MONTEREY PENINSULA
WATER MANAGEMENT DISTRICT

2009-2010 ANNUAL REPORT
(July 1, 2009 - June 30, 2010)

for the

MPWMD MITIGATION PROGRAM

A report in compliance with the

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

Prepared by MPWMD Staff
June 2011

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June 2011

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MPWMD MITIGATION PROGRAM
WATER ALLOCATION PROGRAM ENVIRONMENTAL IMPACT REPORT

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT
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I. EXECUTIVE SUMMARY

INTRODUCTION AND BACKGROUND:

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

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 a portion of the MPWMD user fee on the CAW bill) and expenditures. It should be noted that this fee was removed from Cal-Am's bill in July 2009, however, Cal-Am continued to pay the fee amount (8.325%) under a separate reinvestment agreement with MPWMD through June 2010.

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 2009-2010 Annual Report for the MPWMD Mitigation Program responds to these requirements, and is the nineteenth 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 2009-2010 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 I-1 summarizes the mitigation measures described in this report. In subsequent chapters, for each topic, the mitigation measure adopted as part of the Final EIR is briefly described, followed by a summary of activities relating to the topic in FY 2009-10 (July 1, 2009 through June 30, 2010, unless otherwise noted). Monitoring results, where applicable, are also presented. Tables and figures that support the text are found at the end of each section in the order they are 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 2009-10 for each major category are shown in **Table I-2**.

OBSERVED TRENDS, CONCLUSIONS AND/OR RECOMMENDATIONS:

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

General Overview

In general, the Carmel River environment is in better condition today than it was in 1990. 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 balanced 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 each 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 MPWRS enables informed decision-making that achieves the District's mission of benefiting the community and the environment.

It is acknowledged that there are other important factors responsible for this improved situation. For example, since Water Year (WY) 1991, the Carmel River has received normal or better runoff in 15 out of 19 years. Actions by federal resource agencies under the Endangered Species Act (ESA) or the SWRCB under its Order WR 95-10 and follow-up orders have provided strong incentive for 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 and local user 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 Monitoring Program (Section II)

Streamflow and precipitation data continue to provide a scientific basis for management of the water resources within the District. These data continue to be useful in Carmel River Basin planning studies, reservoir management operations, water supply forecast and budgeting, and

defining the baseline hydrologic conditions of the Carmel River Basin. Also, the District's streamflow monitoring program continues to produce high quality and cost-effective data. Section II contains detailed information and analysis of a wide range of water resource data.

There is limited storage of surface water by dams on the Carmel River. Los Padres Reservoir, completed in 1948, holds 1,626 AF of usable storage, based on 2008 survey data. 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, which remained in effect through WY 2010, 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 had proposed a dam seismic strengthening program. State and federal environmental agencies urged CAW to reconsider their position and support the dam removal and river reroute option. In July 2009, Cal-Am changed its position and now supports the dam removal option, as memorialized in the January 2010 multi-agency collaboration statement.

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 higher 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 changed practices after 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, which was amended through an additional court filing in February 2007. The final decision established a new, lower "natural safe yield" for the Basin of 3,000 AFY, and an initial Basin "operating safe yield" of 5,600 AFY. Under the decision, the operating safe yield would be reduced by 10% every three years until the operating safe yield matches the natural safe yield of the Basin. 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 that could potentially mitigate this observed storage depletion trend is a program that the District has been actively pursuing since 1996 -- the Seaside Basin groundwater injection program (also known as aquifer storage and recovery, or ASR).

ASR entails diverting excess water flows (typically in Winter/Spring) from the Carmel Valley Alluvial Aquifer through existing CAW facilities and injecting the water into the Seaside Groundwater Basin for later recovery in dry periods.

The primary goal of the MPWMD Phase 1 ASR Project is better management of existing water resources to help reduce current impacts to the Carmel River, especially during the dry season. The project is viewed as being complementary to other larger, long-term water augmentation projects that are currently being explored by various entities. This project, now also known as Water Project 1, entails a maximum diversion of 2,426 AFY from the Carmel River for injection, a maximum extraction of 1,500 AFY from the ASR wells in the Seaside Basin, and an average yield of about 920 AFY. The proposed operation of the Phase 1 ASR Project would result in reduced unauthorized pumping of the Carmel River in Summer/Fall and increased storage in the Seaside Basin, which are both considered to be environmentally beneficial.

The ASR water supply efforts in 2009-2010 included: (1) continued development of the permanent plumbing and electrical facilities for the Phase 1 ASR Project at the Santa Margarita site; (2) construction of the first ASR well at the second (Phase 2 or Water Project 2) ASR site; (3) pursuit of water rights from the SWRCB for Phase 2 of the ASR project; (4) construction of a chemical/electrical facility building at the Phase 1 site; (5) coordination with CAW, federal, and state agencies to construct the necessary infrastructure for the ASR project; (6) coordination with CAW on necessary actions and delivery system facilities to enable expanded ASR; and (7) continued implementation of a Memorandum of Understanding (MOU) with CAW to operate the Phase 1 ASR facilities.

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

Steelhead Fishery Program (Section IX)

Monitoring conducted by the District shows that the Carmel River steelhead population has recovered somewhat from remnant levels that prevailed as a result of the last drought from 1987 to 1991 and past water-supply practices. Since 1992, the spawning population had recovered from a handful of fish to levels approaching 900 adults per year as counted at San Clemente Dam (SCD) before a six-year downward trend from 804 fish in 2001 to 222 fish in 2007, rebounding somewhat in 2008 to 412 adults. However, in 2009 and 2010, the population underwent a dramatic reduction to 95 and 157 adults respectively, at SCD, which is below the 1994-2010 average of 427 adults. Past redd surveys below SCD confirm that some of the spawning habitat in the lower river is excellent and adults are potentially spawning in the lower river instead of passing the SCD fish counting station. In addition, juvenile steelhead rescued by the District from the lower river that survive to adulthood are more likely to return to the lower river to spawn. The District's acquisition of grant funds to install a Dual-Frequency Identification Sonar

(DIDSON) counting station in the lower river in the 2011-2012 migration season will help identify if more adults are in fact spawning in the lower river. River bank stabilization and restoration projects by the District have matured and now provide improved rearing habitat, shade and food production for juvenile steelhead in the lower reaches of the river.

Monitoring of the juvenile population at several sites along the mainstem Carmel River below Los Padres Dam shows that in general the population is recovering from low densities during the 1987-91 drought period (ranging below 0.40 fish per foot [fpf] of stream) to levels frequently ranging above 1.00 fpf, values that are typical of well-stocked steelhead streams. In the 2009-2010 reporting period, the average population density was below the long-term average of 0.83 fpf for the Carmel River due primarily to low adult returns in 2009-2010. 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 and 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 to each dams facilities and operations;

- Recovery of riparian habitat, tree cover along the stream, and an increase in woody debris, especially in the reaches between Robles del Rio and Highway One;

- Extensive rescues by MPWMD of juvenile steelhead over the last 20 years, now totaling 360,281 fish through 2009;

- Rearing and releases of rescued fish from the Sleepy Hollow Steelhead Rearing Facility (SHSRF) of nearly 80,000 juveniles and smolts back into the river and lagoon over the past 14 years, at sizes larger then the river-reared fish, which in theory should enhance their ocean survival.

Though overall fish populations have improved since the inception of the Mitigation Program in 1990, District staff has noticed a period of general decline in the adult run from 2001 to 2010. In 2009-2010, the adult run size was the third lowest since 1994. At present, the reasons for this period of apparent 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, encouraging fish to spawn before they reach the counter at the dam;

- Lagoon conditions, including chronic poor water quality, that can cause annual fish die-offs, and high predation by birds and recently by striped bass, especially in low-flow years, thus resulting in fewer returning adults;

- Low numbers of juvenile fish in 2004, 2007, and 2009 affecting subsequent adult populations;

- Impediments to adult immigration and seasonal barriers, such as the Old Carmel River Dam, sub-optimal ladders at San Clemente and Los Padres Dams, and intermittent periods of low flows creating critical riffles below the Narrows during the normal winter-spring immigration season;

- Barriers or seasonal impediments to juvenile and smolt emigration, such as the lack of juvenile passage facilities at Los Padres Dam and intermittent periods of low flow below the Narrows during the normal spring emigration season;

- Chronic, and occasionally acute, fall temperature and hydrogen sulfide levels below LPD, and the increase in suspended sediment from the SCD summer draw-down;

- Potential for enhanced predation on smolts and YOY migrating through the sediment fields of LPD and SCD;

- Poor ocean conditions; and

- Ongoing but limited impacts of fishing (i.e., approximately 0.5 - 1.5% incidental mortality associated with catch-and-release fishing for adults in the winter season, and fishing for juvenile steelhead from in the upper watershed during the Spring/Summer trout season may slightly reduce the adult spawning stock or the number of juvenile 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 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 SHSRF, 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.

District staff continues to provide technical expertise and scientific data to CAW engineers and environmental consultants, DWR/DSOD, CDFG, NMFS, 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 California Department Parks 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 Habitat Mitigation (Section X)

The Carmel River is showing many signs of recovery after the 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 the Rancho Cañada golf courses and Quail Lodge area has been consistently impacted by 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 riparian zone. 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.

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

- Increased oversight of channel maintenance and restoration activities by Federal agencies,
- Increased concentration of groundwater extraction downstream of Schulte Road,
- Significant vegetation encroachment into the channel bottom,
- High avian species diversity values, and

- Maturing of previous restoration projects.

The District is also pursuing special studies to better assess Carmel River Lagoon habitat. In response to a request from the interagency Carmel River Lagoon TAC, the District helped design and support a mark-recapture study in 2006-2007 to estimate the steelhead population in the lagoon at the end of the fall rearing season and before the lagoon might be breached for the year. This study was led by biologists from the District and a number of federal, state agencies and local volunteers. The intent was to continue this cooperative study each year to try to assess the abundance of steelhead in the lagoon as soon as possible after closure in the spring/summer, and again just before breaching in the winter. These two numbers could be used to calculate net survival over the summer and fall to assess how well the lagoon habitat was being sustained to enhance steelhead production. However, since the CDPR's ESA Section 10 consultation for steelhead monitoring of the lagoon restoration project had expired, no government agency had the proper authority under the ESA to conduct the studies and they were not pursued. MPWMD will be applying for ESA Section 10-coverage for the future, as part of its semi-annual renewal of staff Scientific Collecting Permits from CDFG.

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.

As cited in previous reports, 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 greater scrutiny at all levels of governmental oversight. 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 (which 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.
- Downstream of the Robinson Canyon Road Bridge, the river will continue to cut into the channel bottom and form a more complex system of pools, riffles and gravel bars.

A noticeable change to the channel bottom is the obvious continued degradation (i.e., the river channel is incising into floodplain deposits). Downcutting into channel deposits has both

positive and negative aspects. 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 improved 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 sediment 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, but may not be enough to halt the incision process.

The DWR and the U.S. Army Corps of Engineers finalized a combined EIR/EIS in January 2008 concerning alternatives to remediate the safety deficiencies that have been identified at San Clemente Dam. CAW has supported an alternative in which the dam would be buttressed to address the safety issues. The California Coastal Conservancy and other State and Federal agencies, along with citizens groups, support the Dam Removal and Reroute Alternative which consists of: storing sediment in the Carmel River portion of the reservoir; removal of the dam, and rerouting the Carmel River into San Clemente Creek. Funding for this alternative is uncertain. In the interim, DWR has continued to direct CAW to draw San Clemente Reservoir down and maintain it 10 feet lower than the spillway, except between February 1 and May 31 (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 (i.e., 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 NMFS) supplemental irrigation has been installed on engineered floodplains and on vulnerable banks.

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 NMFS 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. The District operates under a regional General Permit from the Corps (obtained in 2004). However, this permit expired November 1, 2009 and the District is currently in the process of renewing it. In addition, the District has a Routine Maintenance Agreement with DFG (obtained in 2008). 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 fluctuated within a normal range since monitoring began in 1992, indicating that the District mitigation program is preserving and improving riparian habitat.

Integrated Regional Water Management Plan

Consistent with the Mitigation Program goal of comprehensive resource management, relatively new cooperative efforts such as the Integrated Regional Water Management Plan (IRWM Plan) 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 and implement 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 was reimbursed $496,957 to prepare the Plan, which cost a total of about $1,258,000 to prepare. Funds for reimbursement came from the IRWM grant program funded by State Proposition 50. The plan combines strategies to improve and manage potable water supply, water conservation, stormwater runoff, floodwaters, wastewater, water recycling, habitat for wildlife, and public recreation.

During 2006, MPWMD identified more than 40 stakeholders in the planning area and invited these stakeholders to participate in development of a draft IRWM Plan, which was completed in November 2006. To facilitate these efforts, a Technical Advisory Committee (TAC) was established comprised of representatives of the stakeholder group. The TAC refined the priorities within the planning region and established a project prioritization process that objectively ranks proposed projects (a requirement of IRWM planning). The IRWM Plan will 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. MPWMD adopted the final version of the IRWM Plan in November 2007.

In addition, MPWMD facilitated the formation of a Regional Water Management Group (RWMG) to guide the continued development and implementation of the IRWM Plan. The RWMG is comprised of representatives of the Big Sur Land Trust, City of Monterey, Monterey County Water Resources Agency, Monterey Regional Water Pollution Control Agency and MPWMD. The RWMG executed a Memorandum of Understanding concerning implementation of the IRWM Plan in 2008.

Carmel River Lagoon Habitat (Section XI)

The District continues to support and encourage the ongoing habitat restoration efforts in the wetlands and riparian areas surrounding the Carmel River Lagoon. These efforts are consistent with goals that were identified in the Carmel River Lagoon Enhancement Plan, which was partially funded by the District. The District continues to work with various agencies and landowners to implement ongoing restoration of the Odello West property and future restoration of the Odello East property across the highway. Because of the restoration activities on the south side of the lagoon, the District has concentrated its monitoring efforts on the relatively undisturbed north side. Staff have also attended meetings and had discussions with other agencies regarding the ongoing use of an existing CDPR agricultural well and potential future use of 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 change the size or ecological character of the wetlands. Demonstrable changes have not been identified. Because of the complexity of the estuarine system, a variety of parameters are monitored, including vegetative cover in transects and quadrants, water conductivity, and hydrology. It is notable that due to the number of factors affecting this system, it would be premature to attribute any observed changes solely to groundwater pumping. During the past 19-year period, based on statistics from 1902 to 2010, there have been two Extremely Wet (1995, 1998), three Wet (1993, 2005, 2006), four Above Normal (1996, 1997, 2000, 2010), and six Normal Water Year types (1992, 1999, 2001, 2003, 2008, 2009), in terms of total annual runoff. Accordingly, 15 of the 19 years or (79%) have been normal or better years. 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.

In 2009, the California State Department of Parks and Recreation (CDPR) acquired its own permits for the closure of the lagoon in the spring to maximize habitat volume. The CDPR took no action to close the lagoon during this specific reporting year, but did so during the prior and succeeding reporting years on May 18, 2009 and July 12, 2010, respectively.

Lagoon bathymetric cross sectional surveys, initially conducted in 1988, have been completed annually during the dry season since 1994. These data are useful in assessing changes in the sand supply within the main body of the lagoon and are necessary to answer to questions concerning whether or not the lagoon is filling up with sand, thus losing valuable habitat. As indicated in the bathymetric survey plots, the sandy bed of the lagoon can vary significantly from year to year. In general, no major trends indicating sand accumulation or depletion at the lagoon cross sections have been identified based on available data, with the exception of the upstream-most cross section, which exhibits an overall loss in sand volume over the 1994-2010 period.

Program Costs (Section XIII)

Mitigation Program costs for FY 2009-10 totaled approximately $3.27 million including direct personnel expenses, operating costs, project expenditures and capital equipment and fixed asset purchases. The annual cost of mitigation efforts varies because several mitigation measures are weather dependent. Expenditures in FY 2009-10 were $418,763 more than the prior fiscal year largely due to increased capital expenditures for ASR. A trend analysis shows that 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 expended total to over $2.6 million that year. More recently, expenditures have trended upward due to expenditures for the Aquifer Storage and Recovery Project. FY 2005-06 expenditures were $3.17 million; and FY 2006-07 expenditures were $3.29 million.

During FY 2009-10, revenues totaled $3.07 million including user fee revenues, tax revenues, reimbursements, interest, grants and minor miscellaneous revenues. The Mitigation Program Fund Balance as of June 30, 2010 was $1,012,706.

Table I-1

SUMMARY OF COMPONENTS OF MPWMD MITIGATION PROGRAM
July 1, 2009 - June 30, 2010

WATER MANAGEMENT

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

STEELHEAD FISHERY

- Capture/Transport Emigrating Smolts in Spring
  -- Smolt rescues
  -- Build acclimation facility/tagging study
- Prevent Stranding of Fall/Winter Juvenile Migrants
  -- Juvenile rescues
  -- Build mid-Valley holding facility
- Rescue Juveniles Downstream of Robles del Rio in Summer
- Build Sleepy Hollow holding/rearing facility
- Modify Spillway/Transport Smolts Around Los Padres Dam
- Monitoring Activities for Mitigation Plan
  -- Adult counts at San Clemente Dam
  -- Juvenile population surveys
- Other Activities not required by Mitigation Plan
  -- Spawning habitat restoration
  -- Fish planting (steelhead broodstock program)
  -- Coastal Salmon Recovery Program grant (began mid-2001)
  -- Modify critical riffles

RIPARIAN VEGETATION AND WILDLIFE

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

LAGOON VEGETATION AND WILDLIFE

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

AESTHETICS

- Restore Riparian Vegetation (see above)

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

Table I-2
Summary of MPWMD Mitigation Program Accomplishments in 2009-2010

MITIGATION ACTION	MAJOR ACCOMPLISHMENTS IN FY 2009-10
Monitor Water Resources	Regularly tracked precipitation, streamflow, surface and groundwater levels and quality, and lagoon characteristics between Los Padres Dam and the Carmel River Lagoon, using real-time and computer-monitoring methods at numerous data collection stations. Maintained extensive monitoring network, and continuous streamflow recorders below San Clemente Dam and other sites.
Manage Water Production	Developed and implemented multi-agency Memorandum of Agreement and quarterly water supply strategies based on normal-year conditions; worked cooperatively with resource agencies implementing the federal Endangered Species Act. Implemented ordinances that regulate wells and water distribution systems.
Manage Water Demand	Inspected about 1,398 properties, which will save an estimated 6.570 acre-feet of water per year (AFY) through required retrofits; approved retrofit refunds for 1,922 applications, saving an estimated 50.558 AFY; continued to offer incentives for property owners who agree to install water-efficient appliances; conducted public outreach for conservation program. Implemented Ordinance No. 109 enabling sale of water entitlements to properties within Del Monte Forest to fund expanded Pebble Beach reclamation program; implemented Ordinance No. 132 to allow expansion of the Cal-Am System to provide service and water-use permits for Sand City. Processed 971 permits of various types under allocation program; coordinated with jurisdictions to help streamline permit process.
Monitor Water Usage	Complied with SWRCB Order 95-10 for Water Year 2010.
Augment Water Supply	Long-term efforts to augment supply included: (1) Continued participation in the CPUC rate hearing process to review elements of the Regional Water Project (RWP); (2) Participated in "alternative dispute resolution" meetings intended to resolve concerns about RWP construction, operations, financing, management and oversight; (3) Passed MPWMD Resolution 2010-01 supporting RWP, requested that MPWMD be involved in project oversight and ratepayers be fully represented; (4) Voted to not sign a Settlement Agreement due to exclusion by project proponents; (5) Prepared written testimony opposing RWP Water Purchase Agreement due to lack of accountability

MITIGATION ACTION	MAJOR ACCOMPLISHMENTS IN FY 2009-10
	to the public and participated in CPUC hearings; (6) Operated Aquifer Storage and Recovery (ASR) Phase 1 project from December 2009 through May 2010, and injected a record-breaking 1,111 AF; began construction on Chemical/Electrical Building; (7) Obtained permission for and drilled initial ASR Phase 2 monitor well at Seaside Middle School site; made significant progress on long-term easement agreement with Monterey Peninsula Unified School District for extended production wells; (8) Held several ASR Phase 2 water rights settlement meetings with National Marine Fisheries Services and Carmel River Steelhead Association; (9) Held regular coordination meetings with Cal-Am regarding needed infrastructure upgrades to deliver water supply to the ASR Phase 2 wells at full capacity; (10) Completed additional hydrogeologic field work and laboratory analyses along the Fort Ord coastline to assess local desalination project feasibility; presented report to the Board in December 2009, which concluded that the hydrogeology would not provide adequate subsurface feedwater for a 8,400 AFY desalination project; (11) Prepared March 2010 report re-evaluating previously identified local desalination sites and met with property owners; (12) Transmitted formal inquiry to Cal-Am regarding expanded capacity at Los Padres Dam and provided an update in a January 2010 report to the Board; (13) Provided technical support to the Monterey Regional Water Pollution Control Agency (MRWPCA) for its Groundwater Replenishment Project (GRP) and received presentation by MRWPCA General Manager on GRP status in January 2010; (14) Filed a lawsuit to challenge State Water Resources Control Board's Final Cease and Desist Order to further reduce CAW pumping; (15) Participated in CPUC hearings on Cal-Am request for moratorium on new and intensified water connections. Near-term water supply efforts included injecting 1,111 AF into Seaside Basin in 2009-10 as part of ongoing ASR operations. Other ongoing activities included: (1) Served as member of both the Seaside Basin Watermaster Board and as the Technical Advisory Committee; (2) Delivered several database products to the Watermaster and its consultants under the District's Phase 1 contract for the required Seaside Basin Monitoring and Management Plan; (3) Continued participation on technical committee regarding removal of San Clemente Dam and associated sediment management.

MITIGATION ACTION	MAJOR ACCOMPLISHMENTS IN FY 2009-10
Allocate New Supply	Remained within Water Allocation Program limits.
Determine Drought Reserve	Rationing was not required due to adequate storage reserve.
Steelhead Fishery Program	Counted 157 adult fish passing San Clemente Dam; rescued 13,477 young steelhead from drying reaches of the Carmel River in June-September 2009; stocked 12,759 fish total at Sleepy Hollow Steelhead Rearing Facility, with a 69% survival rate; conducted annual juvenile fish population survey; conducted California Stream Bio-assessment Procedure (benthic invertebrate sampling at 5 stations); coordinated with CAW regarding operations to maximize fish habitat; applied for grants to fund gravel injection and lower river adult steelhead monitoring station; monitored fish passage throughout migration season; monitored lagoon water quality; preparation of the Rescue and Rearing Management Plan for Facility in consultation with state and federal agencies (Final Draft is expected to be completed in 2011).
Riparian Habitat Program	Continued revegetation efforts at exposed banks with little or no vegetation located between Via Mallorca and Esquiline Roads; Contracted to collect channel profile data and limited cross section data from the Carmel River for use in maintaining a long-term record and comparing to the past and future data; Made public presentations showing MPWMD-sponsored restoration work over the past 21 years; Continued long-term monitoring of physical and biological processes along the river in order to evaluate the District's river management activities; Continued the annual inspections of the Carmel River from the upstream end of the lagoon to Camp Steffani; Walked the entire river to observe and record erosion damage, conditions that could cause erosion, riparian ordinance infractions, and the overall condition of the riparian corridor; Continued two enforcement actions to address serious violations of District riparian ordinances; Carried out vegetation management activities at three sites; Developed a Draft Integrated Regional Water Management Plan; Operated under Routine Maintenance Agreement with CDFG for MPWMD vegetation maintenance activities.

