DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET, 16TH FLOOR
SAN FRANCISCO, CALIFORNIA 94103-1398

JUL 12 2018

Regulatory Division

Subject: File Number 1999-244600S

Mr. Larry Hampson
Monterey Peninsula Water Management District
5 Harris Court, Building G
Monterey, CA 93940

Dear Mr. Hampson:

This correspondence is in reference to your submittal of February 7, 2017, concerning Department of the Army (DA) authorization to upgrade the Sleepy Hollow Steelhead Rearing Facility (SHSRF) Raw Water Intake and Water Supply System Upgrade project. The project located at approximately river mile 17.5 (measured from the Pacific Ocean) on the west bank of the Carmel River, about 1 mile downstream of the former San Clemente Dam location, in unincorporated Monterey County (Latitude: 36.443508, Longitude: 121.715974).

The project will include improvements to the water supply intake, easier water supply intake pump access, and greater instream intake screen reliability and ease of maintenance. Work within U.S. Army Corps of Engineers' (Corps) jurisdiction will include the following within the Carmel River. The excavation of 175 cubic yards and the placement of 169 cubic yards of rock riprap within 0.024 acre to replace the intake screen and concrete base and protect these from scour. The excavation of 230 cubic yards and the placement of 110 cubic yards of rock riprap within 0.011 acre for bank protection. The removal of the existing the drum screen. The excavation of 10.4 cubic yards and back fill of 9.9 cubic yards within 20 square feet (0.0005 acre) for the removal of the existing pump station. Temporary dewatering will occur over a total area of 0.067 acre within the channel bed and banks. In total the project will require the excavation of 415.5 cubic yards of material and the placement of 288.9 cubic yards within 0.035 acre of the Carmel River. All work shall be completed in accordance with the plans and drawings titled "USACE File #1999-244600S, SHSRF, Figure 1 to 6a," provided as enclosure 1.

Section 404 of the Clean Water Act (CWA) generally regulates the discharge of dredged or fill material below the plane of ordinary high water in non-tidal waters of the United States, below the high tide line in tidal waters of the United States, and within the lateral extent of wetlands adjacent to these waters. Section 10 of the Rivers and Harbors Act (RHA) generally regulates construction of structures and work, including excavation, dredging, and discharges of dredged or fill material occurring below the plane of mean high water in tidal waters of the United States; in former diked baylands currently below mean high water; outside the limits of mean high water but affecting the navigable capacity of tidal waters; or below the plane of ordinary high water in non-tidal waters designated as navigable waters of the United States. Navigable waters of the United States generally include all waters subject to the ebb and flow of the tide; and/or all waters presently used, or have been used in the past, or may be susceptible for future use to transport interstate or foreign commerce. A Preliminary Jurisdictional Determination (JD) has been completed for your site. Preliminary JDs are written indications that there may be waters of the U.S. on a parcel or indications of the approximate location(s) of waters of the U.S. on a parcel. Preliminary JDs are advisory in nature and may not be appealed. While this preliminary jurisdictional determination was conducted pursuant to Regulatory Guidance Letter No. 16-01, *Jurisdictional Determinations*, it may be subject to future revision if new information or a change in field conditions becomes subsequently apparent. The basis for this preliminary jurisdictional determination is fully explained in the enclosed *Preliminary Jurisdictional Determination Form*, which has been signed and dated by you and this office. Please see the enclosed Preliminary JD map titled "USACE File #1999-244600S, SHSRF, Preliminary JD map" and dated May 17, 2018 (enclosure 2).

Based on a review of the information in your submittal and the current condition of the site, as verified during a field investigation on April 17, 2017, the project qualifies for authorization under Department of the Army Nationwide Permits (NWPs) 3 for Maintenance and 13 for Bank Stabilization (82 Fed. Reg. 1860, January 6, 2017), pursuant to Section 404 of the CWA of 1972, as amended (33 U.S.C. § 1344 *et seq*.). The project must be in compliance with the terms of the NWP cited on our website (www.spn.usace.army.mil/Portals/68/docs/regulatory/NWP/NWP17_03.pdf), (www.spn.usace.army.mil/Portals/68/docs/regulatory/NWP/NWP17_13.pdf), the general conditions of the Nationwide Permit Program (www.spn.usace.army.mil/Portals/68/docs/regulatory/NWP/NWP17_GC.pdf), and the San Francisco District regional conditions (www.spn.usace.army.mil/Portals/68/docs/regulatory/NWP/NWP17_RC.pdf). You must also be in compliance with any special conditions specified in this letter for the NWP authorization to remain valid. Non-compliance with any term or condition could result in the revocation of the NWP authorization for your project, thereby requiring you to obtain an Individual Permit from the Corps. This NWP authorization does not obviate the need to obtain other State or local approvals required by law.

This verification will remain valid until March 18, 2022, unless the NWP authorization is modified, suspended, or revoked. Activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon a NWP will remain authorized provided the activity is completed within 12 months of the date of a NWP's expiration, modification, or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 C.F.R. § 330.4(e) and 33 C.F.R. § 330.5 (c) or (d). This verification will remain valid if, during the time period between now and March 18, 2022, the activity complies with any subsequent modification of the NWP authorization. The Chief of Engineers will periodically review NWPs and their conditions and will decide to modify, reissue, or revoke the permits. If a NWP is not modified or reissued within five years of its effective date, it automatically expires and becomes null and void. It is incumbent upon you to remain informed of any changes to the NWPs. Changes to the NWPs would be announced by Public Notice posted on our website (www.spn.usace.army.mil/Missions/Regulatory/Public-Notices.aspx). Upon completion of the project and all associated mitigation requirements, you shall sign and return the Certification of Compliance, enclosure 3, verifying that you have complied with the terms and conditions of the permit.

This authorization will not be effective until you have obtained a Section 401 water quality certification from the Central Coast Regional Water Quality Control Board (RWQCB). If the RWQCB fails to act on a valid request for certification within 60 days after receipt of a complete application, the Corps will presume a waiver of water quality certification has been obtained. You shall submit a copy of the certification to the Corps prior to the commencement of work.

General Condition 18 stipulates that project authorization under a NWP does not allow for the incidental take of any federally-listed species in the absence of a biological opinion (BO) with incidental take provisions. As the principal federal lead agency for this project, the Corps initiated consultation with the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) to address project related impacts to listed species, pursuant to Section 7(a) of the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 et seq.). By letter of November 29, 2017, USFWS issued a BO (08EVEN00-2017-F-0457), cited in enclosure 4, with an incidental take statement for the federally threatened California red-legged frog (*Rana draytonii*) and its designated critical habitat. By letter of February 14, 2018, NMFS issued a BO (WCR-2017-7501), cited in enclosure 5, with an incidental take statement for South-Central California Coast (SCCC) steelhead (*Oncorhynchus mykiss*).

In order to ensure compliance with this NWP authorization, the following special conditions shall be implemented:

1. To remain exempt from the prohibitions of Section 9 of the Endangered Species Act, the non-discretionary Terms and Conditions for incidental take of federally-listed California red-legged frog and SCCC steelhead shall be fully implemented as stipulated in the Biological Opinions titled "Biological Opinion for the Sleepy Hollow Steelhead Rearing Facility Upgrade Project, Monterey County, California (Corps file number 1999-244600)," dated November 29, 2017, and "Endangered Species Action Section 7(a)(2) Biological Opinion the Sleepy Hollow Steelhead Facility Raw Water Intake and Water Supply System Upgrade in Carmel, California," dated February 14, 2018. Project authorization under the NWP is conditional upon compliance with the mandatory terms and conditions associated with incidental take. Failure to comply with the terms and conditions for incidental take, where a take of a federally-listed species occurs, would constitute an unauthorized take and non-compliance with the

NWP authorization for your project. The USFWS and NMFS are, however, the authoritative federal agency for determining compliance with the incidental take statement and for initiating appropriate enforcement actions or penalties under the Endangered Species Act.

2. Incidents where any individuals of SCCC steelhead listed by NOAA Fisheries under the Endangered Species Act appear to be injured or killed as a result of discharges of dredged or fill material into waters of the United States or structures or work in navigable waters of the United States authorized by this NWP shall be reported to NOAA Fisheries, Office of Protected Resources, at (301) 713-1401 and the Regulatory Office of the San Francisco District of the U.S. Army Corps of Engineers at (415) 503-6795. The finder should leave the plant or animal alone, make note of any circumstances likely causing the death or injury, note the location and number of individuals involved, and, if possible, take photographs. Adult animals should not be disturbed unless circumstances arise where they are obviously injured or killed by discharge exposure or some unnatural cause. The finder may be asked to carry out instructions provided by NOAA Fisheries, Office of Protected Resources, to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved.

3. All standard Best Management Practices shall be implemented to prevent the movement of sediment and debris into waterways. No debris, soil, silt, sand, bark, slash, sawdust, cement, concrete, washings, petroleum products, or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into the waterways.

4. A post construction report shall be submitted 45 days after the conclusion of construction activities. The report shall document construction activities and contain as-built drawings (if different from drawings submitted with application) and include before and after photos.

You may refer any questions on this matter to Kevin Schwartz of my Regulatory staff by e-mail at Kevin.D.Schwartz@usace.army.mil. All correspondence should be addressed to the Regulatory Division, South Branch, referencing the file number at the head of this letter.

Sincerely,
ORIGINAL SIGNED
BY Katerina Galacatos
CHIEF, REG. DIV., SOUTH BR.
FOR

Rick M. Bottoms, Ph.D.
Chief, Regulatory Division

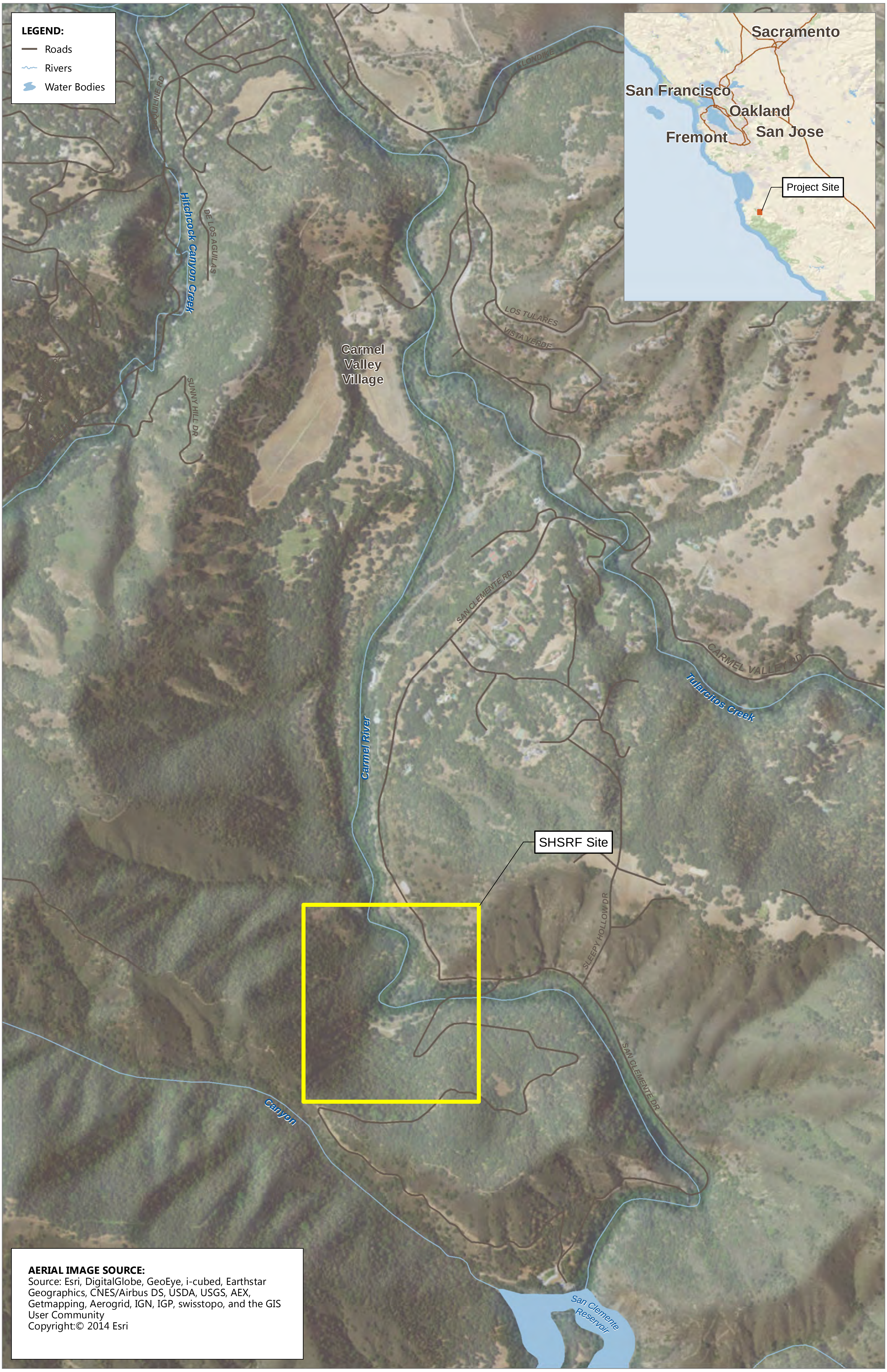
Enclosures

Copy Furnished (w/ encls):

Katie Chamberlin, Anchor QEA, LLC

Copy Furnished (w/ encl 1 only):

CA RWQCB, San Luis Obispo, CA
US FWS, VFWO, Santa Cruz, CA (Attn: Chad Mitcham)
US NMFS, Santa Rosa, CA (Attn: Erin Seghesio)
CDFW, San Luis Obispo, CA



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ANCHOR QEA

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Figure 1
Vicinity Map
Permit Application Supplement
Sleepy Hollow Steelhead Rearing Facility Raw Water Intake and Water Supply System Upgrade

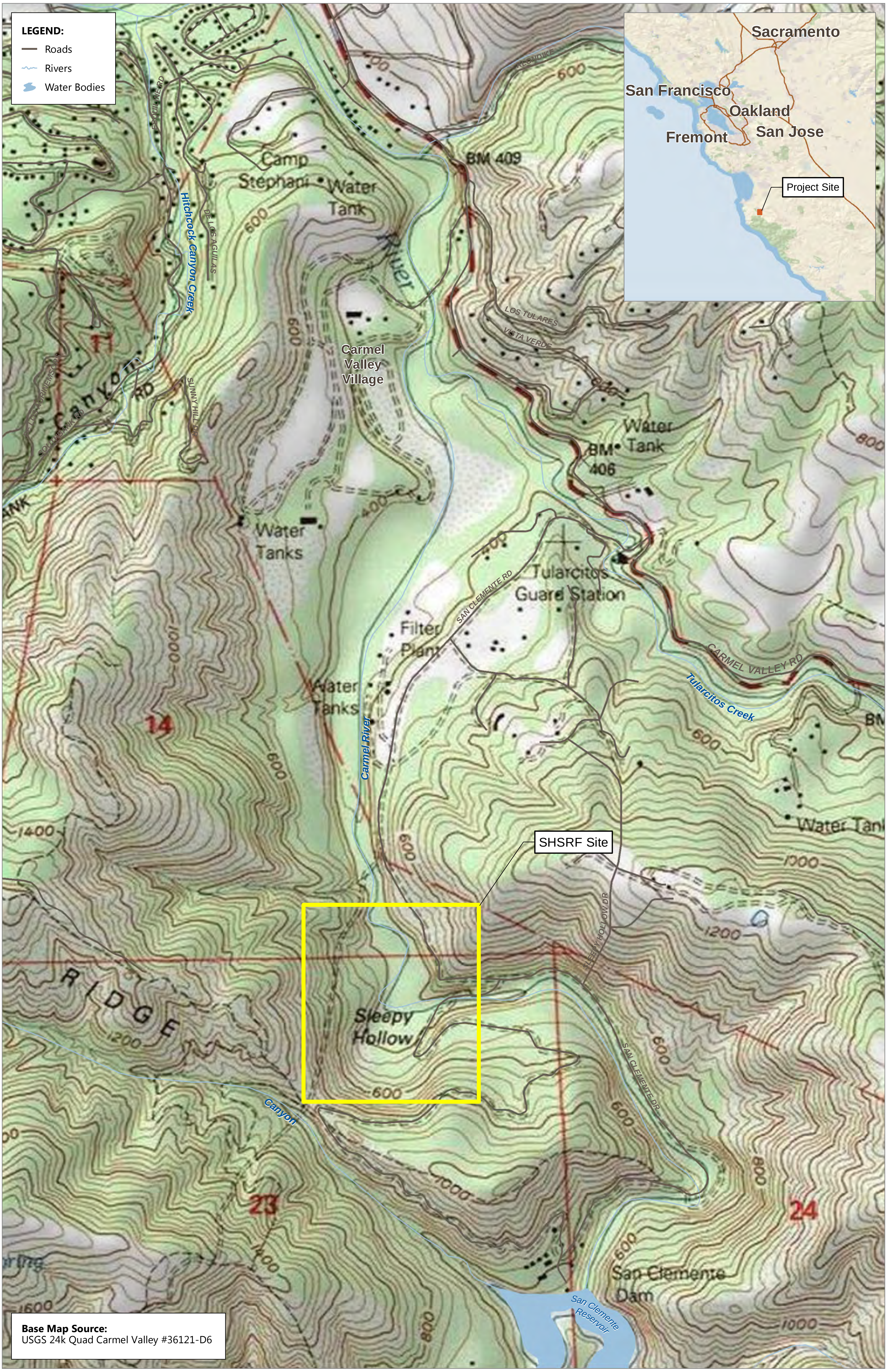

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Figure 1a
Vicinity Map - USGS 7.5-minute Quadrangle Base Map
Permit Application Supplement
Sleepy Hollow Steelhead Rearing Facility Raw Water Intake and Water Supply System Upgrade

Enclosure 1 - USACE File #1999-244600S, SHSRF, Figure 1 to 6a

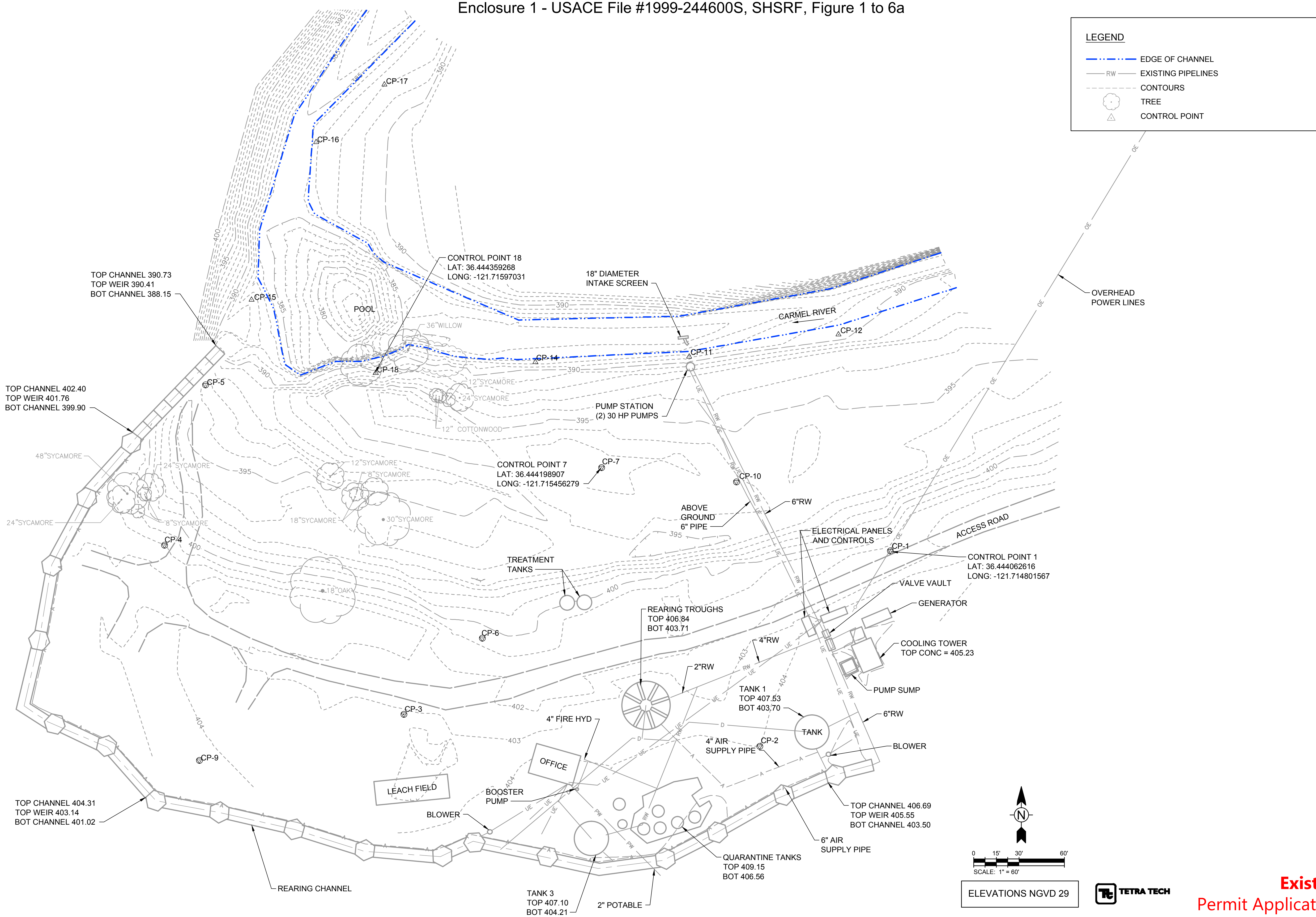
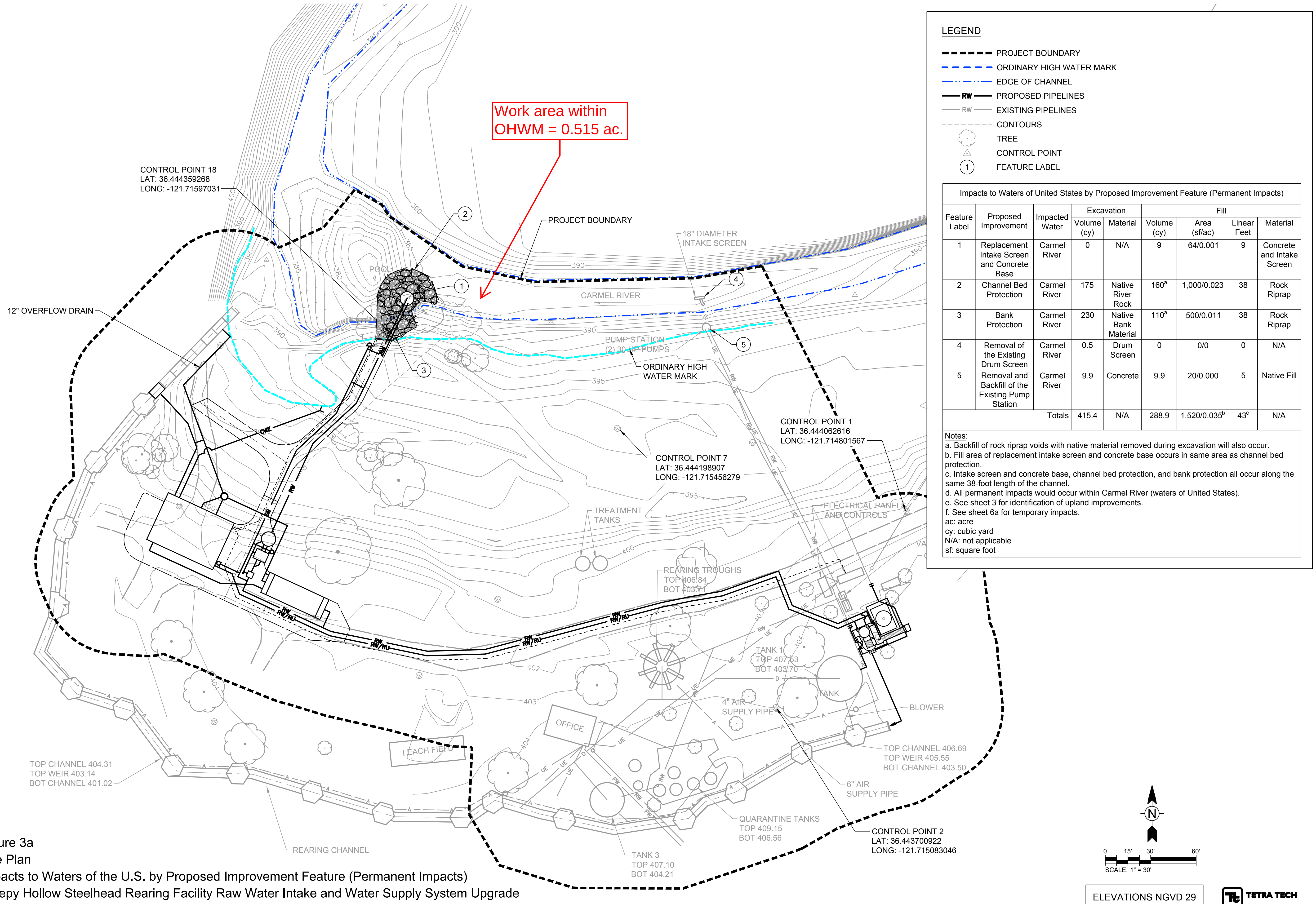


