2005-2006 ANNUAL REPORT EXECUTIVE SUMMARY
(July 1, 2005 - June 30, 2006)

MPWMD MITIGATION PROGRAM
WATER ALLOCATION PROGRAM ENVIRONMENTAL IMPACT REPORT

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT
Prepared June 2006

INTRODUCTION AND BACKGROUND:

In April 1990, the Water Allocation Program Final Environmental Impact Report (EIR) was prepared for the Monterey Peninsula Water Management District (MPWMD or District) by Mintier and Associates. The Final EIR analyzed the effects of five levels of annual California American Water (CAW) production, ranging from 16,744 acre-feet per year (AFY) to 20,500 AFY. On November 5, 1990, the MPWMD Board certified the Final EIR, adopted findings, and passed a resolution that set Option V as the new water allocation limit. Option V resulted in an annual limit of 16,744 AFY for CAW production, and 3,137 AFY for non-CAW production, with a total allocation of 19,881 AFY for the Monterey Peninsula Water Resource System.

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

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

The Five-Year Mitigation Program formally began in July 1991 with the new fiscal year (FY) and was slated to run until June 30, 1996. Following public hearings in May 1996 and District Board review of draft reports through September 1996, the Five-Year Evaluation Report for the 1991-1996 comprehensive program, as well as an Implementation Plan for FY 1997 through FY 2001, were finalized in October 1996. In its July 1995 Order WR 95-10, the State Water Resources Control Board (SWRCB) directed CAW to carry out any aspect of the Five-Year Mitigation Program that the District does not continue after June 1996. To date, as part of the annual budget approval process, the District Board has voted to continue the program. The Mitigation Program presently accounts for a significant portion of the District budget in terms of revenue (derived primarily from the MPWMD fee on the CAW bill) and expenditures.

The California Environmental Quality Act (CEQA) (Pub. Res. Code 21081.6) requires that the MPWMD adopt a reporting or monitoring program to insure compliance with mitigation measures when implementing the Water Allocation Program. Findings Nos. 387 through 404 adopted by the Board on November 5, 1990 describe mitigation measures associated with the Water Allocation Program; many

entail preparation of annual monitoring reports. This 2005-2006 Annual Report for the MPWMD Mitigation Program responds to these requirements, and is the fifteenth in a series. It covers the fiscal year period of July 1 through June 30 of the following year. It is notable that hydrologic data and well reporting data are tabulated using the water year, defined as October 1 through September 30, in order to be consistent with the accounting period used by the SWRCB. This report was delayed until June 2006 in order to incorporate the most recent WY 2005 water production data available in April 2007, and due to other high-priority work tasks.

This 2005-2006 Annual Report will first address general mitigation measures relating to water supply and demand (Sections II through VIII), followed by mitigations relating to specific environmental resources (Sections IX through XII). Section XIII provides a summary of costs for the biological mitigation programs as well as related hydrologic monitoring, water augmentation and administrative costs. Section XIV presents selected references by topic.

Table 1 summarizes the mitigation measures described in this report. In subsequent chapters, for each topic, the mitigation measure adopted as part of the Final EIR is briefly described, followed by a summary of activities relating to the topic in FY 05-06 (July 1, 2005 through June 30, 2006 unless as noted otherwise). Monitoring results, where applicable, are also presented. Tables and figures that support the text are found at the end of each section in the order they are mentioned in the text. Finally, a summary of observed trends, conclusions and/or recommendations is provided, where pertinent.

ACCOMPLISHMENTS:

Many activities are carried out as part of the MPWMD Mitigation Program to address the environmental effects that community water use has upon the Carmel River and Seaside Groundwater Basins. Highlights of the accomplishments in FY 05-06 for each major category are shown in **Table 2**.

OBSERVED TRENDS, CONCLUSIONS AND/OR RECOMMENDATIONS:

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

General Overview

In general, the Carmel River environment is in better condition today than it was 15 years ago. This improvement is evidenced by biological/hydrologic indicators such as consistent steelhead adult spawner counts of several hundred fish in recent years as compared to zero to five fish per year when the Mitigation Program began in 1991; improved densities of juvenile steelhead in quantities that reflect a healthy seeded stream; consistently increased bird diversity in MPWMD restoration project areas compared to control areas; fewer miles of dry river in summer and fall than in the past; and higher water tables in the Carmel Valley alluvial aquifer at the end of the water year.

