vegetation along the Carmel River has promoted channel instability historically, causing loss of land and structural damage in the river’s floodplain (Kondolf and Curry 1986).
To promote the health of the riparian vegetation along the Carmel River, the MPWMD conducts regular assessments of the riparian vegetation. The MPWMD follows a management plan that includes irrigation, removal of encroached vegetation, and reestablishment of native vegetation with cuttings and seedlings (MPWMD 2004). The MPWMD also manages the wood and woody debris in the river for flood management and habitat improvement purposes.

[11] 1. There were two assessments conducted by the RCD and NRCS (Natural Resources Conservation Service) in Carmel Valley in 2011 and 2012. One assessment was conducted on 1 mile of Parrot Ranch Road, off Cachagua Road and the other ½ mile off the Potrero Creek Trail (on the Santa Lucia Preserve). Another assessment was conducted by a contractor in 2015 on the Big Sur Land Trust Mitteldorf Preserve in the San Jose Creek watershed, which is just south of the Carmel River watershed, but also drains into the Carmel Bay. No other assessments are

currently planned*, but the RCD and NRCS can pursue funding based on landowner or road associations' requests.

3. This was a Monterey Peninsula Water Management District (District) project, funded by the California Department of Fish and Wildlife's Fisheries Restoration Grant Program (FRGP), and with cooperation by the California American Water Company. This project was a continuation of the District's long-term commitment to improving steelhead spawning habitat in the upper river since 1994. This gravel enhancement was needed because the Los Padres Dam blocks all naturally occurring gravel behind it, thus starving the downstream riverbed of the proper sized material for steelhead spawning. This project involved placing 1,500 tons of clean, river-run, spawning gravel into the Carmel River at three locations just below Los Padres Dam.

In the spring of 2014, the gravel was delivered via truck and trailer from the Central Valley and stockpiled in the open field below the dam. During the summer/fall of 2014/2015 the gravel was placed into the river using a conveyor truck and/or loader. Over time, the gravel will disperse slowly downstream with high winter river flows, eventually seeding up to five miles of the Carmel River with much needed gravel. A proposal to add additional gravel from the San Clemente Dam removal project was submitted to CDFW and NOAA in March 2015.

[12] 1. The San Clemente Dam removal poses a large-scale experiment in watershed engineering. Not only is it the largest dam removal in California history, it also includes a world-class example of river construction engineering. Removal of the San Clemente Dam was supposed to reintroduce spawning gravel and large wood to the lower Carmel River, without any significant increase in flood risk or channel stability. Our collective goal is to measure three key variables in many places along the river to characterize the dam removal impact on river morphology and habitat. We are studying the following four parameters to assess those stated goals.

1) We are measuring sediment size distribution to evaluate changes in spawning gravel character through time.
2) We are surveying channel cross sections to assess channel stability and bank erosion through time.
3) We are also using the surveys to assess channel filling that might lead to increased flood risk through time.
4) Lastly, we are inventorying all large wood greater than 15 cm in diameter and 1 m long from the lagoon to Camp Stefani to assess changes related to dam removal.

The newly-constructed river reach located upstream of the removed dam was designed to be generally stable up to the 50-year flood. Assessing the structural evolution of the engineered channel and floodplain will benefit future projects of this kind.
Our monitoring efforts were initiated several years before dam removal so that we could see how the river changes in the post-dam era.

[13] 1. At present, California State Parks is working to eradicate non-native plants and weeds at the Carmel River Lagoon. This project includes weed eradication efforts at the Carmel River Lagoon.

2. Status as of December 2017: Ongoing

3. Status as of December 2017: Ongoing

5. Timeline as of August 2017:
•Public release of Draft CEQA/NEPA document has been on hold since beginning of 2017 to further address potential impact issues. An EIR is

being prepared and should be ready for public release by early spring 2018.
•Caltrans Report and CEQA and NEPA review by Winter of 2017
•Construction to begin in 2019
•Full restoration to be complete by 2030

The Carmel River Floodplain Restoration and Environmental Enhancement Program is a multi-objective, comprehensive project that incorporates elements of flood control, floodplain and habitat restoration, public access, land protection, and protection of special species. Monterey County Resource Management Agency (MCRMA) and BSLT are co-sponsors of this project to restore the southern floodplain in the lower Carmel River and provide flood control to the adjacent urban areas. MCRMA has a cooperative agreement with Caltrans to sponsor the causeway component of the project, and the MCRMA is the lead CEQA agency. U.S. Fish and Wildlife Service is the NEPA lead agency and Caltrans is a cooperating agency on the NEPA review.

The objectives of this project are to reduce flood flows in urban areas, to increase riparian and wetland habitat, to recharge groundwater and base flows to the Carmel River, to provide habitat connectivity across the floodplain, to protect agricultural land from flooding, to improve water quality, and to create public trails (BSLT, 2010). The main features of this project are: The construction of a 350-ft flood bypass or causeway/bridge under State Hwy 1 to the end of the lagoon, removal of approximately 1,600 feet of non-engineered farm levees on the south bank of the Odello East Property, grading to contour the floodplain with topographic diversity for habitat benefits and two braided distributary channels that tie into the south arm of the Carmel Lagoon to carry floodwaters from the levee openings across the floodplain to the west side of the highway, restoration of over 90 acres of riparian and floodplain habitats, and the creation of public trails for public access and recreation (BSLT, 2016). In June 2016, Clinton Eastwood and Margaret Eastwood donated 79 acres of the Odello East property to BLST for the Carmel River FREE Project, adding to the 49 acres that had been donated in 1997.

Among the flood control benefits, this project will reduce flood risks to Hwy 1 and adjacent developed areas north of the lower Carmel River. Reconnecting the main stem of the river to the south floodplain and to the area west of Hwy 1 will also help reduce flood threat to infrastructure while providing access for wildlife movement. Habitat restoration is an important component of this project; approximately 90 acres of historic riparian and wetland habitat will be restored, increasing the quality and quantity of important habitat for the resident fish and wildlife. Additional benefits of this project include the protection of over 23 acres of organic farming land, increased groundwater recharge, wildlife connectivity under Highway 1 and increased public access through the creation of a series of recreational trails. Project costs, including pre-construction costs, are roughly $27 million. At present, over $14 million has been secured, but there is a funding gap of approximately $13 million. Current funders include a variety sources including grants as well as funds from private sources, NGOs, the local government and public funding from State and Federal Agencies.

[14] 1. A former agricultural supply well located on State Parks property has been operated in the dry season to augment water in the Lagoon. The well was operated by the Steelhead Association in the past as a means of augmenting freshwater to the Carmel Lagoon in the summer months in order to benefit steelhead and other aquatic species. Funding may be needed to repair the well, as well as to maintain and pay for electricity. However, the well is also within the footprint of the pending Carmel River Floodplain Restoration Project (CR-FREE) and is planned to

be relocated as part of the project.   CRSA has decided it would be wise to wait until the well has been relocated before spending grant money to repair the well, and is in the process of finding funding to relocate the well as soon as possible.

2. The Carmel River Lagoon provides important rearing habitat for the steelhead trout, but low water flows, largely due to overdrafting, have diminished its quantity and impaired its quality. For several years, the CAWD has been discharging advanced treated wastewater near the lagoon to filter through the soil and replenish the water level in the lagoon during the dry season, effectively increasing habitat for the steelhead (CAWD, 2012). Treated wastewater, regardless of the level of treatment achieved, cannot be discharged directly into the lagoon due to environmental regulations, and for this reason, augmentation efforts are focused on recharging the groundwater system, which also result in an increase of water in the lagoon. The project could have added up to 300 acre-feet of water per year to the lagoon for fish habitat.

The Carmel River Steelhead Association proposed a project to pump water from a well owned by State Parks and release it into the lagoon during the summer months to improve both quantity and quality of lagoon water. The
Conservancy commissioned Balance Hydrologics to evaluate the potential impacts of the high rate of pumping proposed by CRSA (600 gpm). The Balance report suggested that a lower rate of pumping might make more sense, but others thought the benefits of this lower rate would be limited. The last annual report incorrectly stated that CRSA was no longer pursuing this effort. In follow up conservations with Conservancy staff, CRSA proposed to conduct a study of how much benefit the lower pumping rate could achieve – for instance over how wide an area would reduced water temperatures be seen. Once the study is complete, CRSA and the Conservancy will re-consider whether to pursue this project on a longer-term basis.

2.State Parks Well Project
2.1.Agency/Organization (s): Carmel River Steelhead Association
2.2.Coordinates (approximate): Hwy 1 Causeway (3a): 121.9156 W 36.5336 N
2.3.General Goal: Habitat Restoration
2.4.Action Plan 2014: Action 39
2.5.Status as of December 2016: CRSA is planning on restarting the well in summer of 2017, including monitoring for impacts in the south arm. This is an interim action, as the CRFEE project will result in eventual relocation of the well.
2.6.Contact: Brian LeNeve - bjleneve@att.net

A former agricultural supply well, located on State Parks property has been operated in the dry season to augment water in the Lagoon. The well was operated by the Steelhead Association in the past as a means of augmenting freshwater to the Carmel Lagoon in the summer months in order to benefit steelhead and other aquatic species. Funding may be needed to repair the well, as well as to maintain and pay for electricity. However, the well is also within the footprint of the pending Carmel River Floodplain Restoration Project (CR-FREE) and is planned to be relocated as part of the project.   CRSA plans to operate the well in the summer and fall of 2017 and monitor its impact to the south arm of the lagoon. Because the well will be relocated as part of CRFEE, this project is an interim measure to add freshwater during the critical dry period of late summer/ early fall.

[15] 1. The MCWRA has conducted a feasibility study to evaluate the placement of a barrier floodwall, called and ecosystem protective barrier or EPB, along the northern portion of the Carmel River Lagoon (MPWMD, 2011b).

The Carmel Lagoon, located at the mouth of the Carmel River, is a productive estuary that serves as habitat for federally listed South-Central California Coast steelhead (S-CCC steelhead; Oncorhynchus mykiss irideus), California red-legged frog (CRLF, Rana aurora draytonii), western snowy plover (Charadrius nivosus), and Smith's blue butterfly (SBB; Euphilotes enoptes smithi). Each winter, when the water levels increase in the lagoon, homes and buildings situated within the floodplain are at risk to flooding. Every year, Monterey County takes preemptive action to lower the water level at the Carmel Lagoon by digging a channel through the sand barrier that contains the lagoon. If allowed to breach naturally, the water level in the Carmel Lagoon could rise to levels that would threaten the surrounding infrastructure. The EPB is one possible solution to mitigate the impacts of flooding in the Carmel Lagoon.

An EPB will allow the levels in the lagoon to rise and breach the sandbar naturally without threatening adjacent low-lying structures. The resulting increase in water quantity and quality in the lagoon is expected to improve rearing habitat for the threatened steelhead and the California red-legged frog. The feasibility study is funded by a $145,000.00 grant from the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Fund of 2006 (Proposition 84), allocated by the Wildlife Conservation Board (WCB, 2011). Breaching dynamics directly affect lagoon stage (water surface elevation), which in turn determines aquatic habitat volume and area, as well as water quality. As a result, mechanical breaching of the lagoon (i.e., for flood protection) has the potential to adversely affect federally listed fish and wildlife in conflict with federal law. Natural breaching, with the assistance of the EPB, is therefore preferred by environmental groups and many key governmental agencies with an interest in the lagoon. Breaching at the north end of the lagoon facilitates a longer and more natural outflow channel, improving conditions for fish and wildlife within the lagoon, but has threatened to undermine Scenic Road and adjacent properties in the past.

The proposed project is a comprehensive plan meant to promote improvement in the ecological function of the lagoon, including natural floodplain function and improvement of habitat for federally listed species associated with the lagoon, by allowing the lagoon to breach naturally, without increasing flood and erosion risk to private structures and public facilities. The project area includes the lagoon and adjacent wetland, riparian and coastal habitats. The proposed project involves implementing three project components: 1) Ecosystem Protective Barrier (EPB), 2) Scenic Road Protection Structure (SRPS), and 3) Interim Sandbar Management Plan (ISMP). The project is currently in the environmental review stage, and distinct components are detailed below.

Ecosystem Protective Barrier details:
●The proposed EPB alignment includes a minimum setback of up to 40 feet from the State Parks property line with a top of wall elevation of 17.5 feet based on the North American Vertical Datum of 1988. This option was recommended as a component of the preferred alternative because it:
●Maintains the current level of protection of facilities and homes accounting for sea level rise over the next 50 years;
●Minimizes ecological impacts by eliminating drainage infrastructure and fill;
●Minimizes visual impacts with a lower height and greater area of vegetative cover;
●Reduces noise because of smaller pumps with less frequent pumping; and,
●Increases area that serves as a bio-swale to collect urban runoff.

While the County is seeking permits for a long-term solution, there is an Interim Sandbar Management Plan in place. The process to complete the design, environmental review, permitting, and construction of the EPB is estimated to take up to eight years, depending on resource availability; however, the County is making every effort to reduce this timeframe to five years or less. In the interim, the County has developed the 5-Year ISMP in coordination with the regulatory agencies for managing the lagoon, including winter openings and summer closure in the best possible manner that reduces potential impacts to both wildlife and property. The County presently lowers the southern end of the barrier beach to the extent that when the rains begin and the lagoon fills, the lagoon will overtop the beach and open the barrier to the ocean prior to the homes flooding on the north side of the lagoon. The activities, conditions, and implementation of the ISMP will be carried out in accordance with the approved MOU between the County, USACE, and NMFS.

The Draft EIR was released in December 2016 with a 60-day public review period ending on January 31, 2017.

[16] 1. At present, up to about 80% of the water consumed by people on the Monterey Peninsula comes from the Carmel River. In order to protect steelhead trout and other threatened species that live within the watershed, the State Water Board ordered Cal Am to reduce water withdrawals from the river. In order to comply with this mandate, more than 100 options were considered and now Cal Am has decided upon a three-part solution that consists of the construction of a 6.4 million gallon per day desalination plant capable of delivering 6,300 acre-feet of water per year, a groundwater replenishment project to deliver 3,500 acre-feet of advanced treated recycled water per year, and expansion of the aquifer storage and recovery project to deliver Carmel River water and desalinated water in winter to the Seaside Basin for storage and later use in the dry season. In addition, pipeline and other Cal Am system improvements are needed to deliver the new water supplies to Cal Am customers. Completion of all components of the project will result in a dramatic reduction in Carmel River diversions, especially during the critical dry season months.

Cal Am submitted an application to the California Public Utilities Commission for the Monterey Peninsula Water Supply Project in April 2012. The expected timeline for the project is detailed below:

•Summer 2017: Construction of Pure Water Monterey (PWM) recycled water project begins
•End of 2017: Monterey Pipeline construction completed
•March 2018: Final EIR for desalination component to be released
•2018: CPUC decision to approve the desalination project
•After CPUC decision: Coastal Commission decision on a Coastal Development Permit
•Fall 2018: Construction of desalination project begins
•Fall 2018: PWM project begins operation
•2021: Desalination plant begins operation

[17] 1. The boundaries of CSA-50 were expanded in 1995 and 1996 to include all of the Mission Fields neighborhood and to encompass the entire north overbank floodplain as far east as Rancho Cañada. Along with the physical expansion of CSA-50 came the expansion of its mission beyond that of drainage services to encompass flood control services as well. This is particularly important given the flood hazard in the area.

A variety of strategies have been used in the past to manage flood risks, including clearing drains and ditches, repairing levees, and maintaining pumps. As part of the 2014 Lower Carmel River Stormwater Management and Flood Control Report, CSA 50 flood prevention analyses and strategies were updated. Monterey County Public Works created new floodplain and flood flow path maps and modeled floodplain scenarios, amongst other things. They found that the riverine flood risk to Mission Fields is relatively low as long as perimeter protection is provided east of Highway 1. In addition, they recommended that a variety of projects be undertaken to further mitigate flooding impacts.

2. While the County is seeking permits for long-term solutions, there is an Interim Sandbar Management Plan in place. This is a coordination between the regulatory agencies for managing the lagoon, including winter openings and summer closure in the best possible manner that reduces potential impacts on community members and wildlife. The first step is installation of sandbags, followed by a lowering of the southern end of the barrier beach using bulldozers, such that the lagoon will fill to a level that will overtop the beach and open up the lagoon to the ocean before the homes on the north side of the lagoon are flooded.

[18] 1. California State Parks is in the process of developing a regional General Plan for the four state park units located in the Carmel area: Carmel River State Beach, Point Lobos State Natural Reserve, Point Lobos Ranch and Hatton Canyon. A second public workshop was held on July 22, 2015 to introduce general plan alternatives as well as conservation projects, visitor uses, and facilities that could be included. A third public meeting will be held in the upcoming months. California State Parks intends to prepare the Preliminary General Plan and Draft EIR in late 2015 to early 2016 and a Final EIR in 2016 or 2017. They hope to have the General Plan completed by summer of 2017.

[19] 1. Steelhead rescue as well as track and truck operations take place throughout the watershed at specific times during the year in order to help with steelhead migration. MPWMD's extensive 25-year rescue has rescued over 400,000 steelhead from the main stem of the Carmel River since 1989. These fish are moved upstream to permanent habitat or reared in the Sleepy Hollow Steelhead Rearing Facility (SHSRF). For example, in 2013, MPWMD staff began fish rescues on April 19 as flow at the HW 1 gage declined to 10 cfs. Through the end of September, 42,805 steelhead had been captured and released upstream in permanent habitat or taken to the Sleepy Hollow Steelhead Rearing Facility (SHSRF) including: 41,893 young-of-the-year (YOY), 650 age 1+ juveniles, 13 adults (released in ocean), and 249 mortalities (0.58%). MPWMD continues to monitor steelhead, but water levels have been so low recently that rescue operations have been minimal. To date, CRSA has rescued over 100,000 fish from tributaries and over 72,000 fish from the mainstream Carmel River Channel.

2. As part of the San Clemente Dam removal project, the Sleepy Hollow Ford was removed and a new bridge was constructed in spring/summer of 2016.

3. The SHSRF started operations in 1997 with the purpose of rescuing and rearing steelhead that were stranded in the Lower Carmel River as a result of water diversions. The facility includes a laboratory, a diversion and pump station, several rearing tanks, an 800-foot long rearing channel, and electrical, water, pressurized air and drainage systems (MPWMD 2011c). In 2003, the MPWMD completed significant improvements to ensure that the facility could continue to operate under increasing sediment loads. The District has continued to upgrade the facility in subsequent years, but additional improvements are still needed in order to renew the necessary operating permits and to prepare the intakes for the increase in sediment loads after the removal of the San Clemente Dam (MPWMD 2011c). The Project is being funded by a $450,000 grant from Cal-Am Settlement Agrement funds administered by the Coastal Conservancy to MPWMD to prepare permitting, engineering, and environmental review documents to improve the intake structure of the Sleepy Hollow Rearing Facility. At present, MPWMD has hired Tetra Tech to lead the planning phase of the settlement. Planning and permit acquisition is currently underway and should be complete in 2017.

[20] 1. MPWMD will combine a watershed availability analysis, a steelhead data and habitat analysis, a geomorphological analysis, feasibility of upstream passage, and feasibility of long-term alternatives to manage the dam. The effort is supposed to be complete by the end of 2017, but given the scope of the project, project completion will extend into 2018.

[21] 1. Cachagua Creek Ford Design project is underway. Topographic and geotechnical analysis has been completed, but may need follow up to address for liquefaction. Alternatives proposed and forwarded to CDFW are currently being reviewed. Still on target for design documents for the March 2017 application for FRGP construction.

Potrero Creek– Trout Unlimited hired consultants to develop plans for removal of passage barriers and improvement of riparian habitat along Potrero Creek as it passes through the Quail Meadows Golf Course and Carmel Valley Athletic Club. The initial barrier and habitat assessment is complete and conceptual alternatives were identified. Trout Unlimited is now working on the preliminary designs. This project should be complete by the end of 2017. Trout Unlimited intends to apply for implementation funding for the project from other sources. The Conservancy is currently budgeting $300,000 from Settlement Funds for implementation. There is not yet an estimate as to when project construction will begin.

2. The largest and arguably most important project that has occurred in the Carmel River Watershed in recent years is the San Clemente Dam removal, which took place in August of 2015. This was the largest dam removal project to take place in California to date. The San Clemente Dam was built in 1920 by the Del Monte Properties Company exclusively to serve as a water storage reservoir (Olmsted, 1921). Originally, the reservoir could store up to 1,425 acre-feet of water, but its capacity greatly diminished over time. By the time the removal project began, the reservoir was filled with over 2.5 million cubic yards of sediment, leaving it at less than 5% capacity (SCC, 2011).

In 1992, the California Department of Water Resources (DWR) Division of Safety of Dams (DSOD) determined that the San Clemente Dam could potentially fail in a strong earthquake or a severe flood, and issued an order mandating Cal Am, the owner of the dam, to address this public safety issue (Cal Am, 2012). After exploring several alternatives to address the seismic concerns, Cal Am, in partnership with the State Coastal Conservancy, NOAA Fisheries, and the Planning & Conservation League Foundation, chose an alternative that included rerouting the Carmel River, removal of the dam, and restoration of that section of the Carmel River watershed. Not only did this project address the public safety issues, but it will also improve the general health of the river. Sediment from the upper watershed is being transported downstream as it did before the construction of the dam, steelhead step pools were constructed to assist steelhead in their journey upstream, and new rearing and spawning habit will open up. Additionally, the smaller Old Carmel River Dam was removed in 2016 and final planting was complete by the end of October 2016 (Coastal Conservancy, 2016). Among other benefits, the San Clemente Dam Removal and Carmel River Reroute project frees over 25 miles of natural spawning and rearing habitat to steelhead, improves sediment transport to the lower river, and provides connectivity of aquatic and riparian habitats (Cal Am, 2015). The project will not affect flood control management or the regional water supply. The San Clemente Dam removal and reroute project is a prime example of the benefits of cooperative, creative, multi-stakeholder approaches to solving watershed management issues.

3. Field surveys have been completed at all barriers located on properties whose owners permitted access. No estimated date has been established as to when project construction will begin (Coastal Conservancy, 2016). In 2016, Trout Unlimited secured a grant to begin work to remove passage barriers in Cachagua Creek and has applied for a grant to do the same in Potrero Creek.

3. Field surveys have been completed at all barriers located on properties whose owners permitted access. No estimated date has been established as to when project construction will begin (Coastal Conservancy, 2016).

[22] Built in 1920, the San Clemente Dam was deemed unsafe by the Division of Safety of Dams in 1992 (Cal Am, 2010). To address the public safety concerns, Cal Am, the owners of the dam, determined that strengthening the dam was the most cost-effective alternative. Strengthening the dam in place, however, would not have addressed many of the environmental impairments associated with it. With the support from regional

stakeholders, including the CRWC (2005 Assessment), an alternative project that addressed both the public safety and environmental concerns was favored. In 2007, the State Coastal Conservancy (SCC), NOAA's National Marine Fisheries Service, and the Planning & Conservation League Foundation (PCLF) formed a partnership with Cal Am to aid in the project's planning, funding, and public outreach activities (SCC 2011). The San Clemente Dam Removal and Carmel River Reroute project was recently completed. The Carmel River was rerouted and the dam was successfully removed in August of 2014. At present, Cal Am and Granite Construction have also completed steelhead step pools to aid steelhead in their migration upstream. Re-vegetation and restoration of riparian habitat continues. The project was completed at the end of 2016. The Bureau of Land Management assumed responsibility for the land around the former dam site. Additionally, Granite Construction removed the smaller Old Carmel River Dam (Coastal Conservancy, 2016).
Among other benefits, the San Clemente Dam Removal and Carmel River Reroute project opens up over 25 miles of natural spawning and rearing habitat for steelhead trout, improves sediment transport to the lower river, and provides connectivity of aquatic and riparian habitats (Cal Am 2012). The project will not affect flood control management or the regional water supply.
The total cost of the San Clemente Dam Removal and River Reroute Project has been estimated at $83 million. Cal Am contributed $49 million, which is the estimated cost of strengthening the dam and the SCC and NOAA Fisheries contributed the additional $34 million. Other funders include the Nature Conservancy and the Resources Legacy Fund. The San Clemente Dam removal and reroute project is a prime example of the benefits of cooperative, creative, multi-stakeholder approaches to solving watershed management issues.

[23] 1. In the Central Coast, steelhead trout are listed as a threatened species and the Carmel River has been identified as one of the most important watersheds for recovery of the species. The lagoon is particularly important for rearing juvenile steelhead prior to them entering the ocean. The recovery plan developed by the National Marine Fisheries Services for Central Coast steelhead trout specifically identifies the placement of additional large woody debris in the lagoon to enhance rearing habitat as a priority. Large woody debris creates areas for steelhead to hide and avoid predation by birds and other species.

The proposed project involved construction of seven structures made up of large wood pieces anchored to large rock. These structures were constructed on shore and then placed by helicopter into the channel. The California Conservation Corps was a partner on the project and constructed the structures. In addition, restoration of the staging areas was done in partnership with MEarth, an environmental education center located along the river. In the Central Coast, steelhead trout are listed as a threatened species and the Carmel River has been identified as one of the most important watersheds for recovery of the species. The lagoon is particularly important for rearing juvenile steelhead prior to them entering the ocean. The recovery plan developed by the National Marine Fisheries Services for Central Coast steelhead trout specifically identified the placement of additional large woody debris in the lagoon to enhance rearing habitat as a priority. Large woody debris creates areas for steelhead to hide and avoid predation by birds and other species.

The project involved constructing seven structures made up of large wood pieces anchored to large rock. These structures were assembled on shore and then placed by helicopter into the channel. The California Conservation Corps was a partner on the project and was responsible for constructing the structures. In addition, restoration of the staging areas was done in partnership with a MEarth, an environmental education center located along the river.

The Carmel River Steelhead Association is an all-volunteer group whose mission is to restore and conserve the steelhead fishery in the Carmel River watershed. They have tackled many challenges in the watershed including completion of a similar project in the south arm of the lagoon several years ago. The Conservancy approved a grant to the Carmel River Steelhead Association (CRSA) to install multiple LWD structures in the Carmel River Lagoon to increase habitat complexity in the lagoon.

Despite being delayed by permitting issues in 2016, phase two of the project was completed in October 2017, and is one of the largest contributors to watershed health to date. Plans to design a third phase, are currently under way. This phase would include implementation of small woody debris upstream where the river flows year-round. Use of small woody debris in lieu of large woody debris would allow any wood that breaks free to pass under any bridge without causing flooding or a need for bridge removal. An exact location, and timeline for this project have yet to be determined.

[24] 1. Field surveys have been completed at all barriers located on properties whose owners whom permitted access. No estimated date has been established as to when project construction will begin (Coastal Conservancy, 2016). In 2016, Trout Unlimited secured a grant to begin work to remove passage barriers in Cachagua Creek and has applied for a grant to do the same in Potrero Creek.

2. Acoustic tags will be deployed on smolts in late fall or early winter of 2017 to determine the success rates of downstream migration to the lagoon. In late winter and spring, any smolts migrating back to sea that become trapped in the lagoon behind a sand berm will be rescued, tagged, and released into the Carmel Bay. An array of acoustic receivers deployed between Alaska and California are available to detect locations of tagged fish, should they pass nearby. Currently, the offshore migrations of the Carmel River’s steelhead trout are unknown. The second part of the project uses genetics to "tag" steelhead family groups (kin) in the watershed in order to track the return migration of siblings and their offspring through kinship analysis. By saving the few mortalities that occur during juvenile fish rescues, they will "fingerprint" their DNA and determine patterns of genetic kinship throughout the watershed. The data collected will become invaluable as a baseline for future genetic analysis. For example, by tracking the redistribution of genetic diversity in the Carmel River watershed before and after the San Clemente Dam was removed, the success of fish restoration after dam removal can be assessed.

[25] 1. Status as of December 2017: On hold

2. Schulte Bridge provides the only access to the areas south of the Carmel River along Schulte Road. The old, one-lane bridge was replaced with a two-lane bridge in late 2013, at a cost of $3.1 million. The new bridge has improved access to properties along the south side of the river, and is less susceptible to failure from high river flows. Additionally, fewer piers in the creek allows for more open river channel underneath the bridge, as well as a pathway for pedestrians and bikes. As part of the project, the area was re-vegetated with plants. Restoration of the riparian corridor has progressed nicely on the upstream end of the bridge that once allowed construction access, and will continue to be monitored for years.