MITIGATION ACTION	MAJOR ACCOMPLISHMENTS IN FY 2009-10
Lagoon Habitat Program	Provided technical expertise and data to multi-agency sponsors of lagoon restoration program; assisted Carmel Area Wastewater District to evaluate possible Lagoon augmentation with recycled water; facilitated six Carmel River Lagoon Technical Advisory Committee meetings; pursued funding for the April 2007 *Final Study Plan for the Long-Term Adaptive Management of the Carmel River State Beach and Lagoon*; continued vegetation habitat monitoring; surveyed and analyzed four bathymetric transects; participated in interagency meetings regarding management of lagoon in winter storm events. (See also steelhead efforts that benefit lagoon.); conducted topographic, hydrology and wildlife surveys.
Aesthetic Measures	See Riparian Habitat Program measures.

II. MONITOR WATER RESOURCES

The Water Allocation Program EIR concluded that Water Supply Option V would have less-than-significant impacts on the water resources in the Monterey Peninsula area, and that no mitigation measures were required. This conclusion was based solely on changes to the hydrologic regime and not on changes to water-dependent resources. Impacts on water-dependent resources (e.g., riparian vegetation and wildlife and steelhead fishery) due to changes in the hydrologic regime were identified as significant in the EIR. Implementation of the mitigation measures proposed for the impacts on these water-dependent resources are described in subsequent sections. It was suggested in the EIR that the District continue and expand its current monitoring programs to establish baseline conditions for assessment of long-term changes (Finding No. 381). The District currently maintains precipitation, streamflow, storage, water level and water quality monitoring programs. These programs and the activities to implement them for Water Year 2010 (October 1, 2009 through September 30, 2010), are summarized below.

A. Precipitation Monitoring

Description and Purpose

During the period from October 1, 2009 through September 30, 2010, the District continued to process long-term precipitation records at Los Padres and San Clemente Dams provided by California American Water (CAW). District staff also records precipitation at its Monterey office located at Ryan Ranch, and receives daily rainfall reports from the National Weather Service climate station at Monterey (maintained by R.J. Renard). In addition, real-time and historical rainfall data for the Monterey Peninsula area can be accessed via the Internet. These data support a variety of District programs, including erosion control, riparian vegetation management and identifying long-term precipitation trends and hydrologic-year conditions.

Implementation and Activities During 2009-2010

Work during this period involved continuing maintenance of the existing precipitation monitoring network. A summary of daily precipitation at San Clemente Dam (SCD) during Water Year (WY) 2010 is shown in **Figure II-1**. The average annual recorded precipitation at this site for the period from 1922 through 2010 is 21.41 inches. In WY 2010, 27.46 inches of precipitation were recorded at SCD, which is 128 percent of average.

Figure II-2 shows a comparison of WY 2010 rainfall at SCD and the average monthly rainfall at this site. As indicated in both **Figures II-1 and II-2,** the Storm of October 13-14, 2009 was by far the most unusual rainfall event of the year, and defied local climatology. Rainfall at SCD during October 2009 totaled 5.11 inches, or nearly seven times the monthly average of 0.77 inches. This was the highest October rainfall total since rainfall record keeping began at SCD in 1922. Interestingly, the monthly October

rainfall record has been reset three times in the last decade (WY 2001 – 3.28 inches, WY 2005 – 4.13 inches and October 2009 – 5.11 inches).

The October 13-14, 2009 rainfall event resulted from the moisture-laden remnants of Super Typhoon Melor (made landfall in Japan on October 8), becoming entrained into an unseasonable strong (westerly) Jet Stream. Storm totals included 5.05 inches at SCD, 7.53 inches at Los Padres Dam, and over 15 inches in the Santa Lucia Mountains to the south of the Carmel River Basin (CRB). Runoff from the October 2009 storm reached the Carmel River Lagoon and ocean on October 14, and necessitated an artificial breach by bulldozers to prevent flooding of homes surrounding the northern margin of the lagoon and wetlands. Because this early season storm fell on essentially dry antecedent soil conditions, no flooding occurred within the CRB. Had the basin been primed from earlier storms, the impacts would have been much more significant.

B. Streamflow Monitoring

Description and Purpose

Since its inception, the District has historically collected streamflow measurements at approximately 15 mainstem sites on the Carmel River and on 16 tributaries to the Carmel River. The District's current principal streamflow measuring sites within the CRB are shown on **Figure II-3**. Prior to 1991, the streamflow measurements were instantaneous measurements made by the current meter method. In 1991, a concerted effort was made to upgrade the streamflow monitoring network as staff installed continuous recorders[1] at six selected tributary sites. Since that time, the District has continued to expand its streamflow monitoring network, which currently consists of 19 continuous recording gaging stations.

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

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

[1] The District utilizes both float gages and data recorders with pressure transducers to monitor stream stage.

Implementation and Activities During 2009-2010

During the 2009-2010 period, the District operated and maintained (O&M) 16 streamflow gaging stations within the Carmel River Basin/District Boundary. In addition, continuous water-level data were collected at both Los Padres and San Clemente Reservoirs, and at the Carmel River Lagoon. The District continuous recording gaging stations are listed below:

Tributary/other
Finch Creek
Cachagua Creek
Pine Creek
San Clemente Creek
Tularcitos Creek
Hitchcock Creek
Garzas Creek near Lower Garzas Canyon
Garzas Creek at Garzas Road
Potrero Creek
Robinson Canyon Creek
San Jose Creek
Arroyo del Rey at Del Rey Oaks

Mainstem
Carmel River below Los Padres Reservoir
Carmel River at Sleepy Hollow Weir
Carmel River at Don Juan Bridge
Carmel River at Highway 1 Bridge

Continuous Water Level
Los Padres Reservoir
San Clemente Reservoir
Carmel River Lagoon

Streamflow gaging station O&M at each of the above sites involves obtaining monthly discharge measurements, maintaining recording equipment, obtaining staff gage readings and occasional surveying. Subsequently, river/creek stage and discharge data are processed in-house to produce mean daily streamflow records for the sites. **Table II-1** summarizes the computed annual flows for the District sites for the WY 1992-2010 period, except for WY 2009 and 2010 tributary sites which have yet to be computed. In addition, **Table II-1** includes annual flow values for the two mainstem sites operated by the U.S. Geological Survey (USGS) for the 1992-2010 period.

During the 2009-2010 period, District staff continued to maintain the existing streamflow monitoring network. Streamflow within the Carmel River Basin during WY 2010 was classified as "above normal". Work within this period involved collecting numerous, routine streamflow measurements by the current meter method, in order to refine the stage/discharge relation at the gaging stations. In addition, many low-flow measurements were obtained at the sites utilizing a three-inch modified Parshall Flume.

In October 2009, The District, in cooperation with Hastings Natural History Reservation (Hastings), a biological field station of the University of California, established a new continuous recording streamflow gaging station on Finch Creek located just below the confluence of Finch, Madrone and Robertson Creeks. Finch Creek, a tributary to Cachagua Creek, drains a 22-square mile watershed situated at the extreme southeast portion of the CRB. Hastings personnel assisted staff in the installation of the gaging station which included real-time access to the gage data via the Hastings web site. The

District maintains the gaging station and Hastings maintains the real-time data that are available on their website. At this time, Finch Creek is the only telemetered Carmel River Tributary within the District's streamflow monitoring network The gage is useful in further defining the general hydrology of the Cachagua Creek and Carmel River drainage basins, and provides a good indicator of streamflow conditions in extreme upper Carmel Valley in real-time.

In WY 2010, staff continued to access seven of the 19 gage sites listed above via telecommunications hardware in order to post current surface-water data on the District's website. Current streamflow data are downloaded, processed and posted to the District's web site to improve data dissemination to public agencies and private groups. These streamflow data can be accessed via the Carmel River Flows section of the District's web site and include the following gage locations:

Carmel River below Los Padres Reservoir
Carmel River at Sleepy Hollow Weir
Carmel River at Don Juan Bridge
Carmel River at Highway 1 Bridge

In addition, the Carmel River Lagoon Water Levels section of the District's web site now provides access to continuous Lagoon water-level data which are updated daily or weekly.

- **Summary of Streamflow Conditions --** Streamflow during WY 2010 within the Carmel River (CR) Basin was classified as "above normal". The highest peak streamflow event of the year occurred on October 13 and 14, 2009 along the upper reaches of the Carmel River (upstream of the Scarlett Narrows or approximate river mile 9.5). On October 13, 2009, peak flow over the Los Padres Reservoir (LPR) spillway reached 2,650 cubic feet per second (cfs). This very unusual early season rainstorm filled LPR from an elevation of 1,024 feet (NGVD 29) to full-spill at elevation 1,040 feet in 14 hours. This stormflow reached USGS CR at Robles del Rio gage, and District-operated CR at Don Juan Bridge gage, early on October 14, reaching peak streamflows of 4,700 cfs and 4,040 cfs, respectively. The October 14 "peak" or "flood wave" propagated downstream to the CR lagoon and ocean and attenuated significantly. At the USGS CR near Carmel and District CR at Highway 1 Bridge gages, the October 14 peak flows were only 2,020 cfs and 1,880 cfs, respectively. The other major peak streamflow event of WY 2010 was on January 20, 2010, and was the highest peak streamflow event along the Lower CR at 4,220 cfs at "near Carmel" and 3,860 cfs at "Highway 1 Bridge". Flow on January 20 peaked at 1,880 cfs at LPR and 3,360 cfs at "Robles del Rio", therefore was exceeded by the October 13-14 event along the Upper CR. The January 20 event was a more typical distribution of peak flow values along the CR as soils and Carmel Valley Alluvial Aquifer storage were primed by earlier winter rains (i.e., the river gained flow in a downstream direction). In contrast, the October 13-14 was an atypical event with excessively heavy rainfall above LPR, dry antecedent soil conditions and aquifer storage near the seasonal low, resulting in major peak flow attenuation in the Lower CR.

During WY 2010, 98,419 acre-feet (AF) of unimpaired runoff were estimated at San Clemente Dam. This total represents 143% of the average annual runoff (68,900 AF) expected at San Clemente Dam. **Figure II-4** shows a comparison of the actual and average cumulative unimpaired inflows at San Clemente Dam for WY 2010. This runoff provided streamflow to the ocean from October 14, 2009 through approximately July 12, 2010, although numerous lagoon mouth closures occurred during this period.

C. Storage Monitoring

Description and Purpose

Since December 1987, the District has calculated end-of-month (EOM) storage values in the major reservoirs and aquifers within the Monterey Peninsula Water Resources System (MPWRS). The storage values for Los Padres and San Clemente Reservoirs are estimated based on EOM water-level elevations and area-elevation-capacity curves provided for each reservoir by CAW. These reservoir-storage values represent "usable" storage and are adjusted for dead storage and minimum-pool requirements. The storage values for the Upper Carmel Valley (UCV) aquifer subunits, Lower Carmel Valley (LCV) aquifer subunits, and the Coastal Subareas of the Seaside Groundwater Basin are estimated based on groundwater levels observed in selected monitor wells measured by the District and CAW. The aquifer storage values also represent "usable" volumes and are adjusted for water inaccessible to existing wells (i.e., below casing perforations) or held in reserve as a safeguard against seawater intrusion or other adverse environmental impacts. As of April 2009, the total capacity became 37,662 acre-feet (AF) due to changes in the Los Padres Reservoir maximum usable storage from 1,478 to 1,626 AF. This change resulted from an updated reservoir survey in 2008, not from enlargement by dredging. Of this total, an estimated 1,690 AF are in reservoir storage and 35,970 AF are in aquifer storage. For this report, all storage values are rounded to the nearest 10 AF.

These storage estimates are compiled by the District to provide a quantitative basis for managing the area's water resources. These estimates are used to make decisions regarding water production and water rationing. These estimates are also used to calibrate the District's Carmel Valley Simulation Model (CVSIM).

Implementation and Activities During 2009-2010

At the end of September 2010, system storage totaled 29,650 AF or 79 percent of capacity. This total was approximately 105 percent of the 28,106 AF storage that is expected under normal conditions at this time of the year. **Figure II-5** shows a monthly comparison of usable system storage versus average system storage during the October 2009 – September 2010 period. Of the total storage at the end of September 2010, an estimated 1,447 AF were in Los Padres and San Clemente Reservoirs, 25,830 AF were in the Carmel Valley Alluvial Aquifer, and 2,370 AF were in the Coastal Subareas of the Seaside Groundwater Basin.

It should be noted that the remaining usable storage capacity in San Clemente Reservoir was constrained in June 2003 when CAW, at the direction of the California Department of Water Resources (DWR), was required to lower the water level in the reservoir from elevation 525 feet above mean sea level (msl) to elevation 514 feet msl. This "drawdown" project is required by DWR as an interim safety measure at San Clemente Dam and remained in effect in Water Year 2010. As constrained by DWR, usable storage capacity in San Clemente Reservoir during the high-flow season (February - May) is limited to approximately 70 AF and during the low-flow period (June - January) is limited to less than 10 AF.

D. Groundwater-Level Monitoring

Description and Purpose

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

Implementation and Activities During 2009-2010

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

Figure II-6 is a typical hydrograph from the lower Carmel Valley, showing groundwater-level fluctuations at the Rancho Cañada East monitor well (River Mile 3.13), compared with mean daily streamflow in the Carmel River at Highway 1 (River Mile 1.09). This monitor well is located nearby the most westerly CAW production well in Carmel Valley, the Cañada well. The monitor well is located approximately 375 feet from the river channel, and about 250 feet from the Cañada well. As shown on this figure, the groundwater elevation increased approximately 18 feet between the middle of October 2009 and the beginning of February 2010, due to the reduced groundwater production at this time of the year, combined with the resumption of Carmel River flows in this lower reach of the river resulting from the unusual storm event in the beginning of October 2009 and the subsequent event in mid-January 2010. Groundwater levels declined

gradually from April through September 2010 in response to receding surface flows and increased groundwater pumping. At the end of WY 2010 (October 1 through September 30), the groundwater elevation in this well was about nine feet higher than at the start of the WY.

The hydrograph of a monitor well closer to the coast is shown in **Figure II-7**. This monitor well, the CAWD-Rio North well, is located at River Mile 1.65, and approximately 850 feet from the river channel. At this location, the magnitude of seasonal water-level fluctuation, approximately four feet, is significantly less than at the Rancho Cañada East monitor well, due to its location farther from the river and major production wells in the lower Carmel Valley. Typically, the seasonal rise in water level at the CAWD-Rio North well lags relative to the Rancho Cañada East monitor well. In **Figure II-7**, the peak groundwater elevation recorded is seen in early March while the peak runoff occurred in mid-January. The lag time is a response to the effect of distance from the river channel on the timing of groundwater recharge from river-flow events.

During the October 2009-September 2010 period, the monitoring data indicated that groundwater storage in the Carmel Valley Aquifer remained relatively full during WY 2010. In the river reach between San Clemente Dam and the Narrows (i.e., aquifer subunits 1 and 2), the lowest storage capacity estimate was **93**% of capacity at the end of August 2010. Similarly, in the river reach from the Narrows to the Carmel River Lagoon (i.e., aquifer subunits 3 and 4), the lowest storage capacity estimate was **90**% of capacity at the end of October 2009. The aquifer remained relatively full during the year due to a number of factors, including:

- Availability of adequate base flows during spring and early summer months,
- Timing and magnitude of controlled river releases from the upstream reservoirs,
- Maximized dry-season production from CAW wells in the Seaside Basin,
- Water-supply management practices implemented by the District in coordination with CAW, the California Department of Fish & Game and the National Marine Fisheries Service, as part of the Quarterly Water Supply Strategy and Budget process, and
- State Water Resources Control Board (SWRCB) Order No. WR 95-10 (and subsequent amendments) and the Seaside Basin adjudication decision, which constrain CAW production from the Carmel River and Seaside Groundwater Basins, respectively.

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

Figure II-8 shows water-level data available from representative wells in the coastal Seaside Basin monitor well network. These graphs show the water-level elevations in the

two principal aquifer zones, the shallower Paso Robles Formation and the deeper Santa Margarita Sandstone, at both upgradient (Site FO-07) and downgradient (Site PCA East) locations from the Paralta production well, the largest capacity CAW well in the coastal area. The graphs illustrate the more dominant effect that production from the Paralta well has had on water levels in the Santa Margarita Sandstone, which is the aquifer zone from which the Paralta well obtains most of its production. The graphs also illustrate the effect of changed water-supply practices resulting from SWRCB Order WR 95-10. Under the Order, CAW has been directed to maximize production from its Seaside Basin sources as a means to reduce production and associated impacts from the Carmel River system. Seasonal recoveries associated with short-term reduced wintertime production and District aquifer storage and recovery (ASR) injection operations have not been sufficient to reverse the observed long-term downward water-level trend. However, the water-level responses in the Santa Margarita Aquifer at these locations indicate a lessening of the seasonal decline during WY 2010. Additional information on the ASR program is available at the District office. Discussion of the District's Water Project 1 (Phase 1) ASR Project is included in Section VI.

E. Groundwater-Quality Monitoring

Description and Purpose

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

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

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

Implementation and Activities During 2009--2010

Currently, the sampling schedule for Carmel Valley is staggered, with Upper Valley wells (i.e., upgradient of the Narrows) sampled in Spring and Lower Valley wells (i.e., downgradient of the Narrows) in Fall, to coincide with the historically higher nitrate

concentrations in these respective areas. Collection of samples from the Seaside Basin monitor wells is conducted once per year in Fall, coinciding with the historically low water levels in the basin at that time of the year. Additionally, in 2010, samples from six of the wells in the Seaside Basin monitoring network were collected quarterly by District staff under contract for the Seaside Groundwater Basin Watermaster.

● **Carmel Valley Aquifer --** Groundwater quality data were collected from seven of the network of eight monitor wells in the Carmel Valley aquifer in November 2009, and three wells in the upper Carmel Valley area in April 2010. The results indicated that, in general, there were only minor changes in overall water quality compared to samples collected in the previous year. Staff is particularly interested in tracking indicators of potential seawater intrusion in the coastal portion of Carmel Valley. Accordingly, three sets of wells were established west of Highway 1, with each set being made up of three wells completed at different depths. Review of historical data indicated that the shallower and intermediate wells in the coastal area are subject to the mixing of fresh water and saline water as high tides and surf overtop the sand berm between the lagoon and the ocean. This contributes to episodic mixing within the shallower and intermediate zones of the aquifer, but is not necessarily representative of larger-scale potential seawater intrusion into the aquifer. Currently, only the deeper wells at each of the coastal locations are sampled.

Well 16S/1W-14Jg was the deepest in the array of three wells located at the Carmel River State Beach parking lot at River Mile (RM) 0.07 (approximately 375 feet from the shoreline). **Figure II-9a** shows that specific electrical conductance (SEC) and chloride concentration increased in this well in 2010 following an apparent recovery from a four-year trend in increased SEC and chloride prior to 2009. The 2010 levels are not yet approaching the peak levels observed at this location in the early 1990's. The ground surface at this well was completely inundated for several days in mid-October due to high run-off and overtopping of the sand berm by high waves. The higher values observed early in the period of record at this site are at least partially attributable to the fact that there was no freshwater surface inflow to the lagoon for approximately four years (April 1987 until March 1991). This lack of freshwater inflow for local groundwater recharge, combined with the proximity to the ocean and the permeability of the alluvial sediments, allowed for inland movement of the freshwater / seawater interface past this site near the end of the 1987 – 1991 drought period. It should also be noted that the data from the District's monitor well network indicate that nitrate concentrations in the shallow zone of the aquifer are well below the State drinking water standard of 45 milligrams per liter (mg/L). The highly permeable nature and flushing effect of the aquifer have prevented long-term build-up of contaminants as can occur in more poorly recharged aquifer systems.

Graphs of water-quality data at a coastal site located farther from the shoreline show that SEC and chloride concentration had increased noticeably from 2009 to 2010 at well 16S/1W-13Lc, located at RM 0.72 from the shoreline (**Figure II-9b**). As noted in prior reports, the anomalously high SEC and chloride concentration in well 16S/1W-13Lc in 2000 are suspicious, and may have been due to sampling error. Additional background on

historical water quality at the coastal monitor well sites can be found in District Technical Memorandum 90-04, *Summary of Carmel Valley Groundwater Quality from Coastal Monitor Wells*, which is available at the District office. Staff will continue to track future results for trends that might indicate significant changes in concentrations of these or other constituents in the coastal area of the aquifer.

For the five wells located farther inland, changes in SEC and chloride concentration did not vary significantly from the previous year's sample results. The example graph in **Figure II-9c** shows SEC and chloride concentration in well 16S/1E-23La, located at RM 6.72. The increased levels of SEC and chloride concentration that were observed in this well in 2005 had returned to below 2004 levels in 2007, decreased even farther in 2008, but slightly increased each year from 2008 through 2010. The high chloride concentration in well number 16S/1E-23La in Spring 1993 is anomalous. The District will continue to track future results for trends.

- **Seaside Groundwater Basin --** Thirteen monitor wells in the coastal subareas of the Seaside Basin were sampled in July and August 2010. The water-quality results from the Seaside Basin indicate that very little water quality changes have occurred over the period of record since monitoring began in 1990, and that there is no indication of sea-water intrusion in this area of the basin at this time. Part of the function of the District's monitor-well network in the Seaside Basin is to serve as an early warning of potential sea-water intrusion into the two principal aquifer zones, the Paso Robles Formation and the Santa Margarita Sandstone. As an example, **Figure II-9d** shows SEC and chloride concentrations in two coastal wells for the historical period of record beginning in April 1991. Results from the District's monitoring program indicate that the Specific Conductance (a measure of the Total Dissolved Solids concentration) averages approximately 350 and 825 micromhos/centimeter, for the Paso Robles and Santa Margarita aquifer zones, respectively.

F. Carmel River Surface-Water Quality Monitoring

Description and Purpose

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

Since 1991, surface-water quality data have been collected at three sampling stations along the Carmel River on a semi-monthly basis. The locations of the sampling stations are as follows: (1) below Los Padres Reservoir (BLP) at River Mile (RM) 25.4, (2) below San Clemente Reservoir at the Sleepy Hollow Weir (SHW) at RM 17.1, and (3) at the Carmel River Lagoon (CRL) at RM 0.1. River miles are measured from the mouth of the

Carmel River. Monitoring at these specific stations gives District staff information on the quality of water released from each reservoir and in the surface layer of the lagoon.

District staff also monitors river temperatures continuously at six locations within the Carmel River Basin (**Figure II-10**). The objective is to document the temperature regime in different stream reaches and to determine whether water-quality criteria for maximum stream temperatures are exceeded. In addition, these data allow District staff to monitor changes in the thermal regime of the river over time.