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

Better understanding of the Monterey Peninsula Water Resource System enables informed decision-making that achieves the District's mission of benefiting the community and the environment.

It is acknowledged that there are other important factors responsible for this improved situation. For example, since 1991, the Carmel River has received normal or better runoff in 12 out of 15 years. Actions by federal resource agencies under the Endangered Species Act (ESA) or the SWRCB under its Order WR 95-10 have provided strong incentive for CAW and other local water producers to examine and amend water production practices to the degree feasible, and for the community to reduce water use. Except for one year in 1997, the community has complied with the production limits imposed on CAW by the SWRCB since Order 95-10 became effective in July 1995.

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

Water Resources

Streamflow and precipitation data continue to provide a scientific basis for management of the water resources within the District. These data continue to be useful in Carmel River Basin planning studies, reservoir management operations, water supply forecast and budgeting, and defining the baseline hydrologic conditions of the Carmel River Basin. The District's streamflow monitoring program continues to produce high quality data in a cost-effective manner. For example, the current annual cost of maintaining a single streamflow gaging station charged by the United States Geological Survey (USGS) is $19,600 per year. If the District's streamflow monitoring program were maintained by the USGS, the annual cost would be $353,000 (based on 18 gage sites). The District is able to maintain its streamflow monitoring network with approximately 75 percent of a full-time District staff position (Associate Hydrologist), and an annual equipment-operating budget of about $2,000.

There is limited storage of surface water by dams on the Carmel River. Los Padres Reservoir, completed in 1948, holds 1,478 AF of usable storage, based on an estimate by CAW in 1998. Usable storage in San Clemente Reservoir, completed in 1921, has been essentially eliminated by order of the Department of Water Resources (DWR) due to seismic safety concerns. As an interim safety measure through WY 2006, DWR has required CAW to lower the water level in San Clemente Reservoir from 525 feet to 514 feet elevation, which is too low for water supply use. CAW has proposed a dam seismic strengthening program that is currently undergoing state and federal environmental review.

Groundwater levels, and consequently groundwater storage conditions, in the Carmel Valley Alluvial Aquifer have maintained a relatively normal pattern in recent years, in contrast to the dramatic storage declines that were observed during the prolonged 1987-1991 drought period. The relatively stable storage in the Carmel Valley alluvial aquifer in recent years is attributable to a combination of more favorable hydrologic conditions and the adoption of improved water management practices that have tended to preserve high storage conditions in the aquifer.

In contrast, storage conditions in the coastal portion of the Seaside Groundwater Basin have not been stable in recent years, in particular with respect to the deeper Santa Margarita aquifer, from which over 80 percent of the CAW production in the Seaside Basin is derived. This downward trend in water levels reflects the changed production operations in the Seaside Basin stemming primarily from SWRCB Order

95-10. The increased annual reliance on production from CAW's major production wells in Seaside, along with significant increases in non-CAW use, have dramatically lowered water levels in this aquifer, and seasonal recoveries have not been sufficient to reverse this trend.

To address this storage depletion trend, the District initiated efforts in the 2000-2001 timeframe to prepare a Seaside Basin Groundwater Management Plan in compliance with protocols set by the State of California (AB 3030 as amended by SB 1938). This process was superseded by litigation filed by CAW on August 14, 2003, requesting a court adjudication of water production and storage rights in the Seaside Basin. The District participated in all litigation proceedings as an intervening "interested party". The Superior Court held hearings in December 2005 and issued a final adjudication decision in March 2006. The final decision established a new, lower "natural safe yield" for the Basin of 3,000 AFY, and an initial Basin "operating safe yield" of 5,600 AFY. Under the decision, the operating safe yield would be reduced by 10% every three years until the operating safe yield matches the natural safe yield of the Basin. The Court also created a nine-member Watermaster Board (of which the District is a member) to implement the Court's decision.

One of the means to mitigate this observed storage depletion trend is a program that the District has been actively pursuing since 1996 -- the Seaside Basin groundwater injection program (also known as aquifer storage and recovery, or ASR) where excess flow from the Carmel River, as specified by state and federal resource agencies, is injected into the Seaside Basin for use during dry periods. Continued testing of the District's full-scale test injection well was carried out during RY 2006 to further confirm the feasibility of this important means to help replenish the Seaside Basin. In addition, a Draft EIR/Environmental Assessment for the long-term MPWMD Phase 1 ASR Project was completed in FY 05-06. In August 2006, the District Board certified the Final EIR for the Project, which is comprised of a second well at the District's Santa Margarita Test Injection Well site; permits were obtained and construction began in December 2006. Next year's annual report will address the MPWMD Phase 1 ASR Project in more detail. It is anticipated that ASR will play an increasing important role in addressing groundwater concerns in both the Carmel River and Seaside Basins.