[26] Schulte Bridge provides the only access to the areas south of the Carmel River along Schulte Road. The old, one-lane bridge was replaced with a two-lane bridge. Construction costs were roughly $3.1 million. The new bridge has fewer piers in the creek, which allows for more open river channel underneath the bridge, as well as a pathway for pedestrians and bikes. As part of the project, the area was re-vegetated with plants. The restoration progress will be monitored for the next several years.

[27] The San Clemente Dam removal poses a large-scale experiment in watershed engineering. Not only is it the largest dam removal in California history, it also includes a world-class example of river construction engineering. Removal of the San Clemente Dam was supposed to

reintroduce spawning gravel and large wood to the lower Carmel River, without any significant increase in flood risk or channel stability. Our goal is to measure three key variables in many places along the river to characterize the dam removal impact on river morphology and habitat. We are studying the following four parameters to assess those stated goals.

1) We are measuring sediment size distribution to evaluate changes in spawning gravel character through time.
2) We are surveying channel cross sections to assess channel stability and bank erosion through time.
3) We are also using the surveys to assess channel filling that might lead to increased flood risk through time.
4) Lastly, we are inventorying all large wood greater than 15 cm in diameter and 1 m long from the lagoon to Camp Stefani to assess changes related to dam removal.

The newly-constructed river reach located upstream of the removed dam was designed to be generally stable up to the 50-year flood. Assessing the structural evolution of the engineered channel and floodplain will benefit future projects of this kind.
Our monitoring efforts were initiated several years before dam removal so that we could see how the river changes in the post-dam era.

[28] 1. The CSUMB Watershed Institute participates in a variety of water quality monitoring research activities, including studies to assess post-fire watershed impacts. More specifically, they study how increases in sediment runoff and debris affects lagoons, reservoirs, and streams, particularly now that the San Clemente Dam has been removed.

[29] 1. Status as of December 2017: Ongoing

2. Status as of December 2017: Ongoing

3. Status as of December 2017: On hold

4. A collaborative group entitled Trust for Public Lands is acquiring the Rancho Cañada Golf Course with plans to convert it into a regional park.

Table 3-2: IRWM Plan Update Prioritized Regional Objectives

Water Supply (WS)
WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.*
WS-2. Maximize use of recycled water and other reuse, including gray water systems, and stormwater capture and use.[2] *
WS-3. Seek long-term sustainable supplies for adopted future demand estimates.*
WS-4. Optimize conjunctive use of surface and groundwater.*
WS-5. Evaluate, advance, or create water conservation throughout the Region in compliance with the State's 20x2020 Water Conservation Plan.*
Water Quality (WQ)
WQ-1. Improve ocean water quality, including Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.*
WQ-2. Improve inland surface water quality for environmental resources (e.g. steelhead) and potable water supplies.*
WQ-3. Protect and improve water quality in groundwater basins.*
WQ-4. Meet or exceed water quality standards established by regulatory agencies and stakeholders. *
Flood Protection and Erosion Prevention (FP)
FP-1. Develop regional projects and plans necessary to protect existing infrastructure and sensitive habitats from flood damage, erosion, and sea level rise, in particular, along the South Monterey Bay shoreline and Carmel Valley.*
FP-2. Develop approaches for adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).*
FP-3. Protect quality and availability of water while preserving or restoring ecologic and stream function.*
FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.
Environmental Protection and Enhancement (EV)
EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds; promote the steelhead run.*
EV-2. Identify opportunities to assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*
EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.*
EV-4. Identify opportunities for open spaces, trails and parks along streams and other recreational areas in the watershed that can be incorporated into projects.
EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.*
Climate Change (CC)
CC-1. Evaluate adaptation measures and mitigative solutions to climate change effects.*
CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.*
CC-3. Support efforts to increase education, research and use of energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.*

[2] The underlined text was added based on comments from the city of Pacific Grove (Sarah Hardgrave, January 2013)

Regional Communication and Cooperation (RC)
RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts. *
RC-2. Foster collaboration among regional entities as an alternative to litigation.*
RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.*
RC-4. Build relationships with State and Federal regulatory agencies and other water forums and agencies.
NOTES: These objectives have been revised and renumbered compared to the draft objectives presented and evaluated at the 7/25/2012 Stakeholder Meeting. **High Priority Objectives based upon those objectives receiving the most points during the objectives prioritization exercise in July and August 2012 are presented in gray shading and bold type.** * = Objective is closely aligned with Statewide Priorities (see **Table 3-4**).

3.1.5 Measuring Attainment of Objectives

The IRWM Guidelines require that objectives must be measurable by some practical means to enable monitoring of the achievement of the objectives and thus the success of IRWM Plan implementation. Because the IRWM Plan is implemented primarily through projects, these measures, or “metrics” apply to projects that seek to achieve the objectives. **Table 3-4** suggests potential qualitative and quantitative measurement metrics that will be further developed when projects under the plan have been implemented. Although this Draft Plan attempts to identify the most appropriate measures for a given objective, the suggested measures do not encompass the full breadth of possible ways to measure success in meeting the Plan goals and objectives. See **Chapter 8, Plan Performance and Monitoring** for additional detail about the future process for measuring achievement of goals and objectives.

Table 3-4:
Measuring Attainment of IRWM Plan Objectives

Darker shading represents high priority objectives

Objective	Qualitative Measurement	Quantitative Measurement
Water Supply		
WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.*	Identification of, and proposals for, implementation of projects and initiatives/programs that will result in achieving water supply replacements for the Carmel River system and Seaside Groundwater Basin.	Measurable increase in water supply replacement amounts (i.e., in acre-feet per year, AFY) for the Carmel River system and Seaside Groundwater Basin.
WS-2. Maximize use of recycled water and other reuse opportunities, such as graywater and stormwater capture and use.*	Identification and implementation of projects and initiatives/programs designed to increase use of recycled water on individual properties as well as by regional wastewater treatment entities.	Measurable increase of use of recycled water in lieu of potable water (AFY); number of individual properties benefitted.
WS-3. Seek long-term, sustainable supplies for adopted future demand estimates.*	Identification and implementation of projects designed to protect, enhance, and increase long-term sustainable supplies for adopted future demand estimates.	Measurable improvements in long-term sustainable supplies for adopted future demand estimates.
WS-4. Optimize conjunctive use of surface and groundwater.*	Identification of projects and initiatives/programs meant to optimize conjunctive use of surface and groundwater.	Acre-feet (AF) of water storage; number of conjunctive management projects developed; reduction in diversions in Carmel Valley Basin to achieve SWRCB limits; reduction in use of Seaside Groundwater Basin native water to legal adjudicated limit.
WS-5. Evaluate, advance, or create water conservation throughout the Region in compliance with the State's 20x2020 Water Conservation Plan.*	Identification of projects and initiatives/programs meant to evaluate, advance, or create water conservation.	Quantitative increase in water conservation; or number of new or enhanced conservation programs/projects.
Water Quality		
WQ-1. Improve ocean water quality, including Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.*	Identification of sources of existing pollutants potential increases in runoff that may impact ocean water quality, including ASBS, and implementation of innovative and effective projects or programs to improve existing runoff conditions.	An increased percentage of projects that include BMP, LID standards, or other alternatives to minimize runoff that may impact ocean water quality. Number of projects or programs implemented to improve existing runoff conditions.

Table 3-4:
Measuring Attainment of IRWM Plan Objectives

Darker shading represents high priority objectives

Objective	Qualitative Measurement	Quantitative Measurement
WQ-2. Improve inland surface water quality for environmental resources (e.g. steelhead) and potable water supplies.*	Identification of needs and opportunities to improve surface water quality for environmental resources. Design and implementation of projects or programs to improve conditions.	Number of projects or programs implemented to improve conditions. Measurable improvement in water quality (i.e., reduced pollutant concentrations) attributed (at least in part) to the implementation of new projects/programs. Pounds of pollutants eliminated from discharges.
WQ-3. Protect and improve water quality in groundwater basins.*	Identification of projects and initiatives/programs designed to protect and improve groundwater quality.	Measurable improvements to groundwater quality (i.e., lowering of salinity, pollutant concentrations) through implementation of projects/programs. Pounds of pollutants eliminated from discharges.
WQ-4. Meet or exceed water quality standards established by regulatory agencies and stakeholders. *	Progress toward meeting established water quality objectives, including TMDLs, and NPDES limits.	Number of projects that benefit water quality of 303(d) listed streams or improve water quality of permitted discharges. Pollutant load reductions in discharges.
Flood Protection and Erosion Prevention		
FP-1. Develop regional projects and plans necessary to protect existing infrastructure and sensitive habitats from flood damage, erosion, and sea level rise, in particular, along the South Monterey Bay shoreline and Carmel Valley.*	Demonstrated progress in eliminating potential for properties to flood damage.	Acreage of property (or square feet of habitable buildings) removed from flood zones identified in flood insurance study updates; reduction in annual losses/damages from flooding in dollars; number of properties removed from mapped flood hazards.
FP-2. Develop approaches for adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).*	Identification of policies and programs that will require all new development to implement adaptive management methods (i.e., LID).	Estimated reduction in annual maintenance/repair costs; presence/absence of LID program; number of projects implementing LID.
FP-3. Protect quality and availability of water while preserving or restoring ecologic and stream function.*	Identification of natural stream/river ecological and hydrological functions and eliminating/minimizing threats to function.	Acres of enhanced or reconnected floodplains; acres of newly created treatment wetland areas; acres of upland enhanced through BMPs, revegetation, number of projects implementing LID.
FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.	Identification of opportunities to provide community benefits and design of projects or programs to provide them.	Number of projects or programs implemented resulting in community benefits (miles of new trails, acres of: 1) new publicly accessible open space; 2) preserved agricultural land; or 3) increased number or appeal of recreational and tourism industry opportunities/benefits).

Table 3-4:
Measuring Attainment of IRWM Plan Objectives

Darker shading represents high priority objectives

Objective	Qualitative Measurement	Quantitative Measurement
Environmental Protection and Enhancement		
EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds; promote the steelhead run.*	Identification, design, and implementation of projects or programs intended to protect and enhance sensitive species and habitats.	Acreage (or lineal feet of stream or river) of conserved, protected and enhanced sensitive species habitats, including length of stream opened during key seasons/months to fish and other aquatic species for migration and watershed areas opened to upland habitat for other species. Measured increases in numbers of species populations.
EV-2. Identify opportunities to assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*	Identification, design, and implementation of projects or programs intended to protect and enhance natural areas.	Increase in area of assessed, protected, enhanced, and/or restored natural areas.
EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.*	To consider and mitigate potential adverse effects on biological and cultural resources when implementing strategies and projects, or developing alternatives to avoid impacts.	Quantifiable measurement is specific to the project and type of resource affected. At a minimum, a no net loss policy should be implemented for potential adverse effects on sensitive biological and cultural resources (i.e., significant impacts should be mitigated).
EV-4. Identify opportunities for open spaces, trails and parks along streams and other recreational areas in the watershed that can be incorporated into projects.	Identification of opportunities to provide community recreational benefits along streams or in watersheds.	Area, miles of trails, and/or number of projects or programs implemented providing community recreational benefits along streams or in watersheds.
EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.*	Requirement to integrate Federal and State species protection and recovery plans into design of all projects, programs, or initiatives.	Number of projects implemented integrating Federal and State species protection and recovery plans.
Climate Change		
CC-1. Evaluate adaptation measures and mitigative solutions to climate change effects.*	Requirement to plan for potential future climate change impacts into design of all projects, programs, or initiatives.	Number of projects implemented incorporating consideration of future climate change impacts.

Table 3-4:
Measuring Attainment of IRWM Plan Objectives

Darker shading represents high priority objectives

Objective	Qualitative Measurement	Quantitative Measurement
CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.*	Improve access to data, reports on current science, documenting trends in climate change (rain fall, temperature, sea level rise, river flows). Development of clearinghouse of proposed and current monitoring programs related to climate change impacts.	Number of research/monitoring programs implemented to obtain greater understanding of long-term impacts of climate change in the Region, and/or monetary investment in research and monitoring programs.
CC-3. Support efforts to increase education, research and use of energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.*	Compile data reports on current science, documenting trends in resource conservation and alternative energy sources. List of proposed additions for current monitoring programs to decrease resource demands of potential projects.	Number of research/monitoring programs implemented to decrease resource demands of potential projects in the Region, and/or monetary investment in research and monitoring programs.
Regional Communication		
RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts. *	Meetings between local, regional, state, and federal entities to identify and resolve infrastructure and environmental resources problem areas.	Number and success ratio increase in proposed projects that have incorporated integrated strategies for protecting both infrastructure and environmental resources.
RC-2. Foster collaboration among regional entities as an alternative to litigation.*	Meetings convened between regional entities and stakeholders to discuss and plan regional water initiatives and/or resolve water-related conflicts. Positive indication of public support for implementation of water-related projects and/or programs that demonstrate collaborative efforts.	Number of projects, programs, or initiatives successfully designed, permitted, or implemented that promote integrated planning, improved communication between agencies & interest groups, and development of projects meeting the IRWM Plan goals.
RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.*	Implementation of programs to educate the public about water resources, with an emphasis on high priority geographic areas or demographic groups.	Number of presentations and outreach events which increase public education about water resources issues and needs; number of diverse, typically under-represented groups attending stakeholder meetings.
RC-4. Build relationships with State and federal regulatory agencies and other water forums and agencies.	Meetings convened and agreements reached between State and Federal regulatory agencies and other water agencies to facilitate the permitting, planning, and implementation of water-related projects.	Number of projects, programs, or initiatives successfully designed, permitted, or implemented as a result of improved relationships and communication with state and federal regulatory agencies.

AMENDED

Memorandum of Understanding for Integrated Regional Water Management in the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region

1. PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to recognize a mutual understanding among entities in the southern Monterey Bay area regarding their joint efforts toward Integrated Regional Water Management (IRWM) planning. That understanding will continue to increase coordination, collaboration and communication for comprehensive management of water resources in the cities and unincorporated portions of the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region (Region).

A. **Background and Description of Amendments**. The initial MOU to form a Regional Water Management Group (RWMG) was fully executed on July 22, 2008 by the Big Sur Land Trust (BSLT), a 501 (c) 3 organization, the City of Monterey, the Monterey Regional Water Pollution Control Agency (MRWPCA), the Monterey County Water Resources Agency (MCWRA), and the Monterey Peninsula Water Management District (MPWMD). The MOU formed a Regional Water Management Group (RWMG) for the purposes of developing and implementing projects consistent with the guidelines set by the State of California for IRWM.

Subsequently, the Marina Coast Water District (MCWD) requested approval to become part of the RWMG and signed an amended MOU in June 2011 that includes MCWD as a member of the RWMG. In 2012, the MOU was amended to include the Resource Conservation District of Monterey County (RCD) as a member of the RWMG. In 2015, the City of Seaside was recommended for addition to the RWMG.

Commented [SH1]: Update and add any other organizations that desire to join

In 2014, voters passed Proposition 1, the Water Quality, Supply, and Infrastructure Improvement Act of 2014 the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Act (Public Resources Code, sections 79700 - 79798), which authorizes the Legislature to appropriate funding for competitive grants for Integrated Regional Water Management (IRWM) projects. Funding is administered by the Department of Water Resources (DWR).

In 2015, representatives from the RWMGs representing the Central Coast region entered into discussions about a funding area ~~allocation~~ agreement for Proposition 1 funds allocated to the Central Coast funding area. ~~Negotiations have resulted in a draft agreement that is acceptable to all RWMGs.~~ In 2016, the Central Coast RWMGs entered into a Memorandum of Agreement for Integrated Regional Water Management Planning and Funding in the Central Coast Funding Area to share Proposition 1 funding for the IRWM grant program among the six Parties in a fair and equitable manner, and to reduce the need for the Parties to compete against each other for grant funds, which creates unnecessary economic inefficiencies in implementing each Planning Region's IRWM Plan.

Commented [SH2]: This is the term used in the definitions

This amended MOU reflects the addition of the City of Seaside, ADD OTHERS as a member of the RWMG and amends the MOU to authorize MPWMD to execute a funding area agreement on behalf of the RWMG.

2. RECITALS

A. The State of California desires to foster Integrated Regional Water Management (IRWM) planning and encourages local public, non-profit, and private (for profit) entities to define planning regions appropriate for managing water resources and to integrate strategies within these planning regions.

B. Water resources management authority in the Region is currently distributed among various public agencies with a range of legal powers and regulatory responsibilities. These public agencies have definite jurisdictional boundaries, whereas sensible water resources planning and management frequently requires actions in multiple jurisdictions. Non-public entities within the Region have considerable interests in cooperating with public entities to protect, manage, and enhance water resources within the Region.

C. Seven public entities and one non-profit entity in the Region with responsibility and interests in the management of water resources have agreed to form a Regional Water Management Group for the purposes of developing and implementing projects consistent with the guidelines set by the State of California for IRWM. These entities are:

- Big Sur Land Trust (BSLT), a 501 (c) 3 organization;
- City of Monterey;
- City of Seaside
- Monterey Regional Water Pollution Control Agency (MRWPCA);
- Monterey County Water Resources Agency (MCWRA);
- Marina Coast Water District (MCWD);
- Resource Conservation District of Monterey County; and
- Monterey Peninsula Water Management District (MPWMD).

Commented [SH3]: Update list if additional entities decide to join

D. The Regional Water Management Group has defined an appropriate planning Region that takes into consideration jurisdictional limits, powers and responsibilities, and watershed and groundwater basin boundaries. The Regional Water Management Group is taking the lead in overseeing and implementing a detailed IRWM Plan within the planning Region. The Region is generally described as encompassing approximately 347 square miles and consists of groundwater basins and coastal watershed areas contributing to the Carmel Bay and south Monterey Bay. The Region includes coastal watersheds from the southernmost portion of the San Jose Creek watershed north to the northern limit of the Seaside Groundwater Basin. The inland area is bounded by the Seaside Groundwater Basin to the north and by the Carmel River watershed to the south and east. The western limit of the planning Region generally coincides with the land and Pacific Ocean interface, but includes the Pt. Lobos, Carmel Bay, and Pacific Grove Areas of Special Biological Significance (ASBS) adjacent to the coastal portion of the Region.

The principal groundwater basins in the planning Region are the Seaside Groundwater Basin and the Carmel Valley Aquifer. The Region includes about 38 miles of the coast within the Monterey Bay National Marine Sanctuary, three ASBS, the Cities of Carmel-by-the Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, Seaside, and unincorporated portions of Monterey County including the Carmel Valley watershed (255 square miles), Pebble Beach, the Carmel Highlands and portions of the Seaside Groundwater Basin adjacent to Highway 68 (also known as Canyon Del Rey). This description of the planning Region is not intended to be a limitation on projects and resource planning that may be shared between adjacent IRWM planning Regions (e.g., the Greater Monterey County IRWM planning Region to the north and east).

E. The entities signatory to this MOU desire to link and integrate efforts to jointly oversee the development and implementation of a comprehensive Integrated Regional Water Management Plan for the Region and to allocate Proposition 1 IRWM funding within the planning Region.

3. GOALS

The goals of the collaborative effort undertaken pursuant to this MOU are:

3.1 To implement a comprehensive IRWMP for the Region that will consider the strategies that are required by the State under CWC 79562.5 and 79564 and subsequent modifications required under Proposition 84 and Proposition 1. Eligible projects must yield multiple benefits and include one or more of the following elements (PRC § 75026.(a)):

- **Water supply reliability, water conservation and water use efficiency**
- **Stormwater capture, storage, clean-up, treatment, and management**
- **Removal of invasive non-native species, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands**
- **Non-point source pollution reduction, management and monitoring**
- **Groundwater recharge and management projects**
- **Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users**
- **Water banking, exchange, reclamation and improvement of water quality**
- **Planning and implementation of multipurpose flood management programs**
- **Watershed protection and management**
- **Drinking water treatment and distribution**
- **Ecosystem and fisheries restoration and protection**

3.2 To implement a comprehensive IRWMP for the Region that incorporates water supply, water quality, flood and erosion protection, and environmental protection and enhancement objectives.

3.3 To improve and maximize coordination of individual public, private, and non-profit agency plans, programs and projects for mutual benefit and optimal gain within the Region.

3.4 To help identify, develop, and implement collaborative plans, programs, and projects that may be beyond the scope or capability of individual entities, but which would be of mutual benefit if implemented in a cooperative manner.

3.5 To facilitate regional water management efforts that include multiple water supply, water quality, flood control, and environmental protection and enhancement objectives.

3.6 To foster coordination, collaboration and communication between stakeholders and other interested parties, to achieve greater efficiencies, enhance public services, and build public support for vital projects.

3.7. To realize regional water management objectives at the least cost possible through mutual cooperation, elimination of redundancy, and enhanced regional competitiveness for State and Federal grant funding.

4. **DEFINITIONS**

4.1 **Funding Area Agreement.** The agreement entered into between the six regions within the Central Coast funding area to allocate a portion of Proposition 1 IRWM funds to each planning region.

4.2 **Integrated Regional Water Management Plan (IRWMP or IRWM Plan).** The plan envisioned by state legislators and state resource agencies that integrates the strategies, objectives, and priorities for projects to manage water resources proposed by public entities, non-profit entities, and stakeholders within a defined Planning Region. The minimum plan standards are as shown in Appendix A of "Integrated Regional Water Management Grant Program Guidelines, November 2004, Department of Water Resources and State Water Resources Control Board, Proposition 50, Chapter 8," as revised. Minimum IRWM Plan standards may be revised from time to time by the State of California.

4.3 **Integration**. The combining of water management strategies and projects to be included in an IRWMP.

4.4.a **Lead Agency for IRWM Plan Development.** The Monterey Peninsula Water Management District is designated by the Regional Water Management Group to lead the development or implementation of an Integrated Regional Water Management Plan for the Region.

4.4.b **Lead Agency for IRWM Grant Applications.** The Regional Water Management Group may designate any entity in the Regional Water Management Group to be the Lead Agency in making application to the State for grant funds.

4.4.c **Lead Agency for Executing a Central Coast funding area agreement**. The entity the Regional Water Management Group designates to represent the Monterey Peninsula Region to execute a Funding Area Agreement.

4.5 **Non-profit Agency.** A 501 (c) (3) corporation, conservancy, group or other organization involved in water resources management in the Region.

4.6 **Private Agency.** A private or publicly held for-profit corporation or property owner involved in water resources management in the Region

4.7 **Project**. A specific project that addresses a service function.

4.8 **Public Agency**. A state-authorized water district, water agency, water management agency or other public entity, be it a special district, city or other governmental entity, responsible for providing one or more services in the areas of water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning and aquatic habitat protection and restoration.

4.9 **Region.** The area defined by the Regional Water Management Group (RWMG) consisting of watersheds, sub-watersheds and groundwater basins under the jurisdiction of one or more entities within the RWMG.

4.10 **Service Function.** A water-related individual service function provided by a private, public, or non-profit entity, i.e. water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood protection, watershed planning, recreational facilities, and habitat protection and restoration.

4.11 **Signatory Entity.** A public, private, or non-profit entity within the Region that is signatory to this MOU.

4.12 **Stakeholder.** A non-signatory public, private, or non-profit agency identified in the IRWM Plan with an interest in water resources management within the Region.

4.13 **Technical Advisory Committee.** The committee organized to advise the Regional Water Management Group and Stakeholders concerning the IRWM Plan. Normally, the group will be comprised of individuals with technical backgrounds in the fields of marine and freshwater biology, ecology, geology, engineering, hydrogeology, planning, resource conservation, riparian systems, water conservation, and water quality. However, stakeholders with interests in a particular aspect of resource or project management, but not necessarily a technical background, may also be considered for inclusion in the TAC.

4.14 **Regional Water Management Group.** The group of entities that takes the lead in overseeing the development and implementation of the Integrated Regional Water Management Plan within the Planning Region. The RWMG consists of the Monterey Regional Water Pollution Control Agency, the Monterey County Water Resources Agency, the Monterey Peninsula Water Management District, the City of Monterey, the City of Seaside, the Marina Coast Water District, the Resource Conservation District of Monterey County, and the Big Sur Land Trust.

Commented [SH4]: Update with any added entities

4.15 **Water Management Strategies**. Plans for and activities to be considered in an IRWMP include, but are not limited to, ecosystem restoration, environmental and habitat protection and improvement, water-supply reliability, flood management, groundwater management, recreation and public access, storm water capture and management, water conservation, water quality improvement, water recycling, and wetlands enhancement and creation.

5. IRWMP PARTICIPANTS

5.1 **Adopting Entities.** The entities in the Region that participate in the development, adoption, and implementation of the Integrated Regional Water Management Plan for the Region. Each entity intending to carry out a project proposed in the IRWMP must formally adopt the IRWMP or provide written substantiation of acceptance by the governing authority of the entity. For a public agency, adoption of the IRWMP is by formal resolution of the governing body. For a non-profit or for-profit entity, proof of acceptance of the IRWMP by the equivalent of a public agency governing body is required (e.g., by a board of directors or other management entity).

5.2. **Stakeholders**. Entities, such as other public, private, and non-profit entities, business and environmental groups, that are considered valuable contributors to the understanding and management of the Region's water resources.

5.3. **Regulatory Agencies**. These agencies, including, but not limited to, the Central Coast Regional Water Quality Control Board, California Coastal Commission, U.S. Army Corps of Engineers, California Public Utilities Commission, National Marine Fisheries Service (NOAA Fisheries), U.S. Fish and Wildlife Service, and the California Department of Fish and Game, will be invited to participate in the development and implementation of the IRWMP.

5.4 **Regional Water Management Group.** The group of entities that takes the lead in developing and implementing an Integrated Regional Water Management Plan within the Planning Region.

6. MUTUAL UNDERSTANDING

6.1. **Subject matter scope of the IRWMP**. The IRWMP for the Region will include, but is not limited to, water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning, erosion prevention, and habitat protection and restoration. It is acknowledged that the proposals contained in the IRWMP may be based, in part, on the land-use plans of the member entities local governments such as Cities, Monterey County, and special districts located within the Region. Therefore, the resultant IRWMP will by design have incorporated the land-use plans and assumptions intrinsic to the respective water-related service function.

6.2. **Geographical scope of the IRWMP.** The area for this Memorandum is generally defined as the watersheds and associated groundwater basins contributing to the south Monterey Bay and Carmel Bay as shown in Figure 3-1: Map of Monterey Peninsula Integrated Regional Water Management Planning Region in the IRWM Plan.

The Region includes coastal watersheds from the southernmost portion of the San Jose Creek watershed north to the northern limit of the Seaside Groundwater Basin. The inland area is bounded by the Seaside Groundwater Basin to the north and by the Carmel River watershed to the south and east. The western limit of the planning Region generally coincides with the land and Pacific Ocean interface, but includes the Pt. Lobos, Carmel Bay, and Pacific Grove Areas of Special Biological Significance (ASBS) adjacent to the coastal portion of the Region.

However, it is recognized that the geographic scope represented in the IRWM Plan may be amended to include projects that are implemented cooperatively between IRWM planning regions (e.g., with the Greater Monterey County IRWM planning region) and is not intended to be a rigid boundary.

6.3. **Approach to developing the IRWMP**. It will be the responsibility of each entity signatory to this Memorandum to provide the Lead Agency with information for the

IRWMP concerning project proposals or to identify the need for a water management strategy for each service function provided by a signatory entity.

In order to be included in the IRWMP, all proposals for development of water management plans and water development project proposals related to the IRWMP must meet the standards identified in the IRWM Plan for the Region.

A technical advisory committee consisting of staff representatives from the Regional Water Management Group, other Stakeholders and such other organizations as may become contributing entities, will review proposed management plans and project proposals for consistency with the IRWMP and recommend a prioritized list of projects to be carried out within the Region. The Regional Water Management Group and Stakeholders will meet to review the recommendation made by the TAC.