Implementation and Activities During 2009-2010

District staff carried out a semi-monthly surface-water quality sampling program for the Reporting Year (RY) 2010 (July 1, 2009 to June 30, 2010); data were collected for the following chemical and physical parameters (units in parentheses): temperature (°F), dissolved oxygen (mg/L), carbon dioxide (mg/L), pH, specific conductance (uS/cm), salinity (ppt), and turbidity (NTU). The emphasis for this suite of parameters is on the suitability for rearing juvenile steelhead. In addition, continuous recording temperature data loggers (Optic StowAway temperature data loggers from the Onset Computer Corporation) were deployed at six locations on the Carmel River (**Figure II-10**), as follows:

1. ALP	Above Los Padres Reservoir	(RM 27.0)
2. BLP	Below Los Padres Reservoir	(RM 25.4)
3. ASC	Above San Clemente Reservoir	(RM 18.5)
4. SHW	Sleepy Hollow Weir	(RM 17.1)
5. GAR	Garland Park	(RM 10.8)
6. SAL	South Arm Lagoon	(RM 0.1)

The following paragraphs describe the results of the semi-monthly data collection and the continuous temperature recorders at specific sampling stations.

- **Carmel River Lagoon--** The water temperature monitoring station for the Carmel River Lagoon is located in the south arm of the lagoon on the Carmel Area Wastewater District (CAWD) effluent discharge pipe. This station had operational difficulties associated with it during RY 2010. Staff continues to apply adaptive strategies to correct these difficulties. During RY 2010, all data collected at the water temperature station were unreliable, and therefore have not been reported. Water-quality data collected at the CRL station, which is located on the south side of the main body of the lagoon, were reliable and are listed in **Table II-2**. Maximum water temperature during water-quality sampling was 71.9°F, occurring on August 14, 2009. Summertime (July through September) water temperatures were within stressful ranges for steelhead and probably decreased their growth rates and survival capabilities. Steelhead likely searched for cold water refuges within the lagoon. The minimum dissolved oxygen measurement recorded was 6.2 mg/L, which is within the suitable criteria recommended by the Environmental Protection Agency (EPA) for steelhead

(Chapman, 1986). The pH measurements ranged from 7.5 to 8.0, which is also within suitable range. Carbon dioxide measurements ranged from 5 to 15 mg/L. Variability in carbon dioxide is usually caused by an increase of marine organic debris entering the lagoon during high surf events, which is typical during the fall season. Carbon dioxide is a byproduct of decomposition of this material. Fish located in waters with free carbon dioxide concentrations above 20 mg/L can show signs of distress (Wedemeyer, 1996). The conductivity measurements ranged from 277 to 25,730 uS/cm. The surface salinity ranged from 0.2 to 19.9 ppt. The conductivity and salinity are highly variable at the lagoon due to tidal influences and river inflows. The turbidity measurements ranged from 0.2 to 5.2 NTU.

- **Garland Park--** Water temperature for the Garland Park (GAR) station is shown in **Figure II-11**. The maximum annual water temperature was 68.9°F, occurring on June 6, 2010. The overall average water temperature during the reporting year at this station was 56.1°F. Maximum daily average water temperature was 65.1°F, occurring on June 6, 2010. Daily average water temperatures were within adequate range for steelhead rearing during the entire reporting year.

- **Sleepy Hollow Weir--** Water temperature for the Sleepy Hollow Weir (SHW) station is shown in **Figure II-12**. The maximum annual water temperature was 69.4°F occurring on July 2, 2009. The overall average water temperature during the reporting year at this station was 55.9°F. The maximum daily average water temperature was 67.3°F, occurring on July 1, 2009. Water-quality data collected at this station are listed in **Table II-3**. The minimum dissolved oxygen measurement recorded was 6.1 mg/L, which is within the suitable criteria recommended by the EPA for steelhead (Chapman, 1986). Carbon dioxide measurements ranged from 5-10 mg/L. The pH measurements ranged from 7.5 to 8.0. The conductivity measurements ranged from 199 to 303 uS/cm. The turbidity measurements recorded were between 0.3 to 4.7 NTU. Water-quality parameters measured were within the adequate range for steelhead rearing during the sampling period.

- **Above San Clemente Reservoir--** Water temperature for the Above San Clemente (ASC) station is shown in **Figure II-13**. The sampling period for this station was September 18, 2009 to June 30, 2010. A large rain event caused high flows, moving the data logger out of the water, resulting in a loss of data from March 10, 2009 to September 17, 2009. The maximum annual water temperature was 69.3°F, occurring on June 28, 2009. The overall average water temperature during the reporting period at this station was 53.4°F. Maximum daily average water temperature at this station was 66.7°F, occurring on June 28, 2009. Daily average water temperatures were within adequate range for steelhead rearing during the entire reporting year.

- **Below Los Padres Reservoir--** Water temperature for the Below Los Padres (BLP) station is shown in **Figure II-14**. The maximum annual water temperature

observed was 68.5°F, occurring on June 29, 2010. The overall average water temperature observed at this station during the sampling period was 56.1°F. The maximum daily average water temperature at this station was 67.1°F on June 29, 2010. Water-quality data collected at this station are listed in **Table II-4**. Water quality at this station is highly influenced by reservoir water quality and release location. The minimum dissolved oxygen measurement recorded was 6.4 mg/L, which is within the suitable criteria recommended by the EPA for steelhead (Chapman, 1986). Carbon-dioxide measurements ranged from 5 to 10 mg/L. The pH and conductivity measurements ranged between 7.0 to 8.0 and 185 to 297 uS/cm, respectively. Turbidity measured at this station ranged from 0.2 to 3.2 NTU. Water-quality parameters measured were within the adequate range for steelhead rearing during the sampling period.

- **Above Los Padres Reservoir--** Water temperature for the Above Los Padres (ALP) station is shown in **Figure II-15**. The maximum annual water temperature was 66.6°F, occurring on June 28, 2009. Average water temperature during the reporting period was 53.7°F. Maximum daily average water temperature at this station was 64.9°F, occurring on July 20, 2009. Daily average water temperatures were within the adequate range for steelhead rearing during the entire reporting year.

Conclusions

Water-quality conditions at all stations in the mainstem Carmel River for RY 2010 were within adequate ranges for steelhead rearing. Water-quality conditions in the Carmel River Lagoon during the summer and fall months (July through November) are commonly within stressful ranges and likely decrease growth and survival rates of rearing steelhead. This is mainly caused by a lack of river inflow and variability in tidal influences. These factors can dramatically change the water-quality dynamics in the lagoon depending on their outcomes.

G. Carmel River Lagoon Water-Level Monitoring

Description and Purpose

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

Implementation and Activities During 2009-2010

During the 2009-2010 period, District staff continued to maintain the continuous water level recorder located in the South Arm of the lagoon, and a complete record of water level readings (i.e., 15 minute intervals) was obtained. Staff continued to utilize the telecommunications capability established at the lagoon gage in September 2007 to post lagoon water level data on to the District's website. These continuous water level data are plotted and posted on the District website under the Carmel River Lagoon Water Levels section approximately weekly. This allows interested parties to access the data to view recent water-level trends.

The monthly plot for October 2009 shown in **Figure II-16** illustrates the first lagoon opening of the 2009-2010 rainy season, on October 14, 2009. Prior to this event, the lagoon mouth was closed, and the Carmel River (CR) streambed upstream of the lagoon was completely dry. Specifically, on October 14 at 5:00 am the riverbed at the CR at Highway 1 Bridge gaging station was dry, and one hour later at 6:00 am, the river was approximately eight feet deep flowing approximately 1,500 cfs, and the lagoon began to rapidly fill. On the morning of October 14 (exact time unknown), an outlet channel connecting the lagoon to the ocean was cut by bulldozers operated by the Monterey County Public Works Department. The lagoon level peaked at 10:45 am at 10.51 feet according to the District's Lagoon stage recorder and by 11:00 the level began to recede as the river flowed continuously to the ocean, ending any threat of flooding along the north margin of the wetlands. The lagoon mouth remained open to the ocean for only a few days following the October 14 event, as indicated by the mid-October oscillating water levels in **Figure II-16** caused by daily tidal cycles. During the latter half of October 2009 the lagoon mouth was closed as relatively low inflows of 10-20 cfs were not sufficient to maintain the outflow channel.

Figure II-1
San Clemente Reservoir Daily Rainfall: Water Year 2010

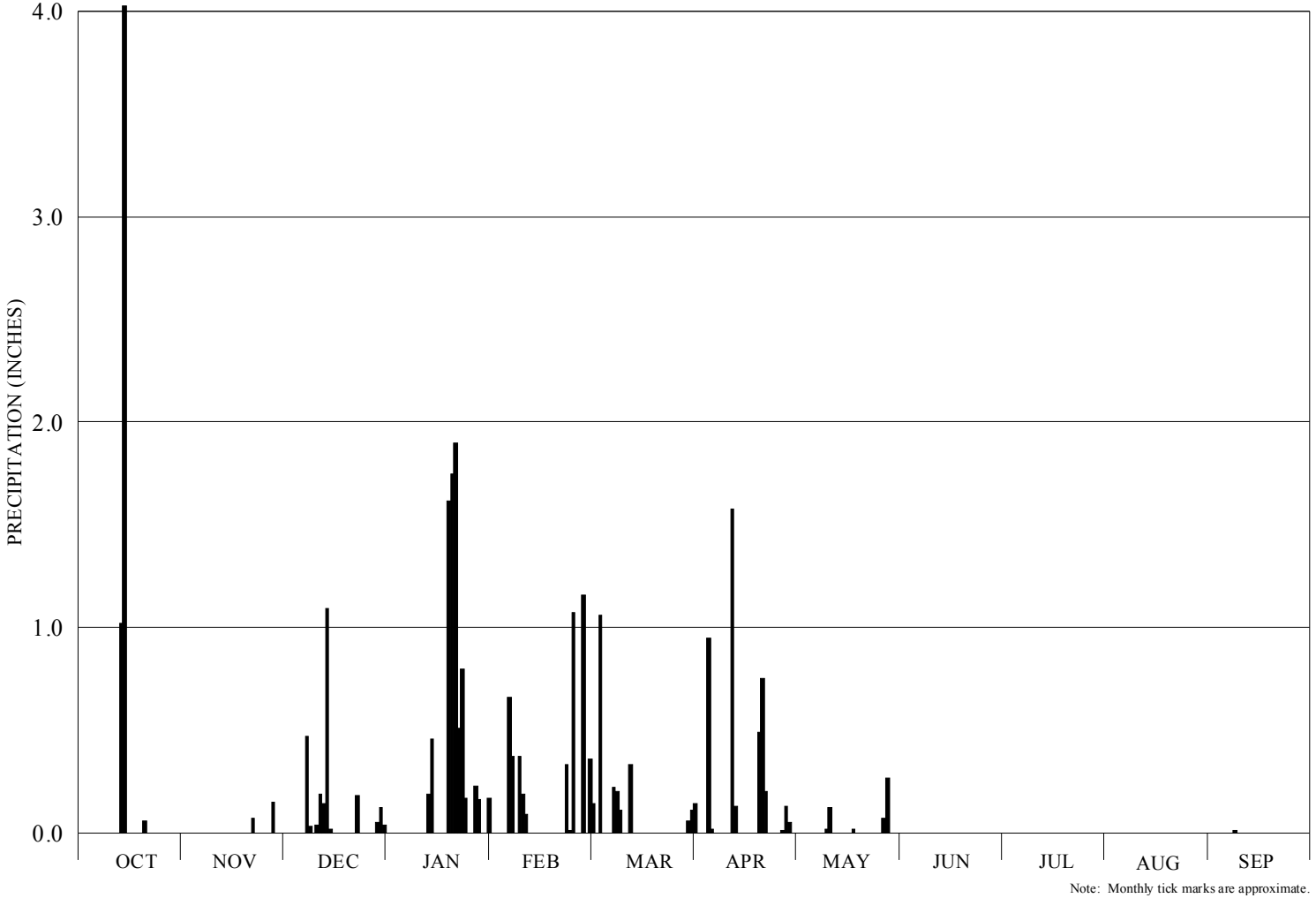
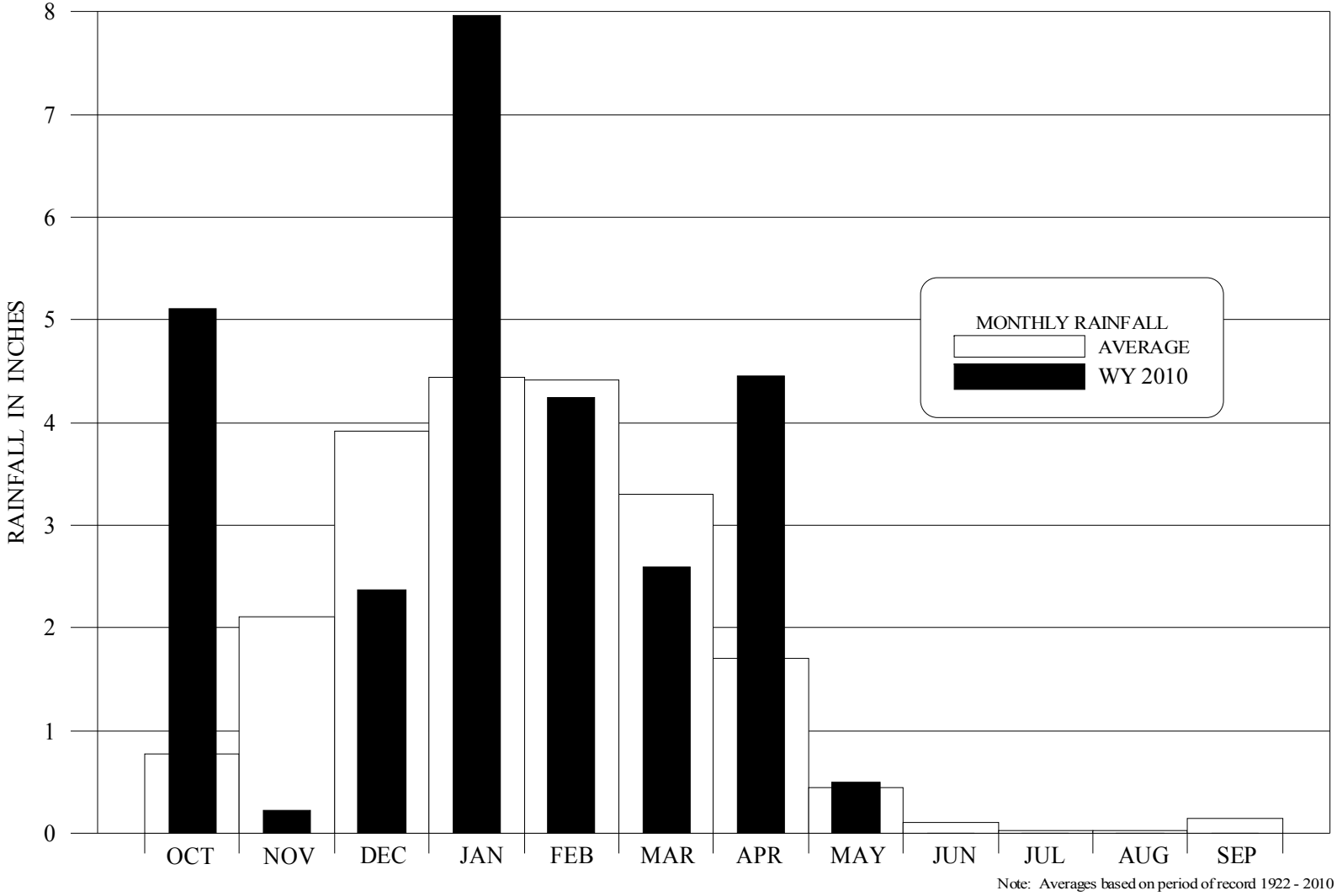


Figure II-2
Monthly Distribution of Rainfall at San Clemente Reservoir



Note: Averages based on period of record 1922 - 2010

Figure II-3
Carmel River Basin Principal Streamflow Gaging Stations

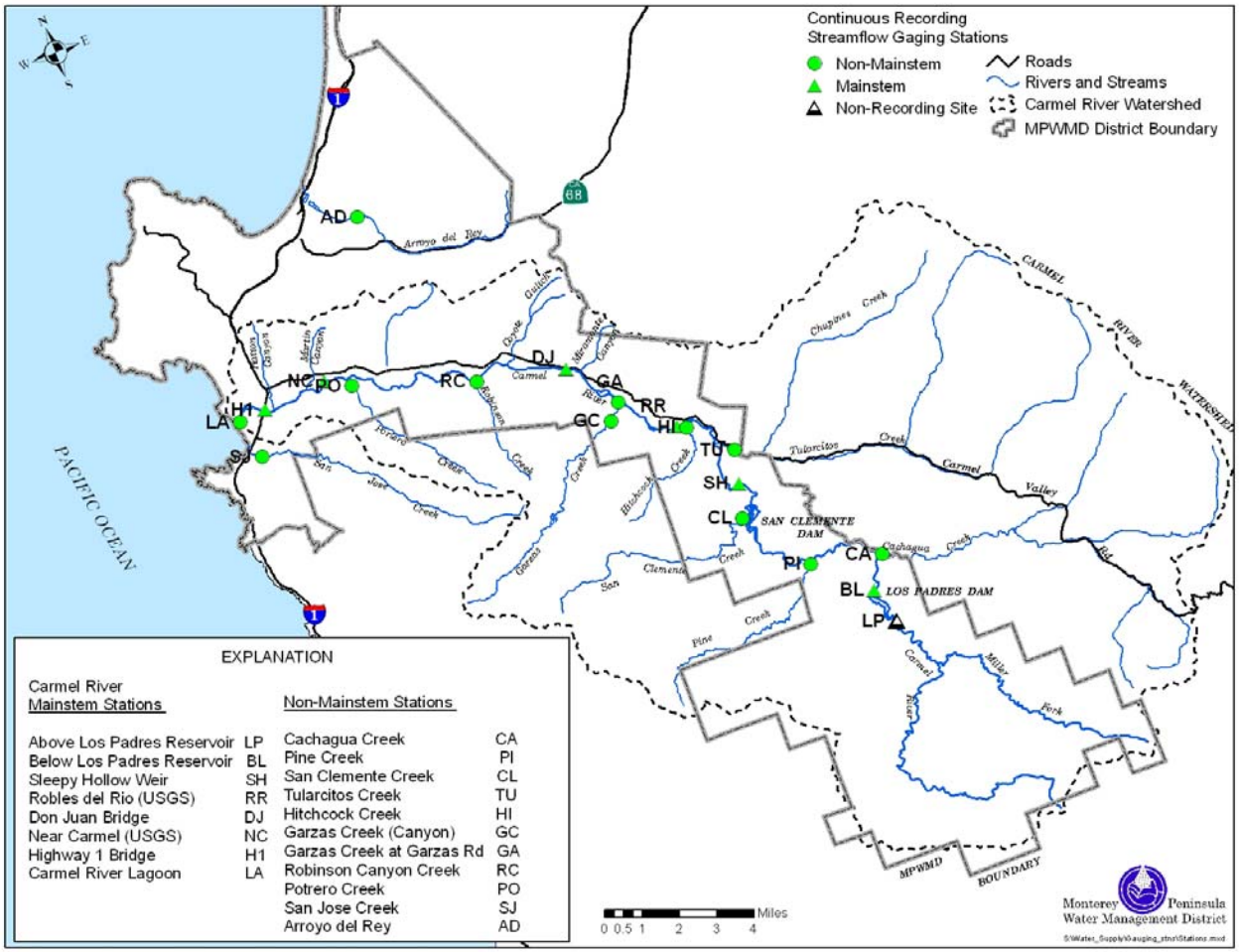


Figure II-4
Cumulative Unimpaired Runoff: Carmel River at San Clemente Dam

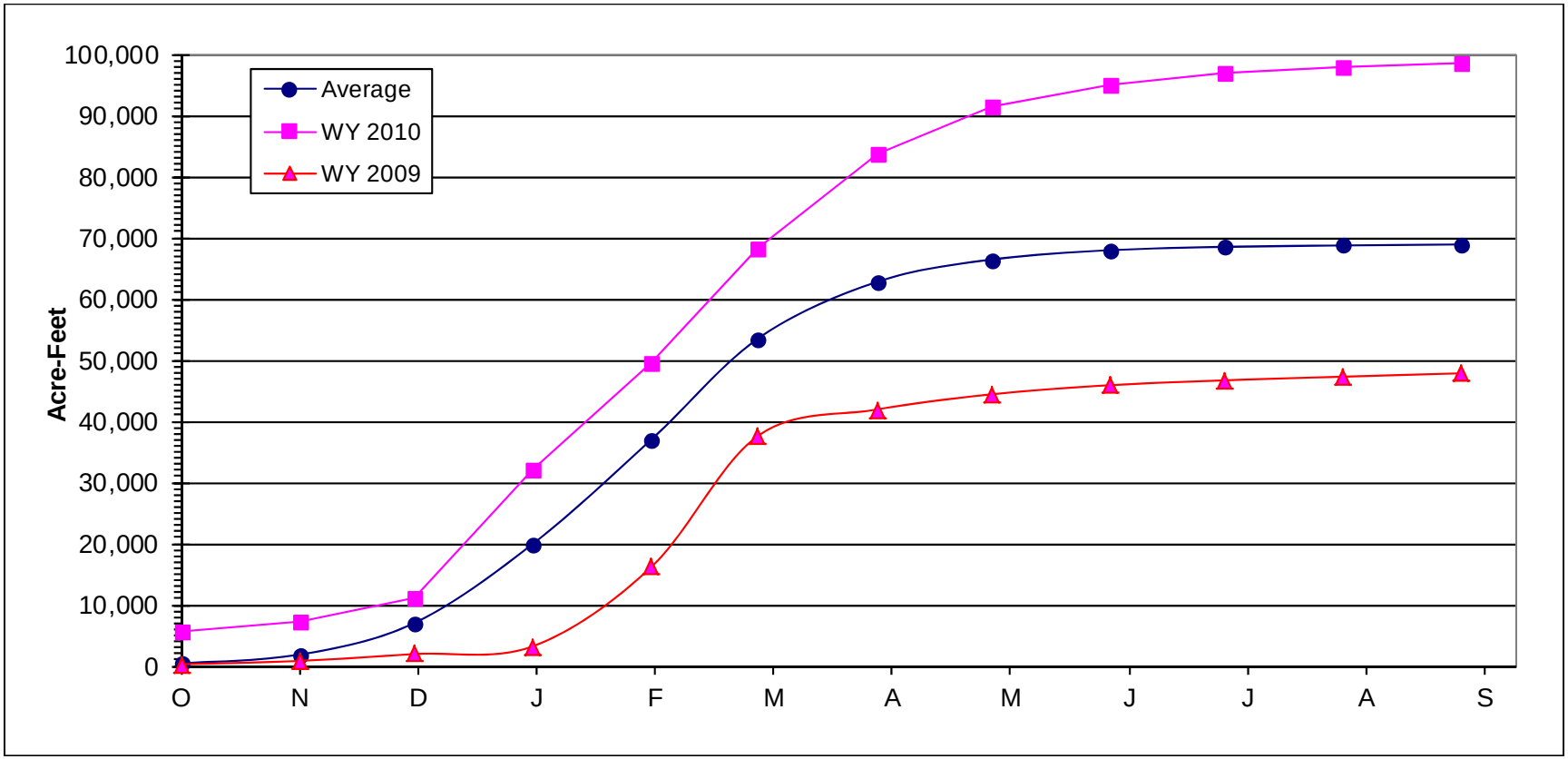


Figure II-5
End-of-Month Usable Storage for the Monterey Peninsula Water Resources System; Water Year 2010