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

Steelhead Resource

Monitoring conducted by the District shows that the Carmel River steelhead population recovered somewhat from remnant levels that prevailed as a result of the last drought and past water supply practices. Since 1992, the spawning population has recovered from a handful of fish to levels approaching 900 adults per year as counted at San Clemente Dam. In the past five years, the spawning population has trended downward from 804 fish in 2001 to 328 fish in 2005, but recovered slightly to 368 fish in 2006. Monitoring of the juvenile population at several sites along the main stem Carmel River below Los Padres Dam shows that the population is recovering from low densities during the 1989-91 drought period (ranging below 0.50 fish per foot [fpf] of stream) to levels frequently ranging above 1.00 fpf, values that are typical of well-stocked steelhead streams. In FY 05-06, average population density was above the long-term average for the Carmel River. District staff believes the recovery and fluctuation of steelhead in the Carmel River Basin is directly related to the following factors:

- Improvements in streamflow patterns, due to favorable natural fluctuations, exemplified by relatively high base flow conditions since 1995;

- The District's and the SWRCB rules to actively manage the rate and distribution of groundwater

extractions and direct surface diversions within the basin;

- Changes to CAW's operations at San Clemente and Los Padres Dams, providing increased streamflow below San Clemente Dam;

- Improved conditions for fish passage at Los Padres and San Clemente Dams due to physical improvements;

- Recovery of riparian habitats, tree cover along the stream, and increases in woody debris, especially in the reach upstream of Robinson Canyon;

- Extensive rescues (and rearing) by MPWMD of juvenile steelhead over the last 17 years, now totaling 233,922 fish through December 31, 2005; and by the transplantation of the younger juveniles to viable habitat below Los Padres Dam, and of older smolts to the lagoon or ocean; and

- Implementation of a captive broodstock program by Carmel River Steelhead Association and California Department of Fish and Game (CDFG), and planting of 186,882 juvenile fish, including 73,786 fry, 84,679 fingerlings, and 28,417 smolts during the period from 1991 to 1994.

Though overall populations are improved since the inception of the Mitigation Program in 1990, District staff has noticed a period of decline in the adult run from 2001 to 2005, even though the juvenile population density have increased or fluctuated within a "normal" range. At present, the reasons for period of decline in adult returns are not obvious, but may be related to a combination of controlling and limiting factors including:

- Better spawning conditions in the lower Carmel River (i.e., fish spawn before they reach the counter at the dam);

- Chronic poor water quality in the lagoon that causes annual fish die-offs or high predation, especially in low-flow years, thus resulting in fewer returning adults;

- Low numbers of juvenile fish in 1999, 2001, and 2004 affecting subsequent adult populations;

- Migration barriers such as the Old Carmel River Dam;

- Chronic, and occasionally acute fall temperature and hydrogen sulfide levels below Los Padres Dam;

- Potential for enhanced predation on smolts migrating through the sediment fields of Los Padres and San Clemente Reservoirs;

- Poor ocean conditions; and

- Ongoing but limited impacts of fishing (i.e., ~1.5% incidental mortality associated with catch-and-release fishing for adults in the winter season, and catch-and-release fishing for juvenile steelhead from in the upper watershed during the Spring/Summer trout season that may slightly reduce the number of fish that reach the ocean).

A recent challenge that may remain for some years is the potential effects of substantive physical and operational changes to San Clemente Dam required by the California Department of Water Resources, Division of Safety of Dams (DWR/DSOD), including possible removal of the dam. The most significant

issue is the effect of released sediment from the reservoir on downstream river habitat, proper functioning of MPWMD's Sleepy Hollow Steelhead Rearing Facility, and downstream property owners (flood elevations). Major changes include:

- Lowering of the reservoir water level to address seismic safety concerns;
- Significant changes in the sediment regime in the Carmel River downstream of San Clemente as the dam fills with sediment; and
- Loss of reservoir storage, which, in the past, has helped maintain adequate river flows and cooler water in the lower Carmel River.