6.4. **Approval of prioritized project list.** Approval of the prioritized project list should occur by consensus of the Regional Water Management Group and Stakeholders and should be based on the prioritization process described in the IRWMP and the recommendations of the Technical Advisory Committee. However, if a consensus cannot be reached among the Stakeholders and Regional Water Management Group, the Regional Water Management Group may make a final determination of the prioritized project list.

Commented [SH5]: Is there a desire/willingness to have a TAC for this plan update and prioritization process?

6.5. **Adoption of the IRWMP**. Plan adoption will occur by approval of the governing board of each entity. Each member of the RWMG shall adopt the IRWM Plan or an amended IRWM Plan, when the Plan becomes available. Project proponents named in an IRWM grant application shall adopt the IRWM Plan or amended IRWM Plan prior to submittal of the grant application. It should be noted that the adopted Plan and project list may be amended from time to time as described below.

6.6 **Amendment of IRWMP or Prioritized Project list.** The IRWM Plan and prioritized project list may be amended from time to time. Any member of the Regional Water Management Group or Stakeholders may request that the Lead Agency convene a meeting of the Regional Water Management Group and Stakeholders for the purposes of amending the IRWM Plan or the prioritized project list. However, it is anticipated that the IRWMP or prioritized project list will be amended no more frequently than annually, unless more frequent amendments are required to meet State IRWM standards or grant application cycles. An amended IRWM Plan must be consistent with State IRWM standards as described in Definition 4.1 “Integrated Regional Water Management Plan” and any subsequent revisions by the State to IRWM guidelines.

6.7. **Project Implementation.** Project proponents will be responsible for completing proposed projects and providing project reports to the Lead Agency.

6.8 **Project Monitoring.** The Regional Water Management Group will be responsible for monitoring the implementation of the IRWMP. The technical advisory committee will regularly report to the General Managers and Governing Boards of the Regional Water Management Group regarding progress on the development and implementation of the IRWMP. The Lead Agency will be responsible for coordinating data collection and dissemination.

6.9 **Grant Applications.** The Regional Water Management Group will designate a Lead Agency to apply for grant funds. The Lead Agency for each grant application should have a mission and expertise that is consistent with the purpose of the grant being applied for.

6.10 **Central Coast funding area agreement.** The RWMG designates MPWMD to execute an funding area agreement on behalf of the Monterey Peninsula Planning Region.

6.11 **Grant Awards and Agreement**. The Lead Agency will be the grantee and administer the grant on behalf of the Regional Water Management Group and Stakeholders.

6.12 **Participation in Regional Water Management Group (RWMG)**. Any qualified stakeholder may petition to become a member of the RWMG. A qualified stakeholder must demonstrate the following: a) an interest, responsibility or authority over multiple resources within the region; or b) a unique interest, responsibility, authority, or asset not shared by any other entity within the RWMG. The RWMG shall consider such a request for a change to the RWMG and shall vote by majority to accept or reject the request.

Commented [SH6]: Recommend further discussion of this provision.

6.13 **Length of Term in Regional Water Management Group**. Members of the RWMG may change from time to time, depending on the level of resources available to each entity. However, there is no required minimum or maximum length of time required as a member of the RWMG. If an entity withdraws from the RWMG, the remaining entities should attempt to replace the interest, responsibility or authority lost by the withdrawal.

6.14 **Rights of the Parties and Constituencies**: This MOU does not provide any added legal rights or regulatory powers to any of the signatory parties, or to the RWMG as a whole. This MOU does not of itself give any party the power to adjudicate water rights, or to regulate or otherwise control the private property of other parties. This MOU does not contemplate the parties taking any action that would adversely affect the rights of any of the parties, or that would adversely affect the customers or constituencies of any of the parties.

6.15 **Termination**. An entity signatory to this MOU may withdraw from participation upon 30 days advance notice to the other signatory entities, provided it agrees to be financially responsible for any previously committed, but unmet resource commitment.

6.16. **Personnel resources**. It is expected that the General Managers and/or other officials of each entity signatory to this MOU will periodically meet to insure that adequate staff resources are available to implement the IRWM Plan.

6.17. **Other on-going regional efforts**. Development of the IRWMP is separate from efforts of other organizations to develop water-related plans on a regional basis around Monterey Bay and the Central Coast. As the IRWMP is developed and implemented, work products may be shared to provide other entities and groups with current information.

Commented [SH7]: Suggestion to add a provision related to the Stormwater Resource Plan and its relationship to the IRWMP

7. RECORD OF AMENDMENTS

7.1 June 2010 – add Marina Coast Water District to RWMG. Revise Goals, Definitions and MOU terms to reflect Proposition 84 requirements.

7.2 March 2012 – add process to change RWMG, define when plan is to be adopted, revise to Proposition 84 standards
7.3 August 2012 – add Resource Conservation District of Monterey County to RWMG
7.4 March 2016 – add City of Seaside to RWMG; designate MWPMD to execute and implement a funding area allocation for Proposition 1 funds; remove indemnification clause.

Commented [SH8]: Not fully executed by all RWMG members, Seaside still to join

8. **SIGNATORIES TO THE MEMORANDUM OF UNDERSTANDING**

Commented [SH9]: Update table of signatories as needed

We, the duly authorized undersigned representatives of our respective entities, acknowledge the above as our understanding of the intent and expected outcome in overseeing the development and implementation of an Integrated Regional Water Management Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region.

Big Sur Land Trust By:_______________________________ Date:______________________, 20____	**Monterey County Water Resources Agency** By:_______________________________ Date:______________________, 20____
Monterey Regional Water Pollution Control Agency By:_______________________________ Date:______________________, 20____	**City of Monterey** By:_______________________________ Date:______________________, 20____
Monterey Peninsula Water Management District By:_______________________________ Date:______________________, 20____	**Marina Coast Water District** By:_______________________________ Date:______________________, 20____
Resource Conservation District of Monterey County By:_______________________________ Date:______________________, 20____	**City of Seaside** By:_______________________________ Date:______________________, 20____

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APPENDIX 14-D

SEPTEMBER 25, 2018 RWMG MEETING

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Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM
Regional Water Management Group (RWMG) Meeting

Meeting Date and Time: September 25, 2018, 10am – 12pm
Meeting Location: MPWMD Conference Room
or WebEx (info below)

Agenda

1. Introductions
2. RWMG Memorandum of Understanding
   2018 update, composition of the RWMG and process for new members to join
3. IRWMP Goals and Objectives
   Review of comments from August 14th meeting
4. Project Priorities & Proposed Project Review
   Discussion on process & brief update on 2018 project solicitation schedule
5. RWMG Technical Advisory Committee
   Creation of TAC to review IRWM Plan updates and project proposals
6. Disadvantaged Communities Needs Assessment
   Status Update and Discussion
7. Outreach to Native American Representatives and Tribes
8. Other updates from meeting participants

WebEx Info:

Meeting number (access code): 297 927 565

Meeting password: 2Qbsydhr

When it's time, join the meeting.

Join by phone

1-877-668-4493 Call-in toll free number (US/Canada)

1-650-479-3208 Call-in toll number (US/Canada)

Toll-free calling restrictions

Can't join the meeting?

Table 3-2: IRWM Plan Update Prioritized Regional Objectives

Water Supply (WS)
WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.*
WS-2. Maximize use of recycled water and other reuse, including gray water systems, and stormwater capture and use.*
WS-3. Seek long-term sustainable supplies for adopted future demand estimates.*
WS-4. Optimize conjunctive use of surface and groundwater.*
WS-5. Evaluate, advance, or create water conservation throughout the Region in compliance with the State's 20x2020 Water Conservation Plan.*
Water Quality (WQ)
WQ-1. Improve ocean water quality, including Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.*
WQ-2. Improve inland surface water quality for environmental resources (e.g. steelhead) and potable water supplies.*
WQ-3. Protect and improve water quality in groundwater basins as well as headwaters of streams.*
WQ-4. Meet or exceed water quality standards established by regulatory agencies and stakeholders. *
Flood Protection and Erosion Prevention (FP)
FP-1. Develop regional projects and plans necessary to protect existing infrastructure and sensitive habitats from flood damage, erosion, and sea level rise, in particular, along the South Monterey Bay shoreline and Carmel Valley.*
FP-2. Develop approaches for adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).*
FP-3. Protect quality and availability of water while preserving or restoring ecologic and stream function.*
FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.
Environmental Protection and Enhancement (EV)
EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds; promote the steelhead run.*
EV-2. Identify opportunities to assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*
EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.*
EV-4. Identify opportunities for open spaces, trails and parks along streams and other recreational areas in the watershed that can be incorporated into projects.
EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.*

Commented [SH1]: Comment that with desalination this also includes ocean resources.

Commented [SH2]: Comment – Water supply needs should include environmental benefits (i.e. adequate instream flows). Noted this is also in EV-1. Add a bullet to this goal?

Commented [SH3]: Subject of discussion in Cal-Am CPUC proceeding. Plan update will need to include further discussion on coordination of land use planning and water supplies.

Commented [SH4]: Need to determine if this is most current reference for this objective.

Commented [SH5]: To be noted in plan update - no Groundwater Sustainability Plan needed for Carmel River Basin because it is considered groundwater under the influence of surface water and not needed for Seaside Basin because adjudicated.

Commented [SH6]: Suggestion to specifically call out sea water intrusion as a concern (Seaside Groundwater Basin), with objective to maintain groundwater levels to prevent seawater intrusion.

Commented [SH7]: Comment that this is somewhat redundant with WQ-1, could possibly be removed.

Commented [SH8]: Add objective on floodplain restoration

Commented [SH9]: Discussion to separate flood protection and erosion into separate goals. Add erosion objectives regarding coastal erosion and adaptation in urban areas, beach nourishment, upper watershed erosion control management (e.g. fire/fuel management activities, road designs)

Commented [SH10]: Move up to Water Supply?

Commented [SH11]: Compare these objectives with Carmel River Watershed Assessment

Commented [SH12]: Strengthen, could do more than just identify opportunities

Climate Change (CC)	
CC-1. Evaluate adaptation measures and ~~mitigative~~ mitigation solutions to climate change effects.*	
CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.*	
CC-3. Support efforts to increase education, research and use of energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.*	
Regional Communication and Cooperation (RC)	
RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts. *	
RC-2. Foster collaboration among regional entities as an alternative to litigation.*	
RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.*	
RC-4. Build relationships with State and Federal regulatory agencies and other water forums and agencies.	

NOTES: ~~These objectives have been revised and renumbered compared to the draft objectives presented and evaluated at the 7/25/2012 Stakeholder Meeting.~~

High Priority Objectives based upon those objectives receiving the most points during the objectives prioritization exercise in July and August 2012 are presented in gray shading and bold type.

* = Objective is closely aligned with Statewide Priorities (see **Table 3-4**).

Commented [SH13]: Could have clearer objectives on sea level rise, drought and wildfire as specific climate change related issues

Commented [SH14]: Suggestions – quarterly meetings, subgroup that stays in contact with Greater Monterey County RWMG, add an objective about regional access to data

Commented [SH15]: Question on what is meant by this phrase, could it be made clearer

Commented [SH16]: Will need to do an objectives prioritization update at future meeting.

Commented [SH17]: To be updated pending Prop 1 PSP and other more recent State documents (e.g. 2018 California Water Plan)

AMENDED

Memorandum of Understanding for Integrated Regional Water Management in the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region

1. PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to recognize a mutual understanding among entities in the southern Monterey Bay area regarding their joint efforts toward Integrated Regional Water Management (IRWM) planning. That understanding will continue to increase coordination, collaboration and communication for comprehensive management of water resources in the cities and unincorporated portions of the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region (Region).

A. **Background and Description of Amendments**. The initial MOU to form a Regional Water Management Group (RWMG) was fully executed on July 22, 2008 by the Big Sur Land Trust (BSLT), a 501 (c) 3 organization, the City of Monterey, the Monterey Regional Water Pollution Control Agency (~~MRWPCA~~now known as Monterey One Water or M1W), the Monterey County Water Resources Agency (MCWRA), and the Monterey Peninsula Water Management District (MPWMD). The MOU formed a Regional Water Management Group (RWMG) for the purposes of developing and implementing projects consistent with the guidelines set by the State of California for IRWM.

Subsequently, the Marina Coast Water District (MCWD) requested approval to become part of the RWMG and signed an amended MOU in June 2011 that includes MCWD as a member of the RWMG. In 2012, the MOU was amended to include the Resource Conservation District of Monterey County (RCD) as a member of the RWMG. In 2015, the City of Seaside was recommended for addition to the RWMG.

In 2014, voters passed Proposition 1, the Water Quality, Supply, and Infrastructure Improvement Act of 2014 the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Act (Public Resources Code, sections 79700 - 79798), which authorizes the Legislature to appropriate funding for competitive grants for Integrated Regional Water Management (IRWM) projects. Funding is administered by the Department of Water Resources (DWR).

In 2015, representatives from the RWMGs representing the Central Coast region entered into discussions about a funding area ~~allocation~~ agreement for Proposition 1 funds allocated to the Central Coast funding area. ~~Negotiations have resulted in a draft agreement that is acceptable to all RWMGs.~~ In 2016, the Central Coast RWMGs entered into a Memorandum of Agreement for Integrated Regional Water Management Planning and Funding in the Central Coast Funding Area to share Proposition 1 funding for the IRWM grant program among the six Parties in a fair and equitable manner, and to reduce the need for the Parties to compete against each other for grant funds, which creates unnecessary economic inefficiencies in implementing each Planning Region's IRWM Plan.

Commented [SO1]: Now know as Monterey One Water or M1W)

Commented [SH2]: Update and add any other organizations that desire to join

Commented [SH3]: This is the term used in the definitions

This amended MOU reflects the addition of the City of Seaside, ADD OTHERS as a member of the RWMG and amends the MOU to authorize MPWMD to execute a funding area agreement on behalf of the RWMG.

2. RECITALS

A. The State of California desires to foster Integrated Regional Water Management (IRWM) planning and encourages local public, non-profit, and private (for profit) entities to define planning regions appropriate for managing water resources and to integrate strategies within these planning regions.

B. Water resources management authority in the Region is currently distributed among various public agencies with a range of legal powers and regulatory responsibilities. These public agencies have definite jurisdictional boundaries, whereas sensible water resources planning and management frequently requires actions in multiple jurisdictions. Non-public entities within the Region have considerable interests in cooperating with public entities to protect, manage, and enhance water resources within the Region.

C. Seven public entities and one non-profit entity in the Region with responsibility and interests in the management of water resources have agreed to form a Regional Water Management Group for the purposes of developing and implementing projects consistent with the guidelines set by the State of California for IRWM. These entities are:

Commented [SH4]: Update list if additional entities decide to join

- Big Sur Land Trust (BSLT), a 501 (c) 3 organization;
- City of Monterey;
- City of Seaside
- Monterey Regional Water Pollution Control Agency (MRWPCA);
- Monterey County Water Resources Agency (MCWRA);
- Marina Coast Water District (MCWD);
- Resource Conservation District of Monterey County; and
- Monterey Peninsula Water Management District (MPWMD).

D. The Regional Water Management Group has defined an appropriate planning Region that takes into consideration jurisdictional limits, powers and responsibilities, and watershed and groundwater basin boundaries. The Regional Water Management Group is taking the lead in overseeing and implementing a detailed IRWM Plan within the planning Region. The Region is generally described as encompassing approximately 347 square miles and consists of groundwater basins and coastal watershed areas contributing to the Carmel Bay and south Monterey Bay. The Region includes coastal watersheds from the southernmost portion of the San Jose Creek watershed north to the northern limit of the Seaside Groundwater Basin. The inland area is bounded by the Seaside Groundwater Basin to the north and by the Carmel River watershed to the south and east. The western limit of the planning Region generally coincides with the land and Pacific Ocean interface, but includes the Pt. Lobos, Carmel Bay, and Pacific Grove Areas of Special Biological Significance (ASBS) adjacent to the coastal portion of the Region.

The principal groundwater basins in the planning Region are the Seaside Groundwater Basin and the Carmel Valley Aquifer. The Region includes about 38 miles of the coast within the Monterey Bay National Marine Sanctuary, three ASBS, the Cities of Carmel-by-the Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, Seaside, and unincorporated portions of Monterey County including the Carmel Valley watershed (255 square miles), Pebble Beach, the Carmel Highlands and portions of the Seaside Groundwater Basin adjacent to Highway 68 (also known as Canyon Del Rey). This description of the planning Region is not intended to be a limitation on projects and resource planning that may be shared between adjacent IRWM planning Regions (e.g., the Greater Monterey County IRWM planning Region to the north and east).

E. The entities signatory to this MOU desire to link and integrate efforts to jointly oversee the development and implementation of a comprehensive Integrated Regional Water Management Plan for the Region and to allocate Proposition 1 IRWM funding within the planning Region.

3. GOALS

The goals of the collaborative effort undertaken pursuant to this MOU are:

3.1 To implement a comprehensive IRWMP for the Region that will consider the strategies that are required by the State under CWC 79562.5 and 79564 and subsequent modifications required under Proposition 84 and Proposition 1. Eligible projects must yield multiple benefits and include one or more of the following elements (PRC § 75026.(a)):

- **Water supply reliability, water conservation and water use efficiency**
- **Stormwater capture, storage, clean-up, treatment, and management**
- **Removal of invasive non-native species, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands**
- **Non-point source pollution reduction, management and monitoring**
- **Groundwater recharge and management projects**
- **Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users**
- **Water banking, exchange, reclamation and improvement of water quality**
- **Planning and implementation of multipurpose flood management programs**
- **Watershed protection and management**
- **Drinking water treatment and distribution**
- **Ecosystem and fisheries restoration and protection**

3.2 To implement a comprehensive IRWMP for the Region that incorporates water supply, water quality, flood and erosion protection, and environmental protection and enhancement objectives.

3.3 To improve and maximize coordination of individual public, private, and non-profit agency plans, programs and projects for mutual benefit and optimal gain within the Region.

3.4 To help identify, develop, and implement collaborative plans, programs, and projects that may be beyond the scope or capability of individual entities, but which would be of mutual benefit if implemented in a cooperative manner.

3.5 To facilitate regional water management efforts that include multiple water supply, water quality, flood control, and environmental protection and enhancement objectives.

3.6 To foster coordination, collaboration and communication between stakeholders and other interested parties, to achieve greater efficiencies, enhance public services, and build public support for vital projects.

3.7. To realize regional water management objectives at the least cost possible through mutual cooperation, elimination of redundancy, and enhanced regional competitiveness for State and Federal grant funding.

3.8 Satisfy State requirements for incorporation of Storm Water Resource plan.

Commented [SH5]: (check & reference government code requirements)

4. DEFINITIONS

4.1 **Funding Area Agreement.** The agreement entered into between the six regions within the Central Coast funding area to allocate a portion of Proposition 1 IRWM funds to each planning region.

4.2 **Integrated Regional Water Management Plan (IRWMP or IRWM Plan).** The plan envisioned by state legislators and state resource agencies that integrates the strategies, objectives, and priorities for projects to manage water resources proposed by public entities, non-profit entities, and stakeholders within a defined Planning Region. The minimum plan standards are as shown in Appendix A of "Integrated Regional Water Management Grant Program Guidelines, November 2004, Department of Water Resources and State Water Resources Control Board, Proposition 50, Chapter 8," as revised. Minimum IRWM Plan standards may be revised from time to time by the State of California.

4.3 **Integration**. The combining of water management strategies and projects to be included in an IRWMP.

4.4.a **Lead Agency for IRWM Plan Development.** The Monterey Peninsula Water Management District is designated by the Regional Water Management Group to lead the development or implementation of an Integrated Regional Water Management Plan for the Region.

4.4.b **Lead Agency for IRWM Grant Applications.** The Regional Water Management Group may designate any entity in the Regional Water Management Group to be the Lead Agency in making application to the State for grant funds.

4.4.c **Lead Agency for Executing a Central Coast funding area agreement**. The entity the Regional Water Management Group designates to represent the Monterey Peninsula Region to execute a Funding Area Agreement.

4.5 **Non-profit Agency.** A 501 (c) (3) corporation, conservancy, group or other organization involved in water resources management in the Region.

4.6 **Private Agency.** A private or publicly held for-profit corporation or property owner involved in water resources management in the Region

4.7 **Project**. A specific project that addresses a service function.

4.8 **Public Agency**. A state-authorized water district, water agency, water management agency or other public entity, be it a special district, city or other governmental entity, responsible for providing one or more services in the areas of water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning and aquatic habitat protection and restoration.

4.9 **Region.** The area defined by the Regional Water Management Group (RWMG) consisting of watersheds, sub-watersheds and groundwater basins under the jurisdiction of one or more entities within the RWMG.

4.10 **Service Function.** A water-related individual service function provided by a private, public, or non-profit entity, i.e. water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood protection, watershed planning, recreational facilities, and habitat protection and restoration.

4.11 **Signatory Entity.** A public, private, or non-profit entity within the Region that is signatory to this MOU.

4.12 **Stakeholder.** A non-signatory public, private, or non-profit agency identified in the IRWM Plan with an interest in water resources management within the Region.

4.13 **Technical Advisory Committee.** The committee organized to advise the Regional Water Management Group and Stakeholders concerning the IRWM Plan. Normally, the group will be comprised of individuals with technical backgrounds in the fields of marine and freshwater biology, ecology, geology, engineering, hydrogeology, planning, resource conservation, riparian systems, water conservation, and water quality. However, stakeholders with interests in a particular aspect of resource or project management, but not necessarily a technical background, may also be considered for inclusion in the TAC.

4.14 **Regional Water Management Group.** The group of entities that takes the lead in overseeing the development and implementation of the Integrated Regional Water Management Plan within the Planning Region. The RWMG consists of the Monterey Regional Water Pollution Control Agency, the Monterey County Water Resources Agency, the Monterey Peninsula Water Management District, the City of Monterey, the City of Seaside, the Marina Coast Water District, the Resource Conservation District of Monterey County, and the Big Sur Land Trust.

Commented [SH6]: Update with any added entities

4.15 **Water Management Strategies**. Plans for and activities to be considered in an IRWMP include, but are not limited to, ecosystem restoration, environmental and habitat protection and improvement, water-supply reliability, flood management, groundwater management, recreation and public access, storm water capture and management, water conservation, water quality improvement, water recycling, and wetlands enhancement and creation.

5. IRWMP PARTICIPANTS

5.1 **Adopting Entities.** The entities in the Region that participate in the development, adoption, and implementation of the Integrated Regional Water Management Plan for the Region. Each entity intending to carry out a project proposed in the IRWMP must formally adopt the IRWMP or provide written substantiation of acceptance by the governing authority of the entity. For a public agency, adoption of the IRWMP is by formal resolution of the governing body. For a non-profit or for-profit entity, proof of acceptance of the IRWMP by the equivalent of a public agency governing body is required (e.g., by a board of directors or other management entity).

5.2. **Stakeholders**. Entities, such as other public, private, and non-profit entities, business and environmental groups, that are considered valuable contributors to the understanding and management of the Region's water resources.

5.3. **Regulatory Agencies**. These agencies, including, but not limited to, the State Water Resources Control Board, Central Coast Regional Water Quality Control Board, California Coastal Commission, U.S. Army Corps of Engineers, California Public Utilities Commission, National Marine Fisheries Service (NOAA Fisheries), U.S. Fish and Wildlife Service, and the California Department of Fish and Game, will be invited to participate in the development and implementation of the IRWMP.

5.4 **Regional Water Management Group.** The group of entities that takes the lead in developing and implementing an Integrated Regional Water Management Plan within the Planning Region.

Commented [SO7]: State Water Resouces Control Board??

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6.1. **Subject matter scope of the IRWMP**. The IRWMP for the Region will include, but is not limited to, water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning, erosion prevention, and habitat protection and restoration. It is acknowledged that the proposals contained in the IRWMP may be based, in part, on the land-use plans of the member entities local governments such as Cities, Monterey County, and special districts located within the Region. Therefore, the resultant IRWMP will by design have incorporated the land-use plans and assumptions intrinsic to the respective water-related service function.

6.2. **Geographical scope of the IRWMP.** The area for this Memorandum is generally defined as the watersheds and associated groundwater basins contributing to the south Monterey Bay and Carmel Bay as shown in Figure 3-1: Map of Monterey Peninsula Integrated Regional Water Management Planning Region in the IRWM Plan.

The Region includes coastal watersheds from the southernmost portion of the San Jose Creek watershed north to the northern limit of the Seaside Groundwater Basin. The inland area is bounded by the Seaside Groundwater Basin to the north and by the Carmel River watershed to the south and east. The western limit of the planning Region generally coincides with the land and Pacific Ocean interface, but includes the Pt. Lobos, Carmel Bay, and Pacific Grove Areas of Special Biological Significance (ASBS) adjacent to the coastal portion of the Region.

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Commented [SH8]: Is there a desire/willingness to have a TAC for this plan update and prioritization process?

6.5. **Adoption of the IRWMP**. Plan adoption will occur by approval of the governing board of each entity. Each member of the RWMG shall adopt the IRWM Plan or an amended IRWM Plan, when the Plan becomes available. Project proponents named in an IRWM grant application shall adopt the IRWM Plan or amended IRWM Plan prior to submittal of the grant application. It should be noted that the adopted Plan and project list may be amended from time to time as described below.

6.6 **Amendment of IRWMP or Prioritized Project list.** The IRWM Plan and prioritized project list may be amended from time to time. Any member of the Regional Water Management Group or Stakeholders may request that the Lead Agency convene a meeting of the Regional Water Management Group and Stakeholders for the purposes of amending the IRWM Plan or the prioritized project list. However, it is anticipated that the IRWMP or prioritized project list will be amended no more frequently than annually, unless more frequent amendments are required to meet State IRWM standards or grant application cycles. An amended IRWM Plan must be consistent with State IRWM standards as described in Definition 4.1 "Integrated Regional Water Management Plan" and any subsequent revisions by the State to IRWM guidelines.

6.7. **Project Implementation.** Project proponents will be responsible for completing proposed projects and providing project reports to the Lead Agency.

6.8 **Project Monitoring.** The Regional Water Management Group will be responsible for monitoring the implementation of the IRWMP. The technical advisory committee will regularly report to the General Managers and Governing Boards of the Regional Water Management Group regarding progress on the development and implementation of the IRWMP. The Lead Agency will be responsible for coordinating data collection and dissemination.

6.9 **Grant Applications.** The Regional Water Management Group will designate a Lead Agency to apply for grant funds. The Lead Agency for each grant application should have a mission and expertise that is consistent with the purpose of the grant being applied for.

6.10 **Central Coast funding area agreement.** The RWMG designates MPWMD to execute a~~n~~ funding area agreement on behalf of the Monterey Peninsula Planning Region.

6.11 **Grant Awards and Agreement**. The Lead Agency will be the grantee and administer the grant on behalf of the Regional Water Management Group and Stakeholders.

6.12 **Participation in Regional Water Management Group (RWMG)**. Any qualified stakeholder may petition to become a member of the RWMG. A qualified stakeholder must demonstrate the following: a) an interest, responsibility or authority over multiple resources within the region; or b) a unique interest, responsibility, authority, or asset not shared by any other entity within the RWMG. The RWMG shall consider such a request for a change to the RWMG and shall vote by majority to accept or reject the request.

6.13 **Length of Term in Regional Water Management Group**. Members of the RWMG may change from time to time, depending on the level of resources available to each entity. However, there is no required minimum or maximum length of time required as a member of the RWMG. If an entity withdraws from the RWMG, the remaining entities should attempt to replace the interest, responsibility or authority lost by the withdrawal.

6.14 **Rights of the Parties and Constituencies**: This MOU does not provide any added legal rights or regulatory powers to any of the signatory parties, or to the RWMG as a whole. This MOU does not of itself give any party the power to adjudicate water rights, or to regulate or otherwise control the private property of other parties. This MOU does not contemplate the parties taking any action that would adversely affect the rights of any of the parties, or that would adversely affect the customers or constituencies of any of the parties.

6.15 **Termination**. An entity signatory to this MOU may withdraw from participation upon 30 days advance notice to the other signatory entities, provided it agrees to be financially responsible for any previously committed, but unmet resource commitment.

6.16. **Personnel resources**. It is expected that the General Managers and/or other officials of each entity signatory to this MOU will periodically meet to insure that adequate staff resources are available to implement the IRWM Plan.