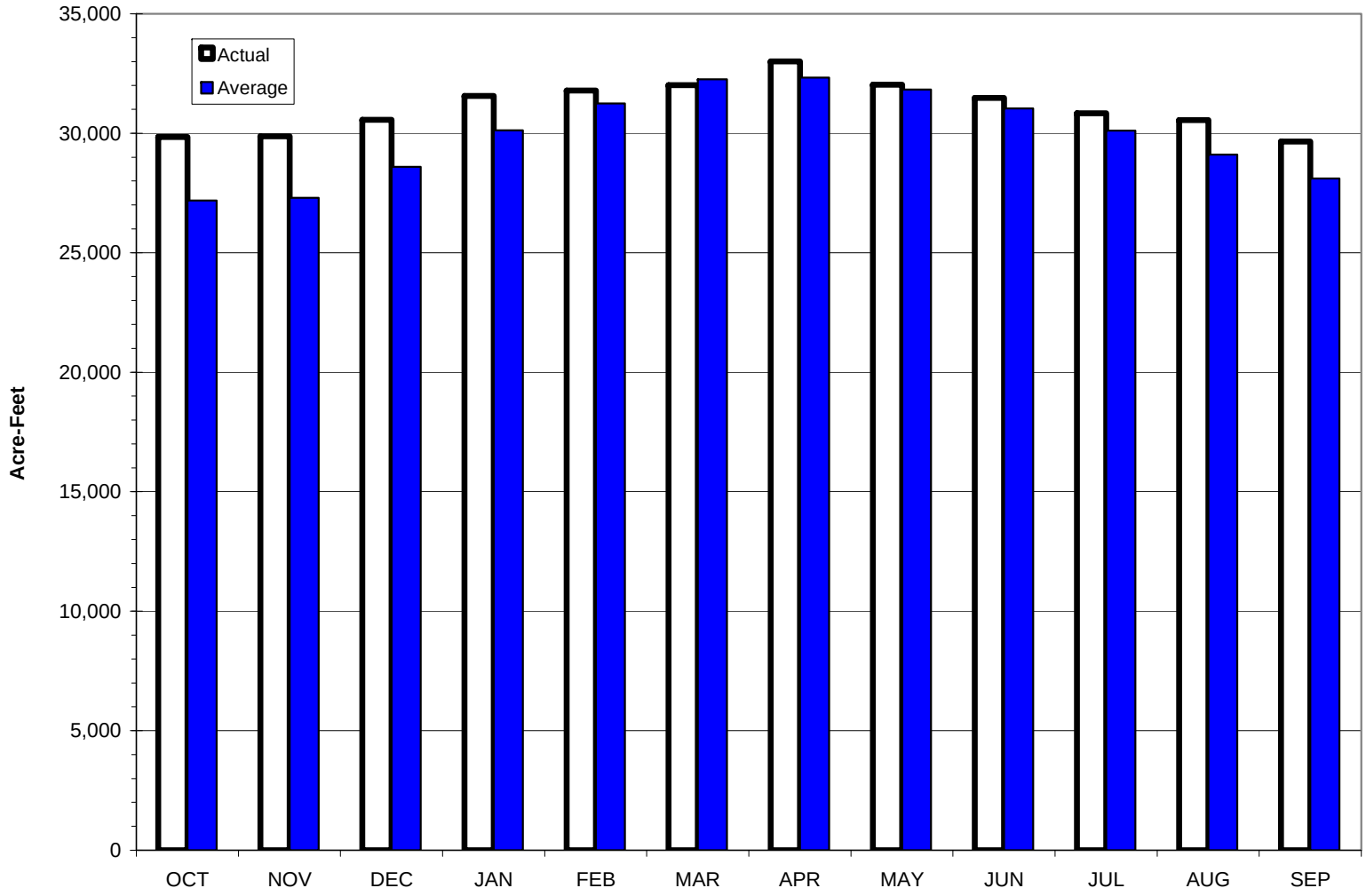


Figure II-6
Mean Daily Streamflow and Groundwater Elevation at the Rancho Canada East Well

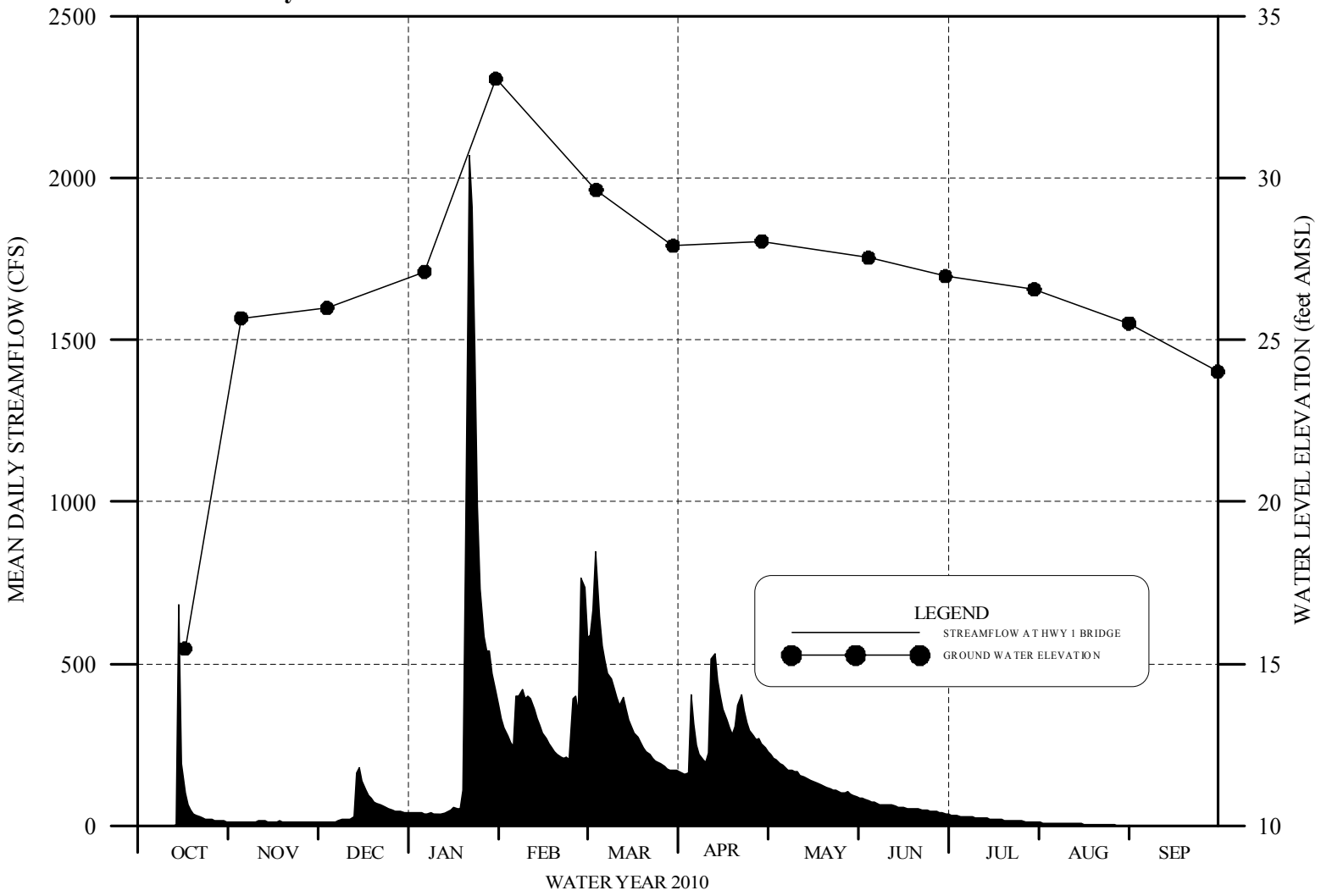


Figure II-7
Mean Daily Streamflow and Groundwater Elevation at the CAWD Rio North Well