Figure 2
Existing Conditions
Permit Application Supplement
Sleepy Hollow Steelhead Rearing Facility Raw Water Intake and Water Supply System Upgrade
Source: Tetra Tech (direction of Darrel Nice), prepared 2016 and revised 3/23/2017

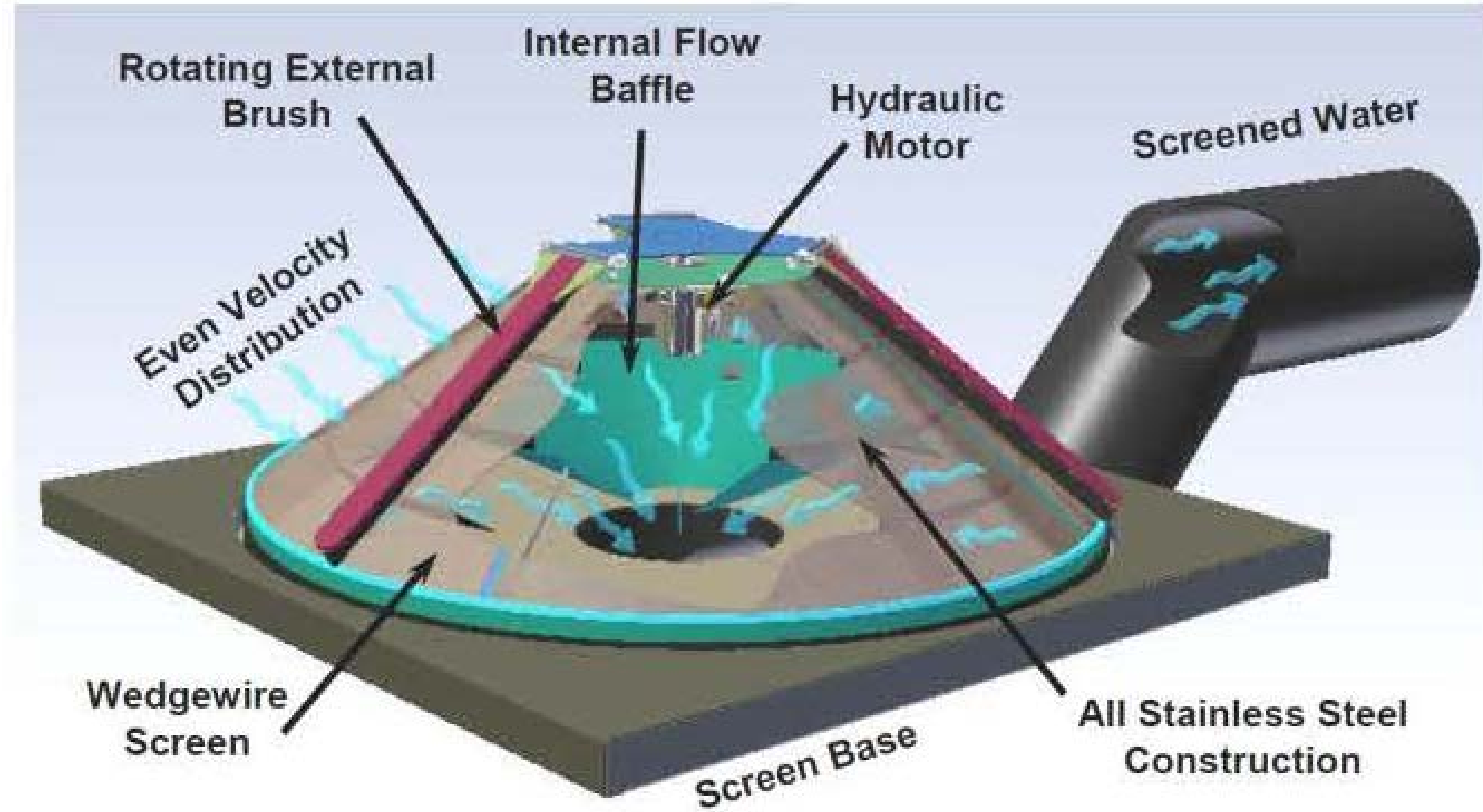


Impacts to Waters of United States by Proposed Improvement Feature (Permanent Impacts)

Feature Label	Proposed Improvement	Impacted Water	Excavation		Fill			
			Volume (cy)	Material	Volume (cy)	Area (sf/ac)	Linear Feet	Material
1	Replacement Intake Screen and Concrete Base	Carmel River	0	N/A	9	64/0.001	9	Concrete and Intake Screen
2	Channel Bed Protection	Carmel River	175	Native River Rock	160[a]	1,000/0.023	38	Rock Riprap
3	Bank Protection	Carmel River	230	Native Bank Material	110[a]	500/0.011	38	Rock Riprap
4	Removal of the Existing Drum Screen	Carmel River	0.5	Drum Screen	0	0/0	0	N/A
5	Removal and Backfill of the Existing Pump Station	Carmel River	9.9	Concrete	9.9	20/0.000	5	Native Fill
		Totals	415.4	N/A	288.9	1,520/0.035[b]	43[c]	N/A

Notes:
a. Backfill of rock riprap voids with native material removed during excavation will also occur.
b. Fill area of replacement intake screen and concrete base occurs in same area as channel bed protection.
c. Intake screen and concrete base, channel bed protection, and bank protection all occur along the same 38-foot length of the channel.
d. All permanent impacts would occur within Carmel River (waters of United States).
e. See sheet 3 for identification of upland improvements.
f. See sheet 6a for temporary impacts.
ac: acre
cy: cubic yard
N/A: not applicable
sf: square foot

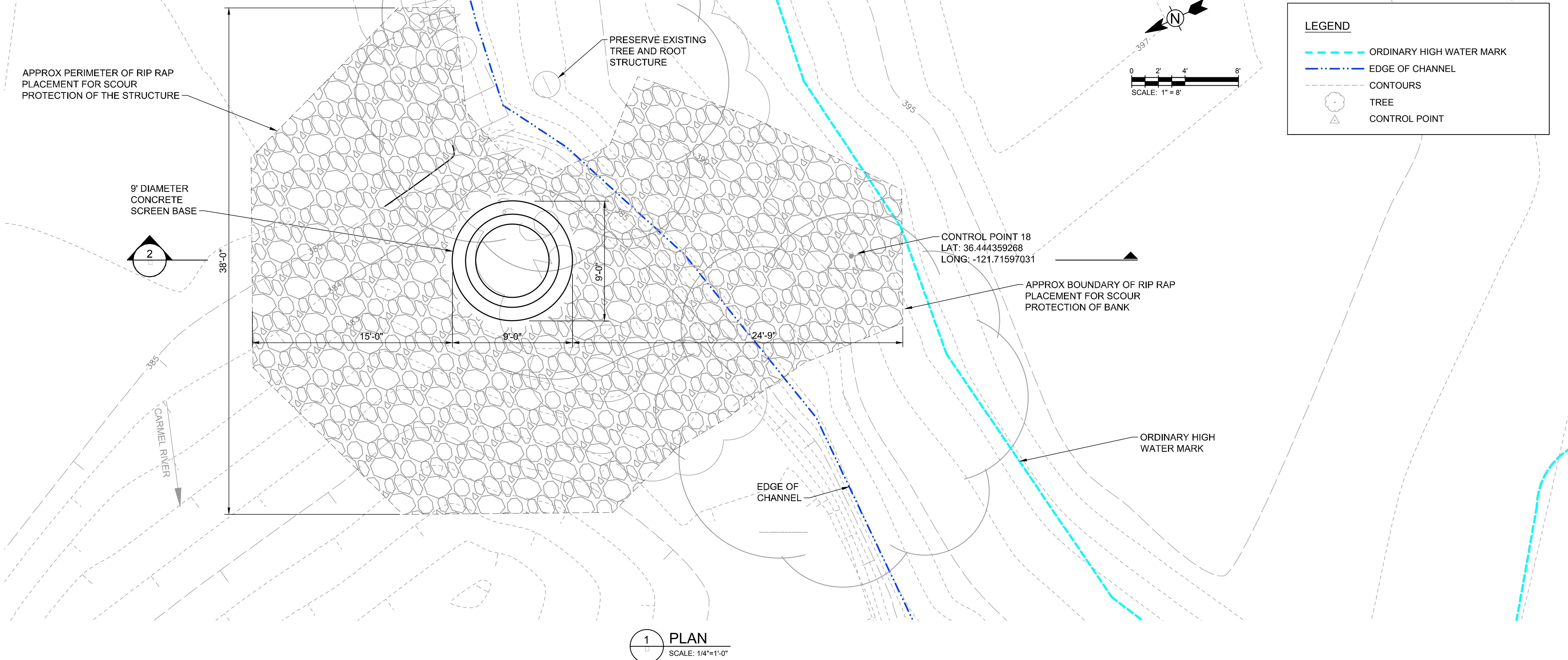
Figure 3a
Site Plan
Impacts to Waters of the U.S. by Proposed Improvement Feature (Permanent Impacts)
Sleepy Hollow Steelhead Rearing Facility Raw Water Intake and Water Supply System Upgrade
Source: Tetra Tech (direction of Darrel Nice), prepared 2016 and revised 5/17/2018



ANCHOR QEA

Figure 4
Proposed Cone Screen Design
Permit Application Supplement
Sleepy Hollow Steelhead Rearing Facility Raw Water Intake and Water Supply System Upgrade

Enclosure 1 - USACE File #1999-244600S, SHSRF, Figure 1 to 6a



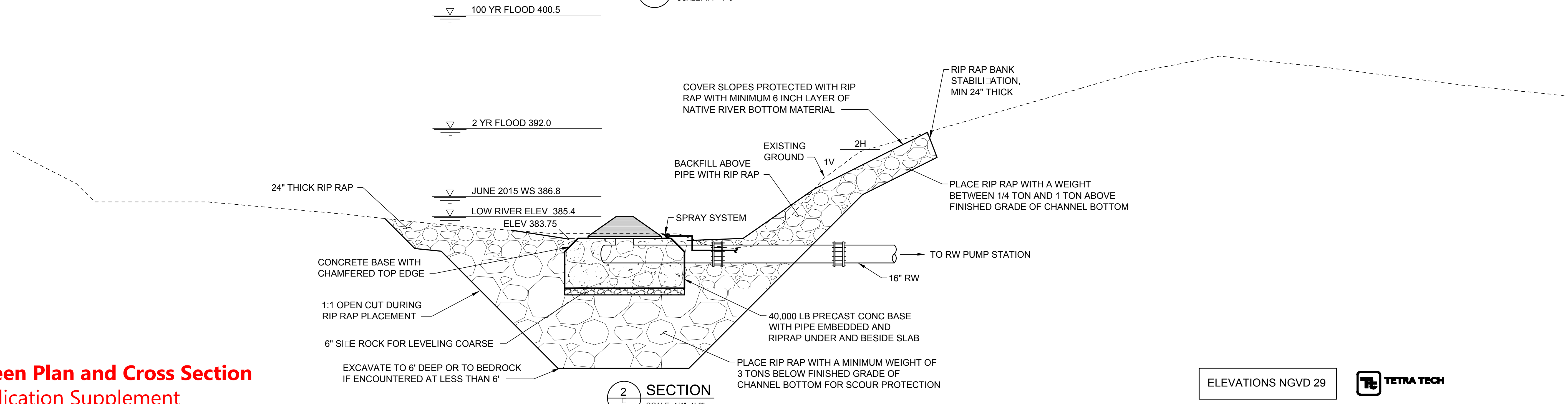


Figure 5
Intake Screen Plan and Cross Section
Permit Application Supplement
Sleepy Hollow Steelhead Rearing Facility Raw Water Intake and Water Supply System Upgrade
Source: Tetra Tech (direction of Darrel Nice), prepared 2016 and revised 3/23/2017

Enclosure 1 - USACE File #1999-244600S, SHSRF, Figure 1 to 6a

Figure 6
Temporary Dewatering or Water Diversion Plan
Permit Application Supplement
Sleepy Hollow Steelhead Rearing Facility Raw Water Intake and Water Supply System Upgrade
Source: Tetra Tech (direction of Darrel Nice), prepared 2016 and revised 3/23/2017

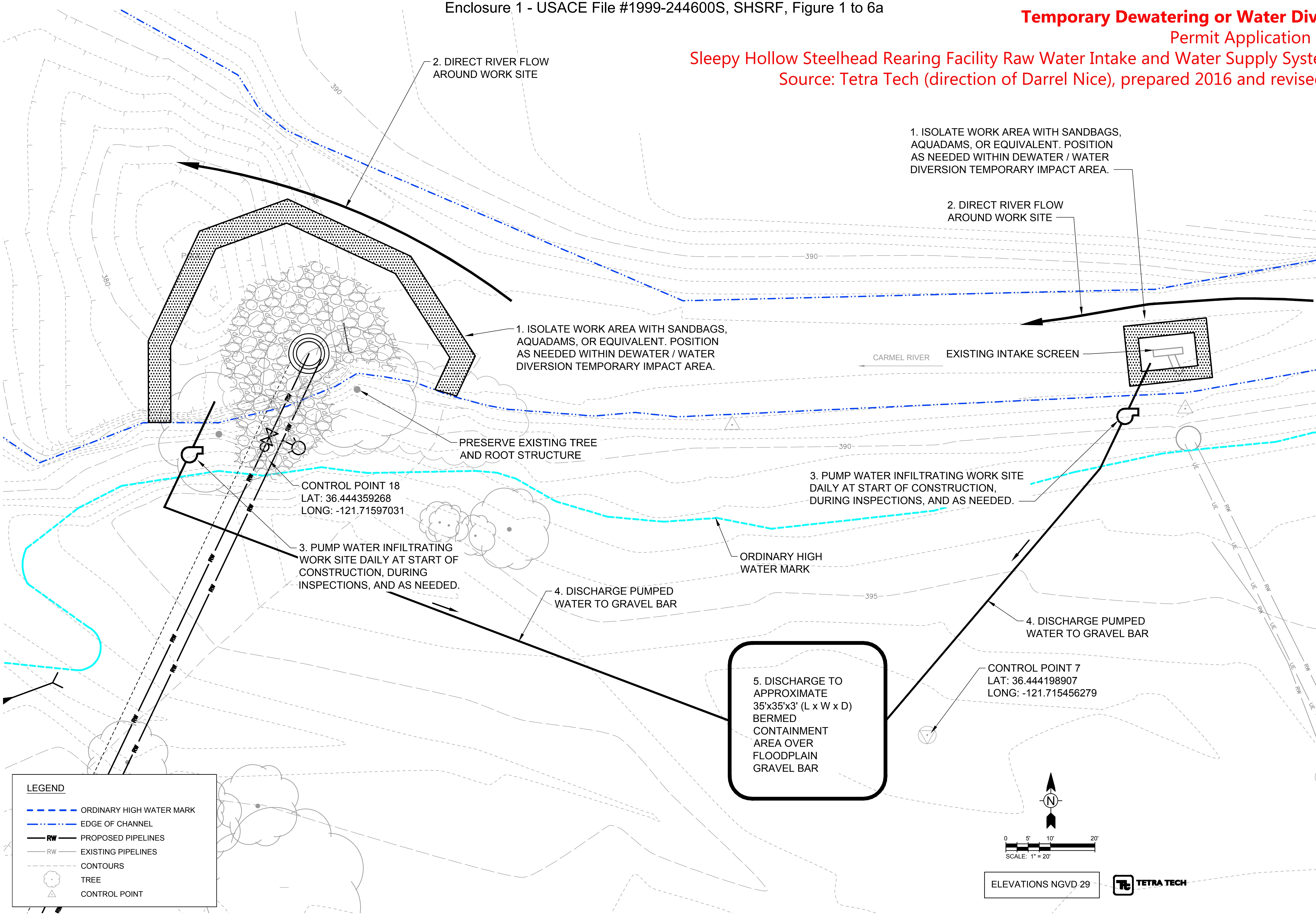


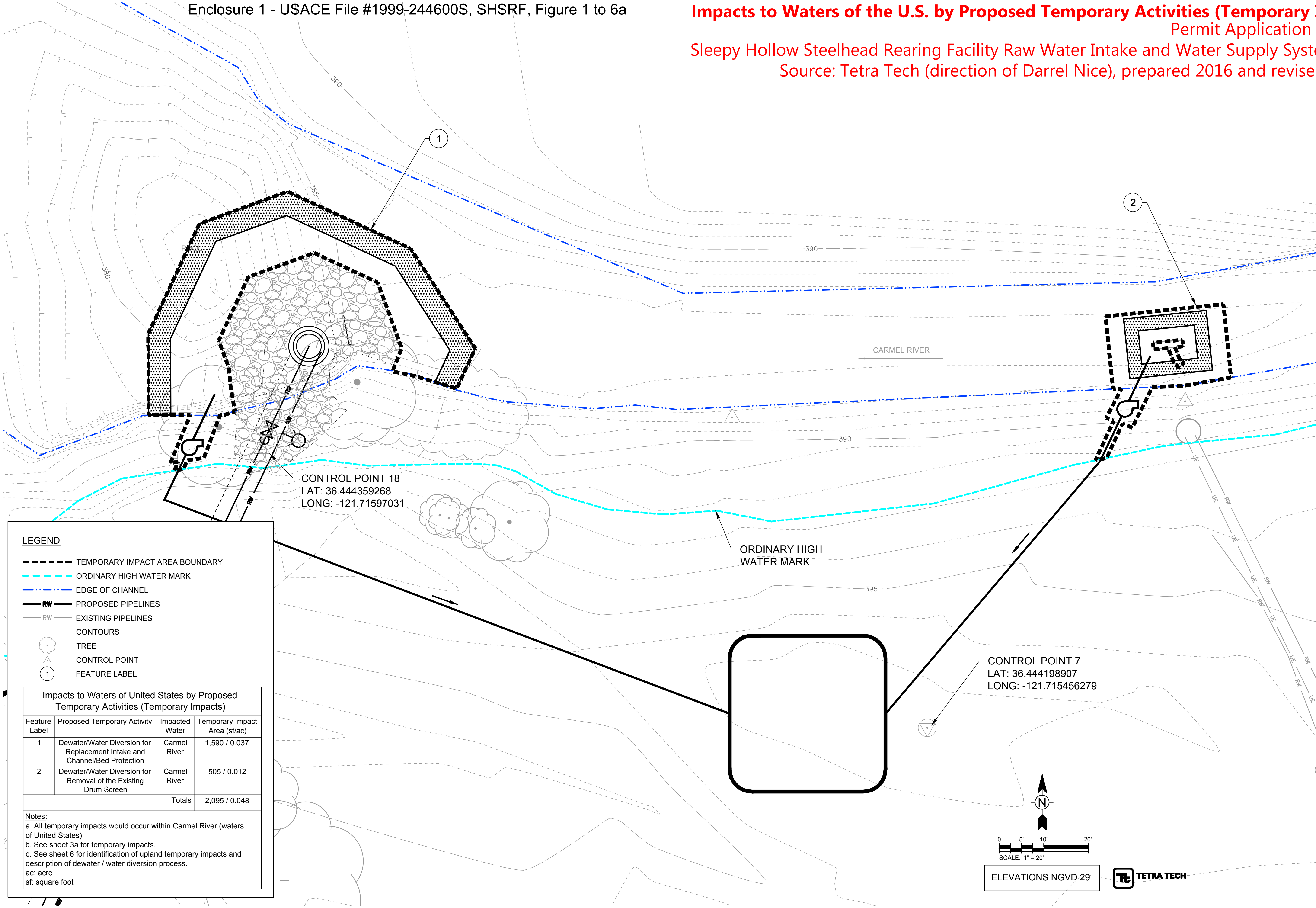
Figure 6a

Impacts to Waters of the U.S. by Proposed Temporary Activities (Temporary Impacts)

Permit Application Supplement

Sleepy Hollow Steelhead Rearing Facility Raw Water Intake and Water Supply System Upgrade

Source: Tetra Tech (direction of Darrel Nice), prepared 2016 and revised 3/23/2017



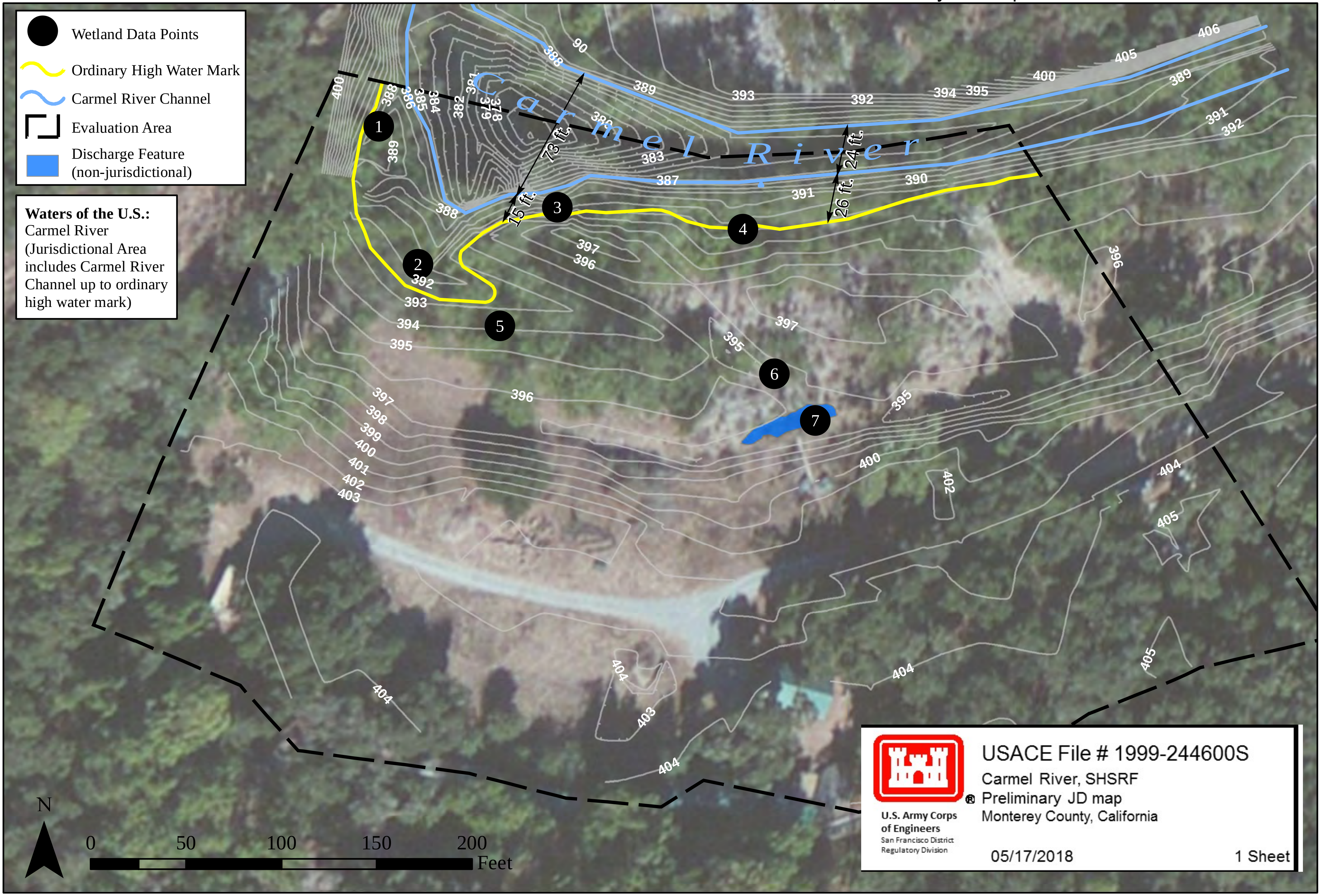
LEGEND

- TEMPORARY IMPACT AREA BOUNDARY
- ORDINARY HIGH WATER MARK
- EDGE OF CHANNEL
- RW PROPOSED PIPELINES
- RW EXISTING PIPELINES
- CONTOURS
- TREE
- CONTROL POINT
- 1 FEATURE LABEL

Impacts to Waters of United States by Proposed Temporary Activities (Temporary Impacts)			
Feature Label	Proposed Temporary Activity	Impacted Water	Temporary Impact Area (sf/ac)
1	Dewater/Water Diversion for Replacement Intake and Channel/Bed Protection	Carmel River	1,590 / 0.037
2	Dewater/Water Diversion for Removal of the Existing Drum Screen	Carmel River	505 / 0.012
		Totals	2,095 / 0.048

Notes:
a. All temporary impacts would occur within Carmel River (waters of United States).
b. See sheet 3a for temporary impacts.
c. See sheet 6 for identification of upland temporary impacts and description of dewater / water diversion process.
ac: acre
sf: square foot

Enclosure 2 - USACE File #1999-244600S, SHSRF, Preliminary JD map



Salinas

Title:

Wetland Delineation Map

File:
\\orcas\GIS\Jobs\TetraTech_0295\SleepyHollow\Maps\DDA\Wetland Delineation Map UTM.mxd

Date:	3/30/2017
Scale:	1 inch = 70 feet
Project:	2016-44

DD&A

Monterey | Truckee | San Jose

Denise Duffy and Associates, Inc.