6.17. **Other on-going regional efforts**. Development of the IRWMP is separate from efforts of other organizations to develop water-related plans on a regional basis around Monterey Bay and the Central Coast. As the IRWMP is developed and implemented, work products may be shared to provide other entities and groups with current information.

7. RECORD OF AMENDMENTS

Commented [SH9]: Recommend further discussion of this provision.

Commented [SH10]: Suggestion to add a provision related to the Stormwater Resource Plan and its relationship to the IRWMP

Commented [SH11R10]: Is added statement above sufficient?

7.1 June 2010 – add Marina Coast Water District to RWMG. Revise Goals, Definitions and MOU terms to reflect Proposition 84 requirements.

7.2 March 2012 – add process to change RWMG, define when plan is to be adopted, revise to Proposition 84 standards

7.3 August 2012 – add Resource Conservation District of Monterey County to RWMG

7.4 March 2016 – ~~add City of Seaside to RWMG;~~ designate MWPMD to execute and implement a funding area allocation for Proposition 1 funds; remove indemnification clause.

7.5 DATE – add City of Seaside, others, to RWMG

Commented [SH12]: Not fully executed by all RWMG members, Seaside still to join

Commented [SO13]: As noted, this needs to be updated.

8. **SIGNATORIES TO THE MEMORANDUM OF UNDERSTANDING**

Commented [SH14]: Update table of signatories as needed

We, the duly authorized undersigned representatives of our respective entities, acknowledge the above as our understanding of the intent and expected outcome in overseeing the development and implementation of an Integrated Regional Water Management Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region.

Big Sur Land Trust By:_______________________________ Date:______________________, 20____	**Monterey County Water Resources Agency** By:_______________________________ Date:______________________, 20____
Monterey Regional Water Pollution Control Agency By:_______________________________ Date:______________________, 20____	**City of Monterey** By:_______________________________ Date:______________________, 20____
Monterey Peninsula Water Management District By:_______________________________ Date:______________________, 20____	**Marina Coast Water District** By:_______________________________ Date:______________________, 20____
Resource Conservation District of Monterey County By:_______________________________ Date:______________________, 20____	**City of Seaside** By:_______________________________ Date:______________________, 20____

Table 3-2: IRWM Plan Update Prioritized Regional Objectives

Water Supply (WS)
WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.*
WS-2. Maximize use of recycled water and other reuse and expand sewer services to areas with onsite systems to increase sources of water for recycling., ~~including gray water systems, and stormwater capture and use~~.*
WS-3. Develop opportunities for stormwater capture and reuse pursuant to the Stormwater Resource Plan.
WS-~~3~~4. Seek long-term sustainable supplies for adopted future demand estimates.*
WS-~~4~~5. Optimize conjunctive use of surface and groundwater.*
WS-~~5~~6. Evaluate, advance, or create water conservation throughout the Region in compliance with the State's 20x2020 Water Conservation Plan.*
WS-7. Improve water supply needs to achieve multiple benefits, beneficial uses and environmental flows.
Water Quality (WQ)
WQ-1. Improve ocean water quality, including Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.*
WQ-2. Improve inland surface water quality for environmental resources (e.g. steelhead) and potable water supplies.*
WQ-3. Protect and improve water quality in groundwater basins as well as headwaters of streams.*
WQ-4. Meet or exceed water quality standards established by regulatory agencies and stakeholders. *
Flood Protection and Erosion Prevention (FP)
FP-1. Develop regional projects and plans necessary to protect existing infrastructure and sensitive habitats from flood damage, erosion, and sea level rise, in particular, along the South Monterey Bay shoreline and Carmel Valley.*
FP-2. Develop approaches for adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).*
FP-3. Protect quality and availability of water while preserving or restoring ecologic and stream function.*
FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.
Environmental Protection and Enhancement (EV)
EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds; promote the steelhead ~~run~~recovery by meeting accepted or approved environmental flows within the regional watersheds.*
EV-2. Identify opportunities to assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*
EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.*
EV-4. Identify opportunities for open spaces, trails and parks along streams and other recreational areas in the watershed that can be incorporated into projects.
EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.*
EV-6. Promote watershed activities for fire fuel management and adaptive management strategies to protect water quality and water supplies from catastrophic wildfires.

Commented [SH1]: Comment that with desalination this also includes ocean resources.

Commented [SH2]: Comment – Water supply needs should include environmental benefits (i.e. adequate instream flows). Noted this is also in EV-1. Add a bullet to this goal?

Commented [SH3]: Recommend separating this into its own objective.

Commented [SH4]: Subject of discussion in Cal-Am CPUC proceeding. Plan update will need to include further discussion on coordination of land use planning and water supplies.

Commented [SH5]: Confirm that gray water systems are included in most current water conservation plan

Commented [SH6]: Need to determine if this is most current reference for this objective.

Commented [SH7]: To be noted in plan update - no Groundwater Sustainability Plan needed for Carmel River Basin because it is considered groundwater under the influence of surface water and not needed for Seaside Basin because adjudicated.

Commented [SH8]: Suggestion to specifically call out sea water intrusion as a concern (Seaside Groundwater Basin), with objective to maintain groundwater levels to prevent seawater intrusion.

Commented [SH9]: Comment that this is somewhat redundant with WQ-1, could possibly be removed.

Commented [SH10]: Add objective on floodplain restoration

Commented [SH11]: Discussion to separate flood protection and erosion into separate goals. Add erosion objectives regarding coastal erosion and adaptation in urban areas, beach nourishment, upper watershed erosion control management (e.g. fire/fuel management activities, road designs)

Commented [SH12]: Move up to Water Supply?

Commented [SH13]: Compare these objectives with Carmel River Watershed Assessment

Commented [SH14]: Strengthen, could do more than just identify opportunities

Climate Change (CC)	
CC-1. Evaluate adaptation measures and ~~mitigative~~ mitigation solutions to climate change effects.*	
CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.*	
CC-3. Support efforts to increase education, research and use of energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.*	
Regional Communication and Cooperation (RC)	
RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts. *	
RC-2. Foster collaboration among regional entities as an alternative to litigation.*	
RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.*	
RC-4. Build relationships with State and Federal regulatory agencies and other water forums and agencies.	
NOTES: ~~These objectives have been revised and renumbered compared to the draft objectives presented and evaluated at the 7/25/2012 Stakeholder Meeting.~~ **High Priority Objectives based upon those objectives receiving the most points during the objectives prioritization exercise in July and August 2012 are presented in gray shading and bold type.** * = Objective is closely aligned with Statewide Priorities (see **Table 3-4**).	

Commented [SH15]: Could have clearer objectives on sea level rise, drought and wildfire as specific climate change related issues

Commented [SH16]: Suggestions – quarterly meetings, subgroup that stays in contact with Greater Monterey County RWMG, add an objective about regional access to data

Commented [SH17]: Question on what is meant by this phrase, could it be made clearer

Commented [SH18]: Will need to do an objectives prioritization update at future meeting.

Commented [SH19]: To be updated pending Prop 1 PSP and other more recent State documents (e.g. 2018 California Water Plan)

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APPENDIX 14-E

NOVEMBER 1, 2018 RWMG MEETING

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Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM
Regional Water Management Group (RWMG) Meeting

Meeting Date and Time: November 1, 2018, 10am – 12pm
Meeting Location: MPWMD Conference Room, 5 Harris Court, Monterey, CA
or WebEx (call information below)

Agenda

1. Introductions

2. RWMG Action Item:
   a) Receive a presentation from Jeff Condit, MRSWMP Program Manager; and

   b) Accept the Stormwater Resource Plan (SWRP) for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Planning Region

   The plan can be found at the following link:
   https://mrwpca1-my.sharepoint.com/:b:/g/personal/jeff_mrwpca_com/EXQIW93_qJxGstIWjnxS3AIBz_gMbhxOXygkxTUVMCf_PQ?e=hOuh3A

   The project database can be found here:
   https://mrwpca1-my.sharepoint.com/:x:/g/personal/jeff_mrwpca_com/EUPJno4F5yBMmYAwCC4XD84BbCKTOjcnsi8Ykzw681C3mw?e=cfl3lD

3. Status Update on the 2018 Revisions to the RWMG Memorandum of Understanding

4. Approve the 2018 IRWMP Goals and Objectives

5. Provide input on IRWMP Objectives priorities

6. Discuss the 2018 IRWMP Update Project Solicitation Process and Schedule

7. Other updates from meeting participants

Webex meeting information:

IRWM Regional Water Management Group (RWMG) Meeting
Thursday, November 1, 2018
10:00 am | Pacific Daylight Time (San Francisco) | 2 hrs
Meeting number (access code): 621 943 294
Meeting password: 6BKevidP

When it's time, join the meeting.

Join by phone
1-877-668-4493 Call-in toll free number (US/Canada)
1-650-479-3208 Call-in toll number (US/Canada)
Toll-free calling restrictions

Can't join the meeting?

IMPORTANT NOTICE: Please note that this WebEx service allows audio and other information sent during the session to be recorded, which may be discoverable in a legal matter. By joining this session, you automatically consent to such recordings. If you do not consent to being recorded, discuss your concerns with the host or do not join the session.

California State University
MONTEREY BAY
Extraordinary Opportunity

School of Natural Sciences
100 Campus Center
Seaside, CA 93955-8001
831-582-3873

9 October, 2018

Sara Hardgrave
Chair, South Monterey Bay Regional Water Management Group
Big Sur Land Trust
509 Hartnell Street
Monterey, Ca 93940

Dear Ms. Hardgrave:

As a member of the faculty authorized by Vice President for Administration to speak on behalf of California State University Monterey Bay (CSUMB), I request membership in the South Monterey Bay Regional Water Management Group.

Part of CSUMB's mission is to "… contribute productively, responsibly, and ethically to California". This mission is supported by the university's vision is for it be "a collaborative, intellectual community distinguished by partnerships with existing institutions both public and private … for coordinated community service". As an academic institution dedicated to analytically meeting critical state and regional needs, CSUMB has an interest in the wise, equitable, and sustainable use of water resources in the region. CSUMB faculty and students have been involved with the monitoring and advising the management of central coast waterbodies through its Watershed Institute for over 20 years. This record of service to the local community clearly demonstrates CSUMB's continuing interest in multiple resources within the region.

Sincerely,

John R. Olson, Ph.D.
Assistant Professor, Freshwater Ecology
California State University Monterey Bay

Carmel Area Wastewater District
P.O. Box 221428 Carmel California 93922 ❖ (831) 624-1248 ❖ FAX (831) 624-0811

October 8, 2018

Sarah Hardgrave
Associate Director of Conservation
Big Sur Land Trust
509 Harnell Street
Monterey, CA 93940

Dear Ms. Hardgrave:

Carmel Area Wastewater District (CAWD) would like to petition the Regional Water Management Group (RWMG) to become a member.

We believe that we are a qualified stakeholder because of CAWD's authority and responsibility for wastewater treatment and collection in its service area for roughly 16,000 customers along with supplying reclaimed water to the Reclaimed Water Users in Del Monte Forest to offset irrigation demands on the region's water supplies.

Depending on timing, we would like to submit the revised MOU to our Board of Directors at their October 25, 2018 meeting, or if necessary, at our December 13, 2018 meeting.

Thank you,

B. Buikema

B. Buikema
General Manager

Carmel River Watershed Conservancy
PO Box 223833, Carmel, CA 93922

September 27, 2018

Sara Hardgrave
Chair, South Monterey Bay IRWM Program
Big Sur Land Trust
509 Hartnell Street
Monterey, Ca 93940

Dear Ms. Hardgrave:

As you requested, I am submitting a formal request on behalf of the Carmel River Watershed Conservancy's Board of Directors to be considered for membership in the Regional Water Management Group and the South Monterey Bay IRWM Membership.

We consider our organization to be a major stakeholder in this IRWM region having conducted a Watershed Assessment and developed an Action Plan for the Carmel River and its watershed, a Supplemental Assessment for the San Clemente Dam's future, annually issuing a listing of all active Projects in the watershed, and chairing the Carmel River Task Force for the past four years.

We plan to attend the IRWM meetings regardless of whether we are a formal member, but we would prefer to attend as a member in good standing.

Sincerely,

Lorin Letendre
Executive Director

Carmel Valley Association

preserving the beauty, resources, and rural character of the Valley since 1949

Sarah Hardgrave
P.O. Box 4071
Monterey, CA 93942

mailto:info@bigsurlandtrust.org

Dear Sarah:

The Carmel Valley Association (CVA) board of directors recently voted to apply to join the Regional Management Group. CVA is the association for residents of Carmel Valley. We have labored strenuously, and often successfully, to craft wise decisions in the areas of land use and formation of the County general plans. As the local IRWM program Regional Management Group surely is aware, land use is an important determinant of the health of the Carmel Valley watershed and of the adjacent Carmel Bay and Point Lobos Areas of Special Biological Significance.

CVA's members are among those most affected by, and thus most concerned with, planning and implementation decisions in the watershed. CVA is, in short, a principal stakeholder. It has a history of concern with issues ranging from recreational assets to groundwater supply.

CVA's intent is to participate fully in the IRWM program. We view this participation as important and consistent with the role CVA has historically performed.

Sincerely,

Pris Walton, President, Carmel Valley Association

MAIL P.O. Box 157, Carmel Valley, CA 93924
WEB www.carmelvalleyassociation.org | EMAIL president@carmelvalleyassociation.org

City of Carmel-by-the-Sea
DEPARTMENT OF PUBLIC WORKS
POST OFFICE BOX CC
CARMEL-BY-THE-SEA, CA 93921
(831) 620-2070

October 10, 2018

Sarah Hardgrave
Chair, South Monterey Bay IRWM Program
Big Sur Land Trust
509 Hartnell Street
Monterey, CA 93940

Dear Ms. Hardgrave:

Per your request, we are submitting a formal request on behalf of the City of Carmel-by-the-Sea to be considered for membership in the Regional Water Management Group (RWMG) and in the South Monterey Bay IRWM Program.

We believe the City of Carmel-by-the-Sea is an important stakeholder of this group as we are a jurisdiction within the Carmel River watershed and we are responsible for the operation and maintenance of the City's drainage system. We also value collaboration with other local agencies that manage important infrastructure such as water supply and sanitary sewers within and around our City boundaries. In addition, we are a member agency of the Monterey Regional Stormwater Management Program.

We appreciate the RWMG's consideration of our request. If you have any questions, please contact Agnes Martelet, Environmental Compliance Manager, at (831) 620-2078.

Sincerely,

Robert M. Harary

Robert Harary
Public Works Director
City of Carmel-by-the-Sea

cc: Chip Rerig, City Administrator
Agnes Martelet, Environmental Compliance Manager

City Hall
1 Pendergrass Way
Sand City, CA
93955

Administration
(831) 394-3054

Planning
(831) 394-6700

FAX
(831) 394-3054

Police
(831) 394-1451

FAX
(831) 394-1038

Incorporated
May 31, 1960

October 10, 2018
Sent via Electronic Mail

Sara Hardgrave
Chair, South Monterey Bay IRWM Program
Big Sur Land Trust
509 Hartnell Street
Monterey, CA 93940

Subject: Request to Join the IRWM

Dear Ms. Hardgrave,

I am submitting a formal request on behalf of the City of Sand City to be considered for membership in the Regional Water Management Group (RWMG) and the South Monterey Bay Integrated Regional Water Management (IRWM) Membership.

We consider the City of Sand City to be a significant stakeholder on the Monterey Peninsula and within the IRWM region. The City exercises responsibility and authority over land uses within its jurisdiction and we work collaboratively with regional agencies to oversee water supply, storm water resources, and infrastructure development for our residents and property owners.

In 2010, the City began operation of its reverse osmosis desalination facility through the Sand City Water Supply Project in partnership with California American Water, thereby providing much needed potable water resources to our community while at the same time helping to reduce over pumping of the Carmel River. The City has sat on the Technical Advisory Committee for the Seaside Groundwater Watermaster and Management Committee of the Monterey Regional Storm Water Management Program for a number of years.

Please consider our request to join the RWMG and the IRWM as a member in good standing.

Sincerely,

Mary Ann Carbone

Mary Ann Carbone
Mayor
City of Sand City

cc: Linda Scholink, City Clerk/Administrative Services Director
Leon D. Gomez, City Engineer

OFFICE OF THE CITY MANAGER
440 Harcourt Avenue
Seaside, CA 93955
www.ci.seaside.ca.us
Telephone 831-899-6701
Fax 831-624-5839

October 9, 2018

Sarah Hardgrave
South Monterey Bay IRWM Program
5 Harris Court, Building G
Monterey, CA 93940

Dear Ms. Hardgrave

I am writing on behalf of the City of Seaside to express our intent to join the Monterey Peninsula, Carmel Bay and South Monterey Bay Integrated Regional Water Management Program (South Monterey Bay IRWMP). Below is a brief summary of the City's qualifications for consideration in joining as a voting stakeholder of the South Monterey Bay IRWMP.

The City of Seaside actively participates in multiple groups focused on solving the regions water supply and water quality challenges. Such efforts include membership in the Seaside Groundwater Basin Water Master, Monterey Regional Storm Water Management Program, and the Monterey Peninsula Regional Water Authority. Furthermore, the City of Seaside is a voting member of the Monterey Peninsula Water Management District, Monterey One Water and the Seaside County Sanitation District, all agencies dedicated to enhancing how water and waste water is managed in the Monterey Bay.

A city council item to consider joining the South Monterey Bay IRWMP is tentatively scheduled for November 15, 2018. The Public Works Engineering department will represent the City during working group meetings. Please coordinate with Rick Riedl, public works director/city engineer, or Scott Ottmar, senior engineer.

Thank you for your time.

Craig Malin
City Manager

Cc:
Rick Riedl, Public Works Director/City Engineer
Scott Ottmar, Senior Engineer

Monterey Peninsula, Carmel Bay, and South Monterey Bay
Integrated Regional Water Management (IRWM)
Regional Water Management Group (RWMG)

October 26, 2018

Dear current and potential new members of the RWMG:

In anticipation of forthcoming IRWM grant funding, the Monterey Peninsula, Carmel Bay, and South Monterey Bay RWMG re-initiated regular meetings earlier this year after a hiatus of activity since the 2014 Integrated Regional Water Management Plan Update. With support from the Monterey Peninsula Regional Water Management District, I am currently working to facilitate meetings of the RWMG, coordinate the program, and prepare required plan updates.

In 2019, the Department of Water Resources (DWR) will begin making new Proposition 1 IRWM implementation funding available. In 2016, the six Central Coast IRWM funding regions entered into a Memorandum of Agreement to share $43M in Proposition 1 funding in a fair and equitable manner based on a base amount, and a proportional amount by population and total acreage of the planning area. This agreement was reached in part because some regions have received a disproportionate amount of past IRWM funding. As a result, the Monterey Peninsula, Carmel Bay and South Monterey Bay IRWM funding area is slated to receive approximately $4.2M in Prop 1 IRWM funding, including 10% for Disadvantaged Community (DAC) Involvement and 10% for DAC Projects.

As part of the plan update and project solicitation process, it was timely to open up an opportunity for new members to join the RWMG and sign onto the Memorandum of Understanding (MOU) that forms the group. Members of the RWMG are not required to make any financial contribution to the IRWM program. Participation as a member of the RWMG does entitle a member with the ability to vote on the prioritization process for projects that would be put forward for the available IRWM grant funding.

At the last RWMG/Stakeholders meeting on September 25, 2018, potential new members were asked to provide a letter request to the RWMG to join, pursuant to the MOU's Mutual Understanding, which currently states:

> *6.12 Participation in Regional Water Management Group (RWMG). Any qualified stakeholder may petition to become a member of the RWMG. A qualified stakeholder must demonstrate the following: a) an interest, responsibility or authority over multiple resources within the region; or b) a unique interest, responsibility, authority, or asset not shared by any other entity within the RWMG. The RWMG shall consider such a request for a change to the RWMG and shall vote by majority to accept or reject the request.*

Seven organizations have since provided letters requesting to join the RWMG: California State University Monterey Bay, Carmel Area Wastewater District, Carmel River Watershed Conservancy, Carmel Valley Association, City of Seaside, City of Carmel-by-the-Sea, City of Sand City.

In addition to adding new members, other revisions are proposed to the MOU based on discussions at the last two meetings and updated information about the IRWM program in the 2016 and 2018 DWR Program Guidelines.

At this time, current RWMG members are requested to initiate your respective process to accept or reject the requests for membership by the aforementioned entities, as well as to approve the attached 2018 revision to the MOU. Potential new members are asked to initiate their respective processes for approval of the MOU. A resolution of approval by your governing body is required as evidence of the action taken.

The project solicitation process will begin in the next month for submittal of proposals by the end of the year. Once projects have been submitted they will be ranked and prioritized by the RWMG. To be able to participate in the final voting on project priorities, the process to add new members and approve the updated MOU should be completed by each member organization no later than early February 2019.

Please let me know if you have any questions about this process, or comments or changes on the draft 2018 MOU.

Sincerely,

Sarah Hardgrave

Sarah Hardgrave, Big Sur Land Trust
Program Coordinator on behalf of the Monterey Peninsula Water Management District

AMENDED

Memorandum of Understanding for Integrated Regional Water Management in the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region

1. PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to recognize a mutual understanding among entities in the southern Monterey Bay area regarding their joint efforts toward Integrated Regional Water Management (IRWM) planning. That understanding will continue to increase coordination, collaboration and communication for comprehensive management of water resources in the cities and unincorporated portions of the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region (Region).

A. **Background and Description of Amendments**. The initial MOU to form a Regional Water Management Group (RWMG) was fully executed on July 22, 2008 by the Big Sur Land Trust (BSLT), a 501 (c) 3 organization, the City of Monterey, the Monterey Regional Water Pollution Control Agency (MRPWCA, now known as Monterey One Water or M1W), the Monterey County Water Resources Agency (MCWRA), and the Monterey Peninsula Water Management District (MPWMD). The MOU formed a Regional Water Management Group (RWMG) for the purposes of developing and implementing projects consistent with the guidelines set by the State of California for IRWM.

   Subsequently, the Marina Coast Water District (MCWD) requested approval to become part of the RWMG and signed an amended MOU in June 2011 that includes MCWD as a member of the RWMG. In 2012, the MOU was amended to include the Resource Conservation District of Monterey County (RCD) as a member of the RWMG. In 2018, a number of additional organizations requested approval to become part of the MOU, including California State University Monterey Bay, Carmel Area Wastewater District, Carmel River Watershed Conservancy, Carmel Valley Association, City of Seaside, the City of Carmel-by-the-Sea, the City of Sand City.

   In 2014, voters passed Proposition 1, the Water Quality, Supply, and Infrastructure Improvement Act of 2014 the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Act (Public Resources Code, sections 79700 - 79798), which authorizes the Legislature to appropriate funding for competitive grants for Integrated Regional Water Management (IRWM) projects. Funding is administered by the Department of Water Resources (DWR).

   In 2015, representatives from the RWMGs representing the Central Coast region entered into discussions about a funding area ~~allocation~~ agreement for Proposition 1 funds allocated to the Central Coast funding area. ~~Negotiations have resulted in a draft agreement that is acceptable to all RWMGs.~~ In 2016, the Central Coast RWMGs entered into a Memorandum of Agreement for Integrated Regional Water Management Planning and Funding in the Central Coast Funding Area to share Proposition 1 funding for the IRWM grant program among the six Parties in a fair and equitable manner, and to reduce the need for the Parties to compete against each other for grant funds, which creates unnecessary economic inefficiencies in implementing each Planning Region's IRWM Plan.

(Pending approval by all current RWMG members) This amended MOU reflects the addition of California State University Monterey Bay, Carmel Area Wastewater District, Carmel River Watershed Conservancy, Carmel Valley Association, City of Seaside, the City of Carmel-by-the-Sea, the City of Sand City, as members of the RWMG.

2. RECITALS

A. The State of California desires to foster Integrated Regional Water Management (IRWM) planning and encourages local public, non-profit, and private (for profit) entities to define planning regions appropriate for managing water resources and to integrate strategies within these planning regions.

B. Water resources management authority in the Region is currently distributed among various public agencies with a range of legal powers and regulatory responsibilities. These public agencies have definite jurisdictional boundaries, whereas sensible water resources planning and management frequently requires actions in multiple jurisdictions. Non-public entities within the Region have considerable interests in cooperating with public entities to protect, manage, and enhance water resources within the Region.

C. (Pending approval by current RWMG members) Eleven public entities and three non-profit entities~~y~~ in the Region with responsibility and interests in the management of water resources have agreed to form a Regional Water Management Group for the purposes of developing and implementing projects consistent with the guidelines set by the State of California for IRWM. These entities are:

- Big Sur Land Trust (BSLT), a 501 (c) 3 organization;
- California State University Monterey Bay
- Carmel Area Wastewater District;
- Carmel River Watershed Conservancy, a 501 (c) 3 organization;
- Carmel Valley Association;
- City of Carmel-by-the-Sea;
- City of Monterey;
- City of Seaside;
- City of Sand City;
- Monterey One Water (M1W)~~Regional Water Pollution Control Agency (MRWPCA)~~;
- Monterey County Water Resources Agency (MCWRA);
- Marina Coast Water District (MCWD);
- Resource Conservation District of Monterey County; and
- Monterey Peninsula Water Management District (MPWMD).

D. The R~~egional~~ W~~ater~~ M~~anagement~~ G~~roup~~ has defined an appropriate planning Region that takes into consideration jurisdictional limits, powers and responsibilities, and watershed and groundwater basin boundaries. The R~~egional~~ W~~ater~~ M~~anagement~~ G~~roup~~ is taking the lead in overseeing and implementing a detailed IRWM Plan within the planning Region. The Region is generally described as encompassing approximately 347 square miles and consists of groundwater basins and coastal watershed areas contributing to the Carmel Bay and south Monterey Bay. The Region includes coastal watersheds from the southernmost portion of the San Jose Creek watershed north to the northern limit of the Seaside Groundwater Basin. The inland area is bounded by the Seaside Groundwater Basin to the north and by the Carmel River watershed to the south and east. The western limit of the planning Region generally coincides with the land and Pacific Ocean interface, but includes the Pt. Lobos, Carmel Bay, and Pacific Grove Areas of Special Biological Significance (ASBS) adjacent to the coastal portion of the Region.

The principal groundwater basins in the planning Region are the Seaside Groundwater Basin and the Carmel Valley Aquifer. The Region includes about 38 miles of the coast within the Monterey Bay National Marine Sanctuary, three ASBS, the Cities of Carmel-by-the Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, Seaside, and unincorporated portions of Monterey County including the Carmel Valley watershed (255 square miles), Pebble Beach, the Carmel Highlands and portions of the Seaside Groundwater Basin adjacent to Highway 68 (also known as Canyon Del Rey). This description of the planning Region is not intended to be a limitation on projects and resource planning that may be shared between adjacent IRWM planning Regions (e.g., the Greater Monterey County IRWM planning Region to the north and east).

E. The entities signatory to this MOU desire to link and integrate efforts to jointly oversee the development and implementation of a comprehensive Integrated Regional Water Management Plan for the Region and to allocate ~~Proposition 1~~ IRWM funding within the planning Region.