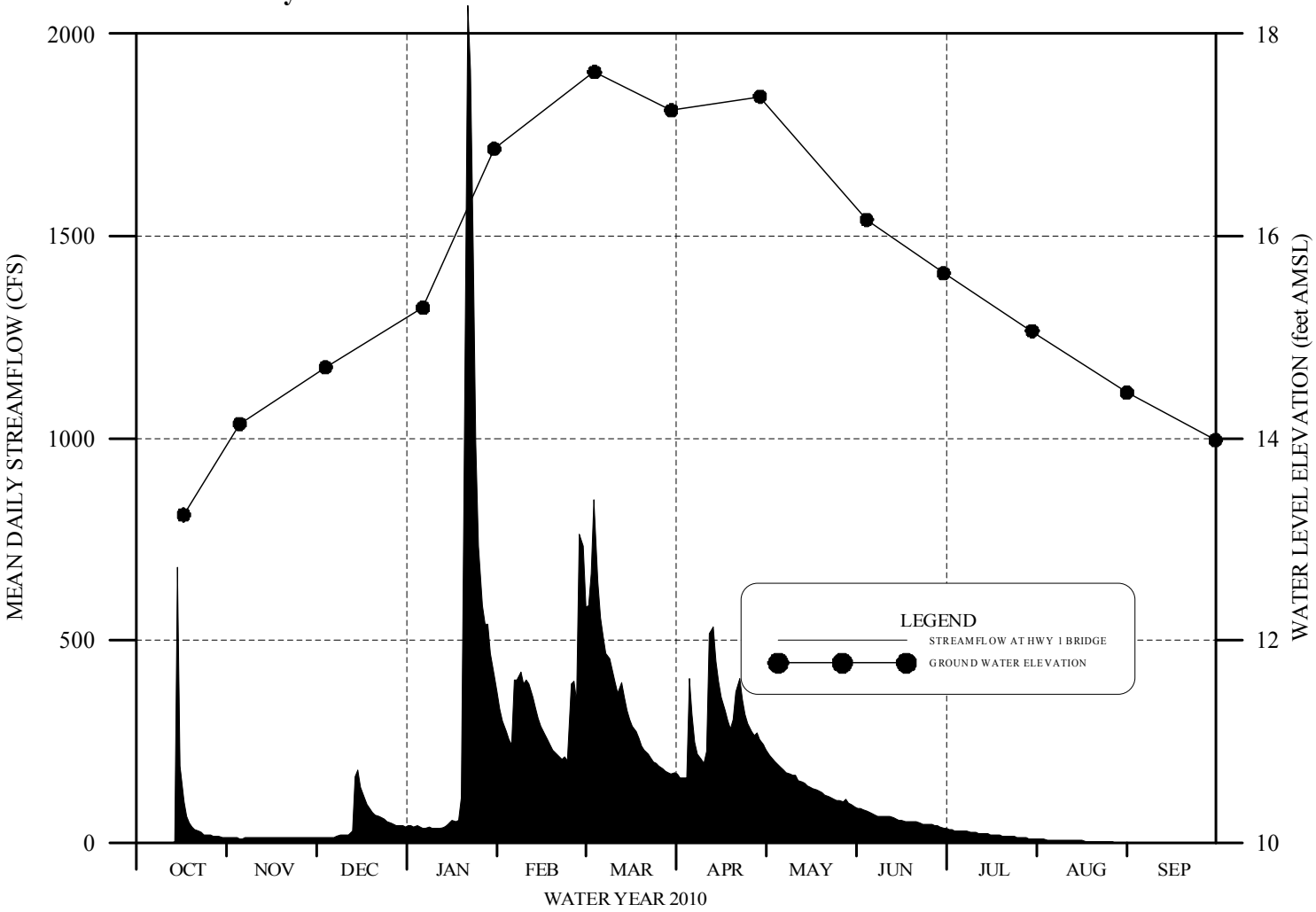


Figure II-8
Seaside Basin Groundwater Monitoring Wells

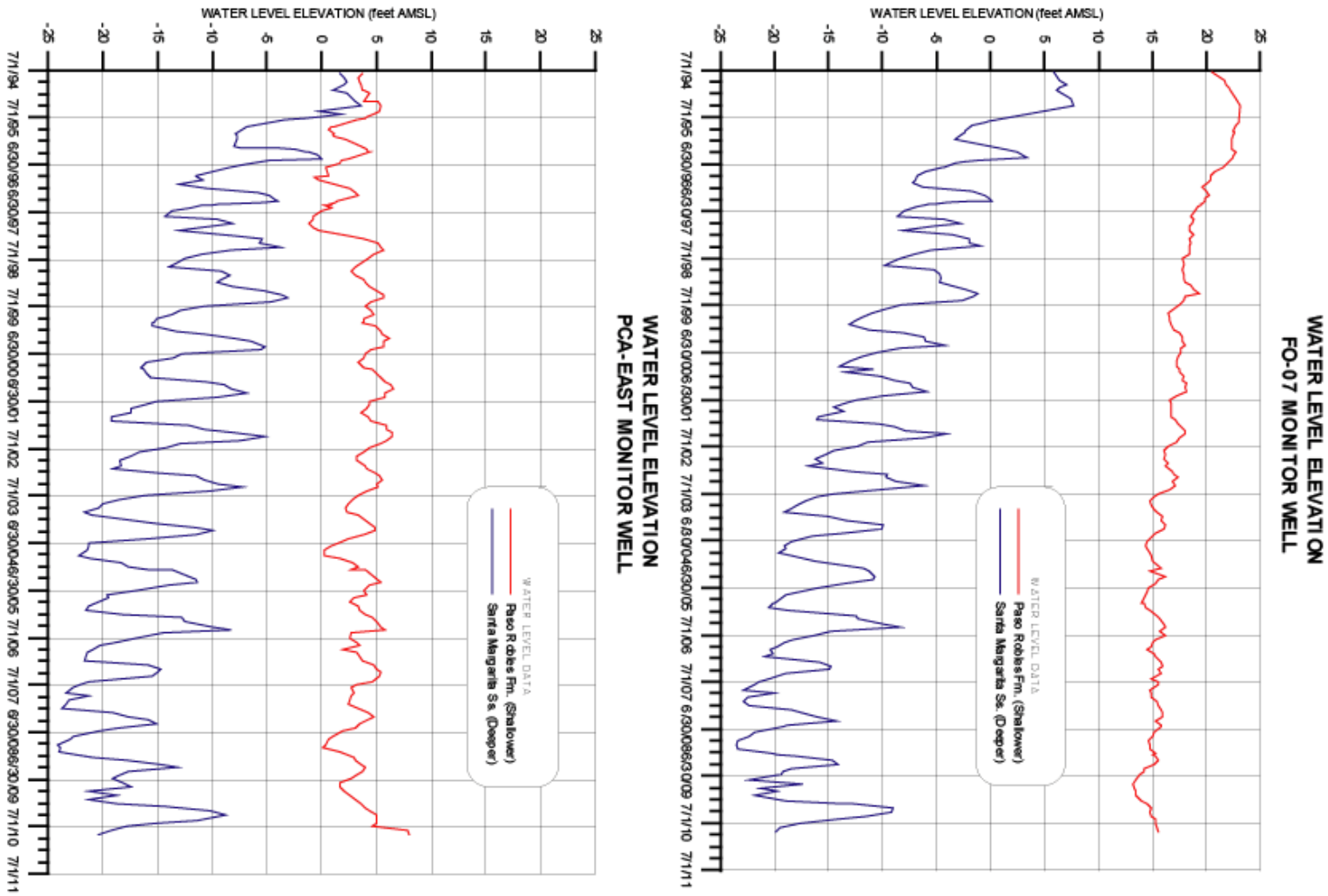


Figure II-9a
Water Quality 0.07 Miles from Coast in Carmel Valley

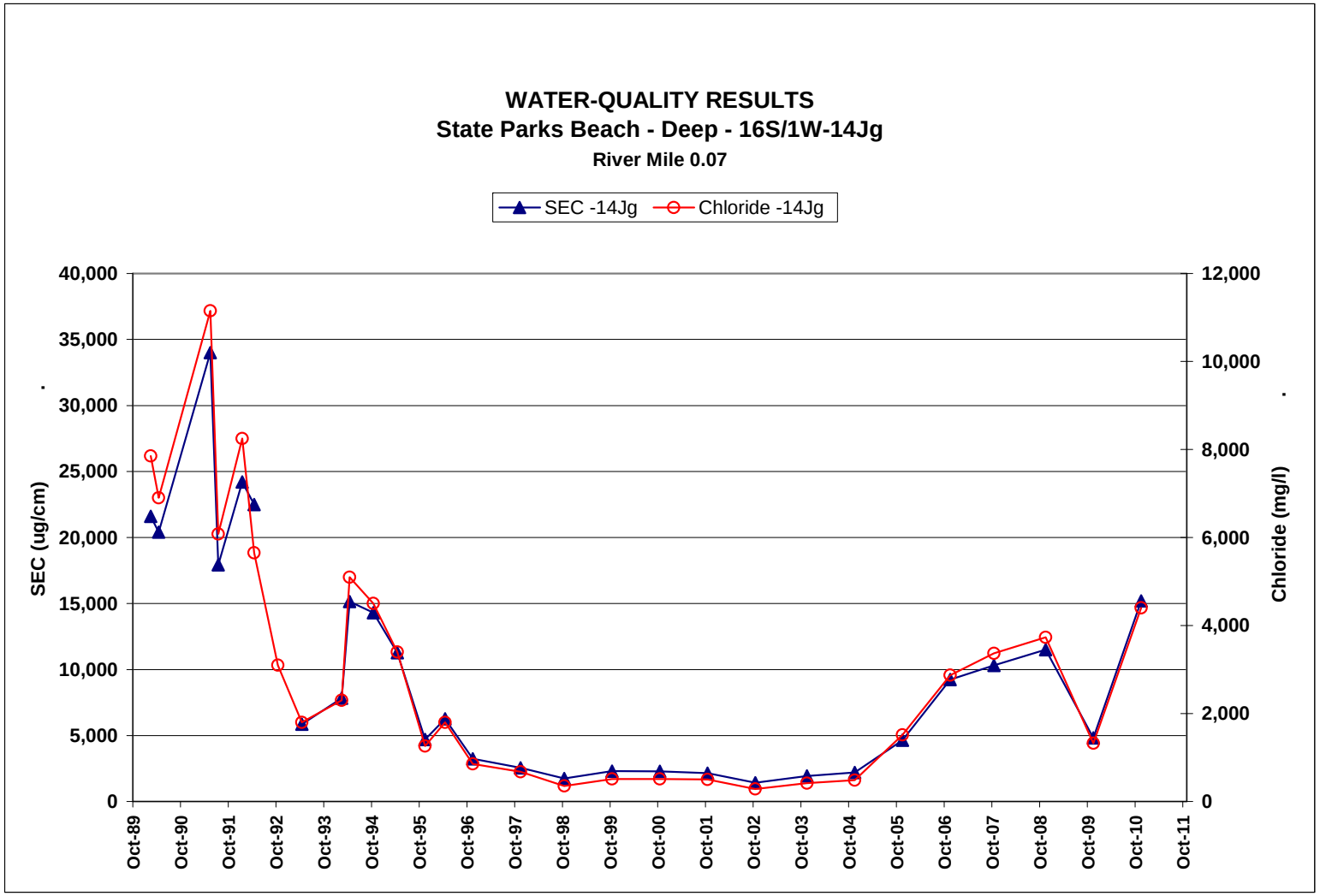


Figure II-9b
Water Quality 0.72 Miles from Coast in Carmel Valley

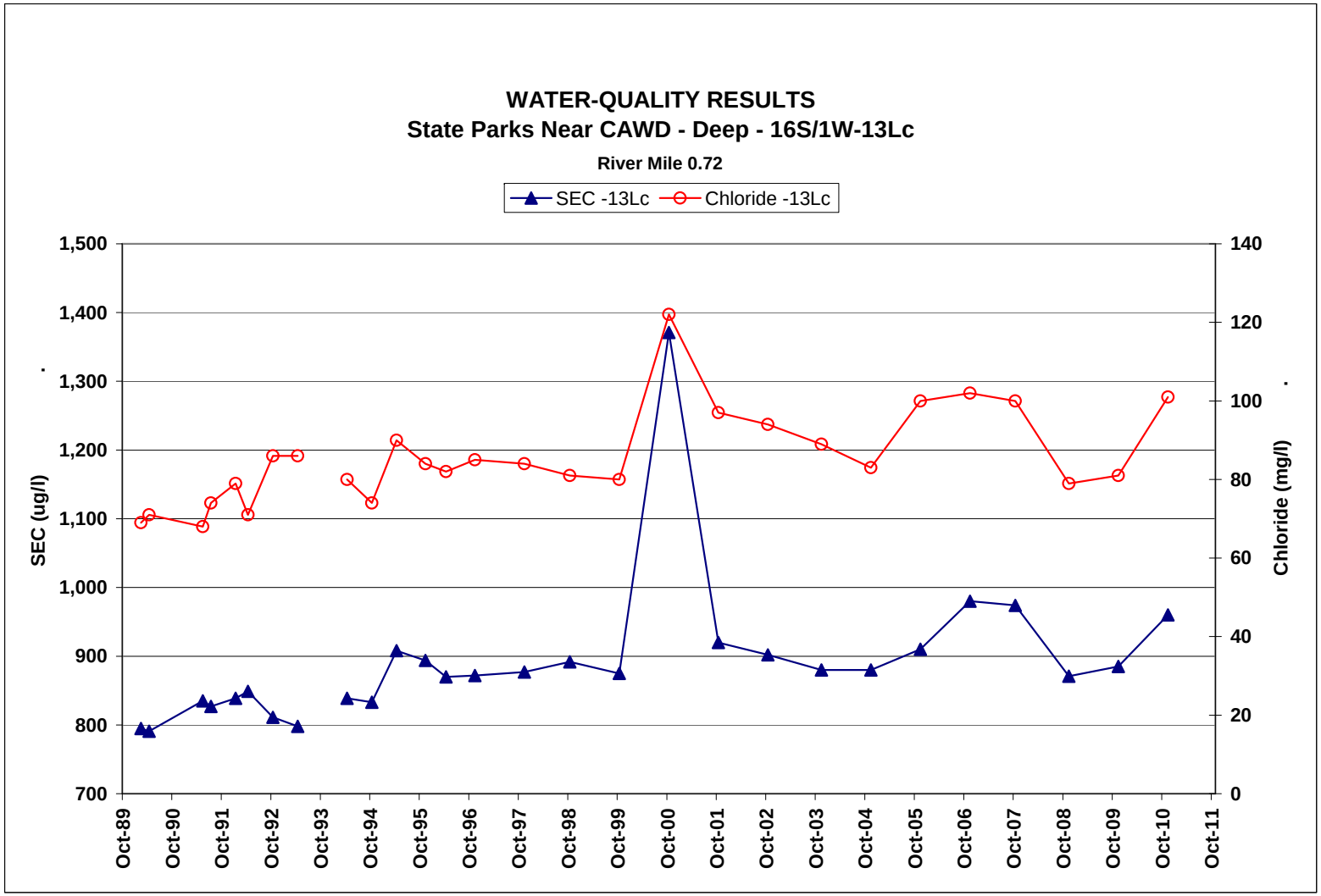


Figure II-9c
Water Quality 6.72 Miles from Coast in Carmel Valley

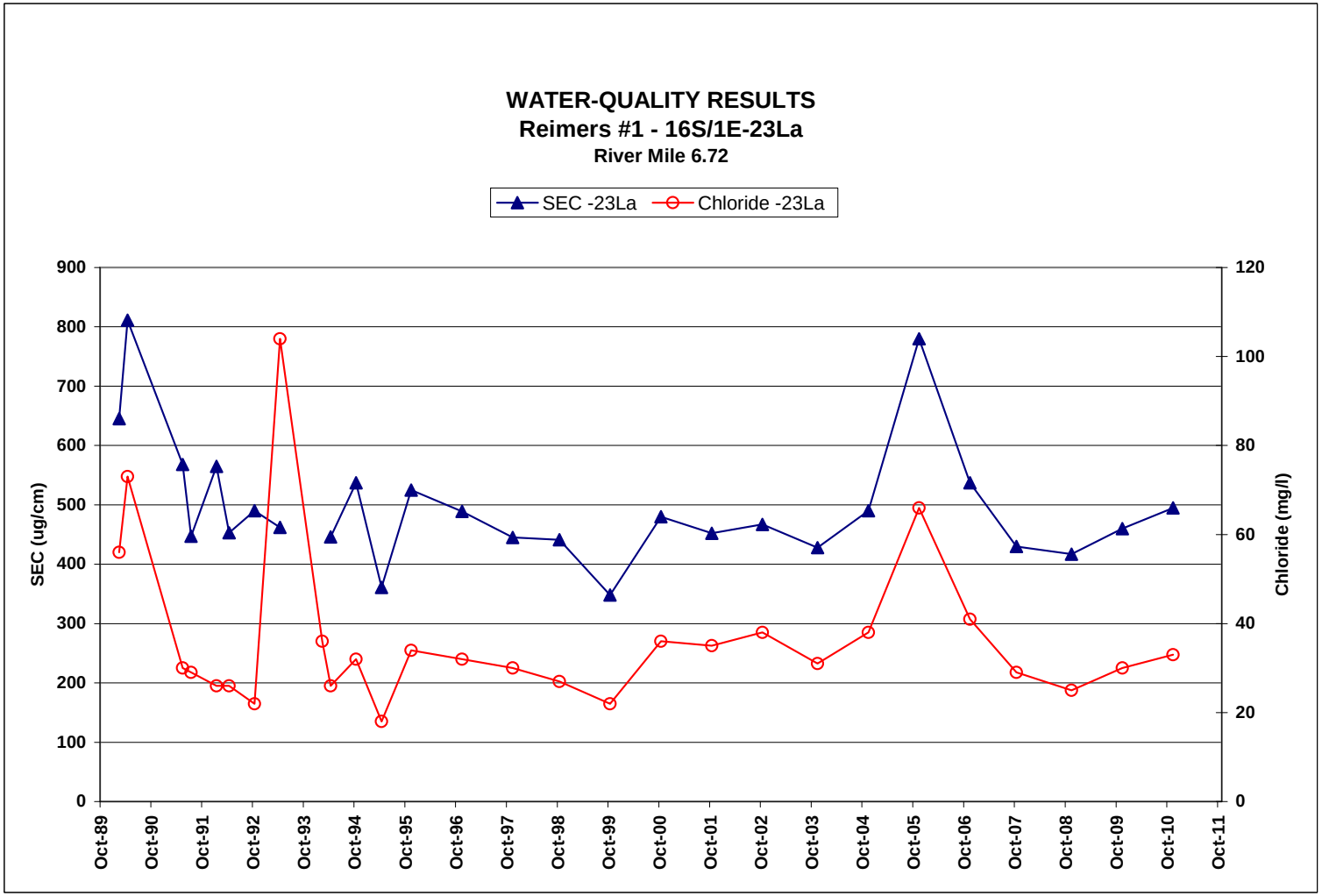


Figure II-9d
Water Quality in two coastal wells in Seaside

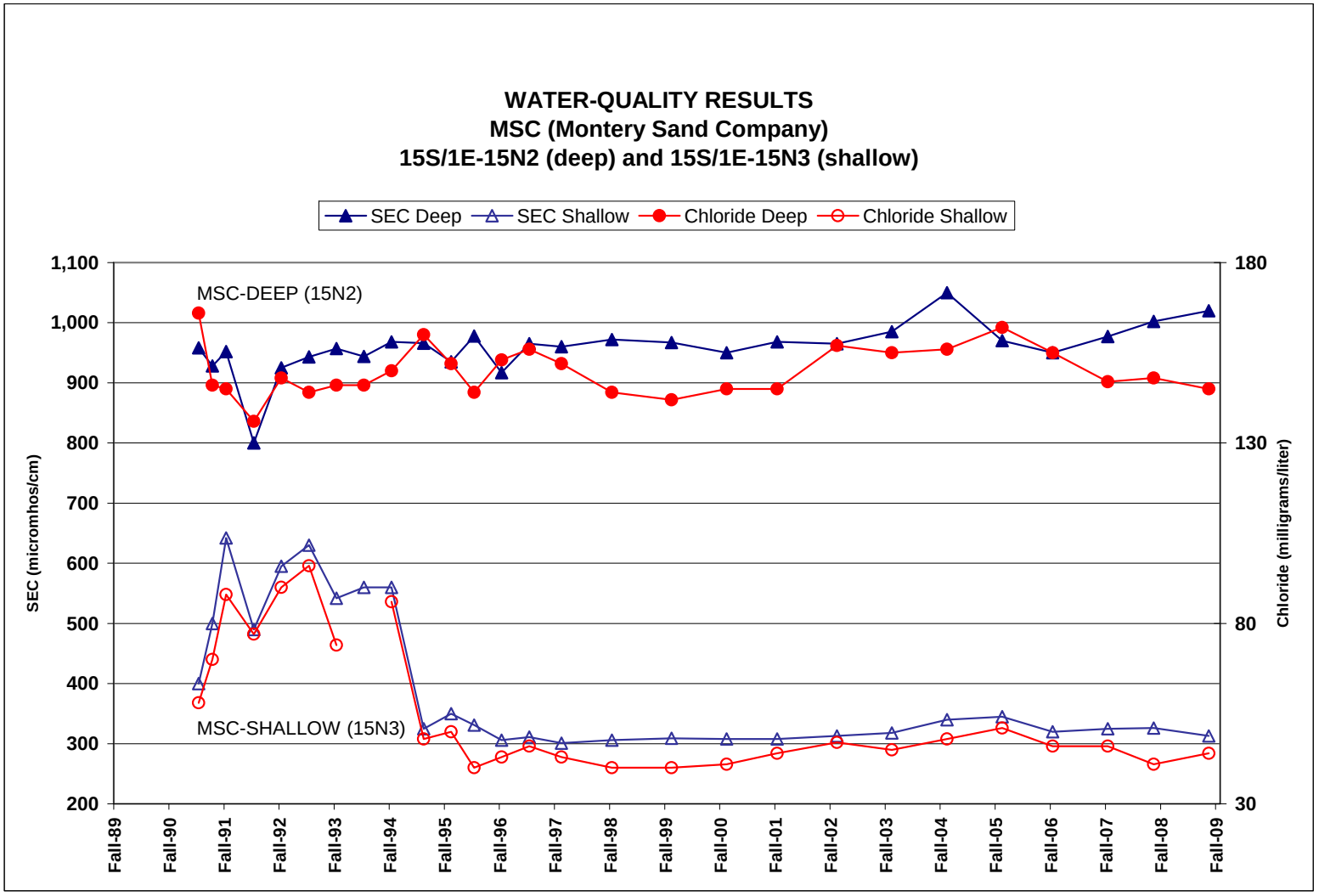


Figure II-10
Temperature and Semi-Monthly Water Quality Monitoring Locations Within the Carmel River Basin During RY 2010

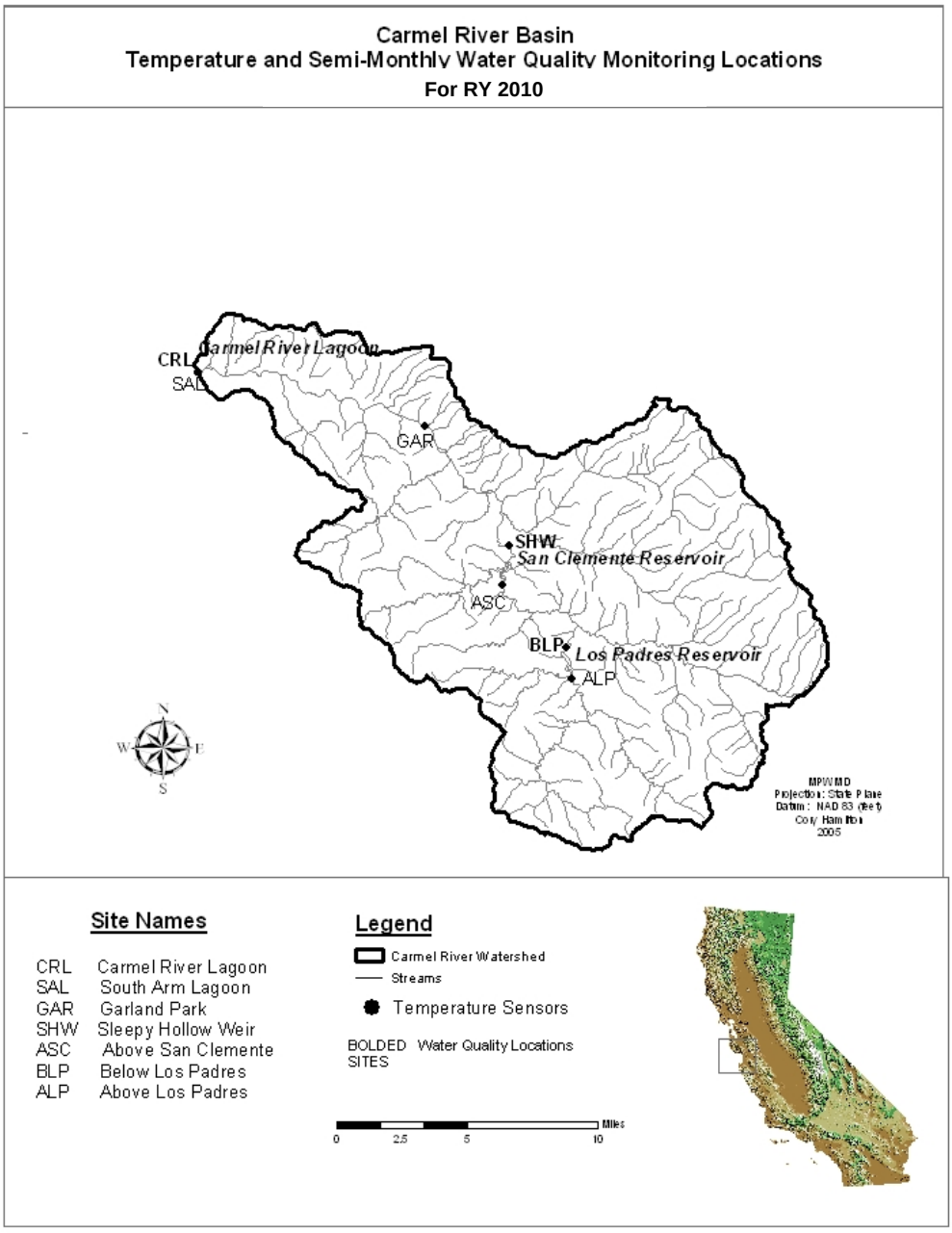


Figure II-11
Daily temperatures recorded from a continuous temperature data logger at the Garland Park (GAR) station during RY 2010.

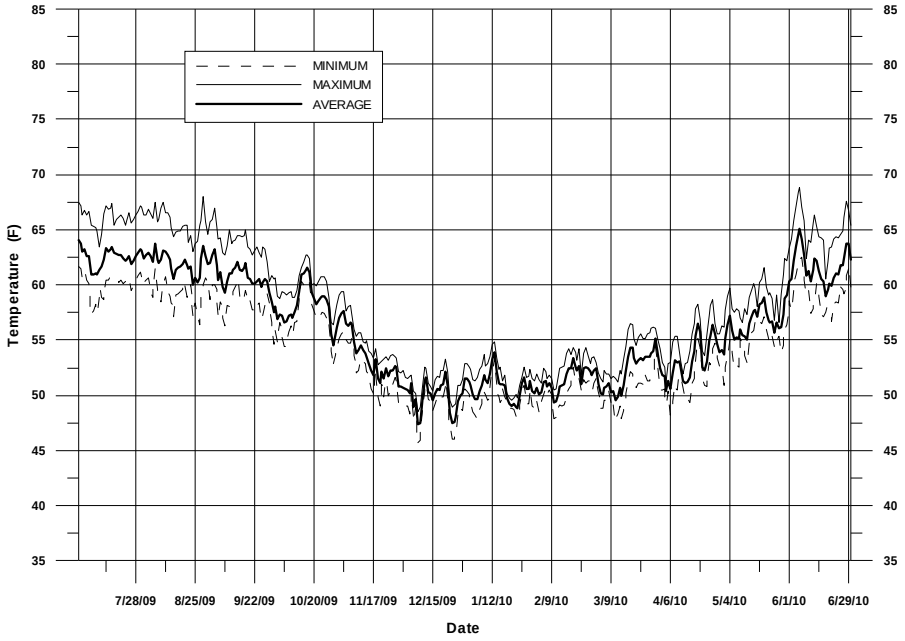


Figure II-12
Daily temperatures recorded from a continuous temperature data logger at the Sleepy Hollow Weir (SHW) station during RY 2010.

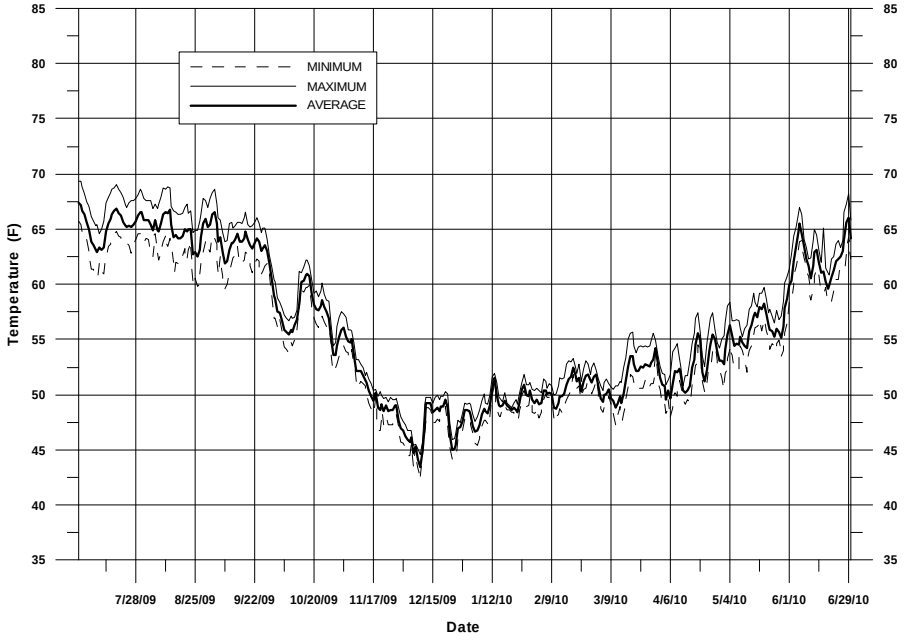


Figure II-13
Daily temperatures recorded from a continuous temperature data logger at the above San Clemente (ASC) station during RY 2010.

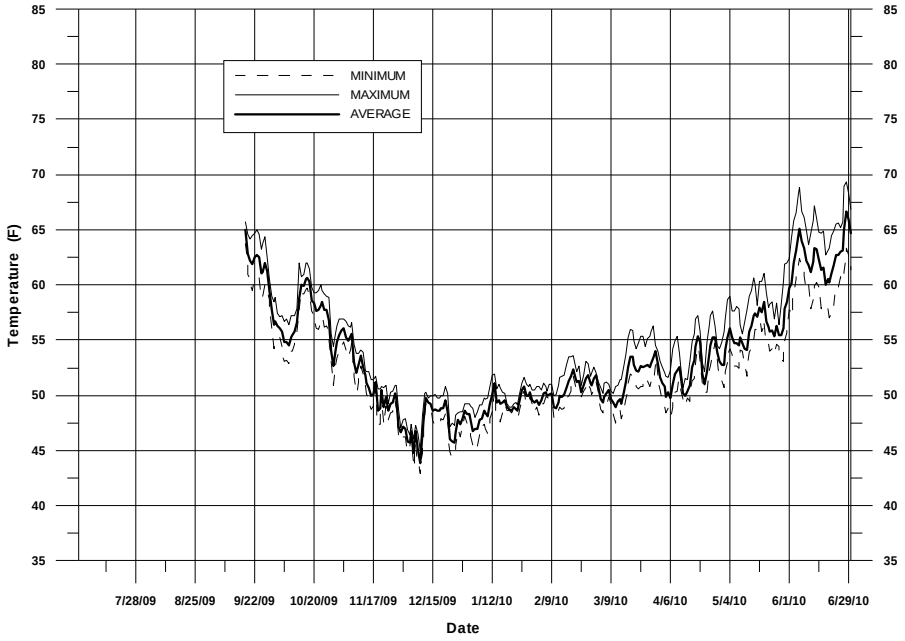


Figure II-14
Daily temperatures recorded from a continuous temperature data logger at the Below Los Padres (BLP) station during RY 2010.

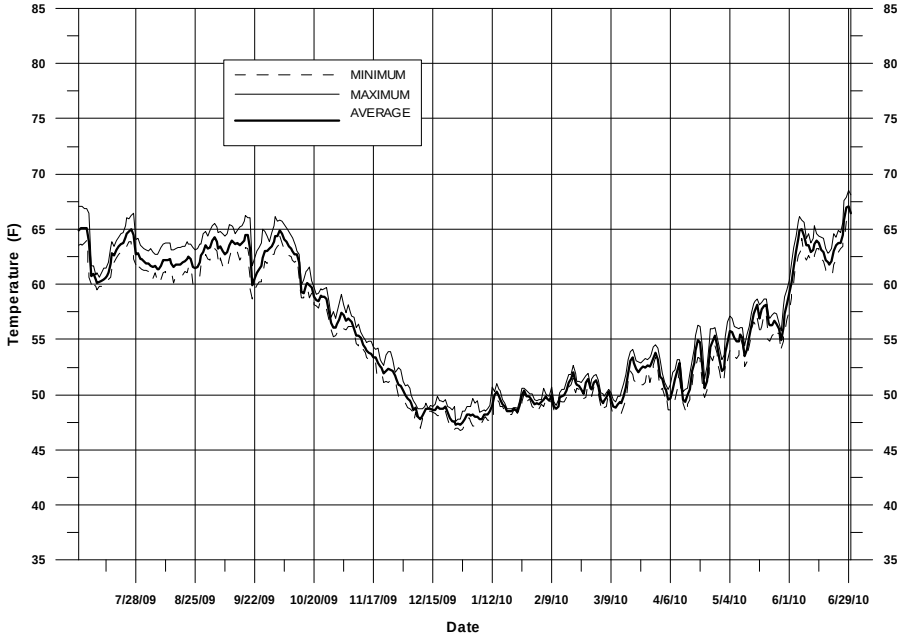


Figure II-15
Daily temperatures recorded from a continuous temperature data logger at the Above Los Padres (ALP) station during RY 2010.

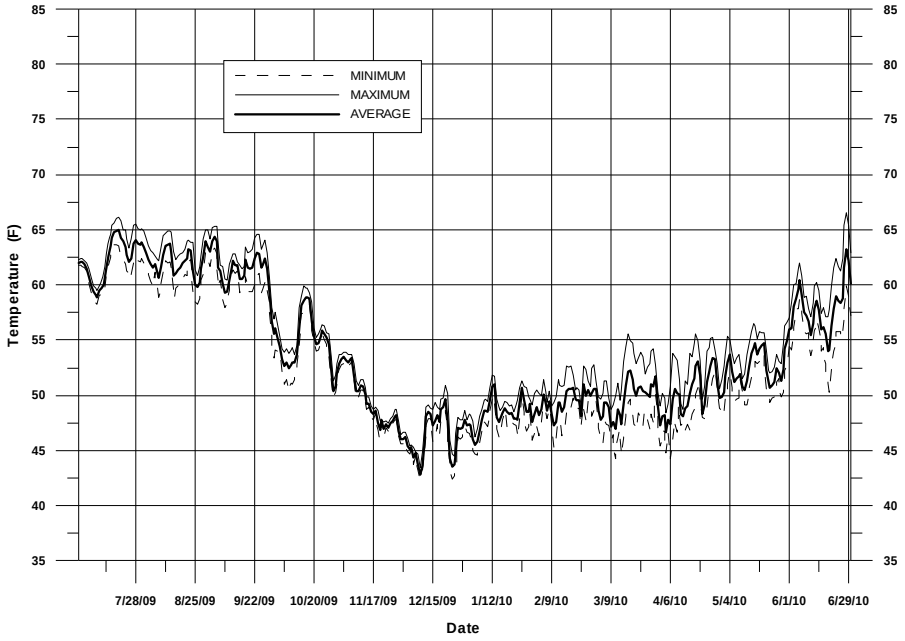


Figure II-16
Carmel River Lagoon Water Level

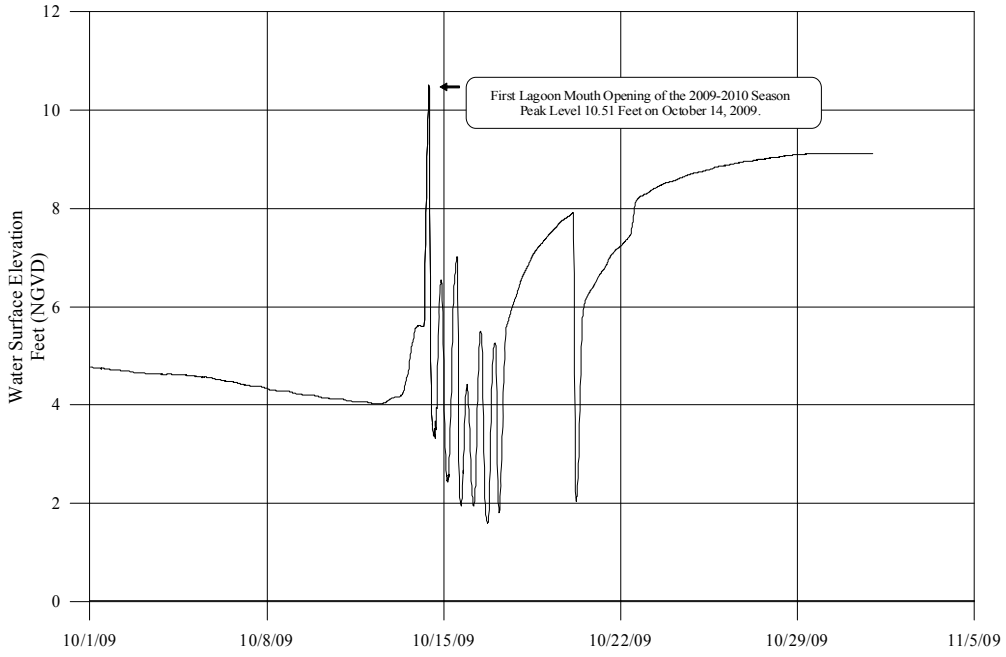


Table II-1

CARMEL RIVER BASIN - ANNUAL STREAMFLOW SUMMARY

WATER YEARS 1992 - 2010

(Values in Acre-Feet)