However, improvements in State and Federal permit conditions this last year have extended by two weeks, until at least May 1 of each year, the time that the reservoir will remain full and that the fish ladder can operate to pass adult steelhead upstream. This improvement over past standards may result in allowing up to a dozen or more adult steelhead each year to pass San Clemente Dam under the new draw down regimen.

District staff continues to provide technical expertise and scientific data to CAW engineers and environmental consultants, DWR/DSOD, CDFG, NOAA Fisheries, U.S. Fish and Wildlife Service, and others involved in addressing the resource management issues associated with seismic retrofit of San Clemente Dam. District staff also continues to provide technical expertise and scientific data to the California Department of Parks and Recreation, Monterey County Water Resources Agency, Monterey County Public Works Department, California Coastal Commission, U. S. Army Corps of Engineers, and Carmel Area Wastewater District, other regulatory agencies and stakeholders involved in the management of the Carmel River Lagoon and barrier beach.

Riparian Corridor

The Carmel River is showing many signs of recovery after the extreme drought and flood events during the 1990s that impacted property owners, threatened species, and riparian habitat. Fine material (silt and sand) that entered the main stem during floods in 1995 and 1998 has, for the most part, been washed downstream of River Mile 2 (measured from the ocean) leaving behind a more complex channel with diverse habitat and a richer riparian community. Areas with perennial flow (upstream of Schulte Bridge) or a high groundwater table, such as downstream of Highway 1, have experienced vigorous natural recruitment in the channel bottom, which has helped to stabilize streambanks and diversify aquatic habitat.

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

In contrast to areas with perennial flow, the recovery of the streamside area between Rancho Cañada and Quail Lodge has been impacted by increased groundwater extraction. In this reach, only irrigated areas are able to sustain a diversity of plant species. Plant stress in the late summer and fall is evident in non-irrigated portions of the river. In these areas, streambanks exhibit unstable characteristics during high flows, such as sudden bank collapse, because of the lack of healthy vegetation that would ordinarily provide stability.

Restoration project areas sponsored by MPWMD since 1984 continue to mature and exhibit more features

of relatively undisturbed reaches, such as plant diversity and vigor, complex floodplain topography, and a variety of in-channel features such as large wood, extensive vegetative cover, pools, riffles, and cut banks. Areas that were repaired after the 1995 and 1998 floods are still developing these natural features. In part, the location and geometry of the projects constrain the rate of progress toward a fully restored stream channel (i.e., several are located in highly developed, narrow sections of the river impacted by groundwater extraction). Also, many of these projects relied heavily on the use of bank hardening (e.g., rip-rap) to stabilize banks, which can discourage plant vigor and diversity.

The most significant trends include the following:

- Increased oversight of channel maintenance and restoration activities by Federal agencies,
- Increased groundwater extraction downstream of Schulte Road,
- Significant vegetation encroachment into the channel bottom,
- Increased avian species diversity, and
- Maturing of previous restoration projects.

Carmel River Erosion Protection and Restoration

With the exception of the channel area between Via Mallorca Road and Rancho San Carlos Road, streambanks in the Carmel River main stem presently appear to be relatively stable during average water years.

It is likely that the following trends will continue or develop in the near future:

- Permit applications by MPWMD for river maintenance and restoration work will come under great scrutiny at all levels of government. More stringent avoidance and mitigation requirements will be placed on activities that could have negative impacts on sensitive aquatic species or their habitats.
- Activities that interrupt or curtail natural stream functions, such as lining streambanks with riprap, will be discouraged or denied permits. Activities that increase the amount of habitat or restore natural stream functions are more likely to be approved.
- Additional work to add instream features (such as large logs for steelhead refuge or backwater channel areas for frogs) will be necessary to restore and diversify aquatic habitat.
- Major restoration projects completed between 1992 and 1999 will require additional work to diversify plantings and to maintain irrigation systems during the establishment period (varies from 5 to 10 years depending on environmental conditions and the availability of staff resources). Streambank repairs may be necessary after high flows as previously installed structural protection works go through an initial adjustment period.

A noticeable change to the channel bottom is the obvious continued degradation (i.e., the river channel is incising into floodplain deposits). This has both a positive and negative aspect. On the plus side, it is clear that sand and fine material has been winnowed out in the past few years, exposing gravel and cobble layers that provide spawning habitat for steelhead and suitable substrate for the food web that steelhead depend on. However, a lack of a natural supply of sediment from the upper watershed (due to the

presence of main stem dams) means that the river must remove material from the channel bottom and streambanks to make up for this deficit. The river system downstream of Los Padres Reservoir is considered "sediment starved."