3. GOALS

The goals of the collaborative effort undertaken pursuant to this MOU are:

3.1 To implement a comprehensive IRWMP for the Region that will consider the strategies that are required by the State under CWC 79562.5 and 79564 and subsequent modifications required under ~~Proposition 84 and~~ Proposition 1. Eligible projects must yield multiple benefits and include one or more of the following elements ~~(PRC § 75026.(a)):~~

~~**Water supply reliability, water conservation and water use efficiency**~~

~~**Stormwater capture, storage, clean-up, treatment, and management**~~

~~**Removal of invasive non-native species, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands**~~

~~**Non-point source pollution reduction, management and monitoring**~~

~~**Groundwater recharge and management projects**~~

~~**Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users**~~

~~**Water banking, exchange, reclamation and improvement of water quality**~~

~~**Planning and implementation of multipurpose flood management programs**~~

~~**Watershed protection and management**~~

~~**Drinking water treatment and distribution**~~

~~**Ecosystem and fisheries restoration and protection**~~

(Water Code §79743 (a - j)):

- ✓ **Water reuse and recycling for non-potable reuse and direct and indirect potable reuse**
- ✓ **Water-use efficiency and water conservation**
- ✓ **Local and regional surface and underground water storage, including groundwater aquifer cleanup or recharge projects**
- ✓ **Regional water conveyance facilities that improve integration of separate water systems**
- ✓ **Watershed protection, restoration, and management projects, including projects that reduce the risk of wildfire or improve water supply reliability**
- ✓ **Stormwater resource management, including, but not limited to, the following:**
  - ▪ **Projects to reduce, manage, treat, or capture rainwater or stormwater**
  - ▪ **Projects that provide multiple benefits such as water quality, water supply, flood control, or open space**
  - ▪ **Decision support tools that evaluate the benefits and costs of multi-benefit stormwater projects**
  - ▪ **Projects to implement a stormwater resource plan developed in accordance with Part 2.3 (commencing with Section 10560) of Division 6 including Water Code § 10562 (b)(7)**
- ✓ **Conjunctive use of surface and groundwater storage facilities**
- ✓ **Water desalination projects**

- ✓ **Decision support tools to model regional water management strategies to account for climate change and other changes in regional demand and supply projections**
- ✓ **Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff**
- ✓ **Regional projects or programs as defined by the IRWM Planning Act (Water Code §10537)**

3.2 To implement a comprehensive IRWMP for the Region that incorporates water supply, water quality, flood and erosion protection, and environmental protection and enhancement objectives.

3.3 To improve and maximize coordination of individual public, private, and non-profit agency plans, programs and projects for mutual benefit and optimal gain within the Region.

3.4 To help identify, develop, and implement collaborative plans, programs, and projects that may be beyond the scope or capability of individual entities, but which would be of mutual benefit if implemented in a cooperative manner.

3.5 To facilitate regional water management efforts that include multiple water supply, water quality, flood control, and environmental protection and enhancement objectives.

3.6 To foster coordination, collaboration and communication between stakeholders and other interested parties, to achieve greater efficiencies, enhance public services, and build public support for vital projects.

3.7. To realize regional water management objectives at the least cost possible through mutual cooperation, elimination of redundancy, and enhanced regional competitiveness for State and Federal grant funding.

3.8 To satisfy State requirements for incorporation of a Storm Water Resource plan developed for the Region in accordance with Part 2.3 (commencing with Section 10560) of Division 6 including Water Code § 10562 (b)(7)

4. DEFINITIONS

4.1 **Funding Area Agreement.** The agreement entered into between the six regions within the Central Coast funding area to allocate a portion of Proposition 1 IRWM funds to each planning region.

4.2 **Integrated Regional Water Management Plan (IRWMP or IRWM Plan).** The plan envisioned by state legislators and state resource agencies that integrates the strategies, objectives, and priorities for projects to manage water resources proposed by public entities, non-profit entities, and stakeholders within a defined Planning Region. The minimum plan standards are as shown in Appendix A of "Integrated Regional Water Management Grant Program Guidelines, November 2004, Department of Water Resources and State Water Resources Control Board, Proposition 50, Chapter 8," as revised. Minimum IRWM Plan standards may be revised from time to time by the State of California.

4.3 **Integration**. The combining of water management strategies and projects to be included in an IRWMP.

4.4.a **Lead Agency for IRWM Plan Development.** The Monterey Peninsula Water Management District is designated by the Regional Water Management Group to lead the development or implementation of an Integrated Regional Water Management Plan for the Region.

4.4.b **Lead Agency for IRWM Grant Applications.** The Regional Water Management Group may designate any entity in the Regional Water Management Group to be the Lead Agency in making application to the State for grant funds.

4.4.c **Lead Agency for Executing a Central Coast funding area agreement**. The entity the Regional Water Management Group designates to represent the Monterey Peninsula Region to execute a Funding Area Agreement.

4.5 **Non-profit Agency.** A 501 (c) (3) corporation, conservancy, group or other organization involved in water resources management in the Region.

4.6 **Private Agency.** A private or publicly held for-profit corporation or property owner involved in water resources management in the Region

4.7 **Project**. A specific project that addresses a service function.

4.8 **Public Agency**. A state-authorized water district, water agency, water management agency or other public entity, be it a special district, city or other governmental entity, responsible for providing one or more services in the areas of water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning and aquatic habitat protection and restoration.

4.9 **Region.** The area defined by the Regional Water Management Group (RWMG) consisting of watersheds, sub-watersheds and groundwater basins under the jurisdiction of one or more entities within the RWMG.

4.10 **Service Function.** A water-related individual service function provided by a private, public, or non-profit entity, i.e. water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood protection, watershed planning, recreational facilities, and habitat protection and restoration.

4.11 **Signatory Entity.** A public, private, or non-profit entity within the Region that is signatory to this MOU.

4.12 **Stakeholder.** A non-signatory public, private, or non-profit agency identified in the IRWM Plan with an interest in water resources management within the Region.

4.13 **Stormwater Resource Plan**. The plan developed for the Region that identifies stormwater capture project opportunities.

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4.14~~3~~ **Technical Advisory Committee.** The committee organized to advise the Regional Water Management Group and Stakeholders concerning the IRWM Plan. Normally, the group will be comprised of individuals with technical backgrounds in the fields of marine and freshwater biology, ecology, geology, engineering, hydrogeology, planning, resource conservation, riparian systems, water conservation, and water quality. However, stakeholders with interests in a particular aspect of resource or project management, but not necessarily a technical background, may also be considered for inclusion in the TAC.

4.15~~4~~ **Regional Water Management Group.** The group of entities that takes the lead in overseeing the development and implementation of the Integrated Regional Water Management Plan within the Planning Region. ~~The RWMG consists of the~~

~~Monterey Regional Water Pollution Control Agency, the Monterey County Water Resources Agency, the Monterey Peninsula Water Management District, the City of Monterey, the City of Seaside, the Marina Coast Water District, the Resource Conservation District of Monterey County, and the Big Sur Land Trust.~~ (a list of members of the Regional Water Management Group is provided in Recital C)

4.16~~5~~ **Water Management Strategies**. Plans for and activities to be considered in an IRWMP include, but are not limited to, ecosystem restoration, environmental and habitat protection and improvement, water-supply reliability, flood management, groundwater management, recreation and public access, storm water capture and management, water conservation, water quality improvement, water recycling, and wetlands enhancement and creation.

5. IRWMP PARTICIPANTS

5.1 **Adopting Entities.** The entities in the Region that participate in the development, adoption, and implementation of the Integrated Regional Water Management Plan for the Region. Each entity intending to carry out a project proposed in the IRWMP must formally adopt the IRWMP or provide written substantiation of acceptance by the governing authority of the entity. For a public agency, adoption of the IRWMP is by formal resolution of the governing body. For a non-profit or for-profit entity, proof of acceptance of the IRWMP by the equivalent of a public agency governing body is required (e.g., by a board of directors or other management entity).

5.2. **Stakeholders**. Entities, such as other public, private, and non-profit entities, business and environmental groups, that are considered valuable contributors to the understanding and management of the Region's water resources.

5.3. **Regulatory Agencies**. These agencies, including, but not limited to, the State Water Resources Control Board, Central Coast Regional Water Quality Control Board, California Coastal Commission, U.S. Army Corps of Engineers, California Public Utilities Commission, National Marine Fisheries Service (NOAA Fisheries), U.S. Fish and Wildlife Service, and the California Department of Fish and Wildlife~~Game~~, will be invited to participate in the development and implementation of the IRWMP.

5.4 **Regional Water Management Group.** The group of entities that takes the lead in developing and implementing an Integrated Regional Water Management Plan within the Planning Region.

6. MUTUAL UNDERSTANDING

6.1. **Subject matter scope of the IRWMP**. The IRWMP for the Region will include, but is not limited to, water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning, erosion prevention, and habitat protection and restoration. It is acknowledged that the proposals contained in the IRWMP may be based, in part, on the land-use plans of the member entities local governments such as Cities, Monterey County, and special districts located within the Region. Therefore, the resultant IRWMP will by design have incorporated the land-use plans and assumptions intrinsic to the respective water-related service function.

6.2. **Geographical scope of the IRWMP.** The area for this Memorandum is generally defined as the watersheds and associated groundwater basins contributing to the south Monterey Bay and Carmel Bay as shown in Figure 3-1: Map of Monterey Peninsula Integrated Regional Water Management Planning Region in the IRWM Plan.

The Region includes coastal watersheds from the southernmost portion of the San Jose Creek watershed north to the northern limit of the Seaside Groundwater Basin. The inland area is bounded by the Seaside Groundwater Basin to the north and by the Carmel River watershed to the south and east. The western limit of the planning Region generally coincides with the land and Pacific Ocean interface, but includes the Pt. Lobos, Carmel Bay, and Pacific Grove Areas of Special Biological Significance (ASBS) adjacent to the coastal portion of the Region.

However, it is recognized that the geographic scope represented in the IRWM Plan may be amended to include projects that are implemented cooperatively between IRWM planning regions (e.g., with the Greater Monterey County IRWM planning region) and is not intended to be a rigid boundary.

6.3. **Approach to developing the IRWMP**. It will be the responsibility of each entity signatory to this Memorandum to provide the Lead Agency with information for the IRWMP concerning project proposals or to identify the need for a water management strategy for each service function provided by a signatory entity.

In order to be included in the IRWMP, all proposals for development of water management plans and water development project proposals related to the IRWMP must meet the standards identified in the IRWM Plan for the Region.

A technical advisory committee consisting of staff representatives from the Regional Water Management Group, other Stakeholders and such other organizations as may become contributing entities, will review proposed management plans and project proposals for consistency with the IRWMP and recommend a prioritized list of projects to be carried out within the Region. The Regional Water Management Group and Stakeholders will meet to review the recommendation made by the TAC.

6.4. **Approval of prioritized project list.** Approval of the prioritized project list should occur by consensus of the Regional Water Management Group and Stakeholders and should be based on the prioritization process described in the IRWMP and the recommendations of the Technical Advisory Committee. However, if a consensus cannot be reached among the Stakeholders and Regional Water Management Group, the Regional Water Management Group may make a final determination of the prioritized project list.

6.5. **Adoption of the IRWMP**. Plan adoption will occur by approval of the governing board of each entity. Each member of the RWMG shall adopt the IRWM Plan or an amended IRWM Plan, when the Plan becomes available. Project proponents named in an IRWM grant application shall adopt the IRWM Plan or amended IRWM Plan prior to submittal of the grant application. It should be noted that the adopted Plan and project list may be amended from time to time as described below.

6.6 **Amendment of IRWMP or Prioritized Project list.** The IRWM Plan and prioritized project list may be amended from time to time. Any member of the Regional Water Management Group or Stakeholders may request that the Lead Agency convene a meeting of the Regional Water Management Group and Stakeholders for the purposes of amending the IRWM Plan or the prioritized project list. However, it is anticipated that the IRWMP or prioritized project list will be amended no more frequently than annually, unless more frequent amendments are required to meet State IRWM standards or grant application cycles. An amended IRWM Plan must be consistent with State IRWM standards as described in Definition 4.1 "Integrated Regional Water Management Plan" and any subsequent revisions by the State to IRWM guidelines.

6.7. **Project Implementation.** Project proponents will be responsible for completing proposed projects and providing project reports to the Lead Agency.

6.8 **Project Monitoring.** The Regional Water Management Group will be responsible for monitoring the implementation of the IRWMP. The technical advisory committee will regularly report to the General Managers and Governing Boards of the Regional Water Management Group regarding progress on the development and implementation of the IRWMP. The Lead Agency will be responsible for coordinating data collection and dissemination.

6.9 **Grant Applications.** The Regional Water Management Group will designate a Lead Agency to apply for grant funds. The Lead Agency for each grant application should have a mission and expertise that is consistent with the purpose of the grant being applied for.

6.10 **Central Coast funding area agreement.** The RWMG designates MPWMD to execute a~~n~~ funding area agreement on behalf of the Monterey Peninsula Planning Region.

6.11 **Grant Awards and Agreement**. The Lead Agency will be the grantee and administer the grant on behalf of the Regional Water Management Group and Stakeholders.

6.12 **Participation in Regional Water Management Group (RWMG)**. Any qualified stakeholder may petition to become a member of the RWMG. A qualified stakeholder must demonstrate ~~the following: a)~~ an interest, responsibility or authority over multiple resources within the region; ~~or b) a unique interest, responsibility, authority, or asset not shared by any other entity within the RWMG.~~ The RWMG shall consider such a request for a change to the RWMG and shall vote by majority to accept or reject the request.

6.13 **Length of Term in Regional Water Management Group**. Members of the RWMG may change from time to time, depending on the level of resources available to each entity. However, there is no required minimum or maximum length of time required as a member of the RWMG. If an entity withdraws from the RWMG, the remaining entities should attempt to replace the interest, responsibility or authority lost by the withdrawal.

6.14 **Rights of the Parties and Constituencies**: This MOU does not provide any added legal rights or regulatory powers to any of the signatory parties, or to the RWMG as a whole. This MOU does not of itself give any party the power to adjudicate water rights, or to regulate or otherwise control the private property of other parties. This MOU does not contemplate the parties taking any action that would adversely affect the rights of any of the parties, or that would adversely affect the customers or constituencies of any of the parties.

6.15 **Termination**. An entity signatory to this MOU may withdraw from participation upon 30 days advance notice to the other signatory entities, provided it agrees to be financially responsible for any previously committed, but unmet resource commitment.

6.16. **Personnel resources**. It is expected that the General Managers and/or other officials of each entity signatory to this MOU will periodically meet to insure that adequate staff resources are available to implement the IRWM Plan.

6.17. **Other on-going regional efforts**~~.~~ Development of the IRWMP is separate from efforts of other organizations to develop water-related plans on a regional basis around Monterey Bay and the Central Coast. As the IRWMP is developed and implemented, work products may be shared to provide other entities and groups with current information.

7. RECORD OF AMENDMENTS

7.1 June 2010 – add Marina Coast Water District to RWMG. Revise Goals, Definitions and MOU terms to reflect Proposition 84 requirements.

7.2 March 2012 – add process to change RWMG, define when plan is to be adopted, revise to Proposition 84 standards

7.3 August 2012 – add Resource Conservation District of Monterey County to RWMG

7.4 DATE (by February 2019) – add California State University Monterey Bay, Carmel Area Wastewater District, Carmel River Watershed Conservancy, Carmel Valley Association, City of Seaside, the City of Carmel-by-the-Sea, the City of Sand City to RWMG

8. **SIGNATORIES TO THE MEMORANDUM OF UNDERSTANDING**

We, the duly authorized undersigned representatives of our respective entities, acknowledge the above as our understanding of the intent and expected outcome in overseeing the development and implementation of an Integrated Regional Water Management Plan for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Region.

Big Sur Land Trust By:______________________________ Date:______________________, 20____	**Monterey County Water Resources Agency** By:______________________________ Date:______________________, 20____
Monterey Regional Water Pollution Control Agency By:______________________________ Date:______________________, 20____	**City of Monterey** By:______________________________ Date:______________________, 20____
Monterey Peninsula Water Management District By:______________________________ Date:______________________, 20____	**Marina Coast Water District** By:______________________________ Date:______________________, 20____
Resource Conservation District of Monterey County By:______________________________ Date:______________________, 20____	**California State University Monterey Bay** By:______________________________ Date:______________________, 20____

Carmel Area Wastewater District **By:____________________** **Date:______________, 20____**	**Carmel River Watershed Conservancy** **By:____________________________** **Date:____________________, 20____**
Carmel Valley Association **By:____________________** **Date:______________, 20____**	**City of Carmel-by-the-Sea** **By:____________________________** **Date:____________________, 20____**
City of Sand City **By:____________________** **Date:______________, 20____**	**City of Seaside** **By:____________________________** **Date:____________________, 20____**

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Table 3-2: IRWM Plan Update Prioritized Regional Objectives

Water Supply (WS)
WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.*
WS-2. Maximize use of recycled water and other reuse, including gray water systems, and stormwater capture and use.[1] *
WS-3. Seek long-term sustainable supplies for adopted future demand estimates.*
WS-4. Optimize conjunctive use of surface and groundwater.*
WS-5. Evaluate, advance, or create water conservation throughout the Region in compliance with the State's 20x2020 Water Conservation Plan.*
Water Quality (WQ)
WQ-1. Improve ocean water quality, including Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.*
WQ-2. Improve inland surface water quality for environmental resources (e.g. steelhead) and potable water supplies.*
WQ-3. Protect and improve water quality in groundwater basins.*
WQ-4. Meet or exceed water quality standards established by regulatory agencies and stakeholders. *
Flood Protection and Erosion Prevention (FP)
FP-1. Develop regional projects and plans necessary to protect existing infrastructure and sensitive habitats from flood damage, erosion, and sea level rise, in particular, along the South Monterey Bay shoreline and Carmel Valley.*
FP-2. Develop approaches for adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).*
FP-3. Protect quality and availability of water while preserving or restoring ecologic and stream function.*
FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.
Environmental Protection and Enhancement (EV)
EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds; promote the steelhead run.*
EV-2. Identify opportunities to assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*
EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.*
EV-4. Identify opportunities for open spaces, trails and parks along streams and other recreational areas in the watershed that can be incorporated into projects.
EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.*
Climate Change (CC)
CC-1. Evaluate adaptation measures and mitigative solutions to climate change effects.*
CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.*
CC-3. Support efforts to increase education, research and use of energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.*

[1] The underlined text was added based on comments from the city of Pacific Grove (Sarah Hardgrave, January 2013)

Regional Communication and Cooperation (RC)
RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts. *
RC-2. Foster collaboration among regional entities as an alternative to litigation.*
RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.*
RC-4. Build relationships with State and Federal regulatory agencies and other water forums and agencies.
NOTES: These objectives have been revised and renumbered compared to the draft objectives presented and evaluated at the 7/25/2012 Stakeholder Meeting. **High Priority Objectives based upon those objectives receiving the most points during the objectives prioritization exercise in July and August 2012 are presented in gray shading and bold type.** * = Objective is closely aligned with Statewide Priorities (see **Table 3-4**).

Table 2: IRWM Plan Update Regional Goals and Objectives

Water Supply (WS) Goal: Improve regional water supply reliability through environmentally responsible solutions that promote water and energy conservation. Protect the community from drought and climate change effects with a focus on interagency cooperation and conjunctive use of regional water resources.
WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.
WS-2. Maximize use of recycled water and other reuse and where feasible, expand sewer services to areas with onsite systems to increase sources of water for recycling.*
WS-3. Develop opportunities for stormwater capture and reuse pursuant to the Stormwater Resource Plan.
WS-4. Evaluate, advance, or create water conservation throughout the Region.*
WS-5. Improve water supply needs to achieve multiple benefits, beneficial uses and environmental flows. WS-6. Seek long-term sustainable supplies for adopted future demand estimates.
Water Quality (WQ) Goal: Protect and improve water quality for beneficial uses consistent with regional community interests and the RWQCB Basin Plan through planning and implementation in cooperation with local and state agencies and regional stakeholders.
WQ-1. Improve inland surface water quality for environmental resources (e.g. steelhead), including headwaters and tributaries of streams, and to protect potable water supplies.*
WQ-2. Improve ocean water quality, including, but not limited to, Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.
WQ-3. Protect and improve water quality in groundwater basins, especially where at risk from seawater intrusion.
Flood Protection (FP) Goal: Ensure that flood protection strategies are developed and implemented through a collaborative and watershed-wide approach and are designed to consider climate change effects and maximize opportunities for comprehensive management of water resources.
FP-1. Develop regional projects and plans necessary to protect critical infrastructure and sensitive habitats from flood damage and sea level rise, in particular, along the Carmel Bay and South Monterey Bay shoreline.*
FP-2. Develop approaches for floodplain restoration or adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).
FP-3. Promote floodplain restoration that protect quality and availability of water while preserving or restoring ecologic and stream function.
FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.*
Coastal and Streamside Erosion (CSE) Goal: Ensure that erosion management strategies are developed and implemented through a collaborative and watershed-wide approach and are designed to consider climate change effects.
CSE-1. Manage areas along the shoreline susceptible to erosion, including long-term strategic retreat where appropriate.
CSE-2. Identify opportunities to restore natural stream function, including meandering, in the lower 15 miles of the Carmel River and selected tributaries.
CSE-3. Reduce or prevent adverse downcutting in the main stem Carmel River and its tributaries.
Watershed Management (WM) Goal: Develop watershed scale management strategies, considering climate change effects and maximizing opportunities for comprehensive management of water resources.
WM-1. Reduce human-induced sources of non-point fine sediment runoff.
WM-2. Restore natural fire frequency in headwater forests.
WM-3. Re-establish the natural hydrologic flow regime in disturbed watersheds.

WM-4. Re-establish a natural level of sediment supply within the Carmel River and its tributaries.

Environmental Protection and Enhancement (EV)

Goal: Preserve the environmental health and well-being of the Region's streams, watersheds, and the ocean by taking advantage of opportunities to assess, restore and enhance these natural resources when developing water supply, water quality, and flood protection strategies. Seek opportunities to conserve water and energy, and adapt to the effects of climate change.

EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds*; including, but not limited to, promoting the steelhead recovery by meeting accepted or approved environmental flows within the regional watersheds. .

EV-2. Assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*

EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.

EV-4. Identify opportunities for open spaces, trails and parks along streams and other recreational areas in the watershed that can be incorporated into projects.*

EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.

EV-6. Promote watershed activities for fire fuel management and adaptive management strategies to protect water quality and water supplies from catastrophic wildfires.*

Climate Change (CC)

Goal: Adapt the region's water management approach to deal with impacts of climate change using science-based approaches, and minimize the regional causal effects related to water resources.

CC-1. Implement adaptation measures and mitigation solutions to climate change effects, including increased large storm intensity and/or frequency, sea level rise, drought and wildfire.

CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.

CC-3. Increase energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.

Regional Communication and Cooperation (RC)

Goal: Identify an appropriate forum for regional communication, cooperation, and education. Develop protocols for encouraging integration and reducing inconsistencies in water management strategies between local, regional, State, and Federal entities. Provide balanced access and opportunity for the public, stakeholders, and DACs to participate in IRWM efforts.

RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts.

RC-2. Foster collaboration among regional entities as an alternative to litigation through ongoing meetings of the RWMG and regional data sharing.

RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.

RC-4. Build relationships with State and Federal regulatory agencies and other water forums and agencies.

NOTE:

* = Objective is closely aligned with Statewide Priorities (see **Table 3-4**).

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APPENDIX 14-F

DECEMBER 6, 2018 RWMG MEETING

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Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM
Regional Water Management Group (RWMG) Meeting

Meeting Date and Time: December 6, 2018, 10am – 12pm
Meeting Location: Big Sur Land Trust Conference Room, 509 Hartnell St, Monterey, CA or conference call: 1-515-603-3124; Participant Access Code: 639141#

Agenda

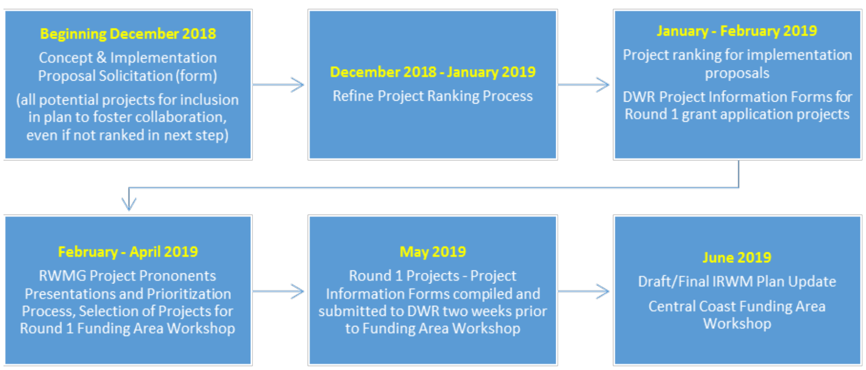
1. Introductions
2. Review of the project solicitation process and application form
3. Discussion on project prioritization process and scoring criteria
4. Round robin discussion on potential projects to be proposed
5. Status update on 2018 MOU approval process
6. Other updates from meeting participants

Project Solicitation and Review

for the 2019 Update to the Monterey Peninsula, Carmel Bay and South Monterey Bay Integrated Regional Water Management Plan

The Regional Water Management Group (RWMG) for the Monterey Peninsula, Carmel Bay and South Monterey Bay (Monterey Peninsula) Integrated Regional Water Management (IRWM) region is soliciting projects for inclusion in the 2019 Update to the IRWM Plan. All projects must undergo a thorough review process before they can be formally included in the IRWM Plan. The goal of this solicitation is to create a comprehensive Project List that includes both concept proposals and projects that can be implemented within one to two years after IRWM Plan adoption, which is planned for June 2019. An overview of the process is provided in Figure 1.

Figure 1: Project Solicitation Process for 2019 IRWM Plan Update



Step 1: Concept and Implementation Proposal Solicitation

For inclusion in the plan, project proponents must complete Section 1 of the application form for implementation projects and concept proposal. Proposals that meet eligibility criteria will be included in the IRWM Plan Update. Implementation Projects can move to Step 2 where projects will be ranked (or prioritized). The application form can be completed electronically, and emailed or mailed to the IRWM coordinator. Projects and proposals previously included in the 2013 Monterey Peninsula IRWM Plan will not be included in the 2019 IRWM Plan unless an application form is completed. It is the project proponent's responsibility to:

- Complete an application for each project
- Ensure the project information is up to date
- Respond to request for information within the established deadline
- Request that a project be removed if it is no longer being pursued

Concept Proposals must meet the following minimum eligibility criteria to be included in the IRWM plan:

- Assist the Monterey Peninsula region in achieving at least one of its IRWM Plan objectives.
- Implement at least one of the region's Resource Management Strategies.
- Provide water resource benefits to the region.
- Be consistent with Proposition 1 IRWM Guidelines and Department of Water Resources standards and requirements.

Step 2: Implementation Project Application and Scoring/Ranking

This step includes submittal of detailed project information that will allow scoring and comparison to an overall ranked list of projects. Project proponents are not required to complete Step 2 in order to be included in the IRWM Plan. However, Step 2 must be completed in order to be eligible for inclusion in an implementation grant application to the IRWM Grant Program. For projects to be ranked and prioritized, project proponents must complete and submit in Sections II – IV of the application form **by January 14, 2019**, and the DWR Project Information Form (Section V) **by February 8, 2019.** A Technical Advisory Committee made up of RWMG members will review project submittals and scoring for consistency with the IRWM Plan and present the initial project ranking to the RWMG and other stakeholders group in late February. Further prioritization of the projects for Proposition 1 Implementation Grant Round 1 will be done by the RWMG in March and April, with a final list of projects to put forward to DWR in May 2019.

Prior to the final date for submission, projects may be added to or removed from the Project List at any time; however, this must be done by the project proponent(s). To remove a project, the project proponent should submit a written request to the IRWM coordinator. The request for removal must include: the project title, consent to remove the project from all project lists, and should include the reason for removal of the project. In the event of multi-entity projects, all entities must agree in writing to a project's removal. In the case of multi-entity projects, a lead entity or "project proponent" must be designated.

Each project will be ranked initially based on a score developed from answers on the application form, which includes a methodology for scoring that is summarized as follows. Two categories of factors are included in the scoring: (1) factors related to how well the project complies with the IRWM Plan, such as policy consistency and ability to assist the region in meeting its goals, and (2) factors related to the individual merits of the project, such as feasibility, readiness to proceed, and costs. Scores from each of these categories comprise one-half of the overall project score as shown in Figure 2. A detailed description of project scoring criteria, factors, relative weighting, and raw scoring is provided below.

IRWM Plan Compliance Factors (50% of total score)

Commented [SH1]: The TAC is in the process of updating the project scoring spreadsheet. The following section is the criteria used in the 2013 plan update.

Within the Plan Compliance category, projects will be scored based upon the following specific factors and the relative weighting is shown in Figure 3. Following each factor and shown in ***italic text*** within parentheses is the current proposed methodology to assign raw scores to projects based upon the project information submitted in the Project Solicitation Form. The appropriate weighting factor will be applied to the raw score to give a weighted score to be used in the overall ranking.