TRIBUTARY SITES	Drainage Area (Sq. Miles)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
CACHAGUA CREEK	46.3	1,780	7,340	560	16,320	3,840	4,990	23,800	2,590	1,730	1,500	245	1,270	1,250	4,340	5,210	261	2,200	N/A	N/A
PINE CREEK	7.8	3,750	9,800	1,230	11,110	6,550	8,300	15,610	4,540	5,300	3,270	2,300	4,250	2,350	8,910	8,020	849	3,840	N/A	N/A
SAN CLEMENTE CREEK	15.6	5,450	17,070	1,820	20,580	9,310	14,100	33,380	7,130	9,830	5,340	3,270	5,850	3,720	16,330	13,720	1,360	5,520	N/A	N/A
TULARCITOS CREEK	56.3	635	3,220	444	5,100	1,650	2,450	22,610	3,810	2,450	1,490	630	552	503	1,000	2,480	503	917	N/A	N/A
HITCHCOCK CREEK	4.6	*	*	52	1,820	451	716	2,970	169	482	214	18	274	234	863	691	2	383	N/A	N/A
GARZAS CREEK	13.2	3,700	11,170	746	12,140	4,890	8,570	24,610	5,050	4,980	3,070	1,200	2,760	1,810	8,590	7,420	381	3,010	N/A	N/A
ROBINSON CANYON CREEK	5.4	619	2,360	89	2,230	619	1,430	6,890	545	823	433	82	448	354	1,710	1,010	25	455	N/A	N/A
POTRERO CREEK	5.2	*	*	30	1,790	506	1,210	5,970	855	1,020	310	43	210	164	1,470	1,050	13	308	N/A	N/A
SAN JOSE CREEK (outside CR	14.2	*	*	*	*	*	*	*	6,400	6,260	2,890	1,100	1,880	1,480	7,640	6,870	862	1,740	N/A	N/A
MAINSTEM SITES																				
CR AT ROBLES DEL RIO	193	38,240	109,000	11,800	155,000	75,210	99,340	250,300	54,640	76,750	47,180	31,850	60,560	38,060	114,400	110,100	12,220	49,080	45,930	104,540
CR AT DON JUAN BRIDGE	216	*	122,000	12,760	173,600	83,090	111,800	252,200	53,570	73,960	49,360	31,330	60,420	38,330	121,800	118,300	12,150	52,510	47,410	106,300
CR NEAR CARMEL	246	35,570	123,400	8,200	177,400	74,500	104,100	261,100	55,000	76,190	47,790	28,340	55,400	35,220	119,200	119,200	7,440	43,960	41,590	105,840
CR AT HIGHWAY 1 BRIDGE	252	*	123,000	7,410	179,500	83,430	112,000	280,900	50,810	72,660	42,860	24,860	52,000	30,300	115,200	115,000	6,470	42,520	39,170	102,700

Notes:
1. Carmel River (CR) at Robles del Rio and near Carmel sites are maintained by the USGS.
2. (*) No continuous stage data collected.
3. Streamflow sites listed in downstream order.
4. San Jose Creek is outside the Carmel River Basin, but is shown for comparison.
5. Water Year 2009 & 2010 data where available are provisional and are subject to revison.

Table II-2
Water-quality data collected by MPWMD during Reporting Year (RY) 2010 at Carmel River Lagoon (CRL) site[1].

Date	Time 24 Hr	Temperature (F)	Dissolved Oxygen (mg/L)	Carbon Dioxide (mg/L)	pH	Conductivity (uS/cm)	Nacl (ppt)	Turbidity (NTU)	WSE (ft)
7/17/2009	1315	71.4	8.1	n/a	7.5	857	0.4	1.7	5.58
7/31/2009	1410	71.1	10.3	n/a	8.0	1079	0.5	1.7	4.64
8/14/2009	1320	71.9	9.8	n/a	8.0	1524	0.8	1.0	3.76
8/28/2009	1225	69.1	9.8	n/a	8.0	1457	0.7	2.5	3.62
9/11/2009	1045	68.0	9.4	n/a	8.0	1517	0.8	1.0	3.74
9/24/2009	1330	69.4	8.4	n/a	8.0	13440	7.8	0.9	4.94
10/9/2009	1205	64.4	9.0	n/a	8.0	8350	4.7	1.5	4.26
10/30/2009	1315	56.7	9.3	n/a	7.5	2105	1.1	1.5	9.14
12/2/2009	1245	49.3	n/a	n/a	7.5	1400	0.7	0.4	9.84
12/16/2009	1310	51.9	10.6	n/a	7.5	4493	2.4	0.7	6.36
1/8/2010	1245	53.6	10.6	10	7.5	6270	3.5	1.0	7.06
2/2/2010	1305	52.7	10.7	10	7.5	332	0.2	3.0	4.02
2/19/2010	1200	54.9	6.2	5	7.5	423	0.2	1.1	2.34
3/15/2010	1200	51.3	n/a	10	7.5	277	0.1	2.3	3.98
3/30/2010	1140	55.9	10.0	10	8.0	25730	19.9	5.2	5.24
4/26/2010	1155	58.1	7.1	15	7.5	316	0.2	2.1	3.36
5/17/2010	1215	57.7	11.8	10	7.5	548	0.3	1.1	1.34
6/4/2010	1240	68.5	8.0	10	8.0	856	0.4	0.6	1.61
6/18/2010	1300	61.9	10.6	10	8.0	662	0.3	0.2	6.18
Minimum		49.3	6.2	5.0	7.5	277	0.1	0.2	
Maximum		71.9	11.8	15.0	8.0	25730	19.9	5.2	
Average		60.9	9.4	10.0	7.7	3770	2.4	1.5	

[1]The CRL station is located on the southwest end of the main body of the Lagoon, along the rock outcrop at River Mile (RM) 0.1.

Table II-3
Water-quality data collected by MPWMD during RY 2010 at Sleepy Hollow Weir (SHW) site[1].

Date	Time 24 hr	Temperature (F)	Dissolved Oxygen (mg/L)	Carbon Dioxide (mg/L)	pH	Conductivity (uS/cm)	Turbidity (NTU)
7/17/2009	1235	67.8	10.1	n/a	8.0	280	3.0
7/31/2009	1205	67.1	9.2	n/a	7.5	287	3.2
8/14/2009	1230	66.2	10.0	n/a	8.0	291	3.5
8/28/2009	1050	64.1	8.7	n/a	7.5	288	4.5
9/11/2009	940	63.1	7.5	n/a	7.5	296	4.2
9/24/2009	1210	64.4	8.7	n/a	7.5	299	4.7
10/9/2009	1240	57.0	9.8	n/a	8.0	303	4.1
10/30/2009	1110	53.2	10.6	n/a	7.5	221	1.7
12/2/2009	1050	46.0	11.1	n/a	8.0	249	0.3
12/16/2009	1225	49.3	11.2	n/a	7.5	199	4.1
1/8/2010	1200	49.6	12.6	10	8.0	230	0.9
2/2/2010	1215	50.4	13.1	5	8.0	203	1.0
2/19/2010	1115	52.7	9.8	5	8.0	220	1.4
3/15/2010	1110	49.6	n/a	5	7.5	211	1.1
3/30/2010	1045	54.7	9.8	10	7.5	235	1.2
4/26/2010	1055	55.4	9.2	10	7.5	221	0.7
5/17/2010	1135	56.8	10.1	10	7.5	240	0.5
6/4/2010	1150	63.1	6.1	10	8.0	250	0.3
6/18/2010	1135	60.4	10.7	10	8.0	260	0.4
Minimum		46.0	6.1	5.0	7.5	199	0.3
Maximum		67.8	13.1	10.0	8.0	303	4.7
Average		57.4	9.9	8.3	7.7	252	2.1

[1] The SHW station is located 15 ft downstream of the Sleepy Hollow Weir at RM 17.1

Table II-4
Water-quality data collected by MPWMD during RY 2010 at Below Los Padres (BLP) site[1].

Date	Time 24 hr	Temperature (F)	Dissolved Oxygen (mg/L)	Carbon Dioxide (mg/L)	pH	Conductivity (uS/cm)	Turbidity (NTU)
7/17/2009	1100	65.5	9.1	n/a	7.5	252	1.8
7/31/2009	1120	62.8	9.0	n/a	7.0	250	1.8
8/14/2009	1135	63.7	8.4	n/a	7.5	253	1.6
8/28/2009	1010	63.1	9.3	n/a	7.5	260	2.4
9/11/2009	900	64.1	7.0	n/a	7.5	273	2.8
9/24/2009	1110	62.2	6.4	n/a	7.0	278	2.4
10/9/2009	1150	64.6	8.4	n/a	7.5	297	2.5
10/30/2009	1025	56.3	9.9	n/a	7.5	205	2.7
12/2/2009	1000	50.5	11.0	n/a	7.5	230	1.1
12/16/2009	1135	49.5	12.5	n/a	7.5	189	1.0
1/8/2010	1115	49.6	11.4	10	7.5	222	0.2
2/2/2010	1135	50.4	11.1	5	7.5	185	1.8
2/19/2010	1025	52.7	8.0	5	7.5	203	0.6
3/15/2010	1020	50.4	n/a	5	7.5	193	3.2
3/30/2010	1005	54.5	10.9	10	7.5	216	0.9
4/26/2010	1010	55.4	10.6	5	8.0	202	0.5
5/17/2010	1050	57.9	11.9	10	7.5	224	0.4
6/4/2010	1110	64.2	8.8	10	8.0	236	0.7
6/18/2010	1045	63.0	9.7	10	8.0	249	0.4
Minimum		49.5	6.4	5.0	7.0	185	0.2
Maximum		65.5	12.5	10.0	8.0	297	3.2
Average		57.9	9.6	7.8	7.5	232	1.5

[1] The BLP station is located approximately 200 ft downstream of the Los Padres spillway at RM 25.

III. MANAGE WATER PRODUCTION

Cooperative operation plans and quantification of California American Water (Cal-Am or CAW) and non Cal-Am water production within the Monterey Peninsula Water Resources System (MPWRS) is necessary for proper water resources management and protection of the natural resources of the Carmel River basin. In the Five-Year Mitigation Program, Riparian Mitigation #1 is based on conservation and "water distribution management to retain water in the Carmel River" (Finding No. 389-A). This section describes various management activities of the District designed to maximize streamflow and groundwater storage in the Carmel River system.

A. Memorandum of Agreement

Description and Purpose

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

Implementation and Activities During 2009-2010

- **2009 MOA** - The 2009 MOA was developed on May 7, 2009, approved by the District Board on June 25, 2009, and signed by all the MOA representatives by July 18, 2009. Based on storage conditions and expected reservoir inflows, it was agreed that Cal-Am would maintain minimum flows in the Carmel River at the Sleepy Hollow Weir of 22 cfs in June, 10 cfs in July, 8 cfs during August, 6 cfs during September and October, and 5 cfs through November and December 2009. The 2009 MOA included terms to: (a) limit Cal-Am diversions at San Clemente Dam during low-flow periods, except during an emergency, as defined in SWRCB Order WRO 2002-0002; (b) allow production from Cal-Am's Russell Wells at a maximum rate of 0.5 cfs; (c) limit operation of Cal-Am wells in the Carmel Valley above Robinson Canyon Road Bridge during low-flow periods; and (d) require Cal-Am to make reasonable efforts to operate the lower Carmel Valley wells in sequence from the most downstream well, progressing upstream as wells are needed and available for production.

In addition, language (Paragraph 12) was added to the 2009 MOA that requires Cal-Am to "make every reasonable effort to produce water from the Coastal Subareas of the Seaside Groundwater Basin before producing water from its Carmel River sources to preserve streamflow and instream habitat in the Carmel River for listed species, consistent with the production amounts specified in the Quarterly Water Supply Strategy and Budget for Cal-Am's main distribution system," whenever Cal-Am has not exceeded its annual production limit from both the Coastal Subareas of the Seaside Groundwater Basin and Carmel River sources.

- **2010 MOA** - The 2010 MOA was developed on May 5, 2010 and approved by the District Board on May 17, 2010. A final version of the document was not signed by all parties due to unresolved language introduced by CDFG. Based on storage conditions and expected reservoir inflows, it was agreed that Cal-Am would maintain minimum flows in the Carmel River at the Sleepy Hollow Weir of 12 cfs June through December 2010. The 2010 MOA included terms to: (a) limit Cal-Am diversions at San Clemente Dam during low-flow periods, except during an emergency, as defined in SWRCB Order WRO 2002-0002; (b) allow production from Cal-Am's Russell Wells at a maximum rate of 0.5 cfs; (c) limit operation of Cal-Am wells in the Carmel Valley above Robinson Canyon Road Bridge during low-flow periods; and (d) require Cal-Am to make reasonable efforts to operate the lower Carmel Valley wells in sequence from the most downstream well, progressing upstream as wells are needed and available for production.

In addition, the language that was added for the 2009 MOA (Paragraph 12) requiring Cal-Am to make every reasonable effort to produce water from the Coastal Subareas of the Seaside Groundwater Basin before producing water from its Carmel River sources was also included in the 2010 MOA.

B. Quarterly Water Supply Strategy and Budget

Description and Purpose

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

Under Ordinance No. 41, which was adopted in March 1989, development of the water-supply strategy and budget was changed from an annual to a quarterly process, and Cal-Am's annual surface-water diversions were reduced to a goal of no more than 29 percent of total production. Currently, the quarterly strategy and budget values are developed jointly by Cal-Am, the District, and CDFG in conformance with the annual MOA. The strategy is designed to maximize the long-term production potential and protect the environmental quality of the Carmel Valley and Seaside basins. The budget includes monthly production targets for each of Cal-Am's major production sources -- San

Clemente Reservoir, Upper Carmel Valley (UCV) Aquifer, Lower Carmel Valley (LCV) Aquifer, and the Coastal Subareas of the Seaside Basin -- which reflect current and expected system conditions. The quarterly strategies and budgets are normally developed in December, March, June, and September of each year.

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

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

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

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

4. The Russell Wells shall be limited to a combined total instantaneous diversion rate of not more that 0.5 cfs during low-flow periods.

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

In addition, the production goals for the quarterly budget process have changed over time. Beginning in 1998, the quarterly budgets were formulated with an annual

production goal of 11,285 AF during each Water Year from the Carmel River Basin, in conformance with goals and requirements established by SWRCB Orders WR 95-10, WR 98-04, and subsequently in conformance with WRO 2002-0002, and CDO 2009-0060. Releases from San Clemente Reservoir were maximized throughout the year and groundwater production in the UCV was limited to periods when sufficient streamflow was available to recharge the aquifer.

Starting in March 2006, the annual limit for Cal-Am's production from its wells in the Coastal Subareas of the Seaside Groundwater Basin for customers in its main system used in the quarterly budgets was reduced from 4,000 AF per year to 3,504 AF per year based on the final judgment in the basin adjudication. Accordingly, the total annual limit for Cal-Am from the Carmel River and Seaside Groundwater Basins for its main system was set at 14,789 AF.

It should be noted that the March 2006 Seaside Basin adjudication decision was amended in February 2007. The decision was amended to allow Cal-Am to combine its production allocation from the Coastal Subareas with its production allocation from the Laguna Seca Subarea. Accordingly, in WY 2010, Cal-Am was allowed to produce a maximum of 3,087 AF from the Coastal Subareas and 246 AF from the Laguna Seca Subarea, for a total of 3,333 AF from its sources in the Seaside Groundwater Basin.

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

Implementation and Activities During 2009-2010

During 2009 and 2010, the quarterly strategies and budgets were structured to optimize production from the Coastal Subareas of the Seaside Basin and minimize impacts from production in the Upper Carmel Valley (UCV). Activities in Water Year 2010 are described below.

- **Cal-Am Main System Production in Water Year 2010**[1] – During Water Year

[1] Beginning with the 2002-2003 Mitigation Report, Cal-Am production is reported on a Water Year basis, from October 1 of one Calendar Year through September 30 of the following Calendar Year. This is a

2010, Cal-Am produced 13,498 acre-feet (AF) of water from all sources for its main system, including 1,111 AF diverted from the Carmel River Basin and injected into the Seaside Basin at the District's Phase 1 ASR facility. Totals of 334 AF, 9,451AF (including the 1,111 AF injected into the Seaside Basin), and 3,283 AF were produced from Cal-Am wells in the UCV, LCV, and Seaside Basin Coastal Subareas, respectively. Of the system total, no water was diverted at San Clemente Dam, which represents the seventh consecutive year this has occurred since Cal-Am's record of diversions began in 1915. Currently, Cal-Am's ability to divert at this site is constrained by: (1) sediment nearly filling the reservoir and blocking the intake structure, (2) higher turbidity standards limiting the duration and period of diversion, (3) the Conservation Agreement with NMFS, and (4) SWRCB Order 2002-0002 that restricts diversions during the low-flow season.

C. Well Registration and Reporting Program

Description and Purpose

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

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

Implementation and Activities During 2009-2010

Tables III-1 and **III-2** show summaries of reported production from CAW and non-CAW wells in WY 2010 and WY 2009, respectively. The report for Water Year 2009 has been revised since it was first presented to the Board on May 17, 2010.

Figure III-1 compares reported production from CAW and non-CAW wells and surface diversions located within the Monterey Peninsula Water Resources System (MPWRS) in

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change from previous annual reports in which the reporting period was July of one year through June of the following year. This change makes the mitigation report consistent with reporting requirements under SWRCB Order No. WR 95-10.

WY 2010 with production limits set by the District's Water Allocation Program. The MPWRS includes the Carmel River Basin, Carmel Valley Alluvial Aquifer, the coastal subareas of the Seaside Groundwater Basin, and the Laguna Seca Subarea of the Seaside Groundwater Basin. With respect to the District's Water Allocation Program limits, CAW production from the MPWRS in WY 2010 was 12,435 acre-feet (AF), or 5,206 AF (29.5%) less than the CAW production limit of 17,641 AF that was established with the adoption of Ordinance No. 87 in 1997. Non-CAW production within the MPWRS in WY 2010 was 3,030 AF, or 16 AF (0.5%) less than the non-CAW production limit of 3,046 AFY established by Ordinance No. 87. Combined production from CAW and non-CAW sources within the MPWRS was 15,465 AF in WY 2010, which is 5,222 AF (25.2%) less than the 20,687 AFY production limit set for the MPWRS as part of the District's Water Allocation Program. It should be noted that this production limit set for the MPWRS did not include production from the Laguna Seca Subarea, whereas the WY 2010 production values above include the Laguna Seca Subarea.

During WY 2010, District staff inspected 23 new water meter installations to ensure compliance with the District's water meter installation standards and guidelines. In addition, staff reviewed copies of nine applications for permits for construction of new wells within the District from the Monterey County Health Department, two of which constituted permits for replacements of older wells, and advised the permitees that MPWMD permits were also needed.

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Table III-1

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT
DRAFT WATER PRODUCTION SUMMARY FOR WATER YEAR 2010
October 1, 2009 - September 30, 2010

SOURCE AREAS [1, 2]	NON CAW (NON CAL-AM) WELLS						CAW (CAL-AM) WELLS		AQUIFER SUBUNIT TOTALS	
	WATER METER		LAND USE		SUB-TOTAL		WATER METER			
	NO. OF WELLS	PRODUCTION [3] (AF)	NO. OF WELLS	PRODUCTION (AF)	NO. OF WELLS	PRODUCTION (AF)	NO. OF WELLS	PRODUCTION (AF)	NO. OF WELLS	PRODUCTION (AF)
AS1	8	107.4	1	0.1	9	107.5	0	0.0	9	107.5
AS2	44	206.8	33	35.7	77	242.5	3	334.2	80	576.7
AS3	128	1,225.7	47	48.8	175	1,274.5	7	6,249.5	182	7,524.0
AS4	27	577.5	6	1.2	33	578.7	1	3,201.8	34	3,780.5
SCS	6	397.9	2	1.2	8	399.0	5	3,283.5	13	3,682.5
LSS	7	420.2	3	1.2	10	421.4	4	430.1	14	851.5
CAC	10	53.3	7	8.5	17	61.7	0	0.0	17	61.7
CVU	260	594.0	36	26.0	296	620.0	0	0.0	296	620.0
MIS	92	345.9	8	7.2	100	353.1	0	0.0	100	353.1
ACTIVE	582	3,928.6	143	129.8	725	4,058.4	20	13,499.1	745	17,557.4
INACTIVE	329		37		366		21		387	
NOT REPORTING	30		33		63		0		63	
								adjusted		adjusted
METHOD TOTALS:	941	3,928.6	213	129.8	1,154	4,058.4	41	12,434.5	1,195	16,492.8

NOTES:
1. Shaded areas indicate production within the Monterey Peninsula Water Resources System. The LSS was added to the Monterey Peninsula Water Resources System in Septembter 2008.

2. CAW - California American Water

3. Source areas are as follows:
   AS1 - UPPER CARMEL VALLEY - San Clemente Dam to Esquiline Bridge
   AS2 - MID CARMEL VALLEY - Esquiline Bridge to Narrows
   AS3 - LOWER CARMEL VALLEY - Narrows to Via Mallorca Bridge
   AS4 - LOWER CARMEL VALLEY - Via Mallorca Bridge to Lagoon
   SCS - SEASIDE COASTAL SUBAREAS
   LSS - LAGUNA SECA SUBAREA (Ryan Ranch Area is within LSS)
   CAC - CACHAGUA CREEK and UPPER WATERSHED AREAS
   CVU - CARMEL VALLEY UPLAND - Hillsides and Tularcitos Creek Area
   MIS - PENINSULA, CARMEL HIGHLANDS AND SAN JOSE CREEK AREAS
4. Any minor numerical discrepancies in addition are due to rounding.

5. 1,110.5 AF was subtracted from CAW production to account for water provided to MPWMD Water Project #1 (ASR Wells #1 and #2) in WY 2010.

6. 45.9 AF was added to CAW procduction to account for water from Sand City Desal Plant.

7. 12.6 AF was provided to Seaside (Municipal) from CAW SCS; production volumes for both of these producers were adjusted accordingly in WY 2010.