Environmental Consultants Resource Planners

947 Cass Street, Suite 5
Monterey, CA 93940
(831) 373-4341

Figure
3

Enclosure 3

Permittee: Larry Hampson, Monterey Peninsula Water Management District

File Number: 1999-244600S

Certification of Compliance
for
Nationwide Permit

"I hereby certify that the work authorized by the above referenced File Number and all required mitigation have been completed in accordance with the terms and conditions of this Nationwide Permit authorization."

___________________________________ ______________________________
(Permittee) (Date)

Return to:

Kevin Schwartz, Ph.D.
U.S. Army, Corps of Engineers
San Francisco District
Regulatory Division, CESPN-R-S
1455 Market Street
San Francisco, CA 94103-1398

Appendix 2 - PRELIMINARY JURISDICTIONAL DETERMINATION (PJD) FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PJD: May 17, 2018

B. NAME AND ADDRESS OF PERSON REQUESTING PJD:

Mr. Larry Hampson
Monterey Peninsula Water Management District
5 Harris Court, Building G
Monterey, CA 93940

C. DISTRICT OFFICE, FILE NAME, AND NUMBER:

San Francisco District, Sleepy Hollow Steelhead Rearing Facility (SHSRF) 1999-244600S

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
(USE THE TABLE BELOW TO DOCUMENT MULTIPLE AQUATIC RESOURCES AND/OR AQUATIC RESOURCES AT DIFFERENT SITES)

State: California County/parish/borough: unincorporated Monterey County

Center coordinates of site (lat/long in degree decimal format):
Lat: 36.443508° Long: 121.715974°

Section S23, Township T17S, Range R2E

Name of nearest waterbody: Carmel River

C. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: May 1, 2017

☒ Field Determination. Date(s): April 17, 2017

TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH "MAY BE" SUBJECT TO REGULATORY JURISDICTION.

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)	Type of aquatic resource (i.e. wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject (i.e. Section 404 or Section 10/404)
1	36.443508	-121.715974	0.6 acre	River/Stream	404

1) The Corps of Engineers believes that there may be jurisdictional aquatic resources in the review area, and the requestor of this PJD is hereby advised of his or her option to request and obtain an approved JD (AJD) for that review area based on an informed decision after having discussed the various types of JDs and their characteristics and circumstances when they may be appropriate.

2) In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an AJD for the activity, the permit applicant is hereby made aware that: (1) the permit applicant has elected to seek a permit authorization based on a PJD, which does not make an official determination of jurisdictional aquatic resources; (2) the applicant has the option to request an AJD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an AJD could possibly result in less compensatory mitigation being required or different special conditions; (3) the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) undertaking any activity in reliance upon the subject permit authorization without requesting an AJD constitutes the applicant's acceptance of the use of the PJD; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a PJD constitutes agreement that all aquatic resources in the review area affected in any way by that activity will be treated as jurisdictional, and waives any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an AJD or a PJD, the.JD will be processed as soon as practicable. Further, an AJD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331. If, during an administrative appeal, it becomes appropriate to make an official determination whether geographic jurisdiction exists over aquatic resources in the review area, or to provide an official delineation of jurisdictional aquatic resources in the review area, the Corps will provide an AJD to accomplish that result, as soon as is practicable. This PJD finds that there *"may be"* waters of the U.S. and/or that there *"may be"* navigable waters of the U.S. on the subject review area, and identifies all aquatic features in the review area that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for PJD (check all that apply)

Checked items should be included in subject file. Appropriately reference sources below where indicated for all checked items:

☒ Maps, plans, plots or plat submitted by or on behalf of the PJD requestor:

Map:

☒ Data sheets prepared/submitted by or on behalf of the PJD requestor.

☒ Office concurs with data sheets/delineation report.

☐ Office does not concur with data sheets/delineation report. Rationale:____

☐ Data sheets prepared by the Corps:__________

☐ Corps navigable waters' study:_____________

☒ U.S. Geological Survey Hydrologic Atlas:

☒ USGS NHD data.

☐ USGS 8 and 12 digit HUC maps.

☒ U.S. Geological Survey map(s). Cite scale & quad name:24K Quad Carmel Valley #36121-D6

☐ Natural Resources Conservation Service Soil Survey. Citation:___________

☐ National wetlands inventory map(s). Cite name:

☐ State/local wetland inventory map(s):_____________

☐ FEMNFIRM maps:_________________

☐ 100-year Floodplain Elevation is:_____. (National Geodetic Vertical Datum of 1929)

☒ Photographs: ☐ Aerial (Name & Date): _____

or ☒ Other (Name & Date): August 2016, April 2017

☐ Previous determination(s). File no. and date of response letter:___________

☐ Other information (please specify):_______________

<u>IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional</u> determinations.

SCHWARTZ.KEVIN.D.1536114587 Digitally signed by SCHWARTZ.KEVIN.D.1536114587 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=SCHWARTZ.KEVIN.D.1536114587 Date: 2018.05.17 11:40:15 -07'00'

Signature and date of Regulatory staff member completing PJD

Larry Hampson 5-21-2018

Signature and date of person requesting PJD (REQUIRED, unless obtaining the signature is impracticable)[1]

[1] Districts may establish timeframes for requester to return signed PJD forms. If the requester does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

FEB 14 2018

Refer to NMFS No: WCR-2017-7501

RECEIVED
FEB 20 2018
MPWMD

Richard M. Bottoms, Ph.D.
Department of the Army
San Francisco District, Corps of Engineers
1455 Market Street
San Francisco, California 94103-1398

Re: Endangered Species Act Section 7(a)(2) Biological Opinion, for the Sleepy Hollow Steelhead Facility Raw Water Intake and Water Supply System Upgrade in Carmel, California

Dear Dr. Bottoms:

Thank you for your letter of May 17, 2017, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 *et seq.*) for the Sleepy Hollow Steelhead Facility Raw Water Intake and Water Supply System Upgrade in Carmel, California (hereafter referred to as "the Project") under Section 404 of the Clean Water Act of 1973, as amended (33 USC Section 1344 *et seq.*). The enclosed biological opinion is based on the proposed Project and describes NMFS' analysis of the effects of the implementation of the Project on threatened South-Central California Coast (SCCC) steelhead (*Oncorhynchus mykiss*).

In the enclosed biological opinion, NMFS concludes the Project is not likely to jeopardize the continued existence of the SCCC steelhead. However, NMFS anticipates take of SCCC steelhead as a result of the Project, and therefore an incidental take statement with non-discretionary terms and conditions is included with the enclosed biological opinion.

Please contact Erin Seghesio at 707-578-8515, or Erin.Seghesio@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Barry A. Thom
Regional Administrator

Enclosure

cc: Kevin Schwartz, USACE, Kevin.D.Schwartz@usace.army.mil
Larry Hansen, Monterey Peninsula Water Management District, Larry@mpwmd.net
Trish Chapman, California State Coastal Conservancy, Trish.Chapman@scc.ca.gov
Aman Gonzalez, California American Water Company, Aman.gonzalez@amwater.com
Katie Chamberlin, Anchor QEA, Kchamberlin@anchorqea.com
Carrie Swanberg, CDFW, Carrie.swanberg@wildlife.ca.gov
Copy to ARN 151422WCR2017SR00199
Copy to Chron File

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion

Sleepy Hollow Steelhead Facility Raw Water Intake and Water Supply System Upgrade

NMFS Consultation Number: WCR-2017-7501

Action Agency: United States Army Corps of Engineers

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely To Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
South-Central California Coast Steelhead (*Oncorhynchus mykiss*)	Threatened	Yes	No	Yes	No

Consultation Conducted By: National Marine Fisheries Service, West Coast Region

Issued By: [signature], for
Barry A. Thom
Regional Administrator

Date: FEB 14 2018

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1. INTRODUCTION

1.1 Background

NOAA's National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement (ITS) portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973 (16 USC 1531 *et seq.*), and implementing regulations at 50 CFR 402.

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available through NMFS' Public Consultation Tracking System: https://pcts.nmfs.noaa.gov/pcts-web/homepage.pcts. A complete record of this consultation is on file at NMFS' North-Central Coast Office in Santa Rosa, California.

The Project involves upgrading the Sleepy Hollow Steelhead Facility (facility) to improve the reliability of the water supply intake and the quality of the intake water. The objective of the project is to maintain and improve the facility's ability to operate and contribute to the restoration and conservation of steelhead populations. The district designed the facility to hold juvenile steelhead rescued from the lower Carmel River during low flows. Construction of the facility was completed in 1996, and the first steelhead were received later that year. Under existing conditions, the facility cannot achieve the water requirements for operation, due to existing limitations with the intake system and conditions in the Carmel River. As a result, the facility has been unable to operate during several recent years.

1.2 Consultation History

On May 18, 2017, NMFS received a letter dated May 17, 2017, from the United States Army Corps of Engineers (Corps) requesting initiation of formal consultation for the Sleepy Hollow Steelhead Facility Raw Water Intake and Water Supply System Upgrade in Carmel, California. The Corps determined that the project adversely effects S-CCC steelhead in the Carmel River. The request for initiation of consultation also included the application package provided to the Corps by the CWA permit applicant: the Monterey Peninsula Water Management District (district). The application package included a project description; design plans; avoidance and minimization measures; and the Biological Assessment. NMFS requested more information on September 14, 2017, and received a response on November 6, 2017. NMFS determined on November 6, 2017, that we had all the information needed to initiate consultation.

1.3 Proposed Federal Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). The Corps proposes to permit the Project under Section 404 of the Clean Water Act of 1973 (33 U.S.C. Section 1344).

The Project involves improving the facility's water supply intake and cooling tower as well as installing a water recirculation (or reuse) system. Improvements to the water supply intake are needed to address existing maintenance issues, operational constraints, increases in sandy bed load[1] and to provide greater instream intake screen reliability. The addition of an intake water reuse system would allow for the facility to operate when river flows fall below 2 cfs and/or when the sediment load is extraordinarily high. The Project would also improve facility efficiency by removing the need for repumping from the cooling tower. Installation of a partial water reuse system will address the challenges of limited water quality and quantity at the facility.

The water supply intake improvements include the following elements which entail fill, excavation, or disturbance of the river bed, banks, or adjacent riparian habitat:

- replacement of the intake screen and concrete base,
- channel bed protection (riprap),
- bank protection (riprap),
- abandoning the existing intake screen and pump station (remove and backfill),
- temporary dewatering or water diversion.

The Project also entails improvements outside of Corps jurisdictional areas (*i.e.*, waters of the U.S., waters of the State, and riparian habitat), including installing a river intake pump station and water conveyance piping; relocating and operating an existing LAKOS sand separator; raising the existing cooling tower headbox; and installing a partial water reuse system that includes a reuse pump station and piping, solids control, dissolved gas conditioning, and pathogen disinfection.

1.3.1 Construction Schedule and Sequence

In-channel work is proposed to be performed between June 1 and October 15, which is within the work window for steelhead (June 1 through October 31) and the typical dry season.

The Project will start with dewatering or diverting water at the existing intake and pump station. After dewatering, the existing intake and pump station would be dismantled and backfilled. Once the work site area in the channel is isolated from flowing water and the dewatering system is in place at the new intake location, excavation of the channel bottom and bank would be required prior to placement of the riprap, concrete base, intake, and bank protection. Excavation would occur in the isolated work site area using either a long-reach excavator operating from the top of the bank adjacent to the channel or a small backhoe in the bottom of the channel. Removal or trimming of several native trees would be required to accommodate construction equipment and the proposed improvements, although trees would be avoided wherever possible. It is estimated that construction will require removal of six alders (*Alnus sp.*; 4- to 8-inch-diameter range), 20 cottonwood (*Populus sp.*; 2- to 10-inch-diameter range), and two bay trees (*Umbellularia californica*; one 2-inch- and one 5-inch-diameter). Prior to construction, a qualified botanist or riparian specialist would identify and record the number, type, and size of trees to be removed or trimmed. Replacement planting for riparian trees would occur at a ratio of 2:1 for White Alder (with willows) and Black cottonwood at a 1.5:1.

Following excavation, installation of the new intake and associated components would occur. Only after placement and construction of these improvements would the temporary water diversion or

[1] Due to the removal of San Clemente Dam.

dewatering system be removed from the in-water work area. Construction staging would occur within the upland floodplain, and would not impact any waters of the U.S. or State, or any riparian areas.

Table 1: Summary of the quantity and type of fill and excavation for each proposed improvement.

Proposed Improvement	Fill		Excavation			
	Volume (cy)	Material	Volume (cy)	Area (sf/ac)	Linear Feet	Material
Replacement Intake Screen and Concrete Base	0	N/A	9	64/0.001	9	Concrete and Intake Screen
Channel Bed Protection	175	Native River Rock	160	1,000/0.023	38	Rock Riprap
Bank Protection	230	Native Bank Material	110	500/0/011	38	Rock Riprap
Removal of the existing drum screen	0.5	Drum Screen	0	0/0	0	N/A
Removal and backfill of the existing pump station	9.9	Concrete	9.9	20/0.000	5	Native Fill
Total	415.4	--	288.9	1,520/0.035*	43**	--

*Fill area of replacement intake screen and concrete base occurs in same area as channel bed protection
** Intake screen and concrete base, channel bed protection and bank protection all occur along the same 38-ft length of the channel.

As shown in Table 1, the Project would result in 288.9 cy of fill over 1,520 sf/0.035 ac occurring within the channel or banks. A small portion of this total fill area would constitute restoration of native streambank (20 sf) from abandonment and backfill of the existing pump station, and an additional 30 sf of streambed would be restored through removal of the existing drum screen. Temporary construction impacts would be limited to the dewatering and water diversion, and riparian tree removal as described above. A more detailed description of each component is discussed below.

1.3.2 Water Intake Improvements: Increasing Water Quantity

1.3.2.1 Replacement of the intake screen and concrete base

The Project will relocate the intake location to the head of a relatively deep pool, located about 120 feet upstream from the present location. The intake will be positioned in an intermediate portion of the water column, which minimizes the short-term potential for the intake to be buried by bedload deposition.

Design criteria for the intake screen meets the requirements of NMFS' 2008 guidance in Anadromous Salmonid Passage Facility Design. It also complies with the lower approach velocity stipulated in NMFS' 1997 Fish Screening Criteria for Anadromous Salmonids. A single 66-inch-diameter replacement active cone screen equipped with an external cleaning brush will be installed in a deeper river area than the current screen location.

The new cone screen will be bolted to the top of a precast concrete base installed at the proposed intake location. The concrete base would weigh up to about 37,000 pounds and would measure 9 feet in diameter by 3.75 feet thick. The top of the base would be an average of 1 foot higher than the river bottom. The intake screen and concrete base would include 9 cubic yards (cy) of fill (concrete and intake screen material) over a fill area of 64 sf/0.001 ac within the channel bed.

1.3.2.2 Channel Bed Protection

The concrete base would be underlain, supported, and surrounded with rock riprap at grade. To protect the new intake and concrete base from scour, the river bed will be excavated to a maximum depth of 6 feet or until bedrock is encountered (estimated maximum of 175 cy of excavation required). The excavated area would be backfilled with angular rock riprap with a minimum weight of 3 tons and size of 42 inches in diameter. Smaller riprap would be placed directly under the screen base location and leveled with an excavator bucket prior to placement of the precast concrete base. Native river rock removed during excavation would be stockpiled for reuse and spread over the riprap at a 6-inch thickness to fill voids in the riprap surface. The channel bed protection would include a maximum of 160 cy of rock riprap over a fill area of 1,000 sf/0.023 ac within the channel bed.

1.3.2.3 Bank Protection

Bank protection will protect the river bank from erosion behind the screen and reinforce the bank where it was disturbed during the installation of the intake structure and connection pipe. Bank protection will include installation of rock riprap around on the channel bank. Excavation of approximately 230 cy from the river bank will be required to accommodate placement of the rock riprap and bank recontouring. Rock riprap will be installed to the top of bank elevation of 390 feet. Native material removed during excavation will be stockpiled for reuse and spread over the riprap to fill voids in the riprap surface. The reinforced bank would be sloped at 2:1 (horizontal to vertical).[2] Reinforced banks will be revegetated with native riparian trees and other native riparian plantings. Native riparian plantings have been found to be highly resistant to bank erosion once vegetation is established. The bank protection would include a maximum of 110 cy of rock riprap over a fill area of 500 sf/0.011 ac within the channel bank (above toe of bank and below ordinary high water).

1.3.2.4 Abandon Existing Intake Screen and Pump Station

The existing drum screen in the riverbed will be disconnected from the intake pipe and removed. Mechanical and electrical equipment from the pump station will be removed with a hoist for salvage. The pump station concrete wet well will be removed using a backhoe or excavator and loaded into a road dump truck for disposal off site. Surplus native river rock excavated from other site work will be reused to fill any void remaining from the wet well removal. Some smaller riprap (up to one-quarter ton) may be mixed into the native material placed into the void to provide some stability during high flows until vegetation is fully established. The streambank will be revegetated with appropriate native plants.

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[2] Although many practitioners and civil engineering references recommend against using riprap on slopes steeper than 1.5:1, failure of 1.5:1 streambanks—even with riprap installed—has been common along the Carmel River.

The existing drum screen occupies a volume of 0.5 cy within the channel bed over an area of 30 sf. No excavation beyond removal of the screen itself is anticipated to be required. Removal and backfill of the existing pump station will include excavation and backfill of 9.9 cy within the channel bank over an area of 20 sf. The existing pump station area will be backfilled with native material and the streambank would be planted with native vegetation; therefore, removal and backfill of the existing pump station will result in restoration of 20 sf of streambank. Removal of the existing drum screen will restore 30 sf of streambed.

1.3.2.5 River Intake Pump Station and Water Conveyance

The river water intake pump station will consist of two submersible non-clog pumps installed in a concrete wet well, with each pump sized to provide the total desired flow of 1,350 gpm. Two pumps will be installed to provide redundancy in the event that the primary pump goes out of service. The pump station wet well will be relocated to the top of the bank, to allow for easier maintenance during river flows greater than 1,000 cfs, and to coincide with the relocated intake screen.

Pumps will be installed on a slide rail system for easy retrieval when service, maintenance, or replacement is required. A valve vault will be located next to the wet well, with an isolation valve, check valve, and pressure gauge for both discharge lines. River water will be conveyed from the intake screen to the wet well via a 16-inch-diameter pipe. A gate or valve would be installed on the end of the 16-inch-diameter pipe inside the wet well to allow for dewatering and maintenance.

The river water intake pumps will be sized to deliver flow directly to the cooling tower. Pipes and valves will be installed to allow operators to direct the river water to the reuse pump station when desired due to high sediment load or other river conditions. This allows the option of receiving flow that would settle and be filtered before being re-pumped to the cooling tower. The river water pumps (either operating alone or in unison with the reuse pump station) will typically need to deliver between 810 gpm and 1,350 gpm depending on level of reuse. Alarms will be activated in the event of pump motor temperature exceedance, motor seal leakage, low wet well water level, and if the pump is running with zero flow at the flow meter.

1.3.3 Improving Water Quality

Treatment of water would include the following; solids filtration, cooling, dissolved gas conditioning, and pathogen disinfection.

1.3.3.1 Sediment Removal

Sediment settling uses the existing LAKOS sand separator with the addition of a sediment settling basin. The settling basin will be 13 feet wide, 35 feet long, and 5 feet deep. With the addition of the settling basin, the reuse sump will also include a chamber for raw river water settling and filtering prior to using the reuse pumps for repumping river water. To control solids so that UV transmissivity is increased, water will be filtered in a microscreen filter with 30-micron screen media. The goals of the system will capture 40% of the solids and controlling TSS to less than 10 mg/L during moderate river stages.

1.3.3.2 Cooling Tower

The existing cooling tower will continue to be used to increase dissolved oxygen levels and reduce dissolved carbon dioxide levels, as well as for cooling. The existing cold well will be removed and backfilled with native rock and soils excavated from other site work. To improve system efficiency, the cooling tower will be raised by approximately 8 feet and a new elevated headbox will be constructed to receive cooling tower flows before discharging to the rearing channel. The headbox will consist of a raised water tank with the bottom elevation about 5 feet above the ground, and will be used for collecting oxygenated water and distributing flow.

1.3.3.3 Dissolved Gas Conditioning

When cooling of flow is not required, the flow will bypass the cooling tower and be directed to the combined aeration and oxygenation tower (OxyTower) to removed dissolved carbon dioxide and add dissolved oxygen. The OxyTower also allows for the addition of pure oxygen gas to boost dissolved oxygen levels to 100% of saturation.

1.3.3.4 Pathogen Disinfection

The facility will have the ability to disinfect water with UV irradiation. A UV dose of 30,000 micro-watt seconds per square centimeter will be used to reduce most common fish pathogens.

1.3.4 Temporary Dewatering or Water Diversion

Improvements within the channel will require isolating the work area from river flows to the extent practicable through flow diversion. In-channel work will occur between July and October when flows are normally at their lowest (4 to 10 cfs). The flow diversion method will entail temporarily isolating and surrounding the immediate work area with sandbags, aquadams, native channel material, or similar structures. Plastic lining will be used in conjunction with the temporary structures to reduce water entry. A portion of the channel adjacent to the improvement area will remain open to accommodate the flow diversion. A pump and pipe system will be employed as needed to remove water that infiltrates the isolated work area, likely daily at the start of construction and as needed to perform inspections. Water pumped from the work site will be discharged to a containment area on the gravel bar isolated with sandbags, allowing the water to infiltrate. The containment area could be on either side of the river, depending on work sequence and infiltration rate of the native gravels. Discharge to the gravel bars will also disperse the flow and prevent erosion. Any pumps or bypass pipes required during dewatering will be screened as appropriate to avoid entrainment of steelhead. The flow diversion and pump and pipe system will be positioned and moved throughout the work area as needed to construct the individual improvements. This includes positioning for the rock riprap, intake screen and base, bank stabilization, and removal of the existing intake screen. Depending on river and flow conditions, it may be possible to construct some of these improvements without flow diversion. Temporary dewatering will occur over a total area of 2,095 sf/0.048 ac within the channel bed and banks.

1.3.5 Fish Collection and Relocation

Fish will be excluded from reentering the work area by blocking the stream channel above and below the work area with fine-meshed net or screens. Fish will then be removed from the blocked area by electro-fishing or seining. After all fish have been removed the area will be dewatered following the protocols outlined above and the block nets will then be removed.

1.3.5.1 Electrofishing Guidelines:

The following methods shall be used if fish are relocated via electrofishing:

1. All electrofishing will be conducted according to NMFS' *Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act* (NMFS 2000).

2. The backpack electro-fisher shall be set as follows when capturing fish:

Voltage setting on the electro-fisher shall not exceed 300 volts

	Initial	**Maximum**
Voltage	100 Volts	300 Volts
Duration	500 μs (microseconds)	5 ms (milliseconds)
Frequency	30 Hertz	30 Hertz

3. A minimum of three passes with the electro-fisher shall be utilized to ensure maximum capture probability of salmonids within the area proposed for dewatering.

4. Water temperature, dissolved oxygen, and conductivity shall be recorded in an electrofishing log book, along with electrofishing settings.

5. A minimum of one assistant shall aid the fisheries biologist by netting stunned fish and other aquatic vertebrates.

1.3.5.2 Seining Guidelines:

The following methods shall be used if fish are removed with seines:

1. A minimum of three passes with the seine shall be utilized to ensure maximum capture probability of all salmonids within the area.

2. All captured fish shall be processed and released prior to each subsequent pass with the seine.

3. The seine mesh shall be adequately sized to ensure fish are not gilled during capture and relocation activities.

1.3.5.3 Guidelines for Relocation of Salmonids:

The following methods shall be used during relocation activities associated with either method of capture (electrofishing or seining):

1. Fish shall not be overcrowded into buckets, allowing no more than 150 0+ fish (approximately

six cubic inches per 0+ individuals) per 5 gallon bucket and fewer individuals per bucket for larger/older fish.

2. Every effort shall be made not to mix 0+ salmonids with larger steelhead, or other potential predators, that may consume the smaller steelhead. Have at least two containers and segregate young-of-year (0+) fish from larger age-classes. Place larger amphibians in the container with larger fish.

3. Salmonid predators, including other fishes and amphibians, collected and relocated during electrofishing or seining activities shall not be relocated so as to concentrate them in one area. Particular emphasis shall be placed on avoiding relocation of predators into the salmonid relocation pools. To minimize predation of salmonids, these species shall be distributed throughout the wetted portion of the stream to avoid concentrating them in one area.

4. All captured salmonids shall be relocated to suitable habitat. Captured fish shall be placed into a pool, preferably with a depth of greater than two feet with available instream cover.