Figure 2: Relative Weighting: Plan Compliance vs. Project Merit Factors

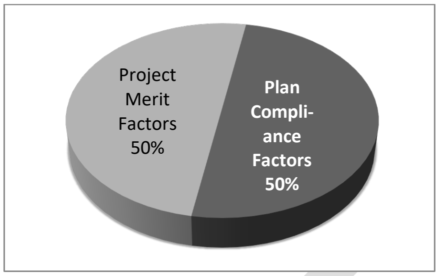
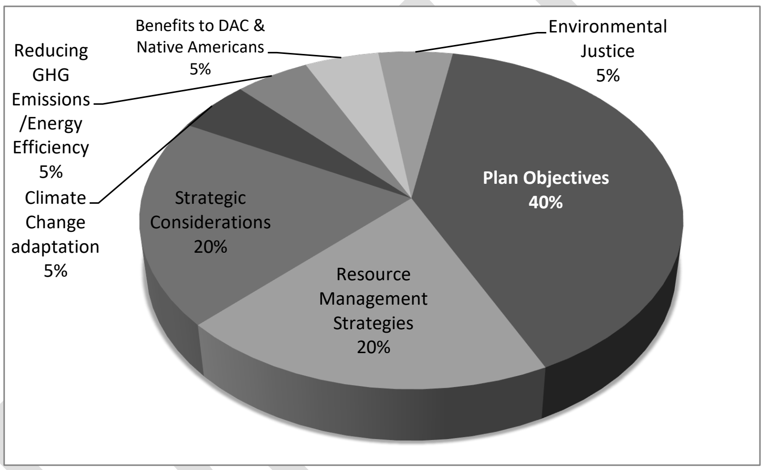


Figure 3: Relative Weighting of Plan Compliance Factors



- **How the project contributes to the IRWM Plan Objectives** (40% of Plan Compliance Factors)
  - Number of objectives and high priority objectives that the project addresses
    Up to 53 pts. Each project gets 1 pt for meeting each of 26 objectives (26 max pts). Plus, additional 3 pts maximum for the level it meets specific metrics of each of the 9 high priority objectives.

- **How the project is related to Resource Management Strategies** (20% of Plan Compliance Factors)
  - Number of different CA Water Plan Management Outcome Categories and number of strategies that the project includes.
    Total of up to 35 pts, including 1 pt per RMS, plus one pt for every CWP management outcome category after the first.

- **Strategic considerations for IRWM Plan implementation** (20% of Plan Compliance Factors)
  - Inter-Regionalism: Does the project involve active inter-regional collaboration or partnerships?
    5 pts: project addresses inter-regional issues
  - Partnerships: How many entities are actively partnering to implement the project?

5 pts: project involves three or more partners that include both government agencies and NGOs; or
2 pts: project involves two or more partners:
0 pts: project involves only one entity (no partnerships).

- Monitoring and reporting of project performance: Will the project establish and document achievement of performance criteria?
  5 pts: project presents a plan for monitoring/reporting performance
- Integration with land use planning: Is the project consistent with local plans, ordinances, and standards? Does the project integrate with local land use and water planning? Does the project increase coordination between water resources agencies and land use planners?
  5 pts: if "yes" to all three questions; 3 pts if "Yes" to 2 questions; 1 pt for "yes" to one question

- **Specific benefits to critical disadvantaged community (DAC) and/or Native American tribal communities' water issues** (5% of Plan Factors)
  - Does the proposed project provide specific benefits to solve critical DAC water issue(s)?
    Yes: 5 pts

- **Environmental Justice considerations** (5% of Plan Factors)
  - Does the project redress inequitable distribution of environmental burdens and/or improve access to environmental goods?
    Yes: 5 pts

- **Contribution of the project in adapting to the effects of Climate Change** (5% of Plan Factors)
  - Will the project contribute to regional adaptation to projected climate change impacts? Does the project implement one or more of the recommendations from the document: "*Evaluation of Erosion Mitigation Alternatives for Southern Monterey Bay*" (Monterey Bay Sanctuary Foundation and the Southern Monterey Bay Coastal Erosion Working Group, May 2012)?
    5 pts: one pt for every adaptation strategy implemented

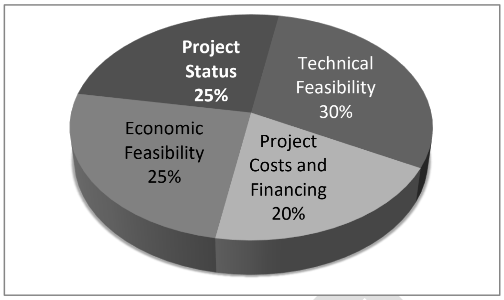
- **Contribution of the project in reducing Greenhouse Gas Emissions as compared to project alternatives** (5% of Plan Factors)
  - Compared to project alternatives, does the project reduce regional GHG emissions and/or improve energy efficiency?
    5 pts: one pt for every GHG mitigation strategy implemented

Project Merit Factors (50% of total score)

Within the Project Merit category, projects will be scored based upon the following specific factors with the relative weighting is shown in Figure 4. As with the Plan Compliance Factors, ***italic*** text following each factor describes the proposed methodology to assign raw scores for these factors based upon the project information submitted in the Project Solicitation Form (and prior to applying the weighting agreed upon at the stakeholder meeting).

- **Technical Feasibility** (30% of Project Merit Factors)
  - Is a common and widely accepted technology with well documented results being used?
  - Are geologic conditions, hydrology, ecology and other system aspects adequately described?

Figure 4: Relative Weighting of Project Merit Factors



- Are there significant data gaps?
- Are there sufficient technical data to indicate the project is likely to result in success?
- Is there enough information to support the project's estimated benefits?
  30 pts: Technical feasibility has been documented in a project-specific pilot study or previous phase or has a documented track record of success
  -- OR score for each of the following –
  10 pts: technology proposed has been established as effective in similar situations;
  10 pts: project site conditions are documented (geology/soil, ecology, hydrology, land use, public utilities;
  10 pts: project partners have experience with similar projects (e.g., similar site, similar technology).

- **Project Costs and Financing** (20% of Project Merit Factors)
  - ***10 pts:*** A project cost estimate has been prepared and documented in the Project Form.
  - ***10 pts:*** There is an identified revenue source of at least 25% match funding.

- **Economic Feasibility** (25% of Project Merit Factors)
  - ***15 pts:*** Project benefits and costs have been defined at a level of detail that will allow cost-effectiveness analysis or benefit-cost analysis **-- OR –** ***project is a DAC project.***
  - ***10 pts:*** Project has a cost-effectiveness or benefit-cost ratio greater than 1.

- **Project Status** (25% of Project Merit Factors)
  - What steps in project planning have been completed?
    - Feasibility Studies and Conceptual Plans
    - CEQA/NEPA Completed
    - Local Cost Share Confirmed
    - Right-of-way / Land Acquisition
    - Permits Acquired
    - Construction Drawings Complete & Bids Acquired

    (***4 pts for each of the above criterion met for a possible total of 24 pts)***

For additional information, contact Larry Hampson larry@mpwmd.net or Sarah Hardgrave shardgrave@bigsurlandtrust.org

MONTEREY PENINSULA, CARMEL BAY AND SOUTH MONTEREY BAY INTEGRATED REGIONAL WATER MANAGEMENT PROGRAM

APPLICATION FORM FOR IMPLEMENTATION PROJECTS AND CONCEPT PROPOSALS

2018/2019

GENERAL INSTRUCTIONS:

Both implementation project proposals and concept proposals are being accepted at this time. Only implementation projects, however, will be eligible for IRWM Implementation Grant funds.

For concept proposals: If you would like to submit a concept proposal, you need only complete Sections I and II of this application.

For implementation projects: There will be two rounds of Proposition 1 IRWM Implementation Grant solicitations (Round 1 in early 2019, Round 2 in 2020). If you are interested in having your project considered for Round 1, you must complete all sections of this application. If you are not interested in having your project considered for Round 1, you need only complete Sections I and II.

For those interested in applying for Round 1: In addition to this application form, stakeholders who are interested in having their projects considered for Round 1 must also complete DWR's Project Information Form. The Project Information Form will be due on February 8, 2019.

Both this form ("Project Application Form") and DWR's form ("Project Information Form") should be submitted to: Sarah Hardgrave – shardgrave@bigsurlandtrust.org

THIS APPLICATION FORM IS DUE January 14, 2018

THE PROJECT INFORMATION FORM IS DUE FEBRUARY 8, 2019

SECTION I. PROJECT SUMMARY AND IRWM OBJECTIVES

1. Project Proponent (Name of Organization Applying):

2. Type of Entity:

☐ Local Public agency ☐ Nonprofit organization ☐ Public Utility ☐ Mutual Water Company

☐ Federally Recognized or State Indian Tribe

3. Name and Title of Contact Person:

4. Phone:

5. Email:

6. Project Title:

7. Type of Proposal: Is your project an implementation project (developed, with budget) or a concept proposal?

- ☐ Implementation project
- ☐ Concept proposal

8. Project Summary: Briefly describe your project (one paragraph):

9. Project Location: Projects must be located within the Monterey Peninsula, Carmel Bay and South Monterey Bay IRWM region,[1] or otherwise be of direct benefit to the Monterey Peninsula, Carmel Bay and South Monterey Bay IRWM region. Where is your project located?

10. IRWM Criteria

To be eligible for inclusion in the IRWM Plan, projects must include one or more of the following elements. Please check all that apply:

- ☐ Water reuse and recycling for non-potable reuse and direct and indirect potable reuse
- ☐ Water-use efficiency and water conservation
- ☐ Local and regional surface and underground water storage, including groundwater aquifer cleanup or recharge projects
- ☐ Regional water conveyance facilities that improve integration of separate water systems
- ☐ Watershed protection, restoration, and management projects, including projects that reduce the risk of wildfire or improve water supply reliability
- ☐ Storm water resource management, including, but not limited to, the following:
  - Projects to reduce, manage, treat, or capture rainwater or storm water
  - Projects that provide multiple benefits such as water quality, water supply, flood control, or open space
  - Decision support tools that evaluate the benefits and costs of multi-benefit storm water projects
  - Projects to implement a storm water resource plan
- ☐ Conjunctive use of surface and groundwater storage facilities
- ☐ Water desalination projects
- ☐ Decision support tools to model regional water management strategies to account for climate change and other changes in regional demand and supply projections
- ☐ Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff
- ☐ Regional projects or programs as defined by the IRWM Planning Act

[1] The Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM region includes: land areas within the San Jose Creek and Carmel River watersheds, portions of the Seaside Groundwater Basin and former Fort Ord, and most of the Monterey Peninsula (the Greater Monterey County region includes and runs north from Marina, as well as all most remaining areas of Monterey County, with the exception of Pajaro Valley).

11. IRWM Plan Objectives

The following objectives have been identified for the Monterey Peninsula, Carmel Bay and South Monterey Bay IRWM Plan. Please select all of the objectives that the project will address, and very briefly explain (unless it is *entirely obvious*) how your project will address each objective. (For concept proposals, you need not provide the justification.)

	Objective	Justification
Water Supply Goal		
☐	WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.	
☐	WS-2. Maximize use of recycled water and other reuse and where feasible, expand sewer services to areas with onsite systems to increase sources of water for recycling.*	
☐	WS-3. Develop opportunities for stormwater capture and reuse pursuant to the Stormwater Resource Plan.	
☐	WS-4. Evaluate, advance, or create water conservation throughout the Region.*	
☐	WS-5. Improve water supplies to achieve multiple benefits, beneficial uses and environmental flows.	
☐	WS-6. Seek long-term sustainable supplies for adopted future demand estimates.	
☐	WS-1. Meet existing water supply replacement needs of the Carmel River system and Seaside Groundwater Basin.	
Water Quality Goal		
☐	WQ-1. Improve inland surface water quality for environmental resources (e.g. steelhead), including headwaters and tributaries of streams, and to protect potable water supplies.*	
☐	WQ-2. Improve ocean water quality, including, but not limited to, Areas of Special Biological Significance (ASBS), by minimizing pollutants in stormwater discharges.	
☐	WQ-3. Protect and improve water quality in groundwater basins, especially where at risk from seawater intrusion.	
Flood Protection Goal		
☐	FP-1. Develop regional projects and plans necessary to protect critical infrastructure and sensitive habitats from flood damage and sea level rise, in particular, along the Carmel Bay and South Monterey Bay shoreline.*	
☐	FP-2. Develop approaches for floodplain restoration or adaptive management that minimize maintenance and repair requirements (sustainable flood management systems).	
☐	FP-3. Promote floodplain restoration that protect quality and availability of water while preserving or restoring ecologic and stream function.	
☐	FP-4. Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.*	
Coastal and Streamside Erosion Goal		
☐	CSE-1. Manage areas along the shoreline susceptible to erosion, including long-term strategic retreat where appropriate.	
☐	CSE-2. Identify opportunities to restore natural stream function, including meandering, in the lower 15 miles of the Carmel River and selected tributaries.	

☐	CSE-3. Reduce or prevent adverse downcutting in the main stem Carmel River and its tributaries.	
Watershed Management Goal		
☐	WM-1. Reduce human-induced sources of non-point fine sediment runoff.	
☐	WM-2. Restore natural fire frequency in headwater forests.	
☐	WM-3. Restore the natural hydrologic flow regime in disturbed watersheds where appropriate, including low impact development strategies in urbanized areas.	
☐	WM-4. Re-establish a natural level of sediment supply within the Carmel River and its tributaries.	
Environmental Protection and Enhancement		
☐	EV-1. Protect and enhance sensitive species and their habitats in the regional watersheds*; including, but not limited to, promoting the steelhead recovery by meeting accepted or approved environmental flows within the regional watersheds. .	
☐	EV-2. Assess, protect, enhance, and/or restore natural resources, including consideration of climate change, when developing water management strategies and projects.*	
☐	EV-3. Minimize adverse effects on biological and cultural resources when implementing strategies and projects.	
☐	EV-4. Identify opportunities for open spaces, trails and parks along streams and other recreational areas in the watershed that can be incorporated into projects.*	
☐	EV-5. Identify and integrate elements from appropriate Federal and State species protection and recovery plans.	
☐	EV-6. Promote watershed activities for fire fuel management and adaptive management strategies to protect water quality and water supplies from catastrophic wildfires.*	
Climate Change Goal		
☐	CC-1. Implement adaptation measures and mitigation solutions to climate change effects, including increased large storm intensity and/or frequency, sea level rise, drought and wildfire.	
☐	CC-2. Support increased education, monitoring and research to increase understanding of long-term impacts of climate change in the region.	
☐	CC-3. Increase energy conservation measures and alternatives to fossil fuel and non-renewable resources to reduce greenhouse gas emissions associated with water and wastewater facility operations and IRWM projects.	
Regional Communication and Cooperation Goal		
☐	RC-1. Identify cooperative, integrated strategies for protecting both infrastructure and environmental resources, including from climate change impacts.	
☐	RC-2. Foster collaboration among regional entities as an alternative to litigation through ongoing meetings of the RWMG and regional data sharing.	
☐	RC-3. Identify and pursue additional opportunities for public education, outreach, and communication on water resource management and climate change, including to disadvantaged communities and stakeholders with interests in water management issues.	
☐	RC-4. Build relationships with State and Federal regulatory agencies and other water forums and agencies.	

SECTION II. RESOURCE MANAGEMENT STRATEGIES AND CLIMATE CHANGE

This section is required for all implementation projects. If your project is a concept proposal, there is no need to complete this section.

12. Do you want your implementation project to be considered for Round 1?

- ☐ Yes
- ☐ No

13. Resource Management Strategies

One of the goals of integrated regional water management planning is to encourage diversification of water management approaches. Please select the strategies that your project will use (check all that apply):

Reduce Water Demand
- ☐ Agricultural Water Use Efficiency
- ☐ Urban Water Use Efficiency

Improve Operational Efficiency and Transfers
- ☐ Conveyance
- ☐ System Reoperation
- ☐ Water Transfers
- ☐ Infrastructure Reliability

Increase Water Supply
- ☐ Conjunctive Management & Groundwater Storage
- ☐ Desalination
- ☐ Precipitation Enhancement
- ☐ Recycled Municipal Water
- ☐ Surface Storage
- ☐ Storm Water Capture and Management

Improve Water Quality
- ☐ Drinking Water Treatment and Distribution
- ☐ Groundwater/Aquifer Remediation
- ☐ Matching Water Quality to Use
- ☐ Pollution Prevention
- ☐ Salt and Salinity Management
- ☐ Urban Runoff Management
- ☐ Water and Wastewater Treatment

Practice Resources Stewardship
- ☐ Agricultural Lands Stewardship
- ☐ Economic Incentives
- ☐ Ecosystem Restoration
- ☐ Forest Management
- ☐ Land Use Planning and Management
- ☐ Recharge Area Protection
- ☐ Water-Dependent Recreation
- ☐ Sediment Management
- ☐ Watershed Management
- ☐ Environmental and Habitat Protection and Improvement
- ☐ Wetlands Enhancement and Creation

Improve Flood Management
- ☐ Flood Risk Management

People and Water
- ☐ Economic Incentives (Loans, Grants, and Water Pricing)
- ☐ Outreach, Engagement, and Education
- ☐ Water and Culture
- ☐ Water-Dependent Recreation
- ☐ Regional Cooperation
- ☐ Recreation and Public Access

Other Resource Management Strategies
- ☐ Dewvaporation or Atmospheric Pressure Desalination
- ☐ Fog Collection
- ☐ Rainfed Agriculture
- ☐ Monitoring and Research

14. Climate Change Adaptation

a) Does your project contribute to climate change adaptation? If so, what climate change vulnerabilities in the region does your project respond to, specifically? Please describe how, and to what extent. Vulnerabilities for the region are described in Chapter 15 of the 2014 IRWM Plan. This chapter can be downloaded at: http://www.mpirwm.org/IRWM%20Library/IRWMPlan%20Final_whole.pdf

b) Does your project consider the effects of sea level rise on water supply conditions and identify suitable adaptation measures?

c) Does the project take into consideration changes in the amount, intensity, timing, quality and variability of runoff and recharge?

15. Reduction of Greenhouse Gas Emissions (GHGs)

a) Please describe the extent to which your project will help reduce GHGs, compared to project alternatives. *To assist you in estimating GHG emissions, please use the California Emissions Estimator Tool (CalEEMod) on the Greater Monterey County IRWM website: http://www.greatermontereyirwmp.org/performance/.*

b) If appropriate, describe the extent to which the project will help the region reduce GHGs over the next 20 years.

c) To what extent will the project help reduce energy consumption, especially the energy embedded in water use, and ultimately reduce GHG emissions?

SECTION III. PROJECT AND BUDGET NARRATIVE

Complete this and the following sections only if you would like your project to be considered for Round 1 Implementation Grant funds.

16. Project Description (1 page or so): Please describe the proposed project. Provide a general discussion of the problem the project addresses, and describe major tasks/activities. Include any other information that supports the justification for this project, including how the project can achieve any claimed benefits.

17. Project Need/Urgent Need: Is there a special, urgent, or critical need for your project? If so, explain.

18. Budget: Please complete the following budget table.

	Non-State Cost Share[2]	Requested Grant Amount	Other State Cost Share	Total Cost
(a) Project Admin				
(b) Land Purchase/Easement				
(c) Planning/Design/ Engineering/Environmental				
(d) Construction/ Implementation				
(e) Total				

19. Budget Justification: Please provide a budget justification. What is the basis for your costs? (For the final application to DWR, you will need to provide documentation, such as quotes, to justify your budget.)

20. Cost Share: DWR requires that proposals provide at minimum 50% non-State cost share. DWR awards additional points for proposals that provide more than the required 50% non-State cost share. Describe your cost share, and sources of cost share funds.

Please also state whether your agency can contribute to any costs that may be associated with the cost of preparing the final Prop 1 grant application, if any.

21. Disadvantaged Communities: Does the project provide direct water-related benefits to a project area entirely comprised of Disadvantaged Communities (DACs) and/or Economically Distressed Areas (EDAs)? If so, explain. (If you need help with this question, contact Maureen at mhamilton@mpwmd.net)

Will you be requesting a full or partial cost-share waiver based on DAC/EDA status?

22. Operations and Maintenance: Please describe how operations and maintenance of the project will be supported.

[2] Proposition 1 requires a minimum cost share of 50% of the total project cost. An applicant may request the local cost share requirement be waived or reduced for projects that directly benefit one or more DACs and/or Economically Distressed Areas (EDAs). See DWR Proposal Solicitation Package for additional details.

23. Storm Water Resource Plan Requirements: Is the project a storm water or dry weather runoff capture project? If so, is it included in a Storm Water Resource Plan?

24. Groundwater: Will the project affect groundwater levels? If so, how?

If your project is located in the Seaside Groundwater Basin, has it been considered by the Seaside Groundwater Basin Watermaster Technical Advisory Committee and does it conform to the adjudication requirements?

25. AB 1249 Requirements: Does the project address nitrate, arsenic, or hexavalent chromium contamination in the region? If so, how?

26. Stakeholder Coordination: Please briefly describe the nature of stakeholder coordination for planning, developing, and implementing the project.

SECTION IV. COMPLIANCE

Complete this section only if you would like your project to be considered for Round 1 Implementation Grant funds.

To be eligible for IRWM Implementation Grant funds, project proponents must comply with the following.

27. Adoption of IRWM Plan

Proposition 1 IRWM Program Guidelines require that each project proponent named in an IRWM Grant application adopt the IRWM Plan. Please check if your agency/organization:

☐ Has already adopted the IRWM Plan

☐ Hereby commits to adopting the IRWM Plan, if the project is selected for submission in an IRWM Grant application

28. Urban Water Management Compliance

If your agency meets the definition of an urban water supplier ("supplier, either publicly or privately owned, that provides water for municipal purposes, either directly or indirectly, to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually"), you must demonstrate compliance with certain requirements. These include:

- DWR-approved 2015 Urban Water Management Plan
- Verification from DWR that your agency submitted a validated water loss audit report (SB 555).
- Compliance with the water metering requirements (CWC section 525)

Is your agency an urban water supplier, and if so, can it meet these requirements?

☐ Yes, my agency is an urban water supplier and I can demonstrate compliance with these requirements.

☐ No, my agency is an urban water supplier but I cannot demonstrate compliance with these requirements.

☐ N/A: My agency is not an urban water supplier.

29. Surface Water Diverter Compliance

If your agency/organization is a surface water diverter, you must state whether your agency/organization has submitted to the State Water Resources Control Board your annual surface water diversion reports. Is your agency/organization a surface water diverter, and if so, can it meet this requirement?

☐ Yes, my agency is a surface water diverter and I can verify that we meet this requirement.
☐ No, my agency is a surface water diverter but we have not met this requirement.
☐ N/A: My agency is not a surface water diverter.

SECTION V. ROUND 1 PROJECT INFORMATION FORM

Please complete and submit the **Project Information Form** to Sarah Hardgrave at shardgrave@bigsurlandtrust.org by **February 8, 2019**.

Complete the ***Project Information Form*** *only if you would like your project to be considered for Round 1.*

The **Project Information Form** was developed by the Department of Water Resources (DWR). It contains the actual questions that each project proponent must address for the Region's Round 1 application for Implementation Grant funds. This **Project Information Form** is still in draft form; some questions may change between now and the final application process. If your project is selected for Round 1, you will have another opportunity to revise your responses on this form, if necessary, before the Regional Water Management Group submits its Round 1 Implementation Grant application to the State.

Note that if your project is selected for the Round 1 application, you will need to be physically present for a Pre-application Workshop (time and location TBD) during which time DWR staff will review your project information and ask questions.

The information below in blue font is provided, for your information, to help you respond to certain questions on the **Project Information Form.**

A. PROJECT INFORMATION

Question 5. DAC question: No need to provide a map at this time.

Question 8. Funding Category: Your project is a "DAC Implementation Project" only if your project directly and entirely benefits a disadvantaged community.

Question 9. Project Type: Click on "Other" to see the categories.

B. SELECTED ELIGIBILITY REQUIREMENTS

Question 2. How the Project Addresses the Critical Need(s) of the Region: Based on the objectives you selected in Section I Question 11 above, please explain how your project addresses the critical needs of the region.

Question 4. Climate Change: You need to explain how your project addresses climate change vulnerabilities specifically for the Monterey Peninsula, Carmel Bay and South Monterey Bay region, if applicable. Vulnerabilities for the region are described in Chapter 15 of the 2014 IRWM Plan. This chapter can be downloaded at: http://www.mpirwm.org/IRWM%20Library/IRWMPlan%20Final_whole.pdf)

Question 5. Regional Water Self-Reliance: This question is actually intended for regions that depend on water from the Delta watershed. However, if your project includes one of the following, it contributes to regional water self-reliance: water use efficiency, water recycling, advanced water technologies, local and regional water supply project, or improved regional coordination of local and regional water supply efforts.

Question 6. Statewide Priorities. Statewide priorities include the following (see pp. 9-10 of the Prop 1 2016 IRWM Grant Program Guidelines Volume 1 for a full description of these priorities):

☐ Make conservation a California way of life

- Building on current water conservation efforts and promoting the innovation of new systems for increased water conservation.
- Expand agricultural and urban water conservation and efficiency to exceed SB-X7-7 targets
- Provide funding for conservation and efficiency
- Increase water sector energy efficiency and greenhouse gas reduction capacity
- Promote local urban conservation ordinances and programs

☐ Increase regional self-reliance and integrated water management across all levels of government

- Ensure water security at the local level, where individual government efforts integrate into one combined regional commitment where the sum becomes greater than any single piece.
- Support and expand funding for Integrated Water Management planning and projects
- Improve land use and water alignment
- Provide assistance to disadvantaged communities
- Encourage State focus on projects with multiple benefits
- Increase the use of recycled water

☐ Protect and restore important ecosystems

- Continue protecting and restoring the resiliency of our ecosystems to support fish and wildlife populations, improve water quality, and restore natural system functions.
- Restore key mountain meadow habitat
- Manage headwaters for multiple benefits
- Protect key habitat of the Salton Sea through local partnership
- Restore coastal watersheds
- Continue restoration efforts in the Lake Tahoe Basin
- Continue restoration efforts in the Klamath Basin
- Water for wetlands and waterfowl
- Eliminate barriers to fish migration
- Assess fish passage at large dams
- Enhance water flows in stream systems statewide

☐ Manage and prepare for dry periods

- Effectively manage water resources through all hydrologic conditions to reduce impacts of shortages and lessen costs of state response actions. Secure more reliable water supplies and consequently improve drought preparedness and make California’s water system more resilient.
- Revise operations to respond to extreme conditions
- Encourage healthy soils

☐ Expand water storage capacity and improve groundwater management

- Increase water storage for widespread public and environmental benefits, especially in increasingly dry years and better manage our groundwater to reduce overdraft.
- Provide essential data to enable Sustainable Groundwater Management
- Support funding partnerships for storage projects
- Improve Sustainable Groundwater Management
- Support distributed groundwater storage

- Increase statewide groundwater recharge
- Accelerate clean-up of contaminated groundwater and prevent future contamination

☐ Provide safe water for all communities

- Provide all Californians the right to safe, clean, affordable and accessible water
- adequate for human consumption, cooking, and sanitary purposes.
- Consolidate water quality programs
- Provide funding assistance for vulnerable communities
- Manage the supply status of community water systems
- Additionally, as required by Water Code §10545, in areas that have nitrate, arsenic, perchlorate, or hexavalent chromium contamination, consideration will be given to grant proposals that included projects that help address the impacts caused by nitrate, arsenic, perchlorate, or hexavalent chromium contamination, including projects that provide safe drinking water to small disadvantaged communities.

☐ Increase flood protection

- Collaboratively plan for integrated flood and water management systems, and implement flood projects that protect public safety, increase water supply reliability, conserve farmlands, and restore ecosystems.
- Improve access to emergency funds
- Better coordinate flood response operations
- Prioritize funding to reduce flood risk and improve flood response
- Encourage flood projects that plan for climate change and achieve multiple benefits

☐ Increase operational and regulatory efficiency

This action is directed towards State and federal agencies; however, consideration will be afforded to eligible local or regional projects that also support increased operational of the State Water Project or Central Valley Project

C. WORK PLAN, BUDGET, AND SCHEDULE

Please summarize the work plan and budget information that you provided (in detail) in Section III above.