DISTRICT-WIDE PRODUCTION	
SURFACE WATER DIVERSIONS:	
CAW Diversions (San Clemente Dam):	0.0
Non Cal-Am Diversions:	6.9
CAW WELLS:	
SEASIDE:	3,713.6
CARMEL VALLEY:	9,785.5
Within the Water Resources System:	13,499.1
Adjustments to CAW production (see Notes 5 - 6)	12,434.5
Outside the Water Resources System:	0.0
CAW TOTAL, Wells and Diversion:	12,434.5
NON CAW WELLS:	
Within the Water Resources System:	3,023.6
Outside the Water Resources System:	1,034.8
NON CAW TOTAL, Wells and Diversion:	4,065.3
GRAND TOTAL:	16,499.7

Table III-2

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT
DRAFT WATER PRODUCTION SUMMARY FOR WATER YEAR 2009
October 1, 2008 - September 30, 2009

SOURCE AREAS [1, 2]	NON CAW (NON CAL-AM) WELLS						CAW (CAL-AM) WELLS		AQUIFER SUBUNIT TOTALS	
	WATER METER		LAND USE		SUB-TOTAL		WATER METER			
	NO. OF WELLS	PRODUCTION [3] (AF)	NO. OF WELLS	PRODUCTION (AF)	NO. OF WELLS	PRODUCTION (AF)	NO. OF WELLS	PRODUCTION (AF)	NO. OF WELLS	PRODUCTION (AF)
AS1	6	116.8	1	0.1	7	116.9	2	336.8	9	453.7
AS2	42	172.8	34	37.1	76	209.9	3	389.2	79	599.2
AS3	122	1,193.3	47	48.8	169	1,242.1	9	7,944.5	178	9,186.6
AS4	30	751.0	6	1.2	36	752.3	2	1,797.1	38	2,549.4
SCS	11	886.4	2	1.2	13	887.6	5	2,631.2	18	3,518.8
LSS	10	515.2	3	1.2	13	516.4	4	515.9	17	1,032.4
CAC	8	43.0	7	8.5	15	51.4	0	0.0	15	51.4
CVU	251	700.0	36	26.0	287	726.0	0	0.0	287	726.0
MIS	87	605.4	8	7.2	95	612.5	0	0.0	95	612.5
ACTIVE	567	4,984.0	144	131.2	711	5,115.1	25	13,614.8	736	18,729.9
INACTIVE	333		37		370		14		384	
NOT REPORTING	41		35		76		0		76	
METHOD TOTALS:	941	4,984.0	216	131.2	1,157	5,115.1	39	13,614.8	1,196	18,729.9

NOTES:

1. Shaded areas indicate production within the Monterey Peninsula Water Resources System. The LSS was added to the Monterey Peninsula Water Resources System in Septembter 2008.

2. CAW - California American Water

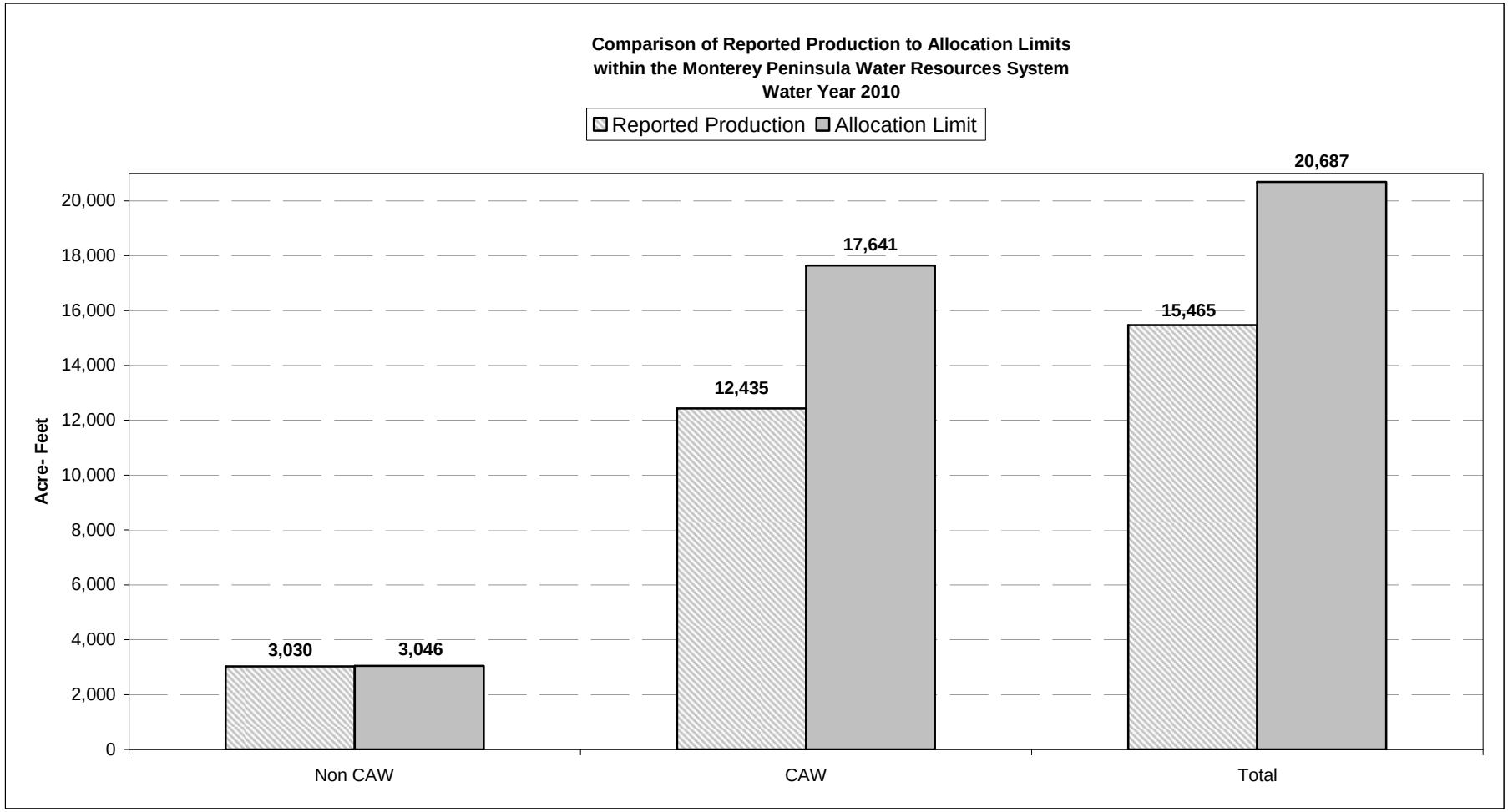
3. Source areas are as follows:
   AS1 - UPPER CARMEL VALLEY - San Clemente Dam to Esquiline Bridge
   AS2 - MID CARMEL VALLEY - Esquiline Bridge to Narrows
   AS3 - LOWER CARMEL VALLEY - Narrows to Via Mallorca Bridge
   AS4 - LOWER CARMEL VALLEY - Via Mallorca Bridge to Lagoon
   SCS - SEASIDE COASTAL SUBAREAS
   CAC - CACHAGUA CREEK and UPPER WATERSHED AREAS
   CVU - CARMEL VALLEY UPLAND - Hillsides and Tularcitos Creek Area
   LSS - LAGUNA SECA SUBAREA (Ryan Ranch Area is within LSS)
   MIS - PENINSULA, CARMEL HIGHLANDS AND SAN JOSE CREEK AREAS

4. Any minor numerical discrepancies in addition are due to rounding.

5. 181.59 AF was subtracted from CAW production to account for water provided to MPWMD Water Project #1 (ASR wells) in WY 2009.

DISTRICT-WIDE PRODUCTION		
SURFACE WATER DIVERSIONS:		
	CAW Diversions (San Clemente Dam):	0.0
	Non Cal-Am Diversions:	27.9
CAW WELLS:		
	SEASIDE:	3,147.1
	CARMEL VALLEY:	10,286.0
	Within the Water Resources System:	13,433.2
	Outside the Water Resources System:	0.0
	CAW TOTAL, Wells and Diversion:	13,433.2
NON CAW WELLS:		
	Within the Water Resources System:	3,725.2
	Outside the Water Resources System:	1,390.0
	NON CAW TOTAL, Wells and Diversion:	5,143.1
	GRAND TOTAL:	18,576.2

Figure III-1
Comparison of Reported Production to Allocation Limits within MPWRS



IV. MANAGE WATER DEMAND

Riparian Vegetation Mitigation #1 in the Five-Year Mitigation Program entails "conservation and water distribution management to retain water in the Carmel River." Finding No. 389-A adopted by the District Board states that annual monitoring of conservation activities would be reported. This section includes information on the District's Conservation and Demand Management programs.

A. Water Conservation

Description and Purpose

The District has been actively involved with water conservation programs on the Monterey Peninsula since October 1979. In 1979, the District implemented its first program that involved public speaking engagements, drought tolerant plant displays, a library of conservation ideas and techniques, development of a drought tolerant plant list, and regular public service announcements. In addition, the District co-sponsored public workshops on rainwater reuse and cisterns and prepared regular press releases regarding its activities.

The Conservation Program expanded in 1983 when the District agreed to facilitate the Water Conservation Plan for Monterey County. This plan was completed and adopted by the District's Board of Directors in 1986. The goal was to save 15 percent of what was estimated to be the demand in 2020, roughly 3,600 AFA in savings from an estimated demand of 24,000 AFA.

The District has also been involved in Water Rationing planning and implementation since its inception in 1978. A Water Rationing plan developed by the Monterey Peninsula Water Management Agency (the predecessor to the District) was available when the District was established. The former plan was reviewed and amended in June 1981 with the adoption of Ordinance No. 7 which established a standby Rationing Plan. The Rationing Plan was again amended in 1988 (Ordinance Nos. 35 and 37) during drought-related Rationing administered by the District that continued through 1991. Water use reductions of approximately 30 percent were achieved during that time. Most recently, the District adopted the Expanded Water Conservation and Standby Rationing Plan that consists of seven stages. The first three stages provide California American Water (CAW) and the District with conservation "tools" to keep community water use within regulatory limits. The last four stages of the Plan contain more stringent actions including per-capita Rationing that would be triggered by a drought-induced water supply shortage and non-compliance with regulatory restrictions.

A cornerstone of the District's program is its Water Conservation Regulation (Regulation XIV). This Regulation requires retrofit of inefficient plumbing fixtures with Low Water Use Plumbing Fixtures before a property changes ownership, for New Construction and Remodels, and for Non-Residential Changes of Use or Expansions of Use. Non-Residential Water Users within the District must comply with the Water Efficiency Standards unless subject to more restrictive requirements by another agency or Jurisdiction. District staff inspects around 90 percent of the properties subject to retrofit and conservation requirements for compliance. Two full-time inspectors are in the field, visiting properties on a prearranged schedule, while office staff schedule and follow up on previously completed inspections. The inspectors document: (1) the

number, type, and flow rates of all water fixtures in the building; (2) verify compliance with Water Permit conditions; (3) provide conservation information, (4) provide Rebate applications and devices as needed, (5) note and report leaks to the property contact, and (6) generally verify that all District requirements have been met. Properties failing to meet the requirements are given 30 days to correct any violation and are typically re-inspected to verify full compliance. Continued non-compliance is enforced with deed restrictions, liens, and other actions.

A second key element of the Conservation Program was added in 1997 when the District began issuing Rebates for voluntary toilet replacements with Ultra-Low Flush (ULFT) 1.6 gallons-per-flush toilets. Initially, the District shared funding with CAW. All Rebate funds for California American Water's customers are currently supported by the ratepayers through a Conservation Surcharge on the CAW bill, with the District administering the program. The Rebate Program has been expanded over the years: Rebates are now available for High Efficiency Toilets (HET) and urinals, Ultra-High Efficiency Toilets (UHET), Pint and Zero Water Consumption Urinals, High Efficiency Dishwashers and High Efficiency Clothes Washers (Residential and Non-Residential), Instant-Access Hot Water Systems, Weather Based Irrigation Controllers, Soil Moisture Sensors, Rain Sensors, Rotating Sprinkler Nozzles, Graywater Irrigation Systems, Cistern water tanks (up to 25,000 gallons), Lawn removal and replacement with low water use plants or permeable surfaces (up to 5,000 square-feet), Synthetic Turf installation (up to 2,000 square-feet), Cooling Tower Conductivity Controller with or without pH controller, Water Efficient Ice Machines, X-ray Film Processor Recirculation System, Water Broom, Dry Vacuum Pump, High Efficiency Connectionless Food Steamer, High Efficiency Commercial Dishwashers, and water tempering devices for medical equipment steam sterilizers.

Other components of the District's conservation program include water efficiency requirements for existing Visitor Serving Facilities and Non-Residential uses; Water Waste and Non-Essential Water Use enforcement; distribution of water-saving showerheads, faucet aerators, hose shut-off nozzles, hose timers and other equipment; public education as a member of the Water Awareness Committee of Monterey County; and District policies and incentives to promote conservation in Jurisdictions within the District.

Implementation and Activities During 2009-2010

- **Conservation Inspections** -- District staff continued an intensive inspection program to ensure compliance with the Conservation and Permit Regulations. Change of Ownership inspections make up the bulk of the District's inspection program. Most of the **1,267** properties that changed ownership from July 2009 through June 2010 (FY 2009-2010) were inspected for installation of Low Water Use Plumbing Fixtures prior to the close of escrow. Seventy-Four percent (**74%**) of the inspected properties were found to be in compliance during the first inspection. An additional four percent (**4%**) passed during the second inspection, typically after replacing older toilets identified during the initial inspection. To establish full compliance with the retrofit requirements, staff continues enforcement until compliance is achieved.

Water efficient equipment is required as a condition of Water Permits issued for New Construction and Remodels. District staff inspected **649** properties for compliance with Water Permit conditions during FY 2009-2010. Inspections included verification of conservation measures, such as Drip Irrigation and Instant-Access Hot Water Systems (systems that make hot water available within ten seconds), as well as installation of Low Water Use Plumbing Fixtures

and efficient Irrigation Systems throughout the property.

For the above two categories, a total of about **1,398** inspections were conducted in FY 2009-2010. An estimated **6.570 a**cre-feet (AF) of water is being saved each year by the retrofits verified this year in these two categories.

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

● **Rebate Program --** In January 1997, the District enacted a program that offered Rebates for older Residential toilets replaced with Ultra Low-Flow Toilet (ULFT) models. Water saved through this program is set aside to reduce community water use and to help the community meet the stringent regulatory restrictions imposed by State Water Resources Control Board Order No. WR 95-10 and the subsequent Cease and Desist Order for the Carmel River and to comply with reductions in the Seaside Groundwater Basin resulting from the Seaside Basin Adjudication Decision. Initially designed to facilitate toilet replacements that might not otherwise occur for years, the program has been expanded to provide Rebates for a number of water saving devices that are listed in the description and purpose section above.

From July 1, 2009, through June 30, 2010, a total of **2,259** applications for rebates were received, and **1,922** or **85** percent of applications were approved. There were **337** applications denied, usually as a result of properties being located outside of the District or because the devices did not meet the District's definition of a Qualifying Device. Table IV-1 summarizes the Rebate Program for FY 2009-2010:

● **Conservation Education** -- District activities remained focused on public education and encouraging Peninsula residents and businesses to implement new water conservation practices or maintain existing equipment and behaviors. Individualized Water Waste education took place as necessary to remind water users not to wash sidewalks, leave hoses running or ignore leaks. Implementation of the Expanded Water Conservation and Standby Rationing Plan has successfully kept community water use below regulatory limits.

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

- District staff handed out water conservation information and devices at the Pebble Beach Community Services District Open House. The event provided the public an opportunity to learn about the District's extensive activities and programs.

- The Water Demand Division launched a new and comprehensive database. The database project will provide faster and more efficient responses to public inquiries related to the District's Demand Management and Conservation Programs and will provide accessible data for evaluation and reporting on District programs.

- The District participated in judging the 5th annual Water Wise Landscape Design Awards at the Monterey County Fair. The Landscape displays were judged on degree of water conservation practiced, use of native and drought tolerant plans, practicality and overall appearance. The display categories were: Non-Residential, Senior, Junior and Individual.

- The District hosted two Irrigation Association (IA) classes at the California American Water Company office in Pacific Grove. The classes were "Predicting and Estimating Landscape Water Use" and "Certified Landscape Irrigation Auditor" (CLIA). Both classes provided instruction on the evaluation of irrigated landscape for efficiency and ways to increase irrigation effectiveness.

- Water Demand Division staff attended and presented at the prestigious Watersmart Innovations Conference and Exposition. The conference offered 16 sessions with choices of eight different water efficiency tracks per session.

- The Water Demand Manager presented information about the local water situation to Monterey's Local Chapter of P.E.O. (a philanthropic education organization). Members were informed about the current water situation and existing conservation programs. Free water-savings equipment, including rain sensors and showerheads, were provided.

- District staff participated in and handed out water conservation devices and information at a California Native Plant Society event.

- District staff participated in and handed out water conservation devices and information at the San Carlos Church – Care for Creation Event.

- District staff gave a presentation to the Del Monte Forest Property Owners' Semi-Annual Meeting and Water Panel Presentation.

- The District sponsored and participated in the 1st annual Water Awareness Day at Del Monte Center. Gardens were installed in the mall behind Macy's to demonstrate the beauty of water efficient gardens. Drought tolerant plants were donated by local nurseries. The event also included informational and family-friendly displays, including tables featuring the District's conservation staff and staff from the Planning and Engineering Division.

- The District hosted a presentation for local planners, building officials, city engineers, public works and parks and recreation department employees, water company staff and District staff presented by the Executive Director for the California Urban Water

Conservation Council. A comprehensive overview of the State's Model Water Efficient Landscape Ordinance was presented. The Water Demand Manager discussed some of the challenges of implementing the state's ordinance, including coordination and delegation issues that may arise between the builders, the land use agencies and the water suppliers and regulators were discussed. Additional information was provided on enforcement challenges, including long-term enforcement of consumption limitations resulting from compliance with the State Model Landscape Ordinance. The District is working with the Jurisdictions to refine landscape requirements for smaller properties not subject to the Model Ordinance.

- District staff partnered with California American Water and Water Awareness Committee to sponsor two classes exclusively for irrigation and landscape professionals on Irrigation Scheduling & Smart Controller Programming and Low Volume (Drip) Irrigation. Instruction was available in Spanish and English.

- District staff provided materials and conservation devices to the Monterey Plaza Hotel conservation awareness day for employees.

- District staff participated and handed out water conservation devices and information at Cutting Day at Monterey City Hall.

- District staff handed out water conservation devices and information at Pacific Grove's Good Old Days Celebration. The booth showcased several large posters about steelhead, river restoration and the rebate program. Visitors learned about the District's extensive activities and programs.

- District staff hosted American Rainwater Catchment Systems Association (ARCSA) in Pacific Grove. Two courses were offered: Beginning and Advanced Rainwater Harvesting and for a presentation on an introduction to Rainwater Harvesting.

- District staff manned a conservation booth at the Department of Defense's Green Fair. Staff provided examples of products and gave out brochures and general information regarding the District's Conservation and Rebate Programs to District residents.

- The Water Demand Manager was a presenter at the American Society of Irrigation Consultants National Conference. The presentation titled "Balancing Act: Managing a Finite Resource" was well-received by approximately 150 conference attendees. Staff also participated in a panel discussion on the future roles of the irrigation consultant. The two day conference provided considerable information on outdoor water use technology, including a number of interesting topics such as Recycled Water, golf course water use, and sustainable landscaping.

- The District in conjunction with California American Water, prepared a conservation awareness flyer that was distributed by email to the Monterey County Hospitality Association members before the U.S. Open Golf Tournament in June 2010. Staff delivered the flyer, along with restaurant table tents and towel and linen reuse cards to businesses. Mirror clings with conservation messages were also delivered to visitor serving Non-Residential users.

- The District hosted a presentation of the Sloan AQUS Water Conservation System. The AQUS system filters and disinfects water from a bathroom sink and pipes it to the toilet for flushing. The system has received Uniform Plumbing Code certification, but is not presently allowed in Monterey County. The presentation was attended by building officials, Monterey County Department of Environmental Health, Marina Coast Water District and MPWMD.

B. Water Distribution System Management (Water Permits)

Description and Purpose

The District balances water supply and demand through the MPWMD Water Allocation Program by carefully tracking the amount of allotted water used by member Jurisdictions. A number of ordinances have been adopted over the years to modify the Water Permit program. A comprehensive listing of ordinances affecting this program is included in the Monthly Water Allocation Program Report.

In 1990, the District revamped its Water Allocation program, doing away with Allocations based on a percentage of the total available production. Instead, a new process was initiated whereby only newly developed water supplies are available for new and/or expanding uses through an Allocation by Jurisdiction system. In mid-1993, the Paralta Well project received a use permit for operation, thereby making new water from the well available for the District to allocate to its eight member Jurisdictions. The District allocated 358 AF for new CAW metered sales, including 308 AF to the eight Jurisdictions and 50 AF to a District "reserve" for community benefit projects.

Beginning with the release of the Paralta water for use, District staff established procedures for closely tracking the amount of Water Permitted to new and expanded water uses. Each Jurisdiction in the District was given a portion of the water to use for permitting. Each applicant for water must receive the Jurisdiction's authorization for a specific quantity of water before applying to the District for a Water Permit. A Water Permit is required by a Jurisdiction before the Building Permit is released. The District evaluates the project's water demand and issues a permit for the project description as depicted on the final construction documents. At the time the Water Permit is issued, the Jurisdiction's Water Allocation is debited. Monthly reports show the amount of water remaining in the Allocation and the permit activity for the month.

In addition to water available from the eight Jurisdictions within the District, there are several separate Water Entitlements: Water West, a water company purchased by CAW in the early 1990's, has an independent Entitlement of water for properties within the boundaries of the former system. Properties located in the Quail Meadow's subdivision, Pebble Beach Company (PBC), Hester Hyde, Griffin Trust, and J. Lohr properties also have an independent Entitlement of water.

● **Permit Activity** -- From July 1, 2009, through June 30, 2010, a total of **971** Water Permits were issued. As shown in **Table IV-2**, **25** new houses and **653** residential Remodels/additions were permitted in the California American Water system. There were **45** Non-Residential Water Permits issued for Remodels/Additions and Changes of Use in the

California American Water system. As of June 30, 2010, a total of **96.296 AF** of water remained available in the areas served California American Water. This includes water from pre- and post-Paralta Allocations and water added to a Jurisdiction's Allocation from Water Use Credit transfers and public retrofits.

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

Ordinance No. 109. In May 2004, the Board adopted Ordinance No. 109 (amending Rule 23.5) to enable financing of upgrades to the CAWD/ PBCSD Recycled Water Project. This ordinance enabled Water Entitlements held by the PBC to be made available to properties throughout the Del Monte Forest in order to finance the Project Expansion. Ordinance No. 109 also provided a framework for several ancillary agreements for financing, construction and operation, and sale of Recycled Water.

In April 2005, the first Water Use Permits were issued to property owners in the Del Monte Forest who purchased water from the PBC. By June 30, 2010, the District had issued Water Use Permits allowing **107.910** AF to be transferred from the PBC to independent property owners in the Forest. Property owners taking advantage of this program pay PBC for a portion of their Entitlement and receive documentation of their purchase. The District processes and records a Water Use Permit on the title of the property that provides notice of the amount of Water Entitlement available. Regular Water Permits are required when the property owner desires to use the water available from a Water Use Permit.