5. All captured salmonids will be processed and released prior to conducting a subsequent electrofishing or seining pass.

6. All captured fish will be allowed to recover from electrofishing before being returned to the stream.

7. Minimize handling of salmonids. However, when handling is necessary, always wet hands or nets prior to touching fish. Handlers will not wear insect repellants containing the chemical N,N-Diethyl-meta-toluamide (DEET).

8. Temporarily hold fish in cool, shaded, aerated water in a container with a lid. Provide aeration with a battery-powered external bubbler. Protect fish from jostling and noise and do not remove fish from this container until time of release.

9. Visually identify species and estimate year-classes of fish at time of release. Count and record the number of fish captured. Avoid anesthetizing or measuring fish.

10. If more than 3 percent of the steelhead captured are killed or injured, the project permittee shall contact Erin Seghesio at 707-578-8515 and by email at Erin.Seghesio@noaa.gov.

11. The purpose of the contact is to review the activities resulting in take and to determine if additional protective measures are required. All steelhead mortalities must be retained, placed in an appropriately sized, zip-sealed bag, labeled with the date and time of collection, fork length, location of capture, and frozen as soon as possible. Frozen samples must be retained until specific instructions are provided by NMFS.

A qualified biologist will perform fish relocation activities. The qualified biologist(s) will possess all valid state and federal permits needed for fish relocation and will be familiar with the life history and identification of steelhead and state-listed fish within the action area. The qualified fisheries biologist shall note the number of steelhead observed in the affected area, the number of steelhead relocated, and the date and time of collection and relocation. The qualified fisheries biologist shall have a minimum of three years of field experience in the identification and capture of juvenile salmonids.

1.3.6 General Project Minimization Measures

Protective measures will include the following, at a minimum:

- No discharge of pollutants from vehicle and equipment cleaning will be allowed into any storm drains or watercourses.
- Vehicle and equipment fueling and maintenance operations will be at least 50 feet away from watercourses.
- Spill containment kits will be maintained on site at all times during construction operations and/or staging or fueling of equipment.
- A Spill Response Plan will be prepared. Hazardous materials (e.g., fuels, oils, or solvents) would be stored in sealable containers in a designated location that is at least 50 feet from watercourses.
- Graded areas will be protected from erosion using a combination of silt fences, fiber rolls, or other similar protection along toes of slopes or along edges of designated staging areas, and erosion control netting (such as jute or coir) as appropriate on sloped areas. Erosion control devices that do not contain plastic or synthetic monofilament netting will be used for these purposes.
- A speed limit of 15 miles per hour in the project footprint in unpaved areas will be enforced to reduce dust and excessive soil disturbance.
- Prior to the start of construction, a qualified biologist will conduct an educational training program for all construction personnel. The training will include, at a minimum, a description of the species with the potential to be present at the site; an explanation of the status of these species and protection under federal or state laws; the avoidance and minimization measures to be implemented to reduce take of these species; communication and work stoppage procedures in case a listed species is observed within the project's area of effect (action area); and an explanation of the environmentally sensitive areas and wildlife exclusion fencing and the importance of maintaining these structures. A fact sheet conveying this information will be prepared and distributed to all construction personnel. Upon completion of the program, personnel will sign a form stating that they attended the program and understand all the avoidance and minimization measures and implications of the Endangered Species Act (ESA) and California Endangered Species Act (CESA).

"Interrelated actions" are those that are part of a larger action and depend on the larger action for their justification. "Interdependent actions" are those that have no independent utility apart from the action under consideration (50 CFR 402.02). There are no interdependent or interrelated activities associated with the proposed action.

2. ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, each Federal agency must ensure that its actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provides an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1 Analytical Approach

This biological opinion includes both a jeopardy analysis and/or an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "to jeopardize the continued existence of" a listed species, which is "to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

This biological opinion relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features"(81 FR 7214).

The designation(s) of critical habitat for (species) use(s) the term primary constituent element (PCE) or essential features. The new critical habitat regulations (81 FR 7414) replace this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a ''destruction or adverse modification'' analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

We use the following approach to determine whether a proposed action is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- Identify the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Describe the environmental baseline in the action area.
- Analyze the effects of the proposed action on both species and their habitat using an "exposure-response-risk" approach.
- Describe any cumulative effects in the action area.

- Integrate and synthesize the above factors by: (1) Reviewing the status of the species and critical habitat; and (2) adding the effects of the action, the environmental baseline, and cumulative effects to assess the risk that the proposed action poses to species and critical habitat.
- Reach a conclusion about whether species are jeopardized or critical habitat is adversely modified.
- If necessary, suggest a RPA to the proposed action.

To conduct the assessment, NMFS examined an extensive amount of information from a variety of sources. Detailed background information on the biology and status of the species and critical habitat has been published in a number of documents including peer reviewed scientific journals, primary reference materials, and governmental and non-governmental reports. Additional information regarding the effects of the project's actions on the listed species in question, their anticipated response to these actions, and the environmental consequences of the actions as a whole was formulated from the aforementioned resources referenced in the Consultation History section. For information that has been taken directly from published, citable documents, those citations have been referenced in the text and listed at the end of this document.

2.2 Rangewide Status of the Species and Critical Habitat

This opinion examines the status of S-CCC steelhead, likely to be adversely affected by the proposed action. The status is determined by the level of extinction risk that S-CCC steelhead face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' current "reproduction, numbers, or distribution" as described in 50 CFR 402.02. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the current function of the essential PBFs that help to form that conservation value.

2.2.1 Species Description, Life History, and Status

This biological opinion analyzes the effects of the federal action on the following Federally-listed species Distinct Population Segment (DPS) and designated critical habitat:

S-CCC steelhead DPS
Threatened (January 5, 2006; 71 FR 834)
Critical habitat (September 2, 2005; 70 FR 52488).

The S-CCC steelhead DPS includes all naturally spawned steelhead populations in streams from the Pajaro River watershed (inclusive) to, but not including, the Santa Maria River, (71 FR 834) in northern Santa Barbara County, California. There are no artificially propagated steelhead stocks within the range of the S-CCC steelhead DPS.

2.2.1.1 S-CCC Steelhead General Life History

Steelhead are anadromous fish, spending time in both fresh- and saltwater. Steelhead possess a complex life history requiring successful completion and transition through various life stages in marine and freshwater environments (*e.g.*, spawning and outmigration, egg-to-fry emergence, juvenile rearing, smolt outmigration and ocean survival). Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and young juveniles all rear in freshwater until they become large enough to migrate to the ocean to finish rearing and maturing to adults. Eggs incubate and emerge in about three weeks (depending on water temperature), and the alevins remain in small spaces between gravels before entering the stream water column. Steelhead fry rear in edgewater habitats and move gradually into pools and riffles as they grow larger. Cover is an important habitat component for juvenile steelhead, both as a velocity refuge and as a means of avoiding predation (Shirvell 1990; Meehan and Bjorn 1991). Steelhead, however, tend to use riffles and other habitats not typically associated with instream cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. Rearing steelhead juveniles prefer water temperatures of 7-14° C (Barnhart 1986; Bjornn 1991). They can survive in water up to 27° C with saturated dissolved oxygen (DO) conditions and a plentiful food supply. Fluctuating diurnal water temperatures also aid in survivability of salmonids (Busby *et al.* 1996).

Although variation occurs in coastal California, juveniles usually spend one to two years in freshwater, then smolt and migrate to the ocean, using an estuary for acclimation to saltwater and as a migration corridor. They usually spend one to three years in the ocean (usually two years in the Pacific southwest) (Barnhart 1986), where they mature into adults before returning to their natal stream to spawn. Steelhead may spawn one to four times over their life. The maximum lifespan of a steelhead is approximately nine years (Moyle 2002).

Studies of coastal *O. mykiss* populations in central and southern California reveal three principal life-history groups, which NMFS describes as fluvial-anadromous, lagoon-anadromous, and freshwater resident[3] (Smith 1990; Bond 2006; Boughton *et al.* 2007). Both anadromous groups classify as winter steelhead, in that adults migrate during the winter rainy season. Lagoon-anadromous fish spend either their first or second summer as juveniles in a seasonal lagoon at the mouth of a stream (Boughton *et al.* 2006).

Upstream adult steelhead migration occurs from December through April, with 95 percent of steelhead counted at the former San Clemente Dam from January through March (Wagner 1983). At the Los Padres Dam fish trap, adults have been reported between January through mid-May from 1995 to present, with peak activity February through April (MPWMD 2010). Arrival of the first adults observed between 1964 and 1975 was almost always preceded by flows of 200 cfs or greater, and the years where peak flows did not generally exceed 100 cfs had the lowest numbers of adult migrants reported (Snider 1983).

2.2.1.2 Status of S-CCC Steelhead DPS

In this opinion, NMFS assesses four population viability parameters to help us understand the status of S-CCC steelhead DPS and the population's ability to survive and recover. These population viability parameters are: abundance, population growth rate, spatial structure, and diversity (McElhany *et al.* 2000). While there is insufficient information to evaluate these population

[3] Freshwater residents, or rainbow trout, are not listed under the ESA.

viability parameters in a thorough quantitative sense, NMFS has used existing information to determine the general condition of the S-CCC steelhead DPS and factors responsible for the current status of S-CCC steelhead DPS.

We use these population viability parameters as surrogates for numbers, reproduction, and distribution, the criteria found within the regulatory definition of jeopardy (50 CFR 402.20). For example, the first three parameters are used as surrogates for numbers, reproduction, and distribution. We relate the fourth parameter, diversity, to all three regulatory criteria. Numbers, reproduction, and distribution are all affected when genetic or life history variability is lost or constrained, resulting in reduced population resilience to environmental variation at local or landscape-level scales.

Populations of S-CCC steelhead throughout the DPS have exhibited a long-term negative trend since the mid-1960s. In the mid-1960s, total spawning populations were estimated at 17,750 individuals (Good *et al.* 2005). Available information shows S-CCC steelhead population abundance continued to decline from the 1970s to the 1990s (Busby *et al.* 1996) and more recent data indicate this trend continues (Good *et al.* 2005). Current S-CCC steelhead run-sizes in the five largest systems in the DPS (Pajaro River, Salinas River, Carmel River, Little Sur River, and Big Sur River) are likely greatly reduced from 4,750 adults in 1965 (CDFG 1965) to less than 500 returning adult fish in 1996. More recent estimates for total run-size do not exist for the S-CCC steelhead DPS (Good *et al.* 2005).

Recent analyses conducted by NMFS (Boughton *et al.* 2006; Boughton *et al.* 2007; Williams *et al.* 2011; Williams *et al.* 2016) indicate the S-CCC steelhead DPS consists of 12 discrete sub-populations which represent localized groups of interbreeding individuals, and none of these sub-populations currently meet the definition of viable. Most of these sub-populations can be characterized by low population abundance, variable or negative population growth rates, and reduced spatial structure and diversity. The sub-populations in the Pajaro River and Salinas River watersheds are in particularly poor condition (relative to watershed size) and exhibit a greater lack of viability than many of the coastal subpopulations.

Although steelhead are present in most streams in the S-CCC DPS (Good *et al.* 2005), their populations are small, fragmented, and unstable, or more vulnerable to stochastic events (Boughton *et al.* 2006). In addition, severe habitat degradation and the compromised genetic integrity of some populations pose a serious risk to the survival and recovery of the S-CCC steelhead DPS (Good *et al.* 2005). NMFS' 2005 status review concluded S-CCC steelhead remain "likely to become endangered in the foreseeable future" (Good *et al.* 2005). NMFS confirmed the listing of S-CCC steelhead as threatened under the ESA on January 5, 2006 (71 FR 834). Observations suggest the number of adult returns is fluctuating, sometimes below recent low numbers. The Coastal Monitoring Plan (CMP) was developed to standardize the sampling of salmonids in a way that would inform the Viable Salmonid Population (VSP) framework (Adams *et al.* 2011). Since the development of the CMP there has been one effort to conduct population/redd surveys in the S-CCC DPS with mixed results (Williams *et al.* 2016). The district has conducted redd surveys, as resources permit, in the lower Carmel River (Williams *et al.* 2016). The district has not fully implemented the protocols used in the northern part of the state, which specify that sampled reaches be resurveyed every two weeks for the duration of the spawning season due to weather and flows

(Gallagher and Gallagher 2005; Williams *et al.* 2016). This has likely resulted in an undercount of redds (Williams *et al.* 2016, K. Urquhart, MPWMD, personal communication, July).

In the Carmel River there has been a fairly steady 15-year decline in abundance of anadromous adults (Williams *et al.* 2016). The decline has surprised researchers because it coincides with a concentrated effort to restore the habitat in the Carmel River and to improve numbers through a rescue/captive rearing operation (Williams *et al.* 2016). This decline could indicate an increase in S-CCC steelhead DPS extinction risk (Williams *et al.* 2016).

Further detailed information on this steelhead DPS is available in NMFS' Status Review of West Coast Steelhead from Washington, Idaho, Oregon, and California (Busby *et al.* 1996), NMFS' final rule for listing steelhead (62 FR 43937), and NMFS' recovery plan (NMFS 2013). Additional information is available from the NMFS Southwest Fisheries Science Center (SWFSC). The SWFSC has prepared several reports specifically for recovery planning that provide: 1) characterization of the S-CCC steelhead DPS historical population structure; 2) viability criteria for recovery; 3) assessment of threats; and 4) recommendations for recovery of the highest priority populations (Boughton and Goslin 2006; Boughton *et al.* 2006; Boughton *et al.* 2007). The two most recent status updates conclude that steelhead in the S-CCC steelhead DPS remain "likely to become endangered in the foreseeable future" (Williams *et al.* 2011; Williams *et al.* 2016), as new and additional information available since Good *et al.* (2005) does not appear to suggest a change in extinction risk. On December 7, 2011, and again on May 26, 2016, NMFS chose to maintain the threatened status of the S-CCC steelhead DPS (76 FR 76386 ; 81 FR 33468).

2.2.1.3 Status of S-CCC Steelhead Critical Habitat

In designating critical habitat, NMFS considers the following requirements of the species: 1) space for individual and population growth, and for normal behavior; 2) food, water, air, light, minerals, or other nutritional or physiological requirements; 3) cover or shelter; 4) sites for spawning, reproduction, and rearing offspring; and, generally and 5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of this species (50 CFR 424.12(b)). In addition to these factors, NMFS also focuses on known PBFs within the designated area that are essential to the conservation of the species and that may require special management considerations or protection. For S-CCC steelhead, PBFs include (70 FR 52488):

1) Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development. These features are essential to conservation because without them the species cannot successfully spawn and produce offspring.

2) Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. These features are essential to conservation because without them, juveniles cannot access and use the areas needed to forage, grow, and develop behaviors (*e.g.*, predator avoidance, competition) that help ensure their survival.

3) Freshwater migration corridors free of obstruction with water quantity and quality conditions

and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival. These features are essential to conservation because without them juveniles cannot use the variety of habitats that allow them to avoid high flows, avoid predators, successfully compete, begin the behavioral and physiological changes needed for life in the ocean, and reach the ocean in a timely manner. Similarly, these features are essential for adults because they allow fish in a non-feeding condition to successfully swim upstream, avoid predators, and reach spawning areas on limited energy stores.

4) Estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation. These features are essential to conservation because without them juveniles cannot reach the ocean in a timely manner and use the variety of habitats that allow them to avoid predators, compete successfully, and complete the behavioral and physiological changes needed for life in the ocean. Similarly, these features are essential to the conservation of adults because they provide a final source of abundant forage that will provide the energy stores needed to make the physiological transition to fresh water, migrate upstream, avoid predators, and develop to maturity upon reaching spawning areas.

For the S-CCC steelhead DPS, approximately 1,832 miles of stream habitat, and 442 square miles of estuarine habitat are designated critical habitat (70 FR 52488). Critical habitat for the DPS has been designated in the following CALWATER Hydrologic Units: Pajaro River, Carmel River, Santa Lucia, Salinas, and Estero Bay. Tributaries in the Neponset, Soledad, and Upper Salinas Valley Hydrologic Sub-areas (HSA) were excluded from critical habitat and Department of Defense lands in the Paso Robles and Chorro HSAs were excluded.

The coastal drainages used by the S-CCC steelhead DPS provide relatively higher amounts of the freshwater rearing PBF, maintain connectivity, and result in a wider distribution of the species in these drainages than in inland drainages. Inland drainages provide important freshwater migration, freshwater spawning, and freshwater rearing PBFs unique within the inland ecotype. However, most areas of critical habitat in both coastal and inland drainages have been degraded compared to conditions that once supported thriving populations of steelhead.

2.2.2 Factors Responsible for the Decline of S-CCC Steelhead DPS and Degradation of S-CCC Critical Habitat

Of the watersheds in the S-CCC steelhead DPS historically supporting steelhead, most continue to support runs, although run sizes are significantly reduced, or no longer exist in many sub-watersheds. A reduced population size causes each individual within the population to be more important and significantly increases the population's susceptibility to small or catastrophic events. Moreover, low population sizes compromise genetic integrity, posing serious risks to steelhead survival and recovery. The four largest watersheds (Pajaro, Salinas, Nacimiento/Arroyo Seco, and Carmel rivers) have experienced declines in run sizes of 90 percent or more, and steelhead are extirpated from many of their subwatersheds primarily due to anthropogenic and environmental influences. Steelhead in this DPS have declined in large part as a result of anthropogenic influences associated with agriculture, mining, and urbanization activities that have resulted in the loss, degradation, simplification, and fragmentation of habitat (Hunt and Associates Biological Consulting Services 2008), and to some degree disease and predation.

2.2.2.1 Habitat Alteration

Habitat destruction and fragmentation have been linked to increased rates of species extinction over recent decades (Davies *et al.* 2001). A major cause of the decline of steelhead is the loss or decrease in quality and function of PBFs. Most of this loss and degradation of habitat, including critical habitat, has resulted from anthropogenic watershed disturbances caused by water diversions, the influences of large dams, agricultural practices (including irrigation), ranching, recreation, urbanization, loss of estuarine habitat and wetland and riparian areas, roads, grazing, gravel mining, and logging. While individual components of this list of factors affecting steelhead and critical habitat have fluctuated in severity over the last 100 years, the general trend has been one of increasing and intractable pressure on aquatic resources. These factors have significantly altered steelhead habitat quantity and quality. Associated impacts of these factors include: alteration of stream bank and channel morphology; alteration of ambient stream water temperatures; degradation of water quality; elimination of spawning and rearing habitats; fragmentation of available habitats; elimination of downstream recruitment of spawning gravels and large woody debris (LWD); removal of riparian vegetation resulting in increased stream bank erosion; and increased sedimentation input into spawning and rearing areas resulting in the loss of channel complexity, pool habitat, suitable gravel substrate, and LWD.

2.2.2.2 Water Use

Water storage, withdrawal, conveyance, and diversions for agriculture, flood control, domestic, and hydropower purposes have greatly reduced or eliminated historically accessible habitat. Modification of natural flow regimes by dams and other water control structures have resulted in increased water temperatures, changes in fish community structures, depleted flow necessary for migration, spawning, rearing, flushing of sediments from spawning gravels, and reduced gravel recruitment. The substantial increase of impermeable surfaces as a result of urbanization (including roads) has also altered the natural flow regimes of rivers and streams, particularly in lower reaches. Depletion and storage of natural flows have altered natural hydrological cycles in many California rivers and streams in general, including streams providing habitat to the S-CCC steelhead DPS in particular. Alteration of stream flows has increased juvenile salmonid mortality for a variety of reasons including: impaired migration from insufficient flows or habitat blockages; loss of rearing habitat due to dewatering and blockage; stranding of fish resulting from rapid flow fluctuations; entrainment of juveniles into unscreened or poorly screened diversions; and increased juvenile mortality resulting from increased water temperatures (Chapman and Bjornn 1969; Berggren and Filardo 1993; 61 FR 56138). However, the greatest threats to the S-CCC steelhead DPS population are the degradation of habitats and loss of habitat by impassable dams. The SWFSC has identified re-establishing access to upper watersheds in the Pajaro and Salinas watersheds as one of the highest priorities for the recovery of the S-CCC steelhead DPS (Boughton *et al.* 2006; Boughton *et al.* 2007).

2.2.2.3 Estuarine Habitat Loss

A significant percentage of estuarine habitats have been lost, particularly in the northern and southern portions of the S-CCC steelhead DPS where the majority of the wetland habitat historically occurred. The condition of these remaining wetland habitats is largely degraded, with many wetland areas at continued risk of loss or further degradation. Although many historically harmful practices have been halted, much of the historical damage remains to be addressed and the necessary restoration activities will likely require decades. Many of the land use activities described above have resulted in the loss of wetlands and degradation of estuaries in the larger river systems such as the Pajaro, Salinas, Carmel and Arroyo Grande rivers, and many also apply to the smaller coastal systems such as Morro, San Luis Obispo, and Pismo Creeks (NMFS 2011).

2.2.2.4 Fishing Harvest

Steelhead populations traditionally supported an important recreational fishery throughout their range and likely increased the mortality of adults and juveniles. There are few good historical accounts of the abundance of steelhead harvested along the California coast (Jensen and Swartzell 1967). However, Shapovalov and Taft (1954) report that very few steelhead were caught by commercial salmon trollers at sea but considerable numbers were taken by sports anglers in Monterey Bay. There are also many anecdotal reports of recreational fishing and poaching of instream adults (Franklin 2005) which suggests a relatively high level of fishing pressure. Although such impacts may have contributed to the decline of some naturally small populations, NMFS does not consider it to be a principal cause for the decline of the S-CCC steelhead DPS (NMFS 2011). Some recreational angling for *O. mykiss* continues to be allowed in all coastal drainages in its range and also continues to occur in areas above currently impassible barriers. CDFW also restricts angling on streams accessible to anadromous fish through their angling regulations, which includes daily restrictions and limited catch numbers along with catch-and-release fishing. This may relieve some of the negative pressures associated with angling on the population, however, it should be noted that even catch-and-release fishing can have adverse effects on listed fish. During periods of decreased habitat availability (*e.g.*, drought conditions or summer low flow when fish are concentrated in freshwater habitats); the impacts of recreational fishing or harassment on native anadromous stocks can increase (NMFS 2011).

Ocean harvest of steelhead is considered to be extremely rare and is an insignificant source of mortality for this DPS since both sport and commercial harvest of steelhead in the ocean is prohibited by CDFW (CDFG 2010). Although high seas driftnet practices in the past likely resulted in incidental harvest of steelhead, the occurrence of this is thought to be limited to some local areas as steelhead are not a commercially targeted species (NMFS 2011).

2.2.2.5 Artificial Propagation

There are no steelhead hatcheries operating in or supplying hatchery reared steelhead to the DPS. However, there is an extensive stocking program of hatchery cultured and reared, non-anadromous *O. mykiss* which supports a put-and-take fishery that is stocked for removal by anglers. These stockings are now generally conducted in non-anadromous waters (though other non-native game species such as smallmouth bass (*Micropterus dolomieui*) and bullhead catfish (*Ameiurus* sp.) are stocked into anadromous waters by a variety of public and private entities). Nevertheless, hatchery origin non-anadromous fish may enter anadromous waters as a result of spillage over dams.

Although these stockings are generally carried out in waters which do not support anadromous populations, the potential does exist for fish to escape into anadromous waters.

While some of these programs have succeeded in providing seasonal fishing opportunities, the impacts of these programs on native, naturally-reproducing steelhead stocks are not well understood. Competition, genetic introgression and disease transmission resulting from hatchery introductions could reduce the production and survival of native, naturally-reproducing steelhead (Araki *et al.* 2007; Araki *et al.* 2008; Araki *et al.* 2009); although, genetic research on southern California steelhead has not detected any substantial interbreeding of native steelhead with hatchery reared steelhead (Girman and Garza 2006; Garza and Clemento 2007; Clemento *et al.* 2008; Abadia-Cardoso *et al.* 2011; Christie *et al.* 2011). Additionally, collection of native steelhead for hatchery broodstock purposes can also harm small or dwindling natural populations. However, artificial propagation, if done to preserve individuals representing genetic resources that would otherwise be lost, or done to aid wild fish repopulation of streams, may also play an influential role in steelhead recovery. Such efforts can supplement, but are not a substitute for naturally-reproducing populations.

2.2.2.6 Environmental Factors

Variability in natural environmental conditions has both masked and exacerbated the problems associated with degraded and altered riverine and estuarine habitats. Floods and persistent drought conditions have periodically reduced naturally limited spawning, rearing, and migration habitats. Furthermore, El Nino events and periods of unfavorable ocean-climate conditions can threaten the survival of steelhead populations already reduced to low abundance levels due to the loss and degradation of freshwater and estuarine habitats. However, periods of favorable ocean productivity and high marine survival can temporarily offset poor habitat conditions elsewhere and result in dramatic increases in population abundance and productivity by increasing the size and correlated fecundity of returning adults (NMFS 2011). The threats from projected climate change are likely to exacerbate the effects of environmental variability on steelhead and its habitat in the future. Thus, increased environmental variability resulting from projected climate change is now recognized as a new and more serious factor that may threaten the recovery of the S-CCC steelhead DPS (NMFS 2011).