D. OTHER PROJECT INFORMATION

Question 5. Does the project address a contaminant listed in AB 1249? These contaminants are, specifically: nitrate, arsenic, hexavalent chromium, and perchlorate.

A "disadvantaged community" (or DAC) is defined as a community with an annual median household income that is less than 80% of the statewide annual median household income, or according to the latest census data, less than $51,026. A "small disadvantaged community" is defined as a DAC that has a yearlong population of no more than 10,000 people.

HOW TO SUBMIT YOUR APPLICATION:

This Project Application Form is due **January 14, 2019**.

The Project Information Form is due **February 8, 2019**.

Please email your completed applications to Sarah Hardgrave, at shardgrave@bigsurlandtrust.org

If you do not have email access, please hand-deliver or mail one copy of your application to:

Sarah Hardgrave
Big Sur Land Trust
509 Hartnell St.
Monterey, CA 93940

Proposition 1 Integrated Regional Water Management (IRWM)
Round 1 Implementation Grant Project Solicitation Schedule 2018/2019

Department of Water Resources (DWR) Timeline for Round 1 Implementation Grants

- Oct 5, 2018: DWR released Draft Project Solicitation Package (PSP) and Guidelines; comments due December 14, 2018
- November – early December: Central Coast Funding Area (CCFA) preparing joint comments on Draft PSP
- Early 2019: DWR releases Final PSP released
- DWR will schedule **Pre-Application Workshops** with each Funding Area following release of PSP. The Central Coast IRWM regions are requesting a workshop in June 2019.
- RWMG must provide DWR with information on proposed projects *at least two weeks prior* to the workshop: A Proposal Summary, plus a "Project Information Form" for each project.
- DWR will get back to regions with comments within 4 weeks after the workshop.
- Application to DWR will be due 12 weeks after the workshop date.

Prop 1 IRWM Grant Funds Available to Central Coast Funding Area

Prop 1 Allocation to CCFA:	$43,000,000
Minus State costs (10%):	<u>- $4,300,000</u>
Remaining for CCFA:	$38,700,000

Of that amount:

DAC Funds (20% total allocation):	$8,600,000
General Implementation Grant Funding:	$30,100,000

Prop 1 IRWM Grant Funds Available to the Monterey Peninsula, Carmel Bay and South Monterey Bay Region

<u>Total Prop 1 funds available:</u>
DAC Funds: $931,966
General Implementation: $3,261,882
TOTAL: $4,193,848

<u>Prop 1 funds spent to date</u>:
DAC Involvement (50% of total DAC): $465,983

For Round 1, DWR is proposing that 35% of DAC Implementation funds and 50% of General Implementation funds be provided, leaving the rest for Round 2 in 2020.

<u>Round 1</u>: 50% of General Implementation allocation, 35% of remaining DAC allocation
DAC Implementation: $163,094
General Implementation: $1,630,941
TOTAL: $1,794,035

<u>Round 2 (2020)</u>: *50% of Implementation allocation, 65% of remaining DAC allocation*
DAC Implementation: $302,889
General Implementation: $1,630,941
TOTAL: $1,933,830

Proposed Project Solicitation Schedule for IRWMP:

- October 5, 2018: Draft Project Solicitation Package (PSP) was released by DWR.

- December 6, 2018: Solicitation begins. The process will be reviewed at the December 6 RWMG meeting.

  Those who are interested in having their projects put forward in Round 1 will also need to submit DWR's Project Information Form. The **Project Information Form** will be due Monday February 8, 2019. This deadline assumes DWR will release the final PSP with the form in early January, but the timeline may be delayed.

- January 14, 2019: Project Application Forms due. Subcommittee ranks projects.

- January 21, 2019: Prioritized project list prepared by TAC (prior to January 24 RWMG meeting).

- January 24 RWMG Meeting: Discuss project ranking with RWMG, and consider ranked Project List for Round 1. RWMG takes a first look at projects on the table for Round 1.

- February 8, 2019: Project Information Forms due.

- February, March and April RWMG Meetings: Project proponents present their projects to the RWMG. RWMG selects projects to put forward.

- April or May RWMG Meeting: Must decide which projects to put forward, in time for June Funding Area Pre-Application Workshop.

- June 2019 (tbd): Pre-Application Workshop with DWR. Proposal Summary and Project Information Forms are due to DWR two weeks *prior* to the workshop.

Local Cost Share

Proposition 1 requires a minimum cost share of 50% of the total project cost. Applicants must demonstrate that a minimum of 50 percent of the total proposal costs will be paid for with non-State funds (Water Code §79742(C)). Costs incurred after January 1, 2015 (the effective date of Proposition 1) can be used as local cost share; in-kind services may also be used for local cost share.

An applicant may request the local cost share requirement be waived or reduced for projects that directly benefit one or more DACs and/or Economically Distressed Areas (EDAs). The 2018 Guidelines, Appendices E and F provide details regarding what documentation must be submitted to support claimed benefits to DACs and/or EDAs. Project benefits may be claimed based on either by population or geographic area. If documentation submitted is reasonable, cost share waivers will be will be determined as follows:

DAC/EDA Benefit Cost Share Waiver

- 76% - 100%: 100 percent cost share waiver
- 51% - 75%: 75 percent cost share reduction waiver
- 25% - 50%: 50 percent cost share reduction waiver
- Less than 25%: No cost share reduction waiver

Eligible Project Types
Subject to regional priorities, projects may include, *but are not limited to*, the following elements (Water Code §79743 (a - j)):

- Water reuse and recycling for non-potable reuse and direct and indirect potable reuse
- Water-use efficiency and water conservation
- Local and regional surface and underground water storage, including groundwater aquifer cleanup or recharge projects
- Regional water conveyance facilities that improve integration of separate water systems
- Watershed protection, restoration, and management projects, including projects that reduce the risk of wildfire or improve water supply reliability
- Stormwater resource management, including, but not limited to, the following:
    - Projects to reduce, manage, treat, or capture rainwater or stormwater
    - Projects that provide multiple benefits such as water quality, water supply, flood control, or open space
    - Decision support tools that evaluate the benefits and costs of multi-benefit stormwater projects
    - Projects to implement a stormwater resource plan developed in accordance with Part 2.3 (commencing with Section 10560) of Division 6 including Water Code § 10562 (b)(7)
- Conjunctive use of surface and groundwater storage facilities
- Water desalination projects
- Decision support tools to model regional water management strategies to account for climate change and other changes in regional demand and supply projections
- Improvement of water quality, including drinking water treatment and distribution, groundwater and aquifer remediation, matching water quality to water use, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff
- Regional projects or programs as defined by the IRWM Planning Act (Water Code §10537).

Eligible proposals must do the following. The following requirements may be applied at the project level depending on the individual PSP:

- Advance the purpose of Proposition 1 Chapter 7, Regional Water Security, Climate, and Drought Preparedness (Water Code §79707(c) and §79740) which are, as follows:
    - Assist water infrastructure systems adapt to climate change
    - Provide incentives for water agencies throughout each watershed to collaborate in managing the region’s water resources and setting regional priorities for water infrastructure

Eligible also projects must:

- Promote State planning priorities and sustainable community strategies, consistent with Government Code §65041.1 and §65080 (Water Code §79707 (i)
- Be included in a Stormwater Resource Plan that has been incorporated into and IRWM plan, unless exempt per Water Code §10563(c)(2)(B). (Applies only to stormwater and dry weather runoff capture projects.)
- Be supported by the local Groundwater Sustainability Agency. (Applies only to projects that affect Groundwater levels.) *If a groundwater project is located in the Seaside Groundwater Basin, it must be considered by the Seaside Groundwater Basin Watermaster Technical Advisory Committee and conform to the adjudication requirements.*

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APPENDIX 14-G

MARCH 6, 2019 RWMG MEETING

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Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM
Regional Water Management Group (RWMG) Meeting

Meeting Date and Time: March 6, 2019, 2pm-4pm
Meeting Location: Monterey Peninsula Water Management District Conference Room
5 Harris Ct., Monterey
or conference call: 872-240-3212; access code: 538-742-293#

Agenda

1. Introductions
2. Status Update from RWMG Members on 2018 MOU Approval Process
3. Update on IRWM Project Solicitation Schedule
4. Discuss Preliminary Results of Project Prioritization Process
5. Any Other Updates from Meeting Participants
6. Schedule Next Meeting

RWMG March 6, 2019 Meeting
Project Solicitation Schedule Summary

Proposition 1 Integrated Regional Water Management Round 1 Implementation Grant Project Solicitation Schedule 2019	
March 6	RWMG Meeting: Discuss project ranking with RWMG and consider ranked Project List for Round 1. RWMG takes a first look at projects on the table for Round 1.
April	RWMG Meeting: Project proponents present their projects to the RWMG. RWMG selects projects to put forward.
Mid-April (tbd)	Deliverable: Projects that are selected by the RWMG to submit Project Information Forms.
End of April (tbd)	Deliverable: RWMG must provide DWR with information on proposed projects at least two weeks prior to the workshop: A Proposal Summary, plus a "Project Information Form" for each project.
June or July (tbd)	DWR Pre-Application Workshop
12 weeks after workshop	Deliverable: Final application to DWR will be due 12 weeks after the workshop date.

RWMG March 6, 2019 Meeting
Project Prioritization Summary

Proposition 1 Integrated Regional Water Management Summary of Project Applications Received for Round 1 Implementation Grant			
Project Proponent	**Project Title**	**Type of Proposal**	**Considered for Round 1 Funding?**
CalAm	Monterey Peninsula Water Supply Project	Implementation Project	Yes
City of Carmel-by-the-Sea	Carmel-by-the-Sea Pilot Wet-Dry Weather Diversion Project	Concept Proposal	No
City of Carmel-by-the-Sea	Carmel by-the-Sea Forest Hill Park Creek Restoration	Concept Proposal	No
City of Carmel-by-the-Sea	City of Carmel by-the-Sea Park Branch Library- Devendorf Rainwater Capture	Concept Proposal	No
City of Monterey	Hartnell Gulch Restoration and Runoff Diversion Project	Concept Proposal	No
City of Monterey	Ramona Avenue Stormwater Runoff Infiltration Project	Implementation Project	Yes
City of Seaside	Del Monte Manor Park LID Improvements Project	Implementation Project	Yes
Marina Coast Water District	Coe Avenue Recycled Water Distribution Pipeline	Implementation Project	Yes
Monterey County	Carmel River Floodplain Restoration and Environmental Enhancement Project (FREE)	Concept Proposal	No
Monterey County	County Service Area 50 (Rio Way Tract #2) Stormwater and Flood Control Project	Concept Proposal	No
Monterey One Water	Coral Street Pump Station Climate Resiliency Project	Concept Proposal	No
Monterey One Water	Seaside Pump Station Climate Change and Erosion Adaptation Study	Concept Proposal	No
Sand City/Seaside	Trash Capture and Urban Diversion Project for the Cities of Seaside and Sand City	Concept Proposal	No
Sand City	West End Stormwater Management Improvements	Implementation Project	Yes

Proposition 1 Integrated Regional Water Management Project Prioritization Scoring Summary	
Implementation Project Title	**Preliminary Score***
Monterey Peninsula Water Supply Project	76.3
Del Monte Manor Park LID Improvements Project	61.2
West End Stormwater Management Improvements	53.5
Ramona Avenue Stormwater Runoff Infiltration Project	32.4
Coe Avenue Recycled Water Distribution Pipeline	12.5
**These scores are preliminary and subject to change based on group discussions and additional information provided by project proponents.*	

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APPENDIX 14-H

APRIL 10, 2019 RWMG MEETING

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Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM
Regional Water Management Group (RWMG) Meeting

Meeting Date and Time:	April 10, 2019, 2pm-4pm
Meeting Location:	Monterey Peninsula Water Management District Conference Room 5 Harris Ct., Monterey or conference call: 872-240-3212 access code: 943-674-509 #

<u>Agenda</u>

1. Introductions
2. Status Update from RWMG Members on 2018 MOU Approval Process
3. Update on IRWM Project Solicitation Schedule
4. Discuss Final Results of Project Prioritization Process
5. Select Project(s) to be included in our Region's Proposal to DWR
6. Any Other Updates from Meeting Participants
7. Schedule Next Meeting

RWMG April 10, 2019 Meeting
Project Solicitation Schedule Summary

Proposition 1 Integrated Regional Water Management Round 1 Implementation Grant Project Solicitation Schedule 2019	
April 10th	RWMG Meeting: Project proponents present their projects to the RWMG. RWMG selects projects to put forward.
End of April (tbd)	Deliverable: Projects that are selected by the RWMG to submit Project Information Forms.
May (tbd)	RWMG Meeting
Mid-May (tbd)	Deliverable: RWMG must provide DWR with information on proposed projects at least two weeks prior to the workshop: A Proposal Summary, plus a "Project Information Form" for each project.
June (tbd)	RWMG Meeting
June or July (tbd)	DWR Pre-Application Workshop
12 weeks after workshop	Deliverable: Final application to DWR will be due 12 weeks after the workshop date.

Proposition 1 Integrated Regional Water Management
Implementation Grant Funding Available

Prop 1 IRWM Grant Funds Available to the Monterey Peninsula, Carmel Bay and South Monterey Bay Region

Total Prop 1 funds available:
DAC Funds: $931,966
General Implementation: $3,261,882
TOTAL: $4,193,848

Prop 1 funds spent to date:
DAC Involvement (50% of total DAC): $465,983

For Round 1, DWR is proposing that 35% of DAC Implementation funds and 50% of General Implementation funds be provided, leaving the rest for Round 2 in 2020. Our region has requested the 50% of the DAC allocation funds be available for Round 1 and the remaining 50% available for Round 2. This request has not yet been approved.

Round 1: 50% of General Implementation allocation, 35% of remaining DAC allocation
DAC Implementation: $163,094
General Implementation: $1,630,941
TOTAL: $1,794,035

Round 2 (2020): *50% of Implementation allocation, 65% of remaining DAC allocation*
DAC Implementation: $302,889
General Implementation: $1,630,941
TOTAL: $1,933,830

Local Cost Share
Proposition 1 requires a minimum cost share of 50% of the total project cost. Applicants must demonstrate that a minimum of 50 percent of the total proposal costs will be paid for with non-State funds (Water Code §79742(C)). Costs incurred after January 1, 2015 (the effective date of Proposition 1) can be used as local cost share; in-kind services may also be used for local cost share.

DAC/EDA Benefit Cost Share Waiver
- 76% - 100%: 100 percent cost share waiver
- 51% - 75%: 75 percent cost share reduction waiver
- 25% - 50%: 50 percent cost share reduction waiver
- Less than 25%: No cost share reduction waiver

Final Results of Project Ranking		
Ranking Number	**Project Name**	**Score**
1	Del Monte Manor Park LID Improvements Project	83.2
2	West End Stormwater Management Improvements	74.8
3	Ramona Avenue Stormwater Runoff Infiltration Project	38.2
4	Coe Avenue Recycled Water Distribution Pipeline	14.6

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APPENDIX 14-I

MAY 9, 2019 RWMG MEETING

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Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM
Regional Water Management Group (RWMG) Meeting

Meeting Date and Time: May 9, 2019, 2pm-4pm
Meeting Location: Monterey Peninsula Water Management District Conference Room
5 Harris Ct., Monterey
or conference call: (786) 535-3211 Access Code: 971-452-613#

Agenda

1. Introductions
2. Status Update from RWMG Members on 2018 MOU Approval Process
3. Update on IRWM Project Solicitation Schedule
4. IRWM Plan Update Progress and Review Process
5. Final Project Solicitation Package
6. Update on Selected Projects
7. Update from Dudek on Application Process
8. Schedule Next Meeting

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APPENDIX 15

SUPPLY AND DEMAND FOR WATER ON THE MONTEREY PENINSULA

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Supply and Demand for Water on the Monterey Peninsula

Prepared by David J. Stoldt, General Manager
Monterey Peninsula Water Management District

September 2019

With the approval of the Monterey Peninsula Water Supply Project (MPWSP) and the continued environmental work on Pure Water Monterey (PWM) expansion as a back-up option, it is an opportune time to examine available supplies and their ability to meet current and long-term demand. This memorandum will also look at the changing nature of demand on the Monterey Peninsula, the underlying assumptions in the sizing of the water supply portfolio, and indicators of the market's ability to absorb new demand.

Supply

Available sources of supply are shown in Table 1 below and are described in the discussion that follows. Despite the California Supreme Court's decision to not hear the two petitions for writ of review, there remains the risk of additional legal challenges and not all permits have been issued for California American Water's (Cal-Am) MPWSP desalination plant. For these reasons, supply has been shown with both desalination and with PWM expansion.

Table 1
Monterey Peninsula Available Supply
(Acre-Feet Annually)

Supply Source	w/ Desalination	w/ PWM Expansion
MPWSP Desalination Plant	6,252	0
Pure Water Monterey	3,500	3,500
PWM Expansion	0	2,250
Carmel River	3,376	3,376
Seaside Basin	774	774
Aquifer Storage & Recovery (ASR)	1,300	1,300
Sand City Desalination Plant	94	94
Total Available Supply	**15,296**	**11,294**
Other Available Supplies	406	406
Total Available Supply w/Other	**15,702**	**11,700**

Desalination: The 6.4 million gallon per day (MGD) MPWSP desalination plant is expected to deliver 6,252 acre-feet annually (AFA).[1] It is likely to begin deliveries in early 2022, considering

[1] CPUC Decision 18-09-017, September 13, 2018, page 70; Amended Application of California-American Water Company (U210W), Attachment H, March 14, 2016

final permits in November 2019, a 21-month construction period, and 6-month commissioning and start-up window.[2]

Pure Water Monterey: Monterey One Water's (M1W) project is expected to come online in late 2019 and begin deliveries of 3,500 AFA to Cal-Am in early 2020. It is over 90% complete.

Pure Water Monterey Expansion: The expansion of Pure Water Monterey is expected to yield 2,250 AFA.[3] The Notice of Preparation indicates source waters for the expansion are secure: *"No new source water diversion and storage sites are necessary to achieve the Expanded PWM/GWR Project's recycled water yield objective of an additional 2,250 AFY of replacement supplies. The Expanded PWM/GWR Project is designed to utilize existing M1W contractual rights to source waters and wastewaters."* There are several different configurations of source waters that could be utilized for the expansion, but one proposed alternative is 81% contractual rights to wastewater and excess secondary effluent and 19% of Blanco Drain and Reclamation Ditch waters. This project could come online by January 2022.

Carmel River: Cal-Am has legal rights to 3,376 AFA from the Carmel River comprised of 2,179 AFA from License 11866, 1,137 AFA of pre-1914 appropriative rights, and 60 AFA of riparian rights. This does not include what is referred to as Table 13 rights, discussed under "*Other Available Supplies*" below.

Seaside Basin: The 2006 Seaside Groundwater Basin adjudication imposed triennial reductions in operating yield for Standard Producers such as Cal-Am until the basin's Natural Safe Yield is achieved. The last reduction will occur in 2021 and Cal-Am will have rights to 1,474 AFA. However, with the delivery of a long-term permanent water supply, the company would like to begin replacing its accumulated deficit of over-pumping by in-lieu recharge by leaving 700 AFA of its production right in the basin for 25 years. Hence, only 774 AFA is reflected as long-term supply available, although the additional 700 AF becomes available again in the future.

Aquifer Storage & Recovery: There are two water rights that support ASR. Permit 20808A allows maximum diversion of 2,426 AFA and Permit 20808C allows up to 2,900 AFA for a total of 5,326 AFA. However, these are maximums that may only be close to being achieved in the wettest of years. Based on long-term historical precipitation and streamflow data, ASR is designed to produce 1,920 AFA on average. The MPWSP assumes a lesser amount of 1,300 AFA to be conservative.

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[2] www.watersupplyproject.org/schedule

[3] Notice of Preparation of a Supplemental Environmental Impact Report and Public Scoping Meeting Notice, page 4, May 15, 2019

Sand City Desalination Plant: The Sand City plant was designed to produce a nominal 300 AFA, but has failed to achieve more than the 276 AF in 2011. Due to source water quality issues and discharge permit requirements the plant has averaged 199 AFA the past three years and appears on course for approximately 140 AF in Water Year 2019. The intakes will likely be augmented and production increased (see "*Other Available Supplies*", below.) Here only the 94 AFA of long-term production legally committed to offset Carmel River pumping is included.

Other Available Supplies: In 2013, Cal-Am received Permit 21330 from the State Water Board for 1,488 AFA from the Carmel River. However, the permit is seasonally limited to December 1 through May 31 each year and subject to instream flow requirements. As a result, actual production will vary by water year. Here, we have assumed 300 AFA on average. For the Sand City desalination plant the amount produced in excess of 94 AFA is available for general Cal-Am use and eventually to serve growth in Sand City. With new intakes, we have assumed average production of 200 AFA or 106 AFA of other available supply. There is also available unused capacity in the Seaside Basin which annually is reallocated to the Standard Producers such as Cal-Am as "Carryover Credit" under the adjudication decision. While not insignificant, Carryover Credit has not been included in the "Other Available Supplies". Total "Other" is 406 AFA.

Historical Water Demand for which MPWSP Desalination Plant is Sized

The MPWSP was initially sized solely as a replacement supply[4] for current customer demand, but this has changed slightly over time as described below. Consideration was also given to peak month and peak day. Additional demand was recognized to accommodate legal lots of record, a request by the hospitality industry to anticipate a return to occupancy rates similar to that which existed prior to the World Trade Center tragedy, and to shift the buildout of Pebble Beach off the river.[5] Table 2 below shows the demand assumptions used in sizing the MPWSP. Each component is discussed below.

Table 2
Water Demand Assumed in Sizing the MPWSP
(Acre-Feet Annually)

Demand Component	Acre-Feet Annually
Average Current Customer Demand	13,290
Legal Lots of Record	1,181
Tourism Bounce-Back	500
Pebble Beach Buildout	325
Total Water Demand	**15,296**

[4] Direct Testimony of Richard C. Svindland, April 23, 2012, pages 4,5,7
[5] Supplemental Testimony of Richard C. Svindland, January 11, 2013, pages 4-5

Average Current Customer Demand: The Application of Cal-Am to the California Public Utilities Commission (CPUC) in April 2012 utilized 13,290 AFA which was the 5-year average demand for 2007-2011.[6] As stated earlier, this was to be replacement supply and the Application stated *"At this point future demands of the Monterey System have not been included in the sizing of the plant."*[7] At that time, the 5-year average maximum month was 1,388 AF and the highest month was 1,532 AF.[8]

In a January 2013 CPUC filing, average demand was reiterated by Cal-Am to be 13,290 AFA but Cal-Am added that the plant would need to be increased larger by approximately 700 acre-feet per year for the in-lieu recharge of the Seaside Basin.[5] However, as can be seen in comparing Tables 1 and 2 above, supply equals demand at 15,296 AFA without changing the size of the plant from the initial Application.

In a 2016 update to the CPUC, Cal-Am recognized that average demand had declined in the intervening three years.[9] The 5-year average had declined to 10,966 AFA and the maximum month declined to 1,250 AF. At the time of the 2016 update, Cal-Am suggested that it should size the plant based on the backward-looking 10-year average demand and maximum month, instead of the 5-year average in the original Application, as well as several alternate assumptions about return of water to the Salinas Valley. They concluded *"we do not believe the size of the plants should be changed."*[10]

In a September 2017 filing to the CPUC, Cal-Am acknowledged continuing declines in demand, but indicated that the plant sizing remained appropriate saying *"We anticipate demand to rebound over time after these new water supplies are available, the drought conditions continue to subside, the moratorium on new service connections is lifted, and strict conservation and water use restrictions are eased."*[11] The company also for the first time introduced the use of future population and demand as a way to "normalize" the average demand used in sizing, a departure from the "replacement supply" basis under the initial Application in 2012.[12] This resulted in average "current" system demand of 12,350 AFA. This amount, combined with the same lots of record, tourism bounce-back, and Pebble Beach buildout results in demand of 14,355 AFA – a reduction from the initial Application – but the company asserted that the plant need not be resized because this would allow it to run at 86% capacity, a more reasonable operating rate compared to the 95% posed in the original Application.

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[6] Direct Testimony of Richard C. Svindland, April 23, 2012, page 21
[7] Direct Testimony of Richard C. Svindland, April 23, 2012, page 36
[8] Direct Testimony of Richard C. Svindland, April 23, 2012, page 22
[9] Supplemental Testimony of Richard C. Svindland, April 14, 2016 (Errata), pages 7-11
[10] Supplemental Testimony of Richard C. Svindland, April 14, 2016 (Errata), page 9
[11] Direct Testimony of Ian Crooks Errata Version, September 27, 2017, page 10
[12] Direct Testimony of Ian Crooks Errata Version, September 27, 2017, pages 11-13

The CPUC, in its September 2018 Decision, determined that Cal-Am's overall future water demand will be approximately 14,000 AFA[13] and therefore the 6.4 MGD desalination plant is warranted.

Legal Lots of Record: The 2012 Application to the CPUC also included 1,181 AFA for Legal Lots of Record.[14, 5] Legal lots of record are defined as lots resulting from a subdivision of property in which the final map has been recorded in cities and towns, or in which the parcel map has been recorded in Parcels and Maps or Record of Surveys. Lots of record may include vacant lots on vacant parcels, vacant lots on improved parcels, and also included remodels on existing improved, non-vacant parcels. Ultimately, not all legal lots are buildable. While the District is the source of the 1,181 AFA estimated demands for the lots of record, the number was lifted from the 2009 Coastal Water Project environmental impact report.

Tourism Bounce-Back: The 500 AFA for economic recovery was originally proffered by the hospitality industry to handle a recovery of occupancy rates in the tourist industry in a post-World Trade Center tragedy setting. [15, 5] The industry felt that their most successful occupancy rates were in the three years prior to September 11, 2001 and felt 500 AFA would provide a buffer for a return to that level.

Pebble Beach Buildout: Ever since the State Water Board issued Order 95-10 and the Cease and Desist Order (CDO) it has recognized the Pebble Beach Company's investment in the Reclamation Project and the Company's right to serve its entitlements from the Carmel River. However, the State Water Board has stated a desire to have the Pebble Beach entitlements shifted away from the river and be satisfied by a new supply. At the time of the 2012 Application, the Pebble Beach company had approximately 325 AF of entitlements still available.

Current Water Demand Assumptions

The original MPWSP desalination project plant sizing was done over seven years ago in 2012. With the passage of time and the opportunity to perform deeper research, it is possible to revisit the assumptions about consumer demand for water in the current context.

Average Current Customer Demand: Figure 1 on the next page shows water production for customer service, a proxy for customer demand, for the past twenty-year period. As can be seen, demand has been in decline. For water year 2019 to date, demand remains 110 AF below 2018 levels, so this trend has not reversed.