Because approximately 35% of the streambanks downstream of Carmel Valley Village have been altered or hardened over the past 40 years, most of the current sediment supply comes from scouring of the channel bottom, which results in exposing the base of streambanks, bridge piers and abutments. Eventually, without corrective measures to balance the sediment load with the flow of water, streambanks will begin to collapse and the integrity of bridges will be threatened.

A comprehensive long-term solution to overall environmental degradation requires a significant increase in dry season water flows in the lower river, a reversal of the incision process, and reestablishment of a natural meander pattern. Of these, MPWMD has made progress with increasing summer low flows and in identifying areas where a natural meander pattern could be considered. Reversal, or at least halting of channel incision, may be possible if the supply of sediment is brought into balance with the transport capacity of the river. Although the supply of sediment to the lower portion of the river is likely to increase as San Clemente Reservoir fills with sediment and sand starts to flow down the river, it is likely that the supply of sediment downstream of the San Clemente Dam will increase slowly in the very near future and may not halt the incision process.

Presently, DWR and the U.S. Army Corps of Engineers are jointly moving forward on a combined Environmental Impact Report and Environmental Impact Statement (EIR/EIS) concerning alternatives to remediate the safety deficiencies that have been identified at San Clemente Dam. A Final combined EIR/EIS is expected to be completed in 2007. In the interim, DWR has directed CAW to draw San Clemente Reservoir down and maintain it 10 feet lower than the spillway, except between February 1 and April 15 (to allow for downstream migration of steelhead).

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

Vegetation Restoration and Irrigation

To the maximum extent possible, MPWMD-sponsored river restoration projects incorporate a functional floodplain that would be inundated in relatively frequent storm events (those expected every 1-2 years). For example, low benches at the Red Rock and All Saints Projects have served as natural recruitment areas and are currently being colonized by black cottonwoods, sycamores and willows. In addition, willow and cottonwood pole plantings in these areas were installed with a backhoe, which allows them to tap into the water table. These techniques have been successful and have reduced the need for supplemental irrigation. However, as pumping has increased in the lower Carmel Valley (pursuant to direction by the SWRCB and a Conservation Agreement between CAW and NOAA Fisheries) supplemental irrigation was installed on the engineered floodplain opposite the All Saints School. This system is not operated in normal to wet years, but in below-average years the system will be used.

The Conservation Agreement between CAW and NOAA Fisheries has changed the lower Carmel Valley pumping regime. Depending on the total rainfall for the year, increased pumping at the Cañada Well may cause significant stress to the riparian corridor and create the need for supplemental irrigation. The severity of these impacts was monitored in FY 05-06 through the Conservation Agreement Monitoring Plan. Based on observation of stress to riparian trees in the area, the irrigation system at the Cañada Well has been sufficient to offset impacts to established trees from groundwater extraction.

Channel Vegetation Management

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

Permits for Channel Restoration and Vegetation Management

To cope with the rising level of environmental analysis and documentation necessary to obtain permits, MPWMD sought and obtained a long term permit from the Corps and the California Regional Water Quality Control Board. In January 2001, the District applied to CDFG to renew a long term Routine Maintenance Agreement (RMA) to conduct regular maintenance and restoration activities. The District continued to pursue this RMA during FY 2005-06 and finally received a signed RMA in October 2005. The District may also seek long-term permits or agreements with other regulatory agencies including the Monterey County Water Resources Agency and Monterey County Planning and Building Inspection Department.

Monitoring Program

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

With respect to riparian songbird diversity, populations dropped after major floods in 1995 and 1998 because of the loss of streamside habitat. However, they have rebounded in the last few years and have shown some of the highest diversity since monitoring began in 1992, indicating that the District mitigation program is preserving and improving riparian habitat.