2.2.2.7 Ocean Conditions

Variability in ocean productivity has been shown to affect salmon production both positively and negatively. Beamish and Bouillion (1993) showed a strong correlation between North Pacific salmon production and marine environmental factors from 1925 to 1989. Beamish *et al.* (1997) noted decadal-scale changes in the production of Fraser River sockeye salmon that they attributed to changes in the productivity of the marine environment. They also reported the dramatic change in marine conditions occurring in 1976-77 (an El Niño year), when an oceanic warming trend began. These El Niño conditions, which occur every three to five years, negatively affect ocean productivity. For instance, Johnson (1988) noted increased adult mortality and decreased average size for Oregon Chinook salmon (*O. tshawytscha*) and coho salmon (*O. kisutch*) during the strong 1982-83 El Niño. Brood years of salmon and steelhead that were in the ocean during the 1983 El Niño event exhibited poor survival all along the Pacific coast of California (Garrison *et al.* 1994). Salmon populations have persisted over time, under pristine habitat conditions, through many cycles of poor ocean survival in the past. It is less certain how they will fare in periods of poor ocean survival when their freshwater, estuary, and nearshore marine habitats are degraded (Good *et al.* 2005).

2.2.2.8 Reduced Marine-Derived Nutrient Transport

Salmonids may play a critical role in sustaining the quality of habitats essential to the survival of their own species via the transfer of marine-derived nutrients (MDN) to freshwater systems. MDN are nutrients that accumulate in the bodies of salmonids while they are in the ocean and are then left in freshwater streams when salmonids die after spawning. Salmon carcasses decay or are eaten, transferring these nutrients from the ocean to watersheds. MDN has been shown to be vital for the growth of juvenile salmonids (Bilby *et al.* 1996; Bilby *et al.* 1998). The return of salmonids to rivers makes a significant contribution to the flora and fauna of both terrestrial and riverine ecosystems (Gresh *et al.* 2000).

Reduction of MDN in watersheds is a consequence of the past century of decline in salmon abundance (Gresh *et al.* 2000). Evidence of the role of MDN and energy in ecosystems suggests this deficit may result in an ecosystem failure contributing to the downward spiral of salmonid abundance (Bilby *et al.* 1996). The loss of this nutrient source may perpetuate salmonid declines in an increasing synergistic fashion.

2.2.2.9 Disease and Predation

Infectious disease is one of many factors that can influence adult and juvenile steelhead survival. Specific diseases such as bacterial kidney disease, Ceratomyxosis, Columnaris, Furunculosis, infectious hematopoietic necrosis, redmouth and black spot disease, Erythrocytic Inclusion Body Syndrome, and whirling disease among others are present and are known to affect steelhead and salmon. Very little current or historical information exists to quantify changes in infection levels and mortality rates attributable to these diseases for steelhead. Warm water temperatures, in some cases can contribute to the spread of infectious diseases. However, studies have shown that native fish tend to be less susceptible to pathogens than hatchery cultured and reared fish (Buchanan *et al.* 1983).

Introductions of non-native aquatic species (including fishes and amphibians) and habitat modifications (*e.g.*, reservoirs, altered flow regimes, *etc.*) have resulted in increased predator populations in numerous river systems, thereby increasing the level of predation experienced by native salmonids (Busby *et al.* 1996). Non-native species, particularly fishes and amphibians such as large and smallmouth basses and bullfrogs have been introduced and spread widely. These species can prey upon rearing juvenile steelhead (and their conspecific resident forms), compete for living space, cover, and food, and act as vectors for non-native diseases. Artificially induced summer low-flow conditions may also benefit non-native species, exacerbate spread of diseases, and permit increased avian predation.

In previous status reviews for this species, NMFS did not conclude that disease and predation were significant factors responsible for the decline of steelhead in this DPS. However, small populations of steelhead such as those found in the S-CCC steelhead DPS may be more vulnerable to the effects of disease and/or predation particularly in combination with the synergistic effects of other threats.

In addition, the effects of disease or predation may be heightened under conditions of periodic low flows or high temperatures which are characteristic of watersheds in this DPS.

2.2.2.10 Global Climate Change

Another factor affecting the rangewide status of S-CCC steelhead and their critical habitat at large is climate change. Impacts from global climate change are already occurring in California. For example, average annual air temperatures, heat extremes, and sea level have all increased in California over the last century (Kadir *et al.* 2013). Snow melt from the Sierra Nevada has declined (Kadir *et al.* 2013). However, total annual precipitation amounts have shown no discernible change (Kadir *et al.* 2013). S-CCC steelhead may have already experienced some detrimental impacts from climate change. NMFS believes the impacts on listed salmonids to date are likely fairly minor because natural, and local, climate factors likely still drive most of the climatic conditions steelhead experience, and many of these factors have much less influence on steelhead abundance and distribution than human disturbance across the landscape. In addition, S-CCC steelhead are not dependent on snowmelt driven streams and thus not directly affected by declining snow packs.

The threat to S-CCC steelhead from global climate change will increase in the future. Modeling of climate change impacts in California suggests that average summer air temperatures are expected to continue to increase (Lindley *et al.* 2007; Moser *et al.* 2012). Heat waves are expected to occur more often, and heat wave temperatures are likely to be higher (Hayhoe *et al.* 2004; Moser *et al.* 2012; Kadir *et al.* 2013). Total precipitation in California may decline; critically dry years may increase (Lindley *et al.* 2007; Schneider 2007; Moser *et al.* 2012). Wildfires are expected to increase in frequency and magnitude (Westerling *et al.* 2011; Moser *et al.* 2012). Many of these changes are likely to further degrade S-CCC habitat by, for example, reducing streamflows during the summer and raising summer water temperatures. Estuaries may also experience changes detrimental to salmonids. Estuarine productivity is likely to change based on changes in freshwater flows, nutrient cycling, and sediment amounts (Scavia *et al.* 2002; Ruggiero *et al.* 2010). In marine environments, ecosystems and habitats important to juvenile and adult salmonids are likely to experience changes in temperatures, circulation, water chemistry, and food supplies (Feely 2004; Brewer and Barry 2008; Osgood 2008; Turley 2008; Abdul-Aziz *et al.* 2011; Doney *et al.* 2012).

The projections described above are for the mid to late 21st Century. In shorter time frames, climate conditions not caused by the human addition of carbon dioxide to the atmosphere are more likely to predominate (Cox and Stephenson 2007; Santer *et al.* 2011).

2.3 Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area for the project includes all areas where improvements, staging, and construction access are to occur, including all of the facility (latitude: 36.443508, longitude: 121.715974), about 1 mile downstream of the former San Clemente Dam location. It includes the Carmel River at the facility and 100 foot upstream and downstream of that location.

2.4 Environmental Baseline

The "environmental baseline" includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

The Carmel River is a central California coastal river that drains approximately 255 square miles of watershed to the Pacific Ocean. Past and present land use within the watershed is generally comprised of open space, grazing lands, viticulture, golf courses, and residential, suburban, urban, and light industrial developments (Carmel River Watershed Conservancy 2004). There are significant human impacts in the basin, including the over appropriation of surface and groundwater, urbanization, an expansive road network, operation of the Los Padres Dam, mechanical sandbar breaching, and grazing and agriculture practices that cumulatively result in a degradation of habitat quality throughout the Carmel River system (Smith *et al.* 2004). Beneficial effects include the recent removal of San Clemente Dam, with the associated rerouting and restoration of instream and riparian habitat in that reach.

2.4.1 Status of Listed Species in the Carmel River

The Carmel River population of S-CCC steelhead is considered a very important population within the DPS, as it likely provides dispersal to the smaller coastal populations. For a description of the DPS and its status see Section 2.2.1.2. While the coastal populations are in better condition than the populations in the larger interior rivers (like the Salinas River), the smaller coastal Big Sur Biogeographic Population Group populations are not currently considered viable by NMFS and may not be able to persist without straying from the Carmel River population (NMFS 2013). Therefore, the Carmel River steelhead run was identified as a Core 1 (*i.e.*, highest priority) population within NMFS' S-CCC DPS recovery plan and is targeted by NMFS for increased conservation and recovery efforts (NMFS 2013).

Adult migration in the Carmel typically occurs January through May, with the majority of spawning occurring between February and March although spawning may occur from December to April. Smolts typically migrate downstream in the spring with peaks in April and May. Smolt migration increases with river freshets, but may move downstream during all months of the year. Kelts also migrate downstream from February through mid-April.

Based upon steelhead adult migration counts at the former San Clemente Dam and Los Padres Dam[4], steelhead in this watershed have undergone a steady decline. According to CDFW, the annual steelhead run prior to the construction of the dams was as much as 8,000 adults (Becker *et al.* 2008). Records of adult steelhead at the Los Padres ladder fish trap from 1949 to 2016 ranged from 558 in 1962 to 0 in multiple recent years (2014-2016), with a historical average of 90 for the

[4] San Clemente Dam was built at RM 18.6 in 1921, and Los Padres Dam was constructed 28 years later at RM 24.8 in 1949. Los Padres Dam is a 148- foot-high earth-filled dam on the Carmel River with an embankment crest elevation of 1,058 feet. The spillway is an Ogee crest (weir) with a crest elevation of 1039.85 feet. San Clemente Dam was removed in 2015 (MPWMD 2016).

years in which counts were made.[5] Using observations from local field personnel, CDFW estimated the annual steelhead spawning population in the mainstem Carmel River to be about 1,650 fish in 1965 (Titus *et al.* 2009). More recent data suggests the historical population in the Carmel River prior to the construction of the dams was a run size somewhere between 1,500 – 8,000 adults annually (Becker *et al.* 2010). More recently the average of adults that have returned since 1997 has been on average 118 steelhead.[6] In the drought years of 1976 -1977, 1988-1990, and 2014-2016 no adult steelhead were captured in the Los Padres ladder trap. In addition, during the 3-year period from 1988 to 1990 and in 2014, the river never breached the sandbar at the mouth, making the river inaccessible to and from the ocean, thus no fish, including migrating steelhead, entered or left the river. Between Los Padres Dam and San Clemente Dam, a comparison of returns before and after 1980 indicates the adult return to this portion of the basin has not recovered to levels that were common to the Carmel River population prior to the 1976-1977 drought (MPWMD 2004).

The failure of steelhead numbers to return to levels seen before the 1976-1977 drought is likely due to the degradation of habitat in the Carmel River resulting from dams, water withdrawals and groundwater pumping. A major impact from the 1976-1977 drought was the substantial increase in groundwater pumping which resulted in a heavy mortality of the riparian vegetation downstream of San Clemente Dam. Large sycamores and willows died throughout the river and floodplain area and then subsequent storms unraveled the river banks. Nehlsen *et al.* (1991) concluded the Carmel River steelhead stock was at a high risk of extinction. The population decline of steelhead in the Carmel River is, to some extent, the result of partial barriers to historic spawning and rearing habitat upstream of Los Padres Dam, the former San Clemente Dam, and the former Old Carmel River Dam[7] , flow reductions from water diversion, and habitat fragmentation and degradation (MPWMD 2004; Titus *et al.* 2009). Additionally, summertime pumping from wells for water supply throughout the river downstream of the former San Clemente Dam removes a significant amount of water from the river when steelhead migrate, as it affects the amount of water required to recharge the aquifers, before surface flow would begin to move in the river. The reduced river flow presents additional impediments to migration due to seasonal river drying between the Narrows (RM 9.5) and the Pacific Ocean. Thus, migration opportunities for steelhead in the Carmel River have been reduced because higher winter and early spring flows needed for migration are curtailed by water withdrawals, storage and groundwater pumping.

Steelhead abundance in the Carmel River has been consistently trending downwards in recent history (Figure 1). In 2004, the district reported that the number of returning adults had rebounded from the drought years of the early 1990's and appeared to have stabilized in the range of 400 to 800 fish (MPWMD 2004). However, as described above, adult steelhead returns at the San Clemente Dam fish ladder fluctuated considerably since 1965. Adult steelhead counts[8] at San Clemente and Los Padres ladders since S-CCC were listed in 1997 are represented in Figure 1. During this timeframe there was an overall downward trend in steelhead adult numbers, although in

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[5]http://www.mpwmd.net/environmental-stewardship/carmel-river-steelhead-resources/los-padres-dam-fish-counts/historic-counts/

[6]http://www.mpwmd.net/environmental-stewardship/carmel-river-steelhead-resources/los-padres-dam-fish-counts/historic-counts/

[7] The Old Carmel River Dam was located at RM 18.3 until it was removed in 2016.

[8] The counts from San Clemente Dam and Los Padres Dam are partial counts and do not represent the entire population of adult steelhead that have migrated into the Carmel River. Spawning occurs in the tributaries and in the mainstem downstream of the dams

some years abundance did increase (Figure 1). Redd surveys below the former San Clemente Dam indicate spawning habitat has improved over the last 20 years and adults are now spawning more frequently below the former San Clemente Dam, instead of migrating into the upper watershed (MPWMD 2016). The district (2016) postulates that the variability of adult steelhead counts are likely the result of a recent severe 5-year drought; variable lagoon conditions, artificial manipulation of the sandbar and/or very low flows in the winter of 2014. In addition, adverse ocean conditions and low densities of juvenile steelhead in 2004, 2007, and between 2009 and 2011 are affecting subsequent adult cohorts. Improved spawning conditions in the lower Carmel River, may encourage fish to spawn before they reach the former fish counter at San Clemente Dam or the current fish counter at Los Padres Dam, thus, lowering the recorded count (but not the actual number of spawning adult fish). Steelhead also spawn in the tributaries of the Carmel River, but tributary redd surveys are limited.

In 2017, there was a slight increase in the number of steelhead observed at the Los Padres Dam fish counter from 0 to 7. Similar to previous post-drought years, we expect steelhead numbers will begin to rebound. However, we expect numbers in the immediate future to remain well below what would be considered "recovered". With the removal of San Clemente Dam, it is much easier for steelhead to access the high quality spawning. The greater accessibility to this habitat will aid in the recovery of steelhead in this watershed.

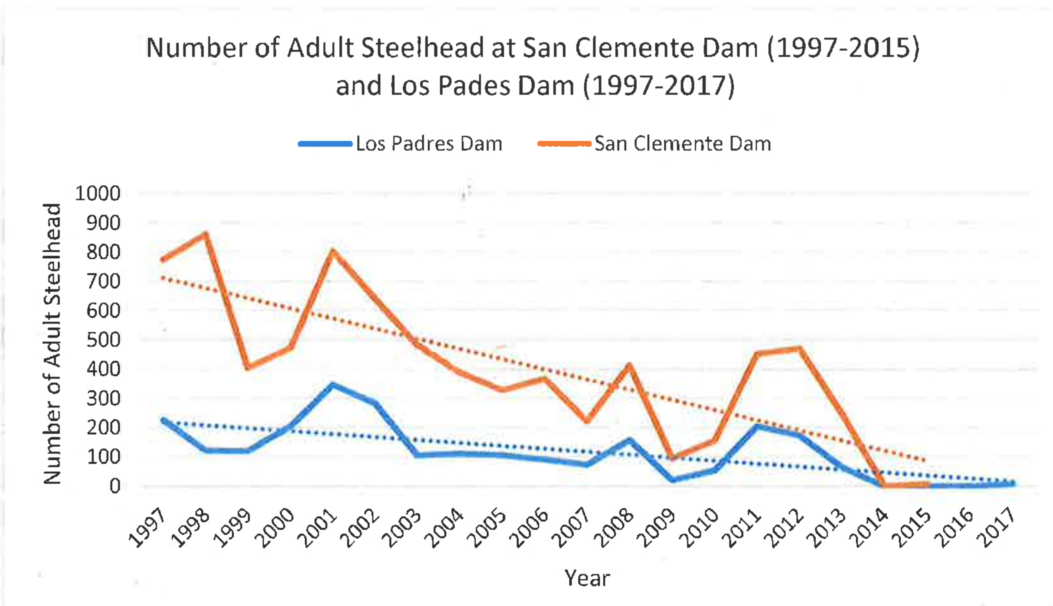

Figure 1: San Clemente and Los Padres Dams steelhead counts from 2000-2015. Source: MPWMD 2016.

2.4.2 Project Setting

The facility is situated in unincorporated Monterey County at approximately river mile 17.5 (measured from the Pacific Ocean) on the west bank of the Carmel River (latitude: 36.443508, longitude: 121.715974), about 1 mile downstream of the former San Clemente Dam location.

The facility is in an isolated area of the county, more than 0.5 mile away from the nearest residences and public roadways. Areas immediately surrounding the facility are undeveloped, except for the access roadway.

Under the district's Mitigation Program, the facility was constructed in 1996 to hold and rear juvenile steelhead, which are rescued from the Carmel River mainstem during the summer months (July through October) when the lower reaches of the river becomes dry. The facility occupies a broad floodplain terrace bench above the river at 401 feet above sea level, covering approximately 7 ac. The facility features cover approximately 9,300 sf of land, including 480 sf for the storage/office building, 2,400 sf for rearing pools, and 6,400 sf for a rearing channel. A mature canopy of coast live oak (*Quercus agrifolia*), several large California sycamores (*Platanus racemosa*), and other riparian trees shade the site, along with local topography (*i.e.*, adjacent hillsides). A broad floodplain exists between the facility buildings and the river. Streamflow at the site is perennial, and is augmented during the dry months by releases from Los Padres Reservoir. Although there have been some difficulties encountered with early operations of the facility, significant upgrades and modifications have occurred over the past several years to the facility to improve operations. NMFS is currently reviewing the district's 5-year Rescue and Rearing Management Plan for the facility and their ESA section 10(a)(1) enhancement permit application.

2.4.3 Existing Facility Components and Operations

The biological program for the facility involves rescuing steelhead in drying portions of the river annually from May through October. Steelhead are reared at the facility until December or January, after which they are collected, transported downstream, and released back into the river. The timing for releasing steelhead back into the river is dictated by river flows. They are released once high flows have been established for 2 to 4 weeks. February is the latest month that steelhead have been released back to the river. The long-term annual average number of steelhead rescued and brought to the facility is 17,000; however, the number of fish brought to and reared at the facility annually is highly variable, with a high of 50,000 and a low of 2,000 (MPWMD 2016). More than 200,000 steelhead have been placed in the facility since operations began (MPWMD 2016).

The primary steelhead rearing capacity is provided by its 800-foot long natural rearing channel. The channel has 17 pairings of 6-foot-wide riffle (rocky or shallow areas) and 9-foot-diameter pool sections. The approximate gross volume of the channel is 14,900 cubic feet; however, the channel is filled with cobble in almost all riffle sections, significantly reducing the volume of water available for fish rearing. The volume of water available for fish rearing is estimated to be approximately 4,000 cubic feet (30,000 gallons). The facility also includes two large holding tanks (22 and 30 feet-in-diameter), eight insulated fiberglass rearing troughs, and six 8-foot-in-diameter quarantine/holding tanks. These tanks are used for initial quarantine and sorting larger-sized fish for stocking into the mixed-sized population in the natural rearing channel, while smaller fish are held in the troughs and tanks.

Water for the facility is supplied from a screened freshwater intake located in the river, approximately 250 feet from the facility. An existing wet well and intake pumps were designed to deliver up to 900 gallons per minute (gpm) of water to the facility via a 6-inch-diameter buried PVC pipe. A portable irrigation pump provides an auxiliary backup water supply of 500 gpm for use in emergency situations. The intake pumps deliver water to the top of a cooling tower before water is distributed to the rearing channel and tanks. The existing intake screen's design is a non-active horizontal "Tee" screen made of 3/32-inch wedge wire. Because the screen is not self-cleaning, buildup of silt, leaf debris, and algae on the screen has resulted in significant maintenance requirements. The screen is located at an elevation that does not allow operation at flows below approximately 2 cfs. Due to a lack of adequate upstream surface storage at Los Padres Reservoir, evapotranspiration, and surface water diversions between Los Padres Dam and the facility, surface flow at the intake screen during critically dry periods may be reduced to less than 1 cfs. Additionally, the existing intake screen becomes inaccessible for maintenance needs as flows increase in early winter.

The facility currently has two 30 horsepower (hp) river intake pumps, each sized to deliver 900 gpm at 85 feet total dynamic head, but which are currently delivering about 825 gpm. In the past, problems have occurred when river sediment fouled the mechanical seals in the river pumps. The existing river pump station housing structure is also undersized for two large pumps and is in a flood prone area. The structure is inundated at a flow of about 1,000 cfs, which is slightly lower than that of the ordinary high water. At flow levels of about 1,000 cfs, the river pump housing is underwater, and while it can still operate, maintenance cannot be performed if it is needed. Furthermore, the back-up river pump cannot operate while the other river pump is being serviced. An emergency portable pump must be removed at flows greater than about 500 cfs such that it is not swept away.

With the removal of San Clemente Dam 2015, the existing intake screen is more vulnerable to inundation by sand and fine sediment. In the past, there has occasionally been a need for sand separation downstream of the river pumps to minimize the buildup of sand and fine sediment in the cooling tower and rearing systems. These conditions have been exacerbated by the increase in the amount of fine sediment in the Carmel River after removal of San Clemente Dam, which previously prevented all bedload from moving downstream. The current system for separating sand from river water consists of a centrifugal-action mechanical sand separator manufactured by LAKOS that is capable of up to 90% sand removal efficiency at a maximum capacity of 525 gpm. The sand separator works less efficiently with finer sands and sediment and will not filter suspended sediment. When the separator is operating, it requires that the river pumps operate at a higher discharge pressure, making them less efficient and requiring them to use more power for the amount of water being pumped. The sand separator is located next to the cooling tower and requires purging the separated sand into a drain pipe that discharges it back into the floodplain.
Water is cooled in a cooling tower prior to use within the facility. The design goals are to keep maximum daily water temperature below 65°F and maintain mean daily water temperatures below 60°F.

Due to the limitations with the existing intake system, and conditions in the river, the facility was unable to operate in 2014 and 2015 but did operate in 2016. The intake system cannot operate when bedload and suspended sediment levels are too high or when river flows are too low. Factors that contribute to this deficiency include difficulty accessing the water supply intake pump and in-stream intake screen for maintenance (especially during high flows or during the fall when large amounts of organic matter pass the intake); high sediment loads during storm events; and recent low flow conditions in the Carmel River. At the other extreme, the dynamic and fast changing nature of the watershed can cause the river to rise within a few days to a level that prevents access to the pump intake and screen. In either case, to prevent steelhead mortality due to pump failure, MPWMD has occasionally had to release steelhead back into the river at suboptimal times.

2.4.4 Steelhead Rescues

In most years, the Mitigation Program significantly reduces losses of juvenile steelhead residing in the approximately up to 7.5 miles of the river channel between the upper end of the Lagoon below Highway 1 (RM 1.1) and Robinson Canyon Road (RM 8.5). Additionally, up to 1.5 miles of habitat in the reach between Boronda Road (RM 12.69) and Esquiline Road (RM 14.45) can be dewatered in drier water year types. Historically (1989 to 2015), the Mitigation Program has rescued a cumulative total of 426,154 steelhead juveniles with an average of 15,783 juveniles per year (MPWMD 2016). Since 2009[9], juvenile rescues occurred for an average of 6.3 miles in the lower Carmel River (Table 2) (MPWMD 2010; 2011; 2012; 2013; 2014; 2015; 2016). Of those years, there was a mix of critically dry (2014), dry (2012, 2013, 2015), normal (2009) and above normal (2010, 2011) water years with the natural hydrology contributing to some of this dry-back. Since 2009, the number of juvenile *O. mykiss* rescued per year ranged from 707 to 49,806 fish (Table 2) (MPWMD 2010; 2011; 2012; 2013; 2014; 2015; 2016). To date, observations of river habitats immediately following the completion of juvenile rescues indicate the district successfully rescues 82 to 99 percent of juveniles.

Table 2. Number of juvenile steelhead rescued in mainstem Carmel River. (MPWMD 2010; 2011; 2012; 2013; 2014; 2015; 2016).

Rescue Year (water year type)	River Miles of Rescues	Total # of Juvenile Steelhead Rescued (includes mortalities during rescues)	Total #of Smolts Rescued	Total # of Kelt Steelhead Rescued During the Summer Dryback Season
2009 (normal)	6.7	13,477	0	0
2010 (above normal)	2.7	3,858	0	0
2011 (above normal)	2.2	1,751	0	0
2012 (dry)	6.2	8,159	102	0
2013 (dry)	8.5	49,806	1,060	0
2014 (critically dry)	7.7	4,043	58	0
2015 (dry)	10.0	707	0	1
Average	**6.3**	**11,686**	**174**	**0**

[9] 2009 is used as opposed to 1989 since this represents the year in which CAW water operations were reduced from historical levels.

During a drought or sequential dry and critically-dry years, when streamflow is too low for adult and smolt migrations, the district monitors streamflow, captures smolts and adults, and transports them to the lagoon or ocean. Limited data is available on the number of smolts rescued prior to 2009. Since 2009, smolts only needed to be rescued during drought years 2012-2014 with an average of 174 smolts rescued during those three years (Table 2). This is because during these years the dry-back began before the end of the smolt outmigration window of February through May.