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[13] CPUC Decision 18-09-017, September 13, 2018, page 68
[14] Direct Testimony of Richard C. Svindland, April 23, 2012, pages 22, 37.
[15] Direct Testimony of Richard C. Svindland, April 23, 2012, page 37

Figure 1
Annual Water Production for Customer Service (Demand)
Last 20 Years
(Acre-Feet)

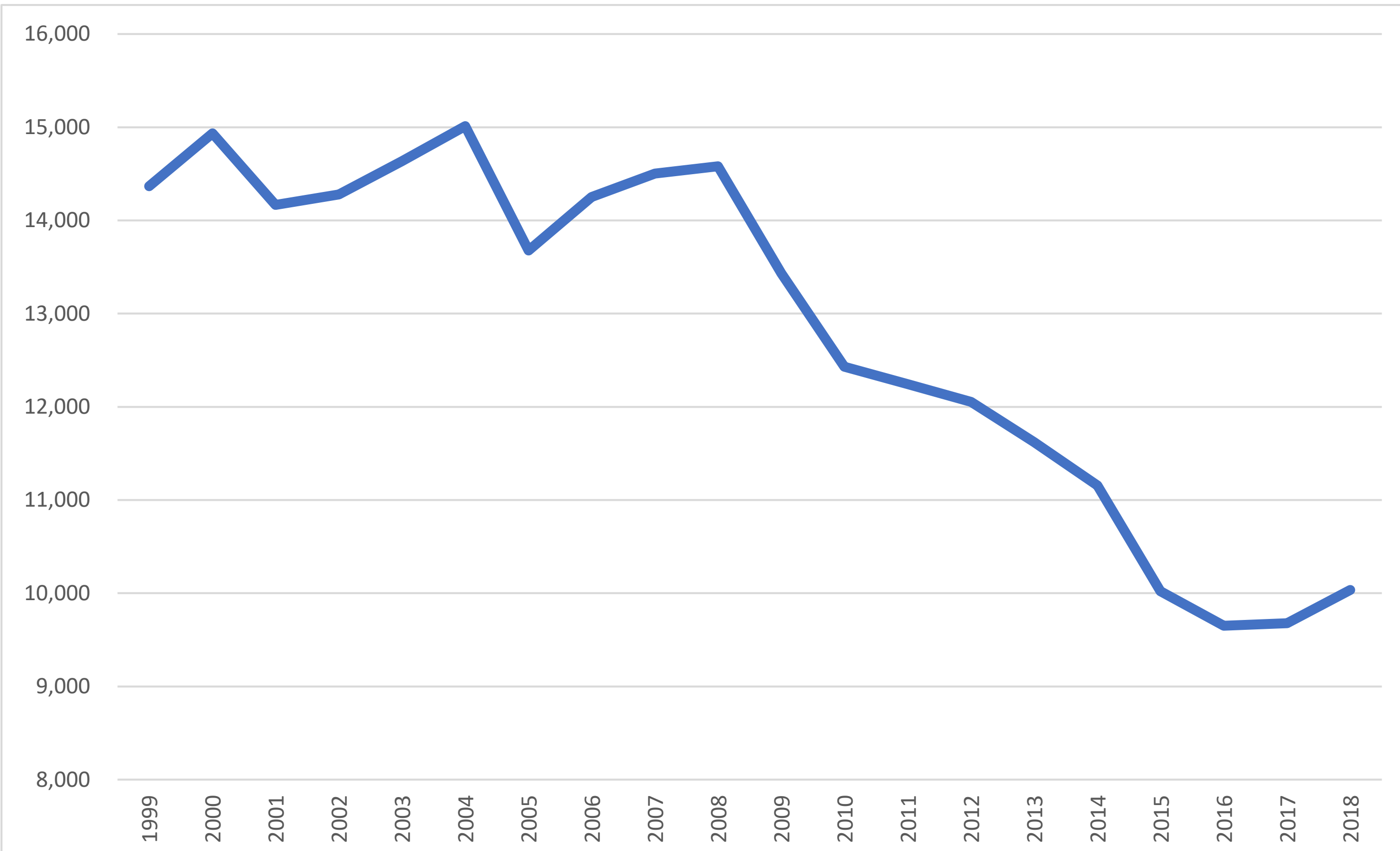

Table 3 shows how the 10-, 5-, and 3-year average demand compares to Cal-Am's most recent 12,350 AFA assumption.

Table 3
Alternate Average Customer Demand Assumptions
(Acre-Feet)

Period	Amount	Difference to Cal-Am #
Cal-Am Assumption	12,350	
10-Year Average - Actual	11,232	1,118
5-Year Average - Actual	10,109	2,241
3-Year Average - Actual	9,788	2,562

The trend is similar for peak month demand: 10-year maximum month through 2018 was 1,111 AF, the 5-year max was 966 AF, and the 3-year max was 950 AF, requiring approximately 15 MGD of firm capacity. By comparison, the maximum month at the time the plant was first sized was 1,532 AF. The proposed desalination plant, in conjunction with the other production facilities can meet peak month/peak day requirements. Pure Water Monterey expansion adds 4 new extraction wells, two for production and two for redundancy. Preliminary analysis shows that peak month/peak day can be met with both supply alternatives.

Hence, the case could be made that the average customer demand assumption in the sizing of the MPWSP should be 9,788 to 11,232 AFA.

Legal Lots of Record: The 1,181 number is derived from the October 2009 Coastal Water Project Final Environmental Impact Report and references a 2001 District analysis as the source. It was actually sourced from a Land Systems Group Phase II February 2002 interim draft report that used the number 1,181.438 AF. A calculation error was corrected and the report was subsequently updated in June 2002 and the number was revised to 1,210.964. However, the earlier number seems to have been used going forward. Both versions did not include vacant lots on improved parcels in the unincorporated County. Table 4 shows how the corrected number was calculated.

Table 4
Legal Lots of Record Estimates (2002)
Unincorporated County Not Included
(Acre-Feet)

Type of Parcel	Amount
Vacant Lots on Vacant Parcels	729.9
Vacant Lots on Improved Parcels	288.2
Anticipated Remodels (10 years)	192.8
Total	**1,210.9**

Table 5
Assumptions Driving the Legal Lots of Record Conclusions

Category	Units on Vacant Parcels	Units on Improved Parcels	Estimated Number of Remodels	Water Use Factor	Total Water Usage
Single Family Dwellings	688	152		0.286 AF	240.2
Multi-Family Dwellings	846	204		0.134 AF	140.7
Commercial/Industrial	556	288		0.755 AF	637.2
Residential Remodels			3765	0.029 AF	109.2
Commercial Remodels			513	0.163 AF	83.6
	2,091	**789**	**4,278**		**1,210.9**

Since the study, the District's conservation programs have resulted in reductions in the average water use factors. For example, with single-family water use at 0.2 AFA, multifamily use at 0.12 AFA, and commercial customer connections averaging 0.66 AFA (2016 data), these changes alone would reduce the total above by 167.1 AF. Further, some of these lots may have been built upon, others determined unbuildable. Many of the remodels have likely occurred. General plans have been rewritten and housing elements recalculated. These factors taken together could result in another 150 AF reduction in the assumption.

Compared to the 1,890 units from the 2002 Land Systems Group study shown above, going forward, AMBAG's 2014 Regional Growth Forecast showed 2,231 additional housing units expected in the 6 cities between 2020 and 2035. Assuming another 120 in the unincorporated county, and 2/3rds single-family and 1/3rd multifamily, with single-family water use at 0.2 AFA and multifamily use at 1.2 AFA, this equates to 407 AFA over a 15-year period. Most of AMBAG's projected growth occurs in Seaside and Del Rey Oaks, which if slated for the former Fort Ord would not be served by Cal-Am. Unfortunately, it is not possible to accurately distinguish the Cal-Am served housing growth from the non-Cal-Am housing growth, but the 407 AFA likely overstates the Cal-Am growth. The AMBAG assumptions appear consistent with the Land Systems Group estimates.

Hence, the case could be made that the legal lots of record demand assumption in the sizing of the MPWSP should be 864 to 1,014 AFA.

Tourism Bounce-Back: As stated earlier, the 500 AFA for economic recovery was originally suggested by the hospitality industry to account for a recovery of occupancy rates in the tourist industry in a post-World Trade Center tragedy setting.[5, 15] Representatives of the Coalition of Peninsula Businesses indicated in testimony that the hospitality industry was hurt by the recent recession and that occupancy rates needs to increase by 12 to 15 percent to re-attain the levels of decades ago.[16] It is true that the Salinas-Monterey market was one of five California markets, out of 22, to experience double digit declines after the events of 2001, from 71.8% in 2000 to 63.0% in 2001.[17] It is also true that the decline persisted and was still down when the MPWSP desalination plant was sized, with occupancy rates of 62.8% in 2011-12 and 64.1% in 2012-13.[18] However, occupancy rates have since recovered with no notable increase in water demand. Hotel occupancy locally is back at approximately 72% and is estimated by Smith Travel Research to be higher for better quality properties on the Monterey Peninsula.[19, 20] The commercial sector water demand is shown below in Table 6 for the year prior to the World

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[16] Testimony of John Narigi (to CPUC), September 29, 2017, page 5
[17] HVS San Francisco, August 19, 2003
[18] Monterey County Convention and Visitors Bureau Annual Report 2012-13, page ii
[19] Fiscal Analysis of the Proposed Hotel Bella Project, Applied Development Economics, April 6, 2016
[20] Cannery Row Company, January 9, 2019

Trade Center tragedy, the year of the MPWSP plant sizing, and the most recent year. As can be seen, commercial demand, which is heavily influenced by the hospitality industry remains in decline, despite the already absorbed "bounce-back" in occupancy rates.

Table 6
Commercial Sector Water Demand
Selected Years
(Acre-Feet)

Year	Demand
2001	3,387
2012	2,770
2018	2,442

There is a secular change in commercial demand that is due to permanent demand reductions resulting from targeted rebate programs, conservation standards for the visitor-serving sector since 2002, mandatory conservation standards for other commercial businesses instituted in 2013, and commercial inspection/enforcement by the District. A "bounce-back" of 500 AFY would represent an increase in water use demand of 20% in the entire commercial sector, not just the hospitality industry. The District does not view this as likely in the near-term, nor due to a return to higher occupancy rates.

Hence, the case could be made that the tourism bounce-back demand assumption in the sizing of the MPWSP should be 100 to 250 AFA.

Pebble Beach Buildout: As cited earlier, at the time of the 2012 Application, the Pebble Beach company had approximately 325 AF of entitlements still available and that number was added to the MPWSP sizing needs. However, the final environmental impact report certified in 2012 envisioned 145 AFA for the buildout projects and 154 AFA in other entitlement demand.[21]

The other entitlement demand goes away when a new water supply comes online because homeowners will have no reason to pay $250,000 per AF for an entitlement when connecting directly to Cal-Am is possible when the moratorium on new service connections is lifted. In the ten years since the CDO was imposed, Pebble Beach entitlement water demand has averaged 4.9 AF added each year. It is reasonable to assume only another 15 AFA during the next three years before a permanent water supply is online.

The project buildout is 145 AFA not 325 AFA used in project sizing. Further, the buildout number includes estimated water use that may never materialize in decades, if ever. Table 7 shows the elements that comprise the Pebble Beach buildout.

[21] Pebble Beach Final Environmental Impact report (FEIR), April 2012, Appendix H "Water Supply and Demand Information for Analysis"

Table 7
Components of Pebble Beach Buildout
(Acre-Feet)

Project	Demand
Lodge	13.11
Inn at Spanish Bay	12.85
Spyglass Hotel	30.59
Area M Residential	10.00
Other Residential	77.00
Driving Range	0.33
Roundabout	0.70
Total	144.58

Two elements of the project warrant greater discussion: "Other Residential" includes 66 single family residences at 1.0 AF each and 24 residences at 0.50 AF each (and a decrement of 1 AF in the total calculation for other reasons.) District research in 2006 determined the average large lot Pebble Beach home utilized 0.42 AFA. Building conservation standards have increased since then. Many of the proposed homes are not utilized year-round. The estimate could be overstated by one-third or more. Spyglass Hotel is not currently being pursued and there are no plans to do so in the near-term. The project could be a decade or two away, if ever.

Hence, the case could be made that the Pebble Beach buildout demand assumption in the sizing of the MPWSP should be 103 to 160 AFA.

Summary of Demand v. Supply

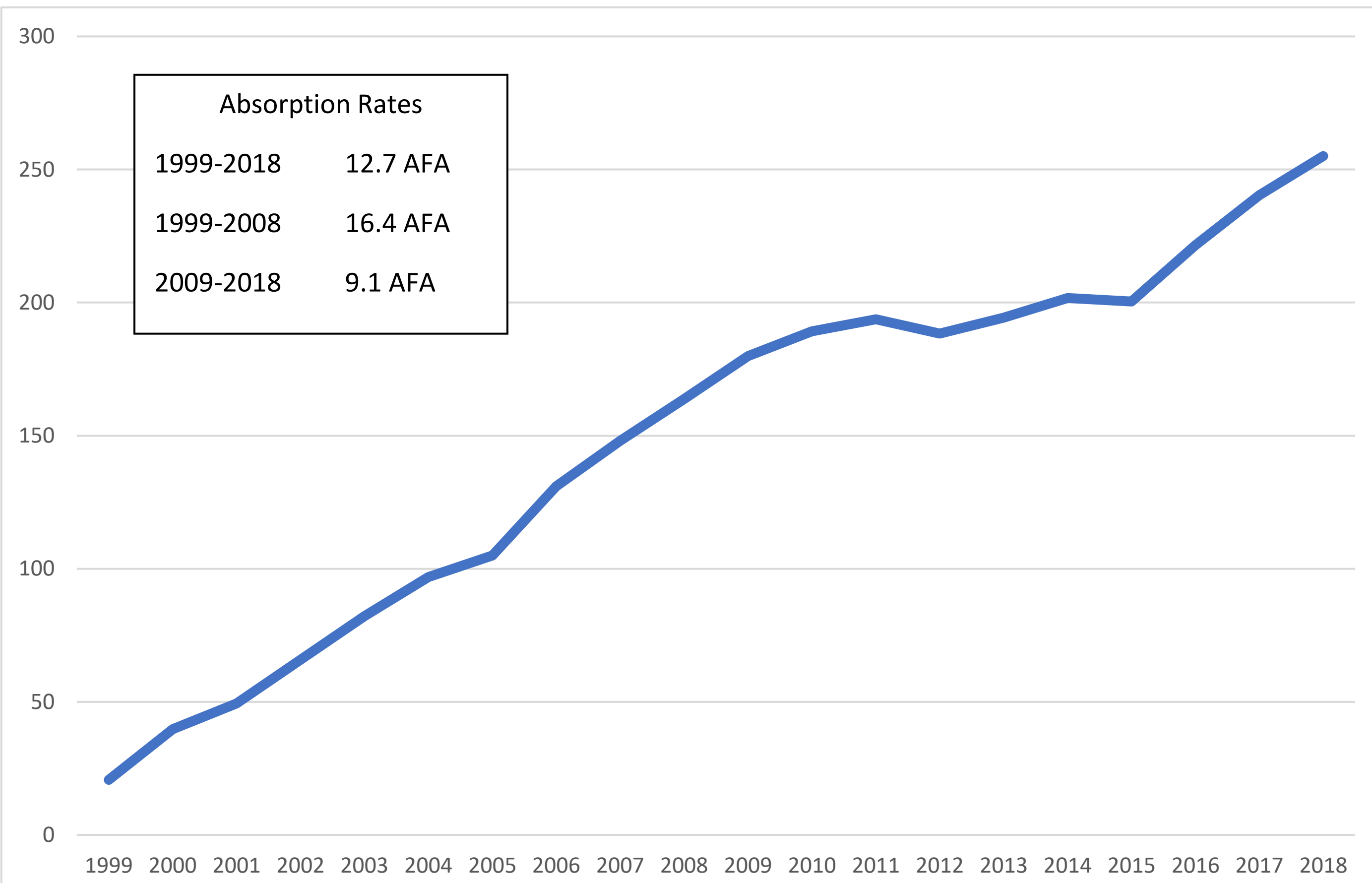
Table 8 shows the range of demand estimates that have been established in the foregoing analysis. These long-term demand estimates can be compared to existing current demand to determine how much water supply is needed.

Table 8
Range of Potential Demand Scenarios in MPWSP Sizing
(Acre-Feet)

Demand Component	Current Project	Revised High	Revised Low
Average Current Customer Demand	13,290	11,232	9,788
Legal Lots of Record	1,181	1,014	864
Tourism Bounce-Back	500	250	100
Pebble Beach Buildout	325	160	103
Total Water Demand	**15,296**	**12,656**	**10,855**

However, the ability of the Monterey Peninsula to generate or "absorb" the housing and commercial growth will help determine when such water supply is needed. Figure 2 shows the past 20 years of market absorption of water demand based on water permits issued. The average growth or absorption in water use was 12.7 AF per year. The first decade preceded the CDO and was a period of relative economic stability, available property, no moratorium on new service connections, and lower water rates resulting in 16.4 AF per year of absorption. The second decade was after the CDO and moratorium on service connections and understandably had a lower absorption rate of 9.1 AF per year.

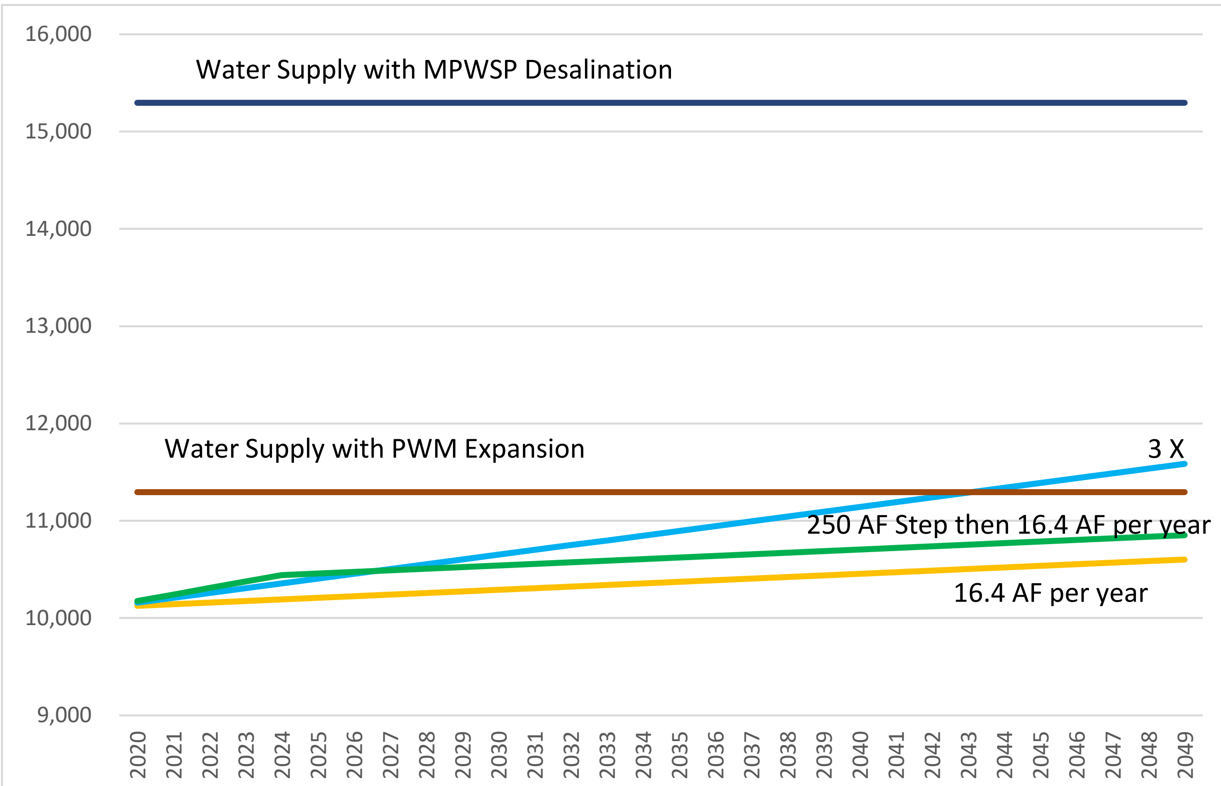
Figure 2
Market Absorption of Water Demand
Last 20 Years
(Acre-Feet)



By adopting assumptions about current demand and market absorption rates, it can be determined the sufficiency of certain supply alternatives over time. In Figure 3, the current demand assumption of 10,109 AF (most recent 5-year average) is shown with three market absorption rates: (a) 16.4 AF per year (pre-CDO decade rate), (b) three times that rate, and (c)

250 AF over the first five years on top of the pre-CDO rate. These are also compared to the two supply alternatives in Table 1.

Figure 3
Market Absorption of Water Demand Compared to Water Supply
Current Demand at 5-Year Average
(Acre-Feet)

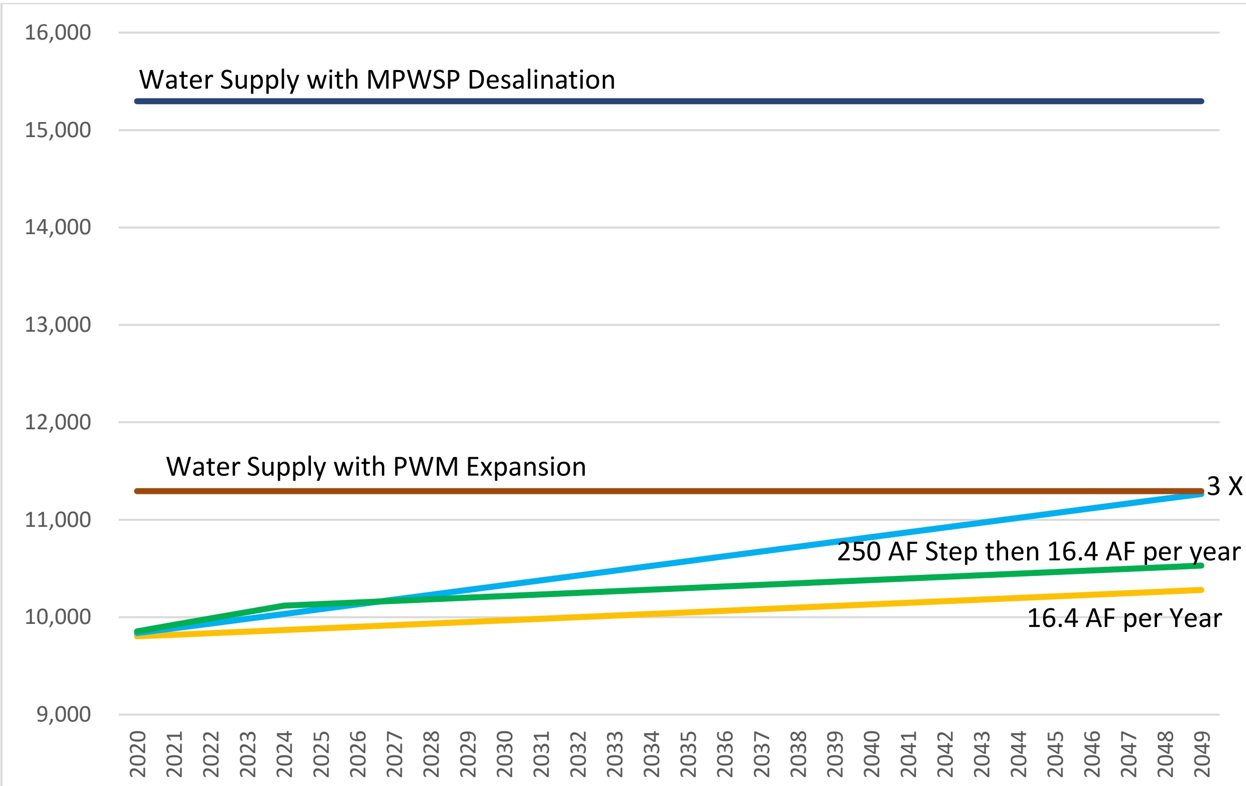


This chart shows that, assuming a starting current demand at the 5-year average, both water supply alternatives meet 30-year market absorption at the historical rate and 250 AF in the first 5 years on top of the historical rate, and Pure Water Monterey expansion is sufficient until 2043 at 3-times the historical absorption rate.

Figure 4 below shows a current starting demand at the 3-year average and shows both supply alternatives meet all three absorption rates.

In both cases, one can assume higher market absorption or one or two large scale developments in the first 5 years, but the general conclusions are not significantly changed.

Figure 4
Market Absorption of Water Demand Compared to Water Supply
Current Demand at 3-Year Average
(Acre-Feet)



Additional Factors Affecting Future Demand

Cost: The future water supply will significantly impact rates. It is expected that the combined cost of new water supply and regular annual rate increases will almost double a residential ratepayer's water bill by 2023. Rules of price elasticity suggest the cost of water might dampen demand. The cost of each major component of supply is shown below:

Desalination Plant	$6,094 per acre-foot[22]
Carmel River:	$271 per acre-foot[23]
Seaside Basin:	$130 per acre-foot[24]

[22] Attachment C-3 California American Water Company Advice Letter 1220 "Total Yr 1 Cost to Customer" $38.1 million, divided by 6,252 acre-feet per year
[23] MPWSP Model- V 2.1 submitted to CPUC; February 2018 and October 2017 versions, 6.4 MGD scenario, "Avoided Costs" worksheet
[24] MPWSP Model- V 2.1 submitted to CPUC; February 2018 and October 2017 versions, 6.4 MGD scenario, "Avoided Costs" worksheet

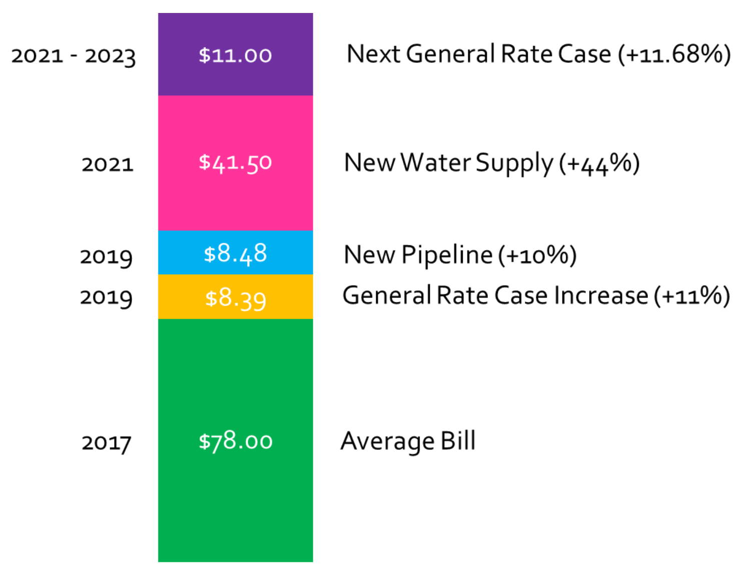
Pure Water Monterey:	$1,976 per acre-foot[25]
PWM with Expansion:	$2,077 per acre-foot[25]

Further, if the desalination plant capacity is not fully utilized, the cost per acre-foot rises due to the fixed costs, as shown below.

Production by Desal Plant – AF	6,252	5,000	4,300
Variable Cost ($ Million)	7.8	6.2	5.4
Fixed Cost ($ Million)	30.3	30.3	30.3
Total Annual Cost to Customer	38.1	36.5	35.7
Cost per Acre-Foot	$6,094	$7,308	$8,294

The rate impact can be seen in Figure 5, below, which is calculated based on full utilization of the desalination plant.

Figure 5
Ratepayer Impacts of New Water Supply[26]



Legislation: On May 31, 2018, Governor Brown signed two bills which build on the ongoing efforts to "make water conservation a California way of life." SB 606 (Hertzberg) and AB 1668 (Friedman) reflect the work of many water suppliers, environmental organizations, and members of the Legislature. The mandates will fall on urban water suppliers – not customers.

[25] Presentation by Monterey One Water at June 27, 2019 Monterey Peninsula Regional Water Authority meeting
[26] "Your Rates Are Changing" California American Water mailer, April 2019 and "Notice of General Rate Case Application filed" July 2019

Specifically, the bills call for creation of new urban efficiency standards for indoor use, outdoor use, and water lost to leaks, as well as any appropriate variances for unique local conditions. Each urban retail water agency will annually, beginning November 2023, calculate its own *objective*, based on the water needed in its service area for efficient indoor residential water use, outdoor residential water use, commercial, industrial and institutional (CII) irrigation with dedicated meters, and reasonable amounts of system water loss, along with consideration of other unique local uses (i.e., variances) and “bonus incentive,” or credit, for potable water reuse, using the standards adopted by the State Water Board.

The indoor water use standard will be 55 gallons per person per day (gallons per capita daily, or GPCD) until January 2025; the standard will become stronger over time, decreasing to 50 GPCD in January 2030. For the water use objective, the indoor use is aggregated across population in an urban water supplier’s service area, not each household. Presently, the average June 2014-May 2019 gallons per capita per day for the Cal-Am Monterey system is 57 gpcd. Hence, existing users are unlikely to increase their water consumption with the availability of new water supply.

Principal Conclusions

- Either supply option can meet the long-term needs of the Monterey Peninsula
- Either supply option is sufficient to lift the CDO
- The long-term needs of the Monterey Peninsula may be less than previously thought
- Several factors will contribute to pressure on decreasing per capita water use

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