Integrated Regional Water Management Plan

Though not part of the adopted Mitigation Program, relatively new cooperative efforts such as the Integrated Regional Water Management Plan (IRWM Plan) will help result in increased state and federal grant funding for solutions to augment the Mitigation Program efforts. The District is serving as the lead to prepare the IRWM Plan for a region encompassing Monterey Peninsula areas within the District

boundary, the area in the Carmel River watershed outside of the MPWMD boundary, Carmel Bay and the Southern Monterey Bay. MPWMD will be reimbursed for up to $496,957 to prepare the Plan, which is estimated to cost a total of about $1,258,000. Funds for reimbursement will come from the IRWM grant program funded by State Proposition 50. The plan will combine strategies to improve and manage potable water supply, water conservation, stormwater runoff, floodwaters, wastewater, water recycling, habitat for wildlife, and public recreation. A draft IRWM Plan was completed in November 2006. When finalized, the IRWM Plan will also aid in applying to State grant programs for implementing projects such as those funded by Proposition 50, 84, and 1E and in applying to Federal grant programs such as those funded through the Army Corps of Engineers and NOAA Fisheries.

In an effort to broaden the integration of water resource management around the Monterey Bay, the District signed a Memorandum of Understanding with the Monterey County Water Resources Agency and the Pajaro Valley Water Management Agency to further joint efforts on IRWM Planning for watersheds draining into the Monterey Bay. A primary goal of this effort is to coordinate the detailed IRWM Plans being developed for areas draining into the Monterey Bay. Such cooperation will avoid duplication, competition for grant funds and more efficiently use agency resources.

Carmel River Lagoon

The District continues to support and encourage the ongoing habitat restoration efforts in the wetlands and riparian areas surrounding the Carmel River Lagoon. These efforts are consistent with goals that were identified in the Carmel River Lagoon Enhancement Plan, which was partially funded by the District. The District continues to work with various agencies and landowners to implement restoration of the Odello West property and the Odello East property across Highway 1. Because of the restoration activities on the south side of the lagoon, the District has concentrated its monitoring efforts on the relatively undisturbed north side. District staff have also attended meetings and had discussions with other agencies regarding the use of an old agricultural well and treated water from the Carmel Area Wastewater District to augment the lagoon during periods of low water.

The District expanded its long-term monitoring around the lagoon in 1995 in an attempt to determine if the reduction in freshwater flows due to ground water pumping upstream might be changing the size or ecological character of the wetlands. Demonstrable changes have not been identified. Because of the complexity of the estuarine system, a variety of parameters are monitored, including vegetative cover in transects and quadrats, water conductivity, and hydrology. It is notable that due to the number of factors affecting this system, it would be premature to attribute any observed changes solely to groundwater pumping. During this period, for example, there have been two extremely wet water years (1995 and 1998), two wet water years (2005 and 2006), and three above-normal water years (1996, 1997 and 2000), in terms of runoff. Other natural factors that affect the wetlands include introduction of salt water into the system as waves overtop the sandbar in autumn and winter, tidal fluctuations, and long-term global climatic change. When the District initiated the long-term lagoon monitoring component of the Mitigation Program, it was with the understanding that it would be necessary to gather data for an extended period in order to draw conclusions about well draw-down effects on wetland dynamics. It is recommended that the annual vegetation, conductivity, topographical and wildlife monitoring be continued in order to provide a robust data set for continued analysis of potential changes around the lagoon.

Lagoon bathymetric cross sectional surveys, initially conducted in 1988, have been completed annually during the dry season since 1994. These data are useful in assessing changes in the sand supply within the main body of the lagoon. Although significant sand accumulation was observed during the June 2005 surveys, the September 2006 surveys indicated just the opposite as significant sand loss or scour was measured at the cross sections. Notably, the 2005 and 2006 data appear to bracket the variability found in the multi-year data set. It is too early to tell if the scour detected in 2006 at the lagoon cross sections is the

beginning of a trend, or merely a short- term change. In general, no major trends indicating sand accumulation or depletion at the lagoon cross sections have been identified based on available data. These data are necessary to answer to questions concerning whether or not the lagoon is filling up with sand, thus losing valuable habitat.

Program Costs

Mitigation Program costs for FY 05-06 totaled approximately $3.17 million. The annual cost of mitigation efforts varies because several mitigation measures are weather dependent. The overall costs remained fairly constant (about $1.3-$1.7 million) for many years, except for FY 2000, when an additional $981,786 was added to the capital expense program to fund one half of the acquisition cost of the District's new office building, bringing the expenditure total to over $2.6 million that year. Expenditures have trended upward in recent years. The FY 2004-2005 expenditures were $2.19 million; the $3.17 expenditures in FY 05-06 were about $976,000 higher than the previous fiscal year due to increased spending in all categories, as well as a new expenditure of over $120,000 to develop an Integrated Regional Groundwater Management Plan (IRGMP) which will be reimbursed from grant funds to be received from the State of California.