The district has not conducted comprehensive surveys of habitats after rescues to enumerate the number of non-rescued juveniles, but they have conducted spot-checks of sites after rescues to attempt to estimate their rescue efficiency rate. They estimate 82 to 99 percent of juvenile fish are likely rescued.

2.4.5 Status of Critical Habitat in the Carmel River

The ecological effects of large dams on river systems have been well documented (Baxter 1977; Petts 1984; Yeager 1993; Drinkwater and Frank 1994; Ligon *et al.* 1995; Shuman 1995; Ward and Stanford 1995; Kondolf 1997; Graf 1999; Collier *et al.* 2000; World Commission on Dams 2000; Bednarek 2001; Duda *et al.* 2008; Kloehn *et al.* 2008; Pess *et al.* 2008). The consequences are numerous and varied, and can include both direct and indirect impacts to the entire river ecosystem. Dams are known to disrupt the natural flow regime of a river, changing it from a free-flowing system to a blocked one that affects both the river's physical and biological characteristics. Dams are also known to alter sediment releases and transport. The trapped sediments are critical for maintaining physical processes and habitats downstream of the dam, including the maintenance of productive instream habitat, barrier beaches/islands, floodplains, and coastal wetlands. These same negative effects from dam presence are evident in the Carmel River system.

Trapped sediments in the Los Padres Reservoir and the former San Clemente Reservoir have been prevented from replenishing the downstream river ecosystem, which created several major ecological changes detrimental to S-CCC steelhead. When a river is deprived of its sediment load, the downstream river bed and banks are eroded, which leads to river channel incision or deepening of the river. This erosion leads to steeper, less stable banks at higher risk for erosion and failure. Risk of bank failure is further exacerbated from channel incision, as it exposes the root structures of riparian and wetland plants, subjecting them to scour and erosion. The damage caused by this erosion can extend for substantial distances below a dam. In general, stream bank erosion is a natural process that often results in the formation of productive floodplains, high quality instream habitat, and alluvial terraces of many river systems. Rivers and streams are products of their catchments, and are dynamic systems in a constant state of change. The factors controlling river and stream formation are complex and interrelated, and include the amount and rate of supply of water and sediment into stream systems, catchment geology, and the type and extent of vegetation in the catchment. As these factors change over time, river systems respond by altering their shape, form and/or location, therefore, even stable river systems have some eroding banks. However, the rate at which erosion is occurring in stable systems is generally much slower and of a smaller scale than that which occurs in unstable systems. In disturbed or altered systems this process can be accelerated, leading to unstable conditions.

The inherent dynamic nature of an unaltered river system can support a wide diversity of species. These species have evolved phases of their life stages to adapt and coincide with a river's variability. Thus, when this natural variability is disrupted by altered or blocked flow associated with dams, the biological response can be decreased species richness (*e.g.*, diversity and abundance) of aquatic organisms. The annual biological assessments conducted by the district indicate that the benthic macroinvertebrate indices (BMI) of the river below the reservoir show a decreased BMI compared to less disturbed reference reaches (MPWMD 2010). Benthic macroinvertebrates are a key food source for juvenile steelhead. Instream sediment particle size, water quality, and flow regime are key factors in controlling the distribution and abundance of benthic invertebrates. The district conducted a 10-year bioassessment program to determine the values and constraints of benthic invertebrate production in the river. This program determined that BMI values in reaches downstream of Los Padres Dam were consistently lower with some improvement in BMI as the distance downstream of the reservoir increased (King 2010). The reason for this decline may be attributed to the lack of fine substrates, changes in water quality due to impoundment, and changes in flow regime associated with the reservoir. This reservoir effect was found to be much greater than other effects associated with urban development along the lower Carmel River (King 2010).

Riverbed incision can also lower groundwater tables, making it difficult for riparian plant roots to access water as well as drawing water from wells for human use. These problems have been observed and documented throughout the Carmel River downstream of the former San Clemente Dam, and are detailed further in the following section. The Carmel River is incised throughout the lower reaches extending below RM 18.6, the location of the former San Clemente Dam. The system is known to be deprived of river sediment, and instream habitat complexity is missing in many of the reaches.

2.4.5.1 Climate Change and the Carmel River

The long-term effects of climate change have been presented in Section 2.2.2.10; Global Climate Change. These include temperature and precipitation changes that may affect steelhead and critical habitat by changing water quality, streamflow levels, and steelhead migration in the action area.

The threat to S-CCC steelhead in the Carmel River from climate change is likely going to mirror what is expected for the rest of Central California. NMFS expects that average summer air temperatures in Carmel would continue to increase, heat waves would become more extreme, and droughts and wildfire would occur more often (Hayhoe *et al.* 2004; Lindley *et al.* 2007; Schneider 2007; Westerling *et al.* 2011; Moser *et al.* 2012; Kadir *et al.* 2013). Many of these changes are likely to further degrade S-CCC habitat in the Carmel River throughout the action area by, for example, reducing streamflow during the summer and raising summer water temperatures.

2.4.6 <u>Previous Section 7 Consultations and Section 10 Permits in the Action Area</u>

There are no previous section 7 consultations in the action area. The facility has a draft section 10(a)(1) permit that is under review. The district has applied for a Section 10(a)(1)(A) Enhancement Permit to conduct steelhead enhancement operations at the facility and in the Carmel River. As part of the permit application package, the district submitted a Rescue and Rearing Management Plan (RRMP) to NMFS. NMFS has reviewed the RRMP and determined it to be complete on February 2, 2018. The authorization provided by the Section 10(a)(1)(A) Enhancement Permit would exempt the district from certain prohibitions of ESA section 9. In particular, the district would be authorized to rescue and either translocate or rear juvenile steelhead that would otherwise die because of river dryback during the dry season. The district's rescue, translocation and rearing activities would be conducted as outlined in the RRMP.

2.5 Effects of the Action

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

2.5.1 Dewatering

Cofferdams with sand bags or other barriers and a pipeline bypass system would be used to temporarily divert flows around the work site. Temporary dewatering would occur over a total area of up to 2,095 sf/0.048 ac within the channel bed and banks.

Installation of the cofferdam and bypass pipe system for dewatering the work site will likely result in temporary changes to instream flow within and downstream of the construction site. These fluctuations in flow are anticipated to be small, gradual, and short-term. Once the actual dewatering operation is completed, stream flow above and below the work site should be the same as free-flowing pre-project conditions except within the dewatered reach where stream flow is bypassed. Stream flow diversion and project work area dewatering are expected to cause temporary loss, alteration, and reduction of aquatic habitat. Stream flow diversions could harm individual rearing juvenile steelhead by concentrating or stranding them in residual wetted areas before they are relocated. Rearing steelhead could be killed or injured if crushed during construction of the water bypass system; however, fish relocation efforts are expected to remove the majority of fish in the area and direct mortality is expected to be minimal. Juvenile steelhead that avoid capture in the project work area will likely be killed due to desiccation or thermal stress. Due to the pre-dewatering fish relocation efforts to be performed by qualified biologists, NMFS expects that the number of juvenile steelhead that will be killed as a result of stranding during dewatering activities will be less than one percent of the fish within the action area prior to dewatering. See take estimate in the Fish Collection and Relocation section below.

Benthic (bottom dwelling) aquatic macroinvertebrates within the project site may be killed or their abundance reduced when stream habitat is dewatered (Cushman 1985). However, effects to aquatic macroinvertebrates resulting from stream flow diversion and dewatering will be temporary because construction activities will be relatively short-lived (about two months) and the dewatered reach would be small (up to 2,095 sf/0.048 ac). Recolonization of disturbed areas by macroinvertebrates is expected following rewatering and typically occurs within two months (Cushman 1985; Thomas 1985; Harvey 1986). In addition, the effect of macroinvertebrate loss on juvenile salmonids is likely to be negligible because food from upstream sources (via drift) would be available downstream of the dewatered areas since stream flow, if present, will be bypassed around the project work site. Food sources derived from the riparian zone will not be affected by dewatering.

2.5.2 Fish Collection and Relocation

Prior to and during the dewatering of the work site, qualified fisheries biologists would collect fish and relocate them from work areas to avoid fish stranding and exposure to construction activities. Only juvenile steelhead are likely to be present at the work site during the June 15 through October 15 construction period. As described above in section 2.4.1 Status of Listed Species in the Carmel River, steelhead adults and smolts are present during the winter and spring months, and no active migration occurs during the June 15 through October 15 construction window. Due to the timing of the instream construction activities, no adult steelhead or steelhead smolts will be adversely affected by dewatering and fish collection.

Juvenile steelhead and other species will be captured by electrofishing or seine. Collected fish will be relocated away from the work site to areas upstream or downstream of the dewatered reach. A qualified biologist will be on-site to conduct fish collections in a manner which minimizes potential risks to steelhead.

Fish relocation activities pose a risk of injury or mortality to rearing juvenile salmonids. Any fish collecting gear, whether passive (Hubert 1996) or active (Hayes *et al.* 1996) has some associated risk to fish, including stress, disease transmission, injury, or death. The amount of unintentional injury and mortality attributable to fish capture varies widely, depending on the method used, the ambient conditions, and the expertise and experience of the field crew. Since fish relocation activities will be conducted by qualified fisheries biologists following NMFS electrofishing guidelines (NMFS 2000), direct effects to, and mortality of juvenile salmonids during capture and relocation will be minimized.

Based on information from other relocation efforts that used similar methods and occurred in similar types of aquatic habitat, NMFS estimates injury and mortalities will be less than three percent of those steelhead that are relocated. Data on steelhead relocation efforts between 2002 and 2009 show most mortality rates are below 3 percent for steelhead (Collins 2004; CDFG 2005; 2006; 2007; 2008; 2009; 2010). The September 2017 juvenile population survey showed 0.25 steelhead per foot of river at the site (Personal Communication, Katie Chamberlin, November 6, 2017). With approximately 150 feet of dewatered river, 40 steelhead could need to be rescued and relocated. If injury and mortality rates reach maximum levels, 2 juvenile steelhead are expected to be killed as a result of injury or mortality during relocation efforts, and 1 steelhead is expected to be stranded and die.

Although sites selected for relocating fish should have similar water temperature as the capture sites and should have ample habitat, in some instances relocated fish may endure short-term stress from crowding at the relocation sites. Relocated fish may also have to compete with other fish causing increased competition for available resources such as food and habitat. Frequent responses to crowding by steelhead include emigration and reduced growth rates (Keeley 2001). Some of the fish released at the relocation sites may choose not to remain in these areas and move either upstream or downstream to areas that have more vacant habitat and a lower density of steelhead. As each fish moves, competition remains either localized to a small area or quickly diminishes as fish disperse. NMFS cannot accurately estimate the number of fish affected by competition, but does not believe this impact will adversely affect the survival chances of individual steelhead, or cascade through the watershed population of these species based on the small area that will likely be affected and the small number of steelhead likely to be relocated. Sufficient habitat appears to be available within the Carmel River watershed to sustain fish relocated without crowding other juvenile steelhead, and NMFS expects these fish will be able to find food and cover upstream or downstream of project reaches as needed during construction.

2.5.3 Increases in Sedimentation and Turbidity

Instream and near-stream construction will result in sediment entering the stream. These activities will result in short-term increases in turbidity from disturbance of the streambed and banks, equipment access, and rewatering the work site that was dewatered for construction purposes.

Sediment may affect fish and critical habitat by a variety of mechanisms. High concentrations of suspended sediment disrupt normal feeding behavior and efficiency (Cordone and Kelley 1961; Bjornn *et al.* 1977; Berg and Northcote 1985; Bjornn 1991), reduce growth rates (Crouse *et al.* 1981), and increase plasma cortisol levels (Servizi and Martens 1992). High turbidity concentrations reduce dissolved oxygen in the water column, result in reduced respiratory functions, reduce tolerance to diseases, and also can cause mortality (Sigler *et al.* 1984; Berg and Northcote 1985; Gregory and Northcote 1993; Velagic 1995; Waters 1995). Even small pulses of turbid water will cause salmonids to disperse from established territories (Waters 1995), which can displace fish into less suitable habitat and/or increase competition and predation, decreasing chances of survival. Increased sediment deposition can fill pools and reduce the amount of cover available to fish, decreasing the survival of juveniles (Alexander and Hansen 1986).

Much of the research discussed in the previous paragraph focused on turbidity levels higher than those anticipated to occur from construction. The avoidance and minimization measures will prevent erosion and minimize the amount of sediment entering the stream. Instream and near stream construction activities would occur during the dry season (June 15 - October 15). Heavy equipment would work from the top of bank or from a dry stream bed. Erosion and pollution control measures would be utilized to contain loose sediment and contaminants. Post-construction, disturbed areas would be stabilized with geotextile fabric and/or vegetative plantings, as appropriate. These measures are expected to minimize the discharge of sediment during construction and any increases in turbidity would most likely occur following the first storm events, as flows could mobilize any recently disturbed sediment that remained. We expect turbidity effects to fall below the threshold necessary to injure or kill fish or degrade critical habitat. Instead the most likely result of turbidity levels from construction will be behavioral responses (*e.g.*, avoidance and relocation) that are not expected to appreciably result in the reduced fitness of individual fish.

2.5.4 Toxins from Heavy Machinery

Construction in and adjacent to the stream can involve the use of heavy machinery in close proximity to the channel or in the dry channel bed. The use of heavy machinery in the stream creates the potential for toxic materials associated with mechanical equipment, such as fuels, motor oils, and antifreeze to enter the stream or channel. Oils and similar substances from construction equipment can contain a wide variety of polynuclear aromatic hydrocarbons (PAHs), and metals. Both can result in adverse impacts to salmonids and their critical habitat. PAHs can alter salmonid egg hatching rates and reduce egg survival as well as harm the benthic organisms that are a salmonid food source (Eisler 2000). Some of the effects that metals can have on salmonids are: immobilization and impaired locomotion, reduced growth, reduced reproduction, genetic damage, tumors and lesions, developmental abnormalities, behavior changes (avoidance), and impairment of olfactory and brain functions (Eisler 2000).

The implementation of avoidance and minimization measures would reduce the chances of toxins entering streams. Specifically, instream construction would be limited to the dry season (June 15 - October 15) and heavy equipment would only be operated in a dry or dewatered stream bed and remain at the top of the bank, if feasible. Pollution control measures, such as keeping spill containment and remediation material nearby and refueling and servicing vehicles outside of the stream bed would also be implemented at the work site. Due to these measures, NMFS expects that accidents will be minimized during construction. However, even with the appropriate measures in place some residual toxins from equipment could be deposited in work sites via small leaks and enter the stream. The amount of toxins entering the stream from the work site would be very small and, depending on the chemical, would either be, 1) flushed from the area over a short period of time after re-watering of work sites or after the first subsequent rain, or 2) attach to sediments in the creek bed. These sediments may be flushed by subsequent winter storms, depending on particle size. Some toxins will also separate from sediments during high flows and be flushed from the site. This will prevent degradation of critical habitat and minimize steelhead exposure to these toxins to the extent that their fitness will not be affected.

2.5.5 Modification of Stream Banks and Channel Beds

Construction may involve the modification of the stream bank and channel bed which may alter the condition of the bed and bank in a manner that reduces critical habitat values for steelhead and other aquatic species. The project includes placement of fill over an area of 1,520 sf (0.035 ac) below the ordinary high water mark, which would affect aquatic and riparian habitat suitable for steelhead, including the following:

- 1,000 sf (0.023 acre) from placing riprap in the channel bed to underlay, support, and surround the new intake cone screen and concrete base).
- Approximately 500 sf (0.011 acre) from placing rock riprap at a 2:1 slope for bank protection.
- Placing the new intake screen and concrete base, which would occur over an area of 64 sf (less than 0.002 acre, within the same area as riprap in the channel bed).
- Removing and backfilling the existing pump station, which currently occupies 20 sf of channel bank.
- Removing riparian vegetation incidental to bed and bank excavation.

Although placement of 1,500 sf of rock riprap within the channel bed and bank constitutes a permanent change to existing conditions, this alteration of the Carmel River channel is not anticipated to degrade aquatic steelhead habitat in the long-term or change channel dynamics. Native river rock removed during excavation will be reused and spread over new riprap about 6-inches thick to restore the native bed and bank material and fill voids in the riprap surface. Placing native material on the channel will initially restore a more natural gradation in the river bottom. It is expected that this material may move downstream during high flows, but bedload material contributed from the 80-square-mile watershed above the site will likely re-populate the channel bottom in the project reach.[10] Thus, roughness (or shear stress) in the reach is not likely to change.

Permanent alteration of the streambed over an area of 64 sf (less than 0.002 acre) would also occur from installation of the proposed intake screen and associated concrete base, although these impacts would be partially offset through removal of the existing 30 sf intake screen from the channel bottom, resulting in a net loss of 34 sf (less than 0.001 acre) of streambed. The intake cone screen and concrete base would affect a relatively small amount of cross-sectional flow area (about 23 sf). A 10-year flood event has about 960 sf of flow area, whereas a 100-year flow event has more than 2,000 sf of flow area. At the screen location, the top width of the 10-year flow is estimated at 270 feet and is about 350 feet at the 100-year flow. Hydraulic modeling indicates that obstructing 23 sf of flow area could result in a water surface elevation rise of about 0.08 foot in a 10-year flow (5,700 cfs), and an imperceptible amount of rise in a 100-year flow (12,100 cfs); however, there are no habitable structures that would be affected and changes in water surface elevation would have no impact on any river function. During the 2-year and 5-year return flows, water surface elevation could increase slightly more, to an estimated 0.10 foot; however, at these flows this increase would have no impact. At the dry season low flow level, when flows are expected to be in the range of 4 to 10 cfs, diversion may result in a slight depression of the water surface in the immediate vicinity of the cone screen at the maximum diversion rate of 3 cfs (note that the rearing channel discharges to the pool where the screen is located).

While net loss of 34 sf of streambed would occur from installation of the proposed intake screen and associated concrete base, the pool in the immediate area surrounding the proposed intake location is not suitable for steelhead spawning but may be suitable for fish trying to occupy deep water habitat. It is estimated that the concrete base would reduce pool area by about 2 percent and volume by less than 2 percent (at low flow).

The concrete base to support the screen could influence the transport of sediment and woody debris past the intake. Improvements have been designed to encourage sediment and debris to pass through the channel without collecting at or near the screen. There could be short-term effects from deposition; however, flow velocity at the site during winter flows and the persistence of a large scour pool immediately downstream of the intake indicate that any deposition of material due to installation of the intake screen would be temporary. Average velocity in the channel during a 10-year flow event (5,700 cfs peak) is about 8 feet per second, which is more than adequate to move any material deposited near the screen at low flows. A scour analysis at high flows (100-year event) indicates that bed scour depths could approach 6 feet.

Using hardscape is a common practice to reduce erosion adjacent to streamside infrastructure and facilities. Empirical evidence suggests salmonids are significantly impacted by projects where hardscape replaces vegetation (Michny and Hampton 1984; USFWS 1988; USFWS 2000; Schmetterling *et al.* 2001). Permanent habitat impacts would be minimal, including a very small loss of streambed and pool area habitat (34 sf and 2 percent, respectively) from installation of the

[10] Mussetter Engineering, Inc., estimated that 576 acre-feet of bedload will pass the former San Clemente Dam site over a 41-year period, as modeled with a HEC-6T sediment transport model. A portion of the material transported into the Sleepy Hollow reach will be similar to material washed out of the site. See Chapter 4 – Hydrology in the Final EIR/EIS for the San Clemente Dam Seismic Safety Project (CDWR 2008).

new intake screen and concrete base, and loss of less than 35 sf of channel bank habitat from bank protection. The remainder of the habitat impacts would be temporary; streambed habitat and hydrological conditions would largely revert to existing conditions, and riparian areas would be restored to pre-project conditions through riparian planting. Thus, the amount of hardscape that will result from the project is not anticipated alter critical habitat values or harm steelhead.

2.5.6 Removal of Riparian Vegetation

Bank protection (placement of rock riprap at a gentle 2:1 slope over an area of 500 sf) and removal of the existing pump station (area of 20 sf) would additionally require removal of native riparian vegetation during excavation. Impacts on riparian and aquatic habitat will occur as a result of the temporary and permanent loss of vegetation within these areas. Riparian vegetation provides environmental benefits, including regulating water temperatures and serving as a food resource. As with riprap in the channel bed, riprap placed on slopes would be covered in native material following placement. Material placed on the streambank provides a medium for riparian vegetation to root in and helps retain moisture. It is anticipated that native vegetation would recolonize voids in the bank protection riprap following construction. Similarly, the area of the existing pump station proposed for removal would likely be recolonized with native riparian vegetation. The majority of impacts to streambank and riparian habitat are therefore anticipated to be temporary, including associated indirect impacts to adjacent riverine habitat, such as from loss of shading. Understory vegetation would likely become established soon after construction, although riparian trees may take longer to establish.

Riparian zones play an important role in stream ecosystems by providing shade, sediment storage, nutrient inputs, channel and stream bank stability, habitat diversity, and cover and shelter for fish (Murphy and Meehan 1991). Vegetation along stream banks also functions to trap fine sediments as they are washed toward streams during rainstorms. Small streams are sensitive to loss of riparian habitat and shade, which moderates stream temperatures by insulating the stream from solar radiation and reducing heat exchange with the surrounding air. This function is particularly important for the Carmel River, where summer air temperatures are very high.

The amount of vegetation and tree removal is anticipated to be very small. Impacts to riparian vegetation will be fully compensated by replanting at a ratio of 2:1 for White Alder (with willows) and Black cottonwood at a 1.5:1. A disturbed area that had a mix of native and non-native (weedy) vegetation would be replaced by all native vegetation and thus result in greater than 1:1 replacement of native vegetation. Additionally, existing vegetation will be preserved by limiting the work site to the smallest possible area required to safely and efficiently complete the work. The area is located in an area that stays shaded for the majority of the day and there is riparian vegetation located along the banks downstream of the project area. So the temporary loss of vegetation is not anticipated to result in elevated stream temperatures. The project site will also be stabilized by erosion control material following construction to prevent excess sediment from entering the stream. Nonetheless, there may be a minor reduction in habitat diversity, shelter, nutrient inputs, and sediment storage in areas that are temporarily denuded and permanently hardened. However, because vegetation will be replanted and hardened areas will be small in size, the stressors described above will be so minor that fish, even if exposed, are not expected to respond. Similarly, impacts on critical habitat would be insignificant.

2.6 Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Some continuing non-Federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline *vs.* cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 2.4).

There are no cumulative effects in the action area.

2.7 Integration and Synthesis

The Integration and Synthesis section is the final step in our assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action (Section 2.5) to the environmental baseline (Section 2.4), taking into account the status of the species and critical habitat (Section 2.2), to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) Reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminishes the value of designated or proposed critical habitat for the conservation of the species.

Threatened S-CCC steelhead occur in Carmel River and are expected to be present within the 150-foot long dewatered area. The Carmel River S-CCC steelhead are a Core 1 population (NMFS 2013). Although steelhead are present in most streams in the S-CCC DPS (Good *et al.* 2005), their populations are significantly less than historical estimates, fragmented, unstable, and more vulnerable to stochastic events (Boughton *et al.* 2006). Most of the approximately 1,240 miles of stream critical habitat (70 FR 52488) are degraded. Severe habitat degradation and the compromised genetic integrity of some populations pose a serious risk to the survival and recovery of the S-CCC steelhead DPS (Good *et al.* 2005), such that they are likely to become endangered in the foreseeable future (Good *et al.* 2005; 76 FR 76386 ; Christie *et al.* 2011; Williams *et al.* 2011; 81 FR 33468 ; Williams *et al.* 2016). The Carmel River once contained the largest southernmost steelhead run in the present range of the S-CCC steelhead DPS, yet by 1975 the annual run had declined by an estimated 75 percent (NMFS 2013). These declines have largely been attributable to passage barriers limiting access to historic spawning and rearing areas, summertime pumping from wells for water supply, and extensive habitat fragmentation and degradation.

The number of individual S-CCC steelhead within the action area during construction are expected to be low due to the small area of dewatered stream. Due to the timing of construction, no adult or smolt life stages would be affected by the project.

Following construction, the steelhead rearing at the facility will experience improved water quality, which in turn should improve survival rates at the facility. Historical total suspended solid (TSS) levels in the river have been generally low (less than 10 milligrams per liter [mg/L]), with spikes greater than 25 mg/L due to storm events. The recent removal of the San Clemente Dam has made the Carmel River subject to more spikes of TSS due to easier transportation of sediment in the river system. The project includes sediment removal facilities to help reduce wear on reuse pumps, reduce buildup of sediment in the process systems, and increase the effectiveness of the proposed ultraviolet (UV) equipment. With water reuse added to the facility, sediment concerns would also reduce; during events when the river stage, bedload, and turbidity are high, the facility could run on 50 percent water reuse, resulting in less turbid water being withdrawn from the river. The facility will also be able to operate at lower Carmel River flows and will have the ability to re-circulate the water during extreme low flows or high water temperatures. High water temperatures have been linked to facility disease outbreaks and die offs. The recirculation system and improved cooling tower, will be able to lower the river temperatures to safer levels.

As described in the *Effects of the Action* section, NMFS identified the following effects as having the potential to result from the project: dewatering, fish collection and relocation, increases in suspended sediment, potential introduction of heavy machinery toxins, modification of stream banks and channel beds, and a reduction in riparian vegetation. Of these effects, all but fish collection and relocation and dewatering are determined to be unlikely to adversely affect S-CCC steelhead or their critical habitat because the expected level of effect is determined to be minor or the potential, of the effect is determined to be improbable (see section 2.5, Effects of the Action).

Prior to dewatering the site, fish would be collected and relocated from the construction area. Fish that elude capture and remain in the project area during dewatering may die due to desiccation or thermal stress, or be crushed by equipment or foot traffic if not found by biologists during the drawdown of stream flow. However, based on the low mortality rates for similar capture and relocation efforts, NMFS anticipates few juvenile steelhead would be injured or killed by fish relocation and construction activities during implementation of the project. With approximately 150 feet of dewatered river, 40 steelhead could need to be rescued and relocated. If injury and mortality rates reach maximum levels, two juvenile steelhead are expected to be killed as a result of injury or mortality during relocation efforts, and one steelhead is expected to be stranded and die. Due to the relatively large number of juveniles produced by each spawning pair, steelhead spawning in the Carmel River watershed in future years are likely to produce enough juveniles to replace the few that may be lost at the project site due to relocation and dewatering. It is unlikely that the small potential loss of juveniles by this project would impact future adult returns.

Effects to S-CCC steelhead critical habitat are expected to include temporary impacts due to project construction. The temporary impacts are expected to be associated with disturbances to the stream bed, bank, riparian corridor, and surface flow. As discussed above, these temporary impacts are not expected to adversely affect PBFs of S-CCC steelhead critical habitat, because aquatic habitat at the site would be restored after the water diversion system is removed. In addition all vegetation will be replanted a higher ratio than it was removed and the bank is being stabilized with native rock that is willow planted.

Regarding future climate change effects in the action area, California could be subject to higher average summer air temperatures and lower total precipitation levels. Higher air temperatures would likely warm stream temperatures. Reductions in the amount of precipitation would reduce stream flow levels in Northern and Central Coastal rivers. Estuaries may also experience changes in productivity due to changes in freshwater flows, nutrient cycling, and sediment amounts. For this project, construction would be completed in 2018/2019 and the above effects of climate change are unlikely to be detected within that time frame. The short-term effects of project construction would have completely elapsed prior to these climate change effects.

Recovery of the S-CCC DPS requires restoration of distribution to previously occupied areas and the restoration of suitable habitat conditions and characteristics for all life history stages of steelhead. The Carmel River population is a Core 1 population because it has produced the largest run sizes in the S-CCC steelhead DPS during years of high rainfall and run-off (Good *et al.* 2005; Boughton *et al.* 2006). The recovery plan was developed before the removal of San Clemente Dam, so it was not known that with the removal of the dam, the facility was going to have an increase in water quality issues. While, the water quality upgrade is not in the recovery plan, it is consistent with recovery. The facility is assisting in keeping the Carmel River S-CCC steelhead from becoming extinct by rescuing steelhead from the drying reaches of the river. The water upgrade will result in a more secure water source that is less turbid and cooler, which will improve survival rates of facility steelhead.

2.8 Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, any effects of interrelated and interdependent activities, and cumulative effects, it is NMFS' biological opinion that the proposed action is *not* likely to jeopardize the continued existence of S-CCC steelhead and destroy or adversely modify its designated critical habitat.

2.9 Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

2.9.1 Amount or Extent of Take

The amount or extent of take described below is based on the analysis of effects of the action done in the preceding biological opinion. If the action is implemented in a manner inconsistent with the project description provided to NMFS, and as a result take of listed species occurs, such take would not be exempt from section 9 of the ESA.

The number of threatened steelhead that may be incidentally taken during project activities is expected to be small, and limited to the juvenile (pre-smolt) lifestage. Take is anticipated to occur during fish relocation and dewatering of a 150-foot reach of creek within the action area between August and October 15, unless an extension is granted by NMFS and other resource agencies. The number of juvenile steelhead relocated during project construction is anticipated to be no more than 40 fish, and no more than two juvenile steelhead are expected to be injured or killed during fish relocation and no more than one juvenile steelhead is expected to be injured or killed during dewatering activities.

If more than 40 juvenile steelhead are captured, or more than three juvenile steelhead are injured or killed, incidental take will have been exceeded.

2.9.2 Effect of the Take

In the biological opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

2.9.3 Reasonable and Prudent Measures

"Reasonable and prudent measures" are nondiscretionary measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of SCCC steelhead:

1. Undertake measures to ensure that harm and mortality to SCCC steelhead resulting from fish relocation and dewatering activities are low.

2. Prepare and submit reports which summarize the effects of construction, fish relocation and dewatering activities, and post-construction site performance.

3. Incidental take of steelhead is monitored and reported immediately to Erin Seghesio at Erin.Seghesio@noaa.gov and 707-578-8515 if exceeded.

2.9.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and the Corps or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). The Corps or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. The following terms and conditions implement reasonable and prudent measure 1:

a. The district will retain qualified biologists with expertise in the areas of anadromous steelhead biology, including handling, collecting, and relocating steelhead; steelhead/habitat relationships; and biological monitoring of steelhead. The district will ensure that all biologists working on the project are qualified to conduct fish collections in a manner which minimizes all potential risks to steelhead.

b. The biologists will monitor the construction site during the placement and removal of cofferdams and during dewatering of the creek channel to ensure that any adverse effects to salmonids are minimized. The biologists will be on site during all dewatering events to capture, handle, and safely relocate steelhead. The district, or the biologists, will notify NMFS biologist, Erin Seghesio at (707) 578-8515 and at Erin.Seghesio@noaa.gov, one week prior to capture activities in order to provide an opportunity for NMFS staff to observe the activities.

c. Steelhead will be handled with extreme care and kept in water to the maximum extent possible during rescue activities. All captured fish must be kept in cool, shaded, and aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream, and fish will not be removed from this water accept when released. To avoid predation, the biologists will have at least two containers and segregate young of year fish from larger age-classes and other potential predators. Captured steelhead will be relocated as soon as possible to a suitable instream location in which suitable habitat conditions are present to allow for adequate survival for transported fish and fish already present.

d. If any steelhead are found dead or injured, the biologist will contact NMFS biologist Erin Seghesio by phone immediately at (707) 578-8515 and by email at Erin.Seghesio@noaa.gov, or the NMFS North Central Coast Office (Santa Rosa, California) at (707) 575-6050. The purpose of the contact is to review the activities resulting in the take and to determine if additional protective measures are required. All salmonid mortalities will be retained, placed in an appropriately-sized sealable plastic bag, labeled with the date and location, fork length, and be frozen as soon as possible. Frozen samples will be retained by the biologist until specific instructions are provided by NMFS. The biologist may not transfer biological samples to anyone other than the NMFS North Central Coast Office without obtaining prior written approval from the North Central Coast Office supervisor. Any such transfer will be subject to such conditions as NMFS deems appropriate.

2. The following terms and conditions implement reasonable and prudent measure 3:

a. The district will monitor physical conditions at the site annually for at least the first five years following project completion. Monitoring of physical conditions must include the performance and stability of the bank stabilization and to ensure it does not become unable to perform its intended purpose (*i.e.,* erosion prevention).

3. The following terms and conditions implement reasonable and prudent measure 4:

    a. The district shall provide the following written reports to NMFS by January 15 of each year following construction for the duration specified below:

        i. **Construction related activities** – On January 15th of the year immediately following construction, a report must be submitted, including the dates construction began and completed; a discussion of any unanticipated effects or unanticipated levels of effects on steelhead, a description of any and all measures taken to minimize those unanticipated effects and a statement as to whether or not the unanticipated effects had any effects on steelhead; the number of steelhead killed or injured; and photos take before, during and after the activity from a photo reference point.

        ii. **Fish Relocation** – On January 15th of the year immediately following construction, a report must be submitted, including a description of the location from which fish were removed and the release site including photographs; the date and time of the relocation effort; a description of the equipment and methods used to collect, hold, and transport salmonids; the number of fish relocated by species; the number of fish injured or killed by species and a brief narrative of the circumstances surrounding steelhead injuries or mortalities; and a description of any problems which may have arisen during the relocation activities and a statement as to whether or not the activities had any unforeseen effects.

        iii. **Physical Site Conditions** – On January 15th of the year immediately following construction, and annually for five years post construction, a report must be submitted to NMFS which includes the "as-built" drawings and a brief narrative of the physical conditions within the action area including the performance and stability of the bank stabilization, and planted vegetation. Each report will include photos of the action area.

2.10 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02). NMFS has no conservation recommendations at this time.

2.11 Reinitiation of Consultation

This concludes formal consultation for the Sleepy Hollow Steelhead Facility Raw Water Intake and Water Supply System Upgrade in Carmel, California.

As 50 CFR 402.16 states, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if: (1) The amount or extent of incidental taking specified in the ITS is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat that was not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action.

3. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The Data Quality Act (DQA) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

2.12 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are Corps. Other interested users could include the district. Individual copies of this opinion were provided to the Corps. This opinion will be posted on the Public Consultation Tracking System website (https://pcts.nmfs.noaa.gov/pcts-web/homepage.pcts). The format and naming adheres to conventional standards for style.

2.13 Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

2.14 Objectivity

Information Product Category: Natural Resource Plan

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA regulations, 50 CFR 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this opinion contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA, and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

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United States Department of the Interior

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IN REPLY REFER TO:
08EVEN00-2017-F-0457

November 29, 2017

Rick Bottoms, Chief
Regulatory Division
U.S. Army Corps of Engineers, San Francisco District
1455 Market Street
San Francisco, California 94103-1398

Subject: Biological Opinion for the Sleepy Hollow Steelhead Rearing Facility Upgrade Project, Monterey County, California (Corps file number 1999-244600)

Dear Dr. Bottoms:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the U.S. Army Corps of Engineers' (Corps) proposed action, issuance of a permit pursuant to Section 404 of the Clean Water Act, for the subject project and its effects on the federally threatened California red-legged frog (*Rana draytonii*) and its designated critical habitat. Your request and our response are made in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). We received your June 2, 2017 request for formal consultation on June 5, 2017.

We have based this biological opinion on information that accompanied your request for consultation, including the project's biological assessment (Anchor QEA 2017) and information in our files. We can make available a record of this consultation at the Ventura Fish and Wildlife Office.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Sleepy Hollow Steelhead Rearing Facility (SHSRF) is located along the Carmel River, at approximately river mile 17.5, in unincorporated Monterey County, California. The Monterey Peninsula Water Management District (MPWMD) proposes to upgrade the facility's water supply intake and cooling tower as well as install a water recirculation system to meet identified water requirements. Improvements to the water supply intake are needed to address existing maintenance issues, operating constraints, and increases in sandy load bed in the Carmel River. The project would allow for easier intake pump access, provide greater instream intake, and screen reliability in addition to ease of maintenance. The addition of an improved intake system would allow for the facility's operation when river flows fall below two cubic feet per second (cfs) and when sediment load is high during storm events.

The proposed project consists of the following elements: replacement of the intake screen and concrete base, installation of channel and bank protection in the form of riprap, removal of the existing intake screen and pump station and backfill, and temporarily dewater or divert river flows.

Replacement of the intake involves relocating it to a relatively deep pool in the Carmel River, approximately 120 feet (ft) upstream from the present location of the outlet discharge point. The intake screen would be attached to a precast concrete base requiring excavation in the river channel to a maximum depth of six feet. The excavated area would be backfilled with rock riprap. The total area of disturbance associated with the proposed in-channel improvements is estimated to be 1,064 square feet (sf). Bank protection is proposed to protect areas of the riverbank from erosion and reinforce areas that are disturbed as a result of project improvements. Bank protection would include the excavation of approximately 230 cubic yards (cy) from the river bank and installation of rock riprap over an approximately 500 sf area. The existing drum screen and pump station would be dismantled and removed. This area would be backfilled with rock and soil and revegetated, resulting in the reestablishment of approximately 20 sf of streambank and 30 sf of streambed in these areas. The permanent loss of terrestrial habitat in the form of approximately 3,000 sf of grassland and approximately 200 sf of coast live oak forest understory would occur from installation of several components of the project including the settling basin, filters, pumps, screen controls, valve vault and dissolved gas conditioning tower. Project activities within the Carmel River channel would require isolating the work area from river flows to the extent practicable. A flow diversion and pump system would be positioned and moved throughout the work area as needed, resulting in the temporary dewatering of approximately 2,930 sf of river channel. In total, habitat impacts are anticipated to occur within 2,930 sq ft (0.067 acre) of aquatic habitat, and within 3,700 sq ft (0.084 acre) of terrestrial habitat for the California red-legged frog. Construction is anticipated to be completed by October 2018, with in-channel work proposed for implementation between June 1 and October 15.

Conservation Measures

To minimize impacts to the California red-legged frog, the MPWMD will implement the following measures:

1. The MPWMD will submit to the Service for approval, at least 15 days prior to the start of construction, the names and credentials of biologists who would survey for, capture and/or relocate California red-legged frogs.

2. Before project activities begin, a qualified biologist will conduct a training program for all personnel. Training will include information on the ecology of the California red-legged frog, its identifying characteristics and habitat requirements, status of the species and its protection under the Act, avoidance measures that must be followed and the boundaries of work areas, and steps to be taken if the species is encountered.

3. Prior to the onset of project activities, the Service-approved biologist will identify appropriate areas to translocate California red-legged frogs if any are observed in an area to be impacted. These areas must be in proximity to the capture site, contain suitable habitat for the corresponding life stage, not be affected by project activities, and be free of predatory species to the maximum extent practicable.

4. A Service-approved biologist will conduct informal California red-legged frog surveys in all areas impacted by project activities, immediately prior to the initiation of work in those areas. Within the staging/construction area, including under vehicles and equipment, surveys must be conducted each morning prior to the initiation of project activities. No work shall be allowed to begin until the work site has been inspected. When working in aquatic habitat, dip-net and/or seine surveys will be conducted until the Service-approved biologist is confident that the species is absent from impact areas.

5. To reduce the threat of injury or entanglement in erosion control materials, plastic or monofilament netting will not be used.

6. The Service-approved biologist or any other personnel will have the authority to stop work if there is a threat of harm to California red-legged frogs or if any measures are not being fulfilled, and will notify the Service within one working day of any work stoppage. Service-approved biologists will have the authority, and allowed sufficient time, to capture and relocate California red-legged frogs to prevent harassment or harm to individuals.

7. To prevent inadvertent entrapment during construction, all excavated steep walled holes or trenches more than one foot deep will be fully covered each working day or provided with escape ramps. All holes and trenches will be surveyed prior to work commencing each day to search for trapped wildlife.

8. If a work site is to be temporarily dewatered by pumping, intakes will be completely screened with mesh not larger than 0.2 inch to prevent California red-legged frogs from entering the pump system.

9. The number of access routes, number and size of staging areas, and total work area will be limited to the minimum necessary. Access routes and the limits of the work area will be clearly marked and located outside of riparian areas to the maximum extent practicable.

10. The Service-approved biologist will permanently remove any individuals of exotic species, such as bullfrogs and non-native crayfish, to the maximum extent practicable.

11. The Declining Amphibian Populations Task Force's Fieldwork Code of Practice (Appendix A) will be followed to minimize the possible spread of chytrid fungus (*Batrachochytrium dendrobatidis*) and other amphibian pathogens and parasites. This measure is applicable to all construction personnel and equipment as well as to biologists.

12. All trash that may attract predators will be properly contained and removed from the work site regularly. After construction, all trash and construction debris will be removed from work areas.

13. Cleaning and refueling of equipment and vehicles shall occur only within designated staging areas. All equipment and vehicles will be checked and maintained on a daily basis to ensure proper operation in order to avoid potential leaks or spills. No debris, soil, or pollutants shall be allowed to enter into or placed where they may be washed by rainfall or runoff into riparian or aquatic habitats.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

Jeopardy Determination

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the range-wide condition of the California red-legged frog, the factors responsible for that condition, and the species' survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the California red-legged frog in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the Effects of the Action, which identifies the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the California red-legged frog; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities, that are reasonably certain to occur in the action area, on the California red-legged frog.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the California red-legged frog, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the California red-legged frog in the wild by reducing the reproduction, numbers, and distribution of that species.

Adverse Modification Determination

Section 7(a)(2) of the Act requires that Federal agencies insure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. A final rule revising the regulatory definition of "destruction or adverse modification" was published on February 11, 2016 (81 FR 7214). The final rule became effective on March 14, 2016. The revised definition states:

> "Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features."

The "destruction or adverse modification" analysis in this biological opinion relies on four components: (1) the Status of Critical Habitat, which describes the range-wide condition of the critical habitat in terms of the key components (i.e., essential habitat features, primary constituent elements, or physical and biological features) that provide for the conservation of the listed species, the factors responsible for that condition, and the intended value of the critical habitat overall for the conservation/recovery of the listed species; (2) the Environmental Baseline, which analyzes the condition of the critical habitat in the action area, the factors responsible for that condition, and the value of the critical habitat in the action area for the conservation/recovery of the listed species; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated and interdependent activities on the key components of critical habitat that provide for the conservation of the listed species, and how those impacts are likely to influence the conservation value of the affected critical habitat; and (4) Cumulative Effects, which evaluate the effects of future non-Federal activities that are reasonably certain to occur in the action area on the key components of critical habitat that provide for the conservation of the listed species and how those impacts are likely to influence the conservation value of the affected critical habitat.

For purposes of making the "destruction or adverse modification" determination, the Service evaluates if the effects of the proposed Federal action, taken together with cumulative effects, are likely to impair or preclude the capacity of critical habitat in the action area to serve its intended conservation function to an extent that appreciably diminishes the rangewide value of critical habitat for the conservation of the listed species. The key to making that finding is understanding the value (i.e., the role) of the critical habitat in the action area for the conservation/recovery of the listed species based on the Environmental Baseline analysis.

STATUS OF THE SPECIES

The California red-legged frog was federally listed as threatened on May 23, 1996 (Service 1996). Revised critical habitat for the California red-legged frog was designated on March 17, 2010 (Service 2010). The Service issued a recovery plan for the species (Service 2002). A detailed description of California red-legged frogs can be found in Storer (1925), Stebbins (2003), and Jennings and Hayes (1994).

The historical range of the California red-legged frog extended coastally from southern Mendocino County and inland from the vicinity of Redding, California, southward to northwestern Baja California, Mexico (Storer 1925, Jennings and Hayes 1985, Shaffer et al. 2004). The California red-legged frog has sustained a 70 percent reduction in its geographic range as a result of several factors acting singly or in combination (Davidson et al. 2001).

The California red-legged frog uses a variety of habitat types, including various aquatic systems, riparian, and upland habitats. California red-legged frogs have been found at elevations that range from sea level to about 5,000 feet. California red-legged frogs use the environment in a variety of ways, and in many cases they may complete their entire life cycle in a particular area without using other components (i.e., a pond is suitable for each life stage and use of upland habitat or a riparian corridor is not necessary). Populations appear to persist where a mosaic of habitat elements exists, embedded within a matrix of dispersal habitat. Adults are often associated with dense, shrubby riparian or emergent vegetation and areas with deep (greater than 28 inches) still or slow-moving water; the largest summer densities of California red-legged frogs are associated with deep-water pools with dense stands of overhanging willows (*Salix* spp.) and an intermixed fringe of cattails (*Typha latifolia*) (Jennings 1988). California red-legged frogs spend considerable time resting and feeding within dense riparian vegetation; it is believed the moisture and camouflage provided by the riparian plant community provide good foraging habitat and riparian vegetation provides cover during dispersal (Rathbun et al. 1993).

Breeding sites of the California red-legged frog are in aquatic habitats; larvae, juveniles, and adult frogs have been collected from streams, creeks, ponds, marshes, deep pools and backwaters within streams and creeks, dune ponds, lagoons, and estuaries. California red-legged frogs frequently breed in artificial impoundments such as stock ponds, given the proper management of hydro-period, pond structure, vegetative cover, and control of exotic predators. While frogs successfully breed in streams and riparian systems, high spring flows and cold temperatures in streams often make these sites risky egg and tadpole environments. An important factor influencing the suitability of aquatic breeding sites is the general lack of introduced aquatic predators. When riparian vegetation is present, California red-legged frogs spend considerable time resting and feeding in it; the moisture and camouflage provided by the riparian plant community likely provide good foraging habitat and may facilitate dispersal in addition to providing pools and backwater aquatic areas for breeding. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting population numbers and distribution.

During periods of wet weather, starting with the first rains of fall, some individual California red-legged frogs may make long-distance overland excursions through upland habitats to reach breeding sites. In Santa Cruz County, Bulger et al. (2003) found marked California red-legged frogs moving up to 1.7 miles through upland habitats, via point-to-point, straight-line migrations without apparent regard to topography, rather than following riparian corridors. Most of these overland movements occurred at night and took up to 2 months. Similarly, in San Luis Obispo County, Rathbun and Schneider (2001) documented the movement of a male California red-legged frog between two ponds that were 1.78 miles apart; this was accomplished in less than 32 days. However, most California red-legged frogs in the Bulger et al. (2003) study were non-migrating frogs and always remained within 426 feet of their aquatic site of residence (half of the frogs always stayed within 82 feet of water). Rathbun et al. (1993) radio tracked several California red-legged frogs near the coast in San Luis Obispo County at various times between July and January; these frogs also stayed rather close to water and never strayed more than 85 feet into upland vegetation. Nine California red-legged frogs radio-tracked from January to June 2001, in East Las Virgenes Creek in Ventura County remained relatively sedentary as well; the longest within-channel movement was 280 feet and the furthest movement away from the stream was 30 feet (Scott 2002). Hayes and Tennant (1985) found juveniles to be active diurnally and nocturnally, whereas adults were largely nocturnal.

After breeding, California red-legged frogs often disperse from their breeding habitat to forage and seek suitable dry-season habitat. Cover within dry-season aquatic habitat could include boulders, downed trees, and logs; agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay-ricks; and industrial debris. California red-legged frogs use small mammal burrows and moist leaf litter (Rathbun et al. 1993, Jennings and Hayes 1994); incised stream channels with portions narrower and deeper than 18 inches may also provide habitat. This type of dispersal and habitat use, however, is not observed in all California red-legged frogs and is most likely dependent on the year-to-year variations in climate and habitat suitability and varying requisites per life stage.

Although the presence of California red-legged frogs is correlated with still water deeper than approximately 1.6 feet, riparian shrubbery, and emergent vegetation (Jennings and Hayes 1985), there are numerous locations in the species' historical range where these elements are well represented yet California red-legged frogs appear to be absent. The cause of local extirpations does not appear to be restricted solely to loss of aquatic habitat. The most likely causes of local extirpation are thought to be changes in faunal composition of aquatic ecosystems (i.e., the introduction of non-native predators and competitors) and landscape-scale disturbances that disrupt California red-legged frog population processes, such as dispersal and colonization. The introduction of contaminants or changes in water temperature may also play a role in local extirpations. These changes may also promote the spread of predators, competitors, parasites, and diseases.

Over-harvesting, habitat loss, non-native species introduction, and urban encroachment are the primary factors that have negatively affected the California red-legged frog throughout its range (Jennings and Hayes 1985, Hayes and Jennings 1988). Habitat loss and degradation, combined with over-exploitation and introduction of exotic predators, were important factors in the decline of the California red-legged frog in the early to mid-1900s. Continuing threats to the California red-legged frog include direct habitat loss due to stream alteration and loss of aquatic habitat, indirect effects of expanding urbanization, competition or predation from non-native species including the bullfrog (*Rana catesbeiana*), catfish (*Ictalurus* spp.), bass (*Micropterus* spp.), mosquitofish (*Gambusia affinis*), red swamp crayfish (*Procambarus clarkii*), and signal crayfish (*Pacifastacus leniusculus*). Chytrid fungus is a waterborne fungus that can decimate amphibian populations, and is considered a threat to California red-legged frog populations.

Recovery Objectives

The 2002 final recovery plan for the California red-legged frog (Service 2002) states that the goal of recovery efforts is to reduce threats and improve the population status of the California red-legged frog sufficiently to warrant delisting. The recovery plan describes a strategy for delisting, which includes (1) protecting known populations and reestablishing historical populations; (2) protecting suitable habitat, corridors, and core areas; (3) developing and implementing management plans for preserved habitat, occupied watersheds, and core areas; (4) developing land use guidelines; (5) gathering biological and ecological data necessary for conservation of the species; (6) monitoring existing populations and conducting surveys for new populations; and (7) establishing an outreach program. This species will be considered for delisting when:

1. Suitable habitats within all core areas are protected and/or managed for California red-legged frogs in perpetuity, and the ecological integrity of these areas is not threatened by adverse anthropogenic habitat modification (including indirect effects of upstream/downstream land uses);

2. Existing populations throughout the range are stable (i.e., reproductive rates allow for long-term viability without human intervention). Population status will be documented through establishment and implementation of a scientifically acceptable population monitoring program for at least a 15-year period, which is approximately 4 to 5 generations of the California red-legged frog. This 15-year period will preferably include an average precipitation cycle;

3. Populations are geographically distributed in a manner that allows for the continued existence of viable metapopulations despite fluctuations in the status of individual populations (i.e., when populations are stable or increasing at each core area);

4. The species is successfully reestablished in portions of its historic range such that at least one reestablished population is stable/increasing at each core area where California red-legged frog are currently absent; and

5. The amount of additional habitat needed for population connectivity, recolonization, and dispersal has been determined, protected, and managed for California red-legged frogs.

The recovery plan identifies eight recovery units, which are based on the assumption that various regional areas of the species' range are essential to its survival and recovery. The recovery status of this species is considered within the smaller scale of recovery units as opposed to the overall range. These recovery units are delineated by major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of the range of the California red-legged frog.

The goal of the recovery plan is to protect the long-term viability of all extant populations within each recovery unit. Within each recovery unit, core areas have been delineated and represent contiguous areas of moderate to high California red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations that, combined with suitable dispersal habitat, will allow for long term viability within existing populations. This management strategy will allow for the recolonization of habitat within and adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of California red-legged frogs.

Critical Habitat for the California Red-Legged Frog

In accordance with section 3(5)(A)(i) of the Act and Federal regulations at 50 CFR 424.12, in determining which areas to designate as critical habitat, we identified the physical or biological features essential to the conservation of the species, the Primary Constituent Elements (PCEs), which may require special management considerations or protection. Because not all life-history functions require all the PCEs, not all areas designated as critical habitat will contain all the PCEs. Based on our current knowledge of the life-history, biology, and ecology of the California red-legged frog, we determined the California red-legged frog's PCEs to consist of: (1) aquatic breeding habitat; (2) aquatic non-breeding habitat; (3) upland habitat, and (4) dispersal habitat.

Detailed descriptions of these PCEs can be found in the final rule (75 FR 12816). The following is a brief summary of the PCEs:

1. Aquatic breeding habitat consists of standing bodies of fresh water (with salinities less than 4.5 parts per thousand), including natural and manmade (stock) ponds, slow moving streams or pools within streams and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years.

2. Aquatic non-breeding habitat consists of the freshwater habitats as described for aquatic breeding habitat but which may or may not hold water long enough for the subspecies to complete the aquatic portion of its lifecycle but which provide for shelter, foraging, predator avoidance, and aquatic dispersal habitat of juvenile and adult California red-legged frogs.

3. Upland habitat consists of upland areas adjacent to or surrounding breeding and non-breeding aquatic and riparian habitat up to a distance of one mile in most cases (i.e., depending on surrounding landscape and dispersal barriers) including various vegetation types such as grassland, woodland, forest, wetland, or riparian areas that provide shelter, forage, and predator avoidance for the California red-legged frog. Upland habitat should include structural features such as boulders, rocks and organic debris (e.g., downed trees, logs), small mammal burrows, or moist leaf litter.

4. Dispersal habitat consists of accessible upland or riparian habitat within and between occupied or previously occupied sites that are located within one mile of each other, and that support movement between such sites. Dispersal habitat includes various natural habitats, and altered habitats such as agricultural fields, that do not contain barriers (e.g., heavily traveled roads without bridges or culverts) to dispersal. Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large lakes or reservoirs over 50 acres in size, or other areas that do not contain those features identified in PCE 1, 2, or 3 as essential to the conservation of the species.

The Service designated critical habitat for the California red-legged frog on 119,492 acres of land in northern Monterey County (Service 2010). This critical habitat unit is named "MNT-2, Carmel River" (MNT-2), and represents approximately 7 percent (in area) of the total critical habitat designated throughout the range of the species. This critical habitat unit is described in detail in the Environmental Baseline section of this document.

ENVIRONMENTAL BASELINE

Action Area

The implementing regulations for section 7(a)(2) of the Act define the "action area" as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area for this biological opinion includes all

areas where people and equipment would be working, areas downstream within the river channel that may receive sediment, and areas where California red-legged frogs would be relocated.

Status of the Species and Existing Conditions in the Action Area

Habitat types within the action area include riverine, riparian, coast live oak woodland, and ruderal grassland/scrub. The river channel potentially provides both breeding and non-breeding aquatic habitat for the species; however, opportunities for successful breeding is likely low in this area due to high river flows, lack of aquatic vegetation, and the presence of aquatic predators within the Carmel River. Upland habitat in the form of riparian vegetation is sparsely present along the river banks. Coast live oak forest and grassland habitat is also present within the action area. The species may utilize all habitats within the action area at any time of year.

California red-legged frogs exhibit a wide distribution throughout the Carmel River watershed, and have been previously observed at the rearing facility as well as in aquatic and riparian habitats in the project vicinity (Anchor QEA 2017). The species is known to breed at many locations within the Carmel River, which is variable depending on seasonal and dynamic fluctuations in riverine habitats.

All terrestrial habitats in the action area provide suitable upland and/or dispersal habitat for the species. California red-legged frog juveniles and adults can be expected to occur at any location in the action area, as their mobility facilitates unimpeded movement throughout the Carmel River corridor and adjacent terrestrial habitat within the project area.

Recovery

The action area is within the Central Coast Recovery Unit and the Carmel River – Santa Lucia Core Area; these are described in the recovery plan for the California red-legged frog (Service 2002). Within the Central Coast Recovery Unit, the California red-legged frog occurs in the Carmel River watershed and most of its tributaries. Core areas, which are distributed throughout portions of the historic and current range, represent a system of areas that, when protected and managed for California red-legged frogs, will allow for long-term viability of existing populations and reestablishment of populations within the historic range. The Carmel River – Santa Lucia Core Area is acknowledged in the recovery plan as a currently occupied source population which provides connectivity between populations.

Threats to California red-legged frogs in the Central Coast Recovery Unit include agriculture, livestock grazing and dairies, mining, non-native species, recreation, timber extraction, urbanization, and water management/diversions/reservoirs. The species' recovery status at the time the recovery plan was created was listed as high. Conservation needs identified for the Carmel River – Santa Lucia Core Area include: protect existing populations and to restore the Carmel River watershed.

Status of California Red-Legged Frog Critical Habitat in the Action Area

The action area for the proposed project is within designated critical habitat for the California red-legged frog (Service 2010), and comprises a small portion of the approximately 119,492 acres of critical habitat unit MNT-2. However, the Carmel River is the central aquatic feature in unit MNT-2, and is vital to the continued existence of California red-legged frogs within MNT-2. MNT-2 is the largest critical habitat unit within Monterey County. MNT-2 is mapped from occurrence records at the time of listing and subsequent to the time of listing. MNT-2 contains the following features that are essential for the conservation of the subspecies: aquatic habitat for breeding and non-breeding activities, and upland habitat for foraging and dispersal activities. MNT-2 is occupied by the California red-legged frog and its designation is intended to prevent further fragmentation of habitat in this portion of the subspecies' range. MNT-2 contains permanent and ephemeral aquatic habitats suitable for breeding and accessible upland areas for dispersal, shelter, and food. The unit consists of approximately 26,098 acres of Federal land, 374 acres of State land, and approximately 91,647 acres of private land. Threats that may require special management in this unit include removal and alteration of aquatic and upland habitat due to urbanization, dewatering of aquatic habitat due to water pumping and water diversions, and predation by non-native species.

All terrestrial habitats within the action area provides suitable upland and/or dispersal habitat for the species (approximately 3,700 sq ft or 0.085 acre). All aquatic habitat within the action area potentially provides suitable habitat for breeding and/or non-breeding activities (up to approximately 2,930 sq ft or 0.067 acre).

EFFECTS OF THE ACTION

This analysis takes into account incorporation of the proposed conservation measures as part of the action. Implementation of the conservation measures are intended to identify the majority of California red-legged frog individuals that could be affected by project activities. The Service believes that incorporation of the proposed conservation measures would reduce potential adverse effects to the species.

California red-legged frogs are known to occur within and adjacent to the action area and could potentially utilize any portion of the action area at any time of year. Although, we cannot anticipate the number of California red-legged frogs that may occur within the action area at any specific time due to their mobility and fluctuations in dispersal patterns. Dynamic changes in the quality and quantity of potential breeding habitat in the vicinity of the action area further contribute to our inability to predict the number of individuals that may occur in the action area. Conducting in-channel improvements during the dry season (June 1 to October 15) would reduce potential impacts to the species. Additionally, we expect very few or no injury or mortality of individuals due to the numerous conservation measures that will be implemented.

All California red-legged frogs that occur in the action area could be adversely affected by project activities. Injury or mortality could occur from animals being crushed by heavy equipment, vehicles, debris, and worker foot traffic during project activities. California red-legged frogs may experience a disruption of normal behavioral patterns from work activities and associated noise and vibration to the point that reaches the level of harassment. This disruption could cause California red-legged frogs to disperse from the project area and may increase the potential for predation, desiccation, competition for food and shelter, or strike by vehicles on roadways. Pre-construction surveys and the relocation of individuals by a Service-approved biologist would reduce these impacts.

Activities within and adjacent to aquatic habitat could kill or injure California red-legged frogs and degrade their habitat. Use of heavy equipment and/or worker presence in these areas could kill or injure frogs. Downstream transport of sediment or pollutants could reduce water quality. The proposed avoidance measures, including surveying for and relocating California red-legged frogs from work areas and using diversion pumps that are screened would reduce these impacts.

California red-legged frogs can disperse through the project area at any time of year. Any amphibians moving through the project site would be at risk of injury or death caused by vehicles, equipment, or workers. Surveying for and relocating California red-legged frogs from work areas would reduce these impacts.

Capture and relocation of California red-legged frogs could result in injury or death. Although survivorship for translocated California red-legged frogs has not been estimated, survivorship of translocated wildlife in general is reduced due to intraspecific competition, lack of familiarity with the location of potential breeding, feeding, and sheltering habitats, and increased risk of predation. This risk would be reduced by using Service-approved biologists to conduct the proper capture, handling, and transport of this species.

Observations of diseased and parasite-infected amphibians are now frequently reported. Releasing amphibians following a period of captivity, during which time they can be exposed to infections, may cause an increased risk of mortality in wild populations. Amphibian pathogens and parasites can also be carried between habitats on the hands, footwear, or equipment of fieldworkers, which can spread them to localities containing species that have had little or no prior contact with such pathogens or parasites. The project proponent has agreed to follow the Declining Amphibian Populations Task Force's Fieldwork Code of Practice to minimize the spread of chytrid fungus and other pathogens.

Trash left during or after project activities could attract predators to the work site, which could in turn prey upon California red-legged frogs. For example, raccoons (*Procyon lotor*) and feral cats are attracted to trash and also prey opportunistically on the California red-legged frog. This potential impact would be reduced or avoided by the proposed control of waste products at all work sites.

Accidental spills of hazardous materials or careless fueling or oiling of vehicles or equipment could degrade water quality or dispersal habitat to a degree where California red-legged frogs are adversely affected or killed. The potential for this effect to occur would be reduced by thoroughly informing workers of the importance of preventing hazardous materials from entering the environment, locating staging and fueling areas away from aquatic resources and having an effective spill response plan in place.

Uninformed workers could disturb, injure, or kill California red-legged frogs. The potential for this to occur would be reduced by educating workers on the presence and protected status of these species and the measures that are being implemented to protect them during Project activities.

In summary, the proposed action could adversely affect California red-legged frogs due to potential for them to occur within the project area and the availability of aquatic, upland, and dispersal habitat in the action area. However, the proposed avoidance and minimization measures would reduce these potential impacts. Based on this information we anticipate that few, if any, California red-legged frogs are likely to be killed or injured during this work.

Effects on Recovery of the California Red-Legged Frog

As stated above in the Status of the Species Section, the recovery status of the California red-legged frog is considered within the scale of the Recovery Unit as opposed to the overall range. The action area lies within the Central Coast Recovery Unit. The proposed action would not increase the threats currently impacting the California red-legged frog in this Recovery Unit or Core Area as identified in the Recovery Plan and described above, or preclude the Service's ability to implement recommended recovery actions (Service 2002). Project impacts would be minor and would not affect the capacity of the Carmel River – Santa Lucia Core Area to provide connectivity between populations. Thus, we do not believe the proposed project would affect recovery of the California red-legged frog.

Summary of Effects to the California Red-Legged Frog

Based on the anticipated minor impacts and conservation measures to be implemented by the project proponent, we conclude that few, if any, California red-legged frogs are likely to be killed or injured as a result of project activities. The project would affect a small number of California red-legged frogs, if any occur within the work areas. We anticipate no long-term effects to the overall population, breeding and reproductive capacity, and recovery of the California red-legged frog due to the proposed activities.

Critical Habitat for the California Red-Legged Frog

Critical Habitat Unit MNT-2 for the California red-legged frog comprises approximately 119,492 acres, of which approximately 0.152 acre (6,630 sf) are in the action area. The action area represents a small portion (less than 0.001 percent) of critical habitat Unit MNT-2, and less than 0.00001 percent of the 1,636,609 acres of total critical habitat throughout the range of the California red-legged frog. All aquatic and terrestrial habitats in and around the action area provide one or more of the PCE's. The action area potentially includes aquatic breeding and/or non-breeding habitat (PCE's 1 and 2) totaling up to 0.067-acre (2,930 sq ft) and, upland and dispersal habitats (PCE's 3 and 4) totaling up to approximately 0.084-acre (3,700 sq ft). The proposed action will affect the critical habitat's PCE's by temporarily affecting the quality and quantity of aquatic habitat (PCE's 1 and 2) and by resulting in the loss of approximately 0.084-acre (3,700 sq ft) of the species terrestrial habitat. These minor impacts are not anticipated to preclude the capacity of critical habitat Unit MNT-2 to serve its intended conservation function.

Summary of Effects to California Red-Legged Frog Critical Habitat

We do not anticipate long-term adverse effects to the PCE's of critical habitat for the California red-legged frog as a result of the proposed action. Any potential direct and indirect effects of the project would affect a very small proportion of critical habitat Unit MNT-2, would be minimized by implementation of the proposed conservation measures, and would not appreciably diminish the conservation function of critical habitat for the species.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. We do not consider future Federal actions that are unrelated to the proposed action in this section because they require separate consultation pursuant to section 7 of the Act. We are unaware of any other non-Federal actions that are reasonably certain to occur in the action area that are likely to adversely affect the California red-legged frog.

CONCLUSION

The regulatory definition of "to jeopardize the continued existence of the species" focuses on assessing the effects of the proposed action on the reproduction, numbers, and distribution, and their effect on the survival and recovery of the species being considered in the biological opinion. For that reason, we have used those aspects of the status of the California red-legged frog as the basis to assess the overall effect of the proposed action on this species.

Reproduction

Project activities in upland and or dispersal habitat could injure or kill California red-legged frogs sheltering or dispersing through the action area. Activities conducted in aquatic habitats would be conducted between June 1 and October 15, greatly reducing the potential to impact tadpoles of the California red-legged frog in the unlikely event that any occur in the action area. The loss of reproductive individuals and potential breeding habitat could temporarily lower the reproductive capacity of the local population. However, we expect such impacts to be small due to the minor nature of impacts and the measures proposed to protect California red-legged frogs which include surveying for and relocating individuals from the work area. Therefore, we expect the proposed project to result in no or minimal impacts to breeding California red-legged frogs and conclude that it will not appreciably reduce reproduction of the species locally or rangewide.

Numbers

A small number of California red-legged frogs may be injured or killed as a result of project activities. The California red-legged frog is known to occur within and around the action area and may occur onsite during project activities. However, the minor nature of project impacts and the range of proposed conservation measures will minimize the number of California red-legged frogs lost as a result of project activities. Therefore, we conclude that the potential loss of a small number of individuals, if any, which may occur during the proposed project would not appreciably reduce the local or rangewide population of the California red-legged frog.

Distribution

The proposed project could injure, kill, or temporarily displace a small number of California red-legged frogs, but the project proponents have proposed conservation measures to minimize the risk of adverse effects on individuals. Construction activities will temporarily impact aquatic breeding and/or non-breeding habitat and directly affect upland and dispersal habitat. The proposed project would affect a small proportion of the California red-legged frog habitat available in the vicinity and a very small proportion of the habitat available in the species' geographic range. Therefore, we conclude that the proposed project will not appreciably reduce the distribution of the California red-legged frog at the local or rangewide level.

Recovery

The action area lies within the Central Coast Recovery Unit and the Carmel River – Santa Lucia Core Area for the California red-legged frog. Project impacts to California red-legged frogs and their habitat would be minor and further reduced by the proposed conservation measures. The project would not increase the threats currently impacting the California red-legged frog in this Recovery Unit. We anticipate that the proposed project would not substantially affect reproduction, numbers and distribution of the species. The proposed project would not preclude the Service's ability to implement any of the measures identified in the recovery plan for the species. Therefore, we conclude that the proposed project would not reduce the likelihood of recovery of the California red-legged frog.

Conclusion for the California Red-Legged Frog

After reviewing the current status of the California red-legged frog, the environmental baseline for the action area, the effects of the proposed project and the cumulative effects, it is the Service's biological opinion that the Sleepy Hollow Steelhead Rearing Facility Upgrade Project, as proposed, is not likely to jeopardize the continued existence of the California red-legged frog, because:

1. The project would not appreciably reduce reproduction of the species locally or rangewide;

2. The project would affect a small number of individuals, if any, and would not appreciably reduce numbers of the California red-legged frog at the local level or rangewide;

3. The project would not reduce the species' distribution either locally or rangewide; and,

4. The project would not cause any effects that would preclude our ability to recover the species.

California Red-Legged Frog Critical Habitat

We expect proposed project activities to result in impacts to a small area of California red-legged frog critical habitat Unit MNT-2. The action area represents less than 0.001 percent of Unit MNT-2 and less than 0.00001 percent of total designated critical habitat for the species.

The action area potentially includes aquatic breeding and/or non-breeding habitat (PCE's 1 and 2) totaling up to 0.067-acre and upland and dispersal habitats (PCE's 3 and 4) totaling up to 0.084-acre. The proposed action will affect the critical habitat's PCE's by temporarily affecting the quality and quantity of aquatic habitat (PCE's 1 and 2) and by resulting in the loss of approximately 0.084-acre of the species terrestrial habitat (PCE's 3 and 4). These minor impacts are not anticipated to preclude the capacity of critical habitat Unit MNT-2 to serve its intended conservation function.

Conclusion for California red-legged frog Critical Habitat

After reviewing the current status of critical habitat of the California red-legged frog, the environmental baseline of critical habitat for the action area, the effects of the Corps' action to permit the proposed Sleepy Hollow Steelhead Rearing Facility Upgrade Project on critical habitat, and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to result in the destruction or adverse modification of critical habitat of the California red-legged frog, because:

1. The action would have minor effects on all PCE's within less than 0.001 percent of critical habitat Unit MNT-2; and,

2. The overall function and conservation value of MNT-2 would not be appreciably reduced by the action locally or in critical habitat Unit MNT-2.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened wildlife species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

This incidental take statement does not exempt any activity from the prohibitions against take contained in section 9 of the Act that is not incidental to the action as described in this biological opinion. California red-legged frogs may be taken only within the defined boundaries of the action area as described in the Environmental Baseline section of this biological opinion.

The measures described below are non-discretionary and the Corps must make these binding conditions of any authorizations or contracts associated with the proposed action, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps fails to require the project proponents to adhere to the terms and conditions of this incidental take statement through enforceable terms that are added to the authorization, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Corps must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

All California red-legged frogs in the action area may be subject to take as a result of project activities. Take could occur in the form of capture during relocation activities and in the form of harassment, harm, injury, or death as a result of construction activities, or if they are accidentally injured during capture and relocation. Incidental take of California red-legged frogs will be difficult to detect because of their small body size; therefore, finding a dead or injured specimen may be unlikely. California red-legged frogs injured or killed during translocation efforts are likely to be observed; however, mortality from other sources, including the indirect effects of translocation, would be difficult to observe.

Consequently, we are unable to reasonably anticipate the actual number of California red-legged frogs that would be taken by the proposed action; however, we must provide a level at which formal consultation would have to be reinitiated. The Environmental Baseline and Effects Analysis sections of this biological opinion indicate that we expect some California red-legged frogs to be observed in the action area, but that adverse effects to the species would likely be low given the nature of the proposed activities and conservation measures. Therefore, we anticipate that take of California red-legged frogs would also be low. We also recognize that for every California red-legged frog found dead or injured, other individuals may be killed or injured that are not detected, so when we determine an appropriate take level we are anticipating that the actual take would be higher and we set the number below that level.

> If more than four (4) California red-legged frog adults or juveniles or ten (10) tadpoles are captured and relocated during project activities, any operations causing such take should cease pending reinitiation of consultation. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.
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> If more than one (1) California red-legged frog adult or juvenile or one (1) tadpole are found dead or injured during project activities, any operations causing such take should cease pending reinitiation of consultation. Project activities that are likely to cause

additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

REASONABLE AND PRUDENT MEASURE

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize the impacts of the incidental take of California red-legged frogs:

Effects to the California red-legged frog must be minimized.

TERMS AND CONDITION

To be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following term and condition, which implements the reasonable and prudent measure described above and outline reporting and monitoring requirements. This term and condition implements the reasonable and prudent measure and is non-discretionary.

To ensure effects to the California red-legged frog are minimized, the project proponent and all contractors must follow and implement all of the conservation measures specified above under the Description of the Proposed Action. If any of these measures are not followed at any time work must immediately cease and the Service promptly contacted to determine the best procedure to continue minimizing adverse effects to the species.

REPORTING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)(3), the Corps must report the progress of the action, including compliance with the above measures and the impact of the action on the species, to the Service as specified in this incidental take statement to the Service's Ventura Fish and Wildlife Office (2493 Portola Road, Suite B, Ventura, California 93003) within 90 days following completion of the proposed project.

DISPOSITION OF DEAD OR INJURED SPECIMENS

Within 3 days of locating any dead or injured California red-legged frogs, you must notify the Ventura Fish and Wildlife Office by telephone (805) 644-1766. The report must include the date, time, location of the carcass, a photograph, cause of death (if known), and any other pertinent information.

Care must be taken in handling dead specimens to preserve biological material in the best possible state for later analysis. Remains of California red-legged frogs should be placed with educational or research institutions holding the appropriate State and Federal permits.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that the Corps advise Service-approved biologist(s) to relocate other native reptiles or amphibians found within work areas to suitable habitat outside of project areas if such actions are in compliance with State laws.

2. We recommend that dead California red-legged frogs identified in the action area be tested for amphibian disease.

The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats.

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the request for formal consultation. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the Corp's action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the Corps' action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) may have lapsed and any further take could be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions about this biological opinion, please contact Chad Mitcham of my staff at (805) 677-3328, or by electronic mail at Chad_Mitcham@fws.gov.

Sincerely,

Stephen P. Henry
Field Supervisor

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APPENDIX A. The Declining Amphibian Populations Task Force Fieldwork Code of Practice

<u>The Declining Amphibian Populations Task Force Fieldwork Code of Practice</u>

1. Remove mud, snails, algae, and other debris from nets, traps, boots, vehicle tires, and all other surfaces. Rinse cleaned items with sterilized (e.g., boiled or treated) water before leaving each work site.

2. Boots, nets, traps, and other types of equipment used in the aquatic environment should then be scrubbed with 70 percent ethanol solution and rinsed clean with sterilized water between study sites. Avoid cleaning equipment in the immediate vicinity of a pond, wetland, or riparian area.

3. In remote locations, clean all equipment with 70 percent ethanol or a bleach solution, and rinse with sterile water upon return to the lab or "base camp." Elsewhere, when washing-machine facilities are available, remove nets from poles and wash in a protective mesh laundry bag with bleach on the "delicates" cycle.

4. When working at sites with known or suspected disease problems, or when sampling populations of rare or isolated species, wear disposable vinyl[1] gloves and change them between handling each animal. Dedicate sets of nets, boots, traps, and other equipment to each site being visited. Clean them as directed above and store separately at the end of each field day.

5. When amphibians are collected, ensure that animals from different sites are kept separately and take great care to avoid indirect contact (e.g., via handling, reuse of containers) between them or with other captive animals. Isolation from unsterilized plants or soils which have been taken from other sites is also essential. Always use disinfected and disposable husbandry equipment.

6. Examine collected amphibians for the presence of diseases and parasites soon after capture. Prior to their release or the release of any progeny, amphibians should be quarantined for a period and thoroughly screened for the presence of any potential disease agents.

7. Used cleaning materials and fluids should be disposed of safely and, if necessary, taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

The Fieldwork Code of Practice has been produced by the Declining Amphibian Populations Task Force with valuable assistance from Begona Arano, Andrew Cunningham, Tom Langton, Jamie Reaser, and Stan Sessions.

For further information on this Code, or on the Declining Amphibian Populations Task Force, contact John Wilkinson, Biology Department, The Open University, Walton Hall, Milton Keynes, MK7 6AA, UK, e-mail: DAPTF@open.ac.uk.

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[1] Do not use latex gloves as latex is toxic to amphibians.