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

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

Table IV-1
Summary of Rebate Program

	Rebate Paid	Number of devices	Estimated AF	Gallons Saved
ULFT	$7,963.75	82	1.886	614,555
HET	$198,428.44	1,165	35.819	11,671,772
HEDW	$31,875.00	242	0.726	236,568
HECW	$182,787.00	756	11.534	3,758,398
IAHW	$5,258.61	28	0.000	0
On Demand Systems	$1,400.00	14	0.000	0
Zero Use Systems	$400.00	2	0.000	0
Cisterns	$13,395.75	37	0.000	0
Smart Controllers	$3,940.00	26	0.000	0
Rain Sensors	$465.00	11	0.000	0
Moisture Sensors	$50.00	2	0.000	0
Lawn Removal & Replacement	$10,053.48	11	0.747	243,390
Rebate Refund	$-1,200.00	0	-0.154	0
	$454,817.03	**2,376**	**50.558**	**15,910,128**

Table IV-2
Summary of Water Permits Issued

Main CALIFORNIA AMERICAN WATER System Permits Issued (July 2009-June 2010)			
Type of Use	No. of Permits	Use (Acre-Feet)	Average Use Per Permit (Acre-Feet)
PARALTA & PRE-PARALTA			
New Residential	25	9.274	0.371
*Pebble Beach Entitlements**	7	0.810	0.116
Residential Remodels/Additions	653	2.296	0.004
*Pebble Beach Entitlements**	31	1.602	0.052
New Non-Residential	9	0.977	0.109
*Pebble Beach Entitlements**	0	0.000	0.000
Non-Residential Remodels/Additions	45	8.305	0.185
*Pebble Beach Entitlements**	0	0.000	0.000

**Pebble Beach Entitlements are tracked separately from Main CALIFORNIA AMERICAN WATER System permits.*

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V. MONITOR WATER USAGE

A general mitigation identified in the Findings for the Final Allocation EIR (Finding No. 403) was to adopt Option V production limits as the new allocation maximum. This was achieved by the passage of Ordinance No. 53, "Selecting Water Supply Option V to Implement the Water Allocation Program," on December 13, 1990, effective January 1, 1991. The Ordinance entailed a monitoring component to track California American Water (Cal-Am) and non-Cal-Am production.

A companion Ordinance No. 52, "Implementing the Water Allocation Program, Modifying the Resource System Supply Limit and Causing a Temporary Limit on the Issuance of Water Connection Permits," was also passed on December 13, 1990. The Ordinance entailed a monitoring component to track the number of permits issued as well as the amount of water represented by the permits.

A. Monitor Production and Compliance with MPWMD and SWRCB Limits

Description and Purpose

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

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

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

In addition to District-imposed production limits as part of its Water Allocation Program, Cal-Am must also comply with limits set by the State Water Resources Control Board (SWRCB) in 1995 as part of Order WR 95-10. The Order includes a provision that Cal-Am water diversions (surface and

groundwater production) from the Carmel River basin should not exceed 11,990 AF in Water Year (WY) 1996, and not exceed 11,285 AF in WY 1997 and subsequent years. A water year begins on October 1 and ends on September 30 the following year. The District program to monitor water use includes tracking Cal-Am compliance with the SWRCB goals.

Implementation and Activities During 2009-2010

District staff continued to manage the overall supply budget, sending periodic reports to the cities and/or county and providing updates and general information as needed. The monitoring programs initiated by Ordinance Nos. 52 and 53 continue to be implemented. As noted in Section III-C of this report, beginning with the 2001-2002 Annual Report, the District changed the reporting period for the Well Registration and Reporting Program from a Reporting Year (July 1-June 30) to a Water Year (October 1-September 30) to be consistent with the SWRCB Order reporting requirements, and other hydrological reporting programs. The 2000-2001 Annual Mitigation Report was the last report in which groundwater production within the District was presented in a Reporting Year format. Water production tables for the current year in this report use WY 2010 (October 1, 2009 through September 30, 2010) data.

As shown in **Table V-1**, total water produced within the Monterey Peninsula Water Resources System during WY 2010 was 15,459 AF, or 1,699 AF less (10% decrease) than the MPWRS production of 17,158 AF in WY 2009. Cal-Am's WY 2010 production of 12,435 AF was a decrease of 998 AF (7% decrease) compared to WY 2009. Non-Cal-Am WY 2010 production of 3,024 AF (including surface diversions) was a decrease of 701 AF (19% decrease) compared to WY 2009. In WY 2010, Cal-Am accounted for about 80% of total production within the MPWRS.

Regarding compliance with limits imposed by MPWMD as part of the Water Allocation Program, Cal-Am water production from the MPWRS in WY 2010 was 12,435 AF, or 71% of the 17,641 AF annual limit (5,206 AF lower than the limit). (**Table V-1**). Please refer to Section III-C for more information.

Regarding compliance with SWRCB Order WR 2009-0060, Cal-Am target production from the Carmel River Basin in WY 2010 for the SWRCB tally was based on the initial regulatory limit of 10,978 AF. This number was then reduced by the initial CDO reduction of 549 AF, and by the WY 2010 Sand City Desalination Project production of 46 AF, resulting in and adjusted base amount of 10,388 AF. No ASR recovery occurred in WY 2010, so no reductions were made to Cal-Am's maximum allowable Carmel River diversions for this project. Actual Cal-Am Carmel River Basin diversions (after ASR adjustment) for WY 2010 were 8,673 AF. Thus, Cal-Am reported diversions were 1,715 AF or 17% below the adjusted 10,388 AF diversion limit from the Carmel River Basin imposed by the SWRCB. WY 2010 was the 13th straight year in which compliance with Order WR 95-10 was achieved and the first year for compliance with Order WR 2009-0060. A major purpose of the District's *Expanded Conservation Plan and Standby Rationing Program* is to ensure continued compliance with the SWRCB Orders. The community was in Stage 1 of the conservation program throughout the 2009-2010 reporting period.

B. Water-Use Trends

Description and Purpose

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

Implementation and Activities During 2009-2010

Water-use trends may be tracked by using production data at the well head, as described above, or by considering Cal-Am metered sales information, as described below. **Figure V-1** provides water-use trends from 1980 through 2010, as represented by consumption in AF per Cal-Am connection (AF/connection) for customers[1] in the Cal-Am's Monterey District (i.e., the "Main System"). This is based on Cal-Am annual "Customers & Consumption by Political Jurisdiction & Classification" reports that provide water-use information for each political jurisdiction and system subunits, as well as several user classifications. For WY 2010, the use per connection is based on Cal-Am's total metered sales[2] (10,707 AF) divided by Cal-Am's total customers (37,848) and equaled 0.283 AF/connection.

Water consumption per connection in WY 2010 was the lowest rate on record during the 1980- 2010 period, likely due in part to increased awareness of the need for conservation and higher water charges, and possibly depressed economic conditions. Review of **Figure V-1** indicates that water use per connection for the last 22 years (1989-2010) is significantly less than in the preceding 9 years (1980-1988). The sharp decline in WYs 1989, 1990, and 1991 is attributable to mandatory water rationing in response to the 1987-1991 drought period. From 1989-2010, annual water consumption has remained relatively stable, with a range from approximately 0.28 to 0.40 AF/connection, and average of 0.344 AF/connection, compared to the average of 0.500 AF/connection for the 1980-1988 period. Notably, water consumption in WY 2010 (0.283 AF/connection) was 44% less than the pre-drought consumption in RY 1987 (0.503 AF/connection).

[1] Includes residential, multi-residential, commercial, industrial, golf course, public authority, other and no-revenue metered connections.

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

Table V-1
MPWMD ALLOCATION LIMIT COMPARED TO WATER PRODUCTION[3] IN THE MONTEREY PENINSULA WATER RESOURCE SYSTEM
Data from Water Years 2009 and 2010

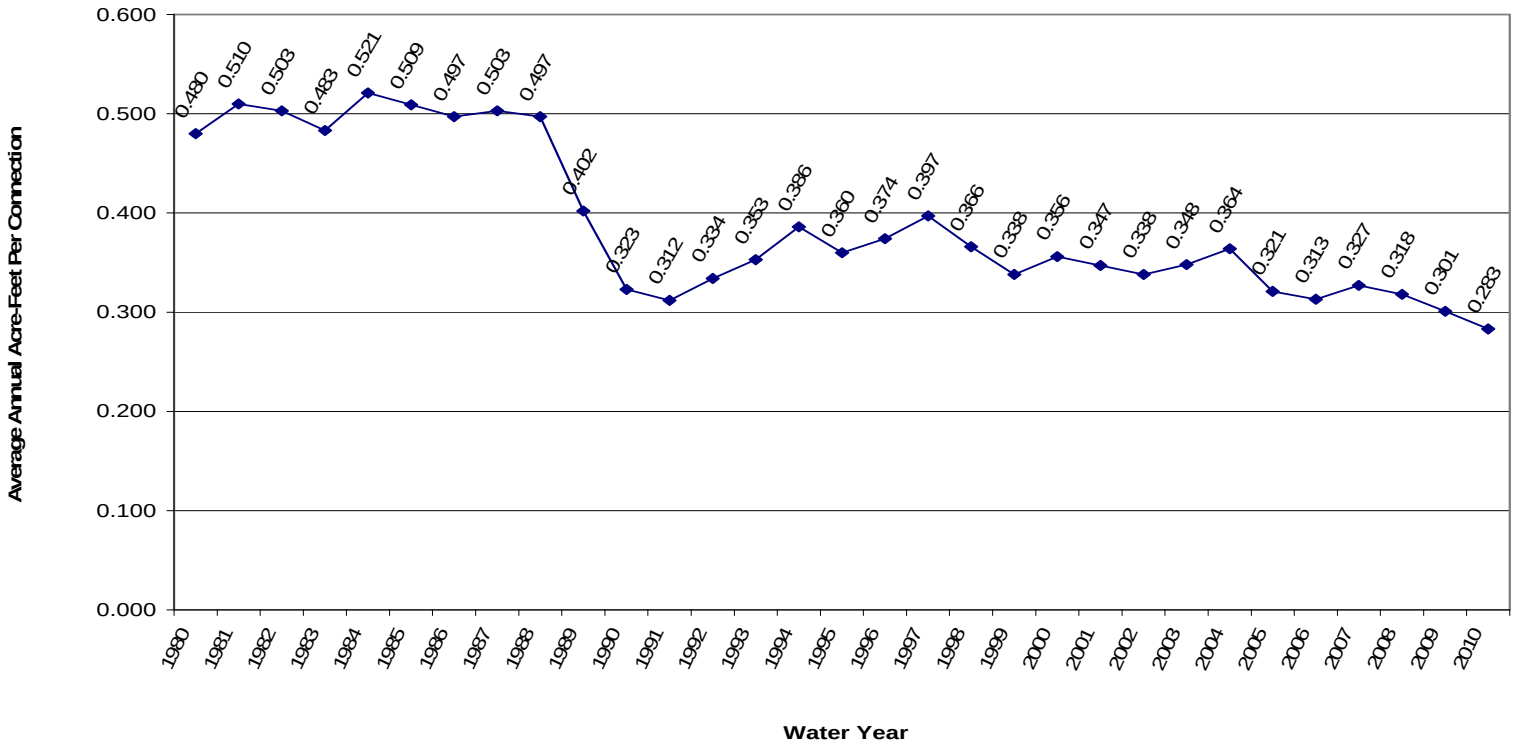
WATER USER	ALLOCATION LIMIT	WY 2009 PRODUCTION	% LIMIT	WY 2010 PRODUCTION	% LIMIT
Cal-Am	17,641 AF	13,433 AF	76%	12,435 AF	71%
Non-Cal-Am	3,046 AF	3,725 AF	122%	3,024 AF	99%
TOTAL	**20,687 AF**	**17,158 AF**	**83%**	**15,459 AF**	**75%**

Notes:
1. MPWRS includes production from the Carmel River and underlying Carmel Valley alluvial aquifer, Coastal Subareas and Laguna Seca Subarea of the Seaside Groundwater Basin.
2. The Water Year (WY) runs from October 1 to September 30; see Section III-C for more information.
3. The non Cal-Am Production figures include non Cal-Am surface-water diversions.

Source: MPWMD production reports

[3] Production values (Table V-1 above) are based on amounts of water diverted and pumped and are, therefore, higher than the metered sales figures for water delivered to customers (Figure V-1 below).

Figure V-1 California American Water Use Per Connection for Main System Users: 1980 – 2010



VI. AUGMENT WATER SUPPLY

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

In 1996, District efforts related to both long-term and near-term projects were consolidated into the MPWMD Water Augmentation Plan (WAP). The first WAP report was received by the Board in December 1996, and specific goals were adopted in January 1997. Revised WAP objectives were set in January 1998, April 2000, and March 2001. In September 2001, the MPWMD Board set its top five strategic planning initiatives, three of which entailed augmenting the water supply. Periodic Board workshops were held to receive progress reports and provide policy guidance. For the past several years, the MPWMD Board has held either annual or semi-annual Strategic Planning Workshops to set goals and objectives to guide District activities. Objectives adopted in February 2008 guided action in the July through December 2009 period. Objectives adopted in December 2009 guided action from January through June 2010. The 2009 objectives will be highlighted in the discussion herein.

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

The following paragraphs provide a more detailed setting due to the complexity of the water supply situation. This background information is followed by a review of action in July 2009 through June 2010. Please refer to quarterly water supply project updates in the January, April, July and October Board agenda materials for years 2009-2010 for additional information. Starting with the January 2010 report, limited background information is provided. The reader should refer to previous reports through October 2009 for a detailed historical overview of previous action. District staff also makes monthly presentations and/or quarterly reports to the Board on water augmentation activities. All this information is available on the District website at: http://www.mpwmd.dst.ca.us/asd/board/meetings/meeting.htm. Updated weekly information is also available in the General Manager's letter to the Board at: http://www.mpwmd.dst.ca.us/gmletters/gmletters.htm.

A. Long-Term Water Supply Project

Description and Purpose

Carmel River Basin Setting: In November 1995, the electorate did not approve the then-proposed 24,000 acre-foot (AF) New Los Padres Dam and Reservoir (NLP) Project, and did not authorize the District to issue revenue bonds for the project. Since then, the District has focused its efforts on

non-dam alternatives through its Water Augmentation Plan and Strategic Planning Workshops. The District extensively participated in the 1999-2002 California Public Utilities Commission (CPUC) "Plan B" process to identify a non-dam alternative to the NLP; and the District continues to work with California American Water (CAW) and other local agencies on water-supply solutions.

The State Water Resources Control Board (SWRCB) decisions on Carmel River issues in July 1995 continued to influence water augmentation efforts through June 2010. The SWRCB Order WR 95-10 identified an estimated 10,730 acre-feet per year (AFY) of historical unpermitted CAW diversions from the Carmel River that must be replaced by another water project or projects. Order 95-10 includes a "one-for-one replacement" requirement, whereby any new water that is developed must first completely offset the 10,730 AFY unlawful diversions from the Carmel River before any water can be used for new construction or remodels that intensify water use in the CAW system. Thus, near-term projects could potentially serve as a source of "supplemental water" to provide for the needs of existing legal lots of record and other future needs only when Order 95-10 requirements have been fully satisfied by a larger project or series of projects.

On January 15, 2008, the SWRCB issued a draft Cease and Desist Order (CDO) against CAW. The draft CDO asserted that compliance with Order 95-10 – that is, to find a replacement water supply to offset unlawful diversions from the Carmel River Basin – had not yet been achieved after 12 years, and that CAW water diversions to serve the community continue to have adverse impacts to fish, wildlife and their habitat, with particular reference to federally protected species such as the Carmel River steelhead. The draft CDO proposed a cutback in CAW water diversions that would be equivalent to another 15% reduction from current community use beginning October 1, 2008 to a 50% reduction in community water use by the year 2014. Extensive fines could be levied against CAW, which potentially could pass them on to the community, if compliance was not achieved. Given that the Monterey Peninsula already has one of the lowest water use rates in the state, concerns have been expressed about the feasibility of the cutbacks in the draft CDO and/or health and safety, economic and quality of life impacts to the community.

CAW protested the draft CDO and was granted a formal hearing before the SWRCB, similar to a court case. The District and several other entities were allowed to be parties in this proceeding, and to testify at hearings in Sacramento in June-August 2008 regarding two key issues:

- Part 1: June 19 and 20, 2008; compliance with Order 95-10 and state water code.
- Part 2: July 23-25, 2008 and August 7-8, 2008; content of CDO, and rationale for changes.

Community water augmentation efforts have focused on compliance with Order 95-10 as a primary goal. Project proposals since 1996 have included: CAW Carmel River Dam and Reservoir Project (CRDRP), off-stream reservoir storage, ASR, local and regional desalination projects, reclamation for irrigation or groundwater recovery, and storm water reuse. Since 1996, MPWMD environmental review efforts as a lead agency under the California Environmental Quality Act (CEQA) have focused on CAW's CRDRP (application was denied in August 2003); an MPWMD proposal to construct a local 8,400 AFY desalination project in Sand City; as well as the MPWMD Phase 1 and Phase 2 ASR Projects. MPWMD is also a responsible agency or active participant in other agencies' environmental review of water supply proposals, as described below.

Seaside Basin Setting: Though much attention is focused on the Carmel River Basin due to Order 95-10, management of the Seaside Basin also has important ramifications for long-term community water supply. SWRCB Order 95-10 directs CAW to maximize pumping in the Seaside Basin to the extent practicable in order to reduce diversions from the Carmel River. Thus, since 1995, the Seaside Basin has become an increasingly important source of water supply. Unfortunately, it has also exhibited signs of stress from over-pumping due to Order 95-10 as well as significant increases in non-CAW use. In December 2000, the MPWMD Board directed staff to begin planning activities to prepare a Seaside Basin Groundwater Management Plan (SBGMP) in compliance with protocols set by the State of California (AB 3030 as amended by SB 1938), in coordination with major well owners in the basin. In 2002, the District began evaluating two conceptual interim ordinances that would be in place until the long-term SBGMP is adopted, but this effort was terminated in 2004. Concurrently, staff continued public outreach on the SBGMP itself.

Complicating this task was litigation filed by CAW on August 14, 2003 requesting a Court adjudication of the Seaside Basin. The lawsuit involved issues such as: prioritization and quantification of water rights within the basin; rights to aquifer storage within the basin; rights to artificially introduce non-native water into the basin through direct injection or spreading grounds; a judicial determination that the basin is in overdraft; and the appointment of a Watermaster to manage the basin water rights and resources. The District was recognized as an interested party and participated in all proceedings, including a non-jury trial in December 2005. District staff served as expert witnesses in the hearing and helped prepare extensive pre-trial documentation.

Judge Robert Randall rendered a Final Decision on March 27, 2006, which was subsequently amended on February 9, 2007. The complex and lengthy Decision determined that the Seaside Basin is in overdraft; quantified water rights for parties with overlying water rights; and set a reduced "natural safe yield" and a near-term "operating yield" allowed to be produced by certain parties as they work toward a "physical solution" (including ASR and wastewater reclamation) to eliminate the overdraft. A nine-member Watermaster Board was created to implement the Decision with continued oversight by the Court. The MPWMD holds one seat on the Watermaster with two out of 13 votes. A MPWMD Board member serves as the MPWMD representative to the Watermaster Board. The Watermaster has normally held monthly meetings since its formal commencement on April 5, 2006.

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

MPWMD Board Priorities for 2009-2010: A Strategic Planning Workshop was held on November 10, 2009, and resulted in 90-day, 3-year and 5-year goals, which were adopted at the Board's December 14, 2009 meeting. The current goals and objectives include:

<u>90-Day Goals (by February 2010; numbered for reference only)</u>

Goal 1: Actively join with Marina Coast Water District (MCWD), California American Water (CAW), Monterey County Water Resources Agency (MCWRA), Monterey Regional Water

Pollution Control Agency (MRWPCA), and Jurisdictions to provide input on the regional water supply planning process. Have meaningful influence over the type, management and financing of the selected regional project.

Goal 2: For the Aquifer Storage and Recovery Phase 1 Project, (a) inject at least 500 acre-feet of water in the 2010 season (assuming adequate streamflow), with infrastructure in place to enable 100% efficiency, and (b) determine the full project completion date.

Goal 3: For the Aquifer Storage and Recovery Project Phase 2, determine the timetable for project development/completion.

Goal 4: For the MPWMD "95-10 Desalination Project," determine if the Board should continue pursuit of project development.

Goal 5: For the MRWPCA Groundwater Replenishment Project (2,000+ AFY), schedule a presentation from MRWPCA to the MPWMD Board on cost, legal issues, timeline and next steps.

3-Year Goals (by December 2012; only water supply goals are included)
Begin construction on a Desalination Project
Complete Phase 2 Aquifer Storage and Recovery Project
Deliver Water from Groundwater Replenishment Project
Establish a Public/Private Partnership for Water Development or Conservation
Resolve Fate of San Clemente and Los Padres Dams

5-Year Goals (by 2015 and beyond; only water supply goals are included)
Cease Illegal Pumping on the Carmel River
Foster Interagency Regional Collaboration (e.g., Annual Water Summit and Committee)
Operate Within Safe Yield of Seaside Basin (5^{th} or 6^{th} year)
Assess Jurisdictions' Unmet Water Needs and Plan to Meet Them

Implementation and Activities During 2009-2010

The following paragraphs describe action on the water-supply objectives identified above in the July 1, 2009 through June 30, 2010 period. For clarity, background information is provided for certain objectives. Pertinent objectives adopted during the Board's February 2008 Strategic Planning Workshop are first discussed if they affected District action in the July 2009-June 2010 period.

February 2008 Objectives re: SWRCB Cease and Desist Order

Last year's report described work by the MPWMD Legislative Committee, comprised of Directors Dave Potter, Bob Brower and Judi Lehman. It also provided details on testimony presented by the District in June-August 2008. As of June 2009, no action had been taken by the SWRCB hearing officers. The SWRCB held a closed session on July 7, 2009 on the potential adoption of an Order regarding the CDO, with no reportable action.

After several draft versions, the final SWRCB Board determination on the CDO was issued on

October 20, 2009. The District (and other parties) immediately filed suit to challenge this ruling, and the Monterey County Superior Court issued a stay on November 3, 2009. In response to a challenge by SWRCB, the Court ruled on November 23, 2009 that the stay will remain in effect until a hearing in Santa Clara is held on April 22, 2010. The change to Santa Clara was based on a requested change in venue by SWRCB, which was approved by the Court on January 14, 2010. An appeal lodged by the District was not successful.

On April 22, 2010, the Santa Clara Superior Court lifted the stay, that is, determined that the CDO is in effect and will remain in effect until litigation is resolved. District Counsel and staff, at the direction of the Board, will continue to actively participate in litigation on the CDO.

In May 2010, District staff posted (and updates as needed) *Answers to Frequently Asked Questions about the CDO* (FAQ) on the District website, with emphasis on District permits, CAW connections, rationing, etc. This also addresses a May 2010 submittal by CAW to the CPUC requesting a moratorium on new connections in its Monterey District Main System, with certain exceptions. The most recent version of the CDO FAQ is located at the link below, which includes information subsequent to the July 2009-June 2010 period for this report:
http://www.mpwmd.dst.ca.us/CDO/FAQ/CDO_FAQ_20110202_HS.pdf

The District also participated in CPUC procedures regarding the CAW moratorium request to ensure that exempted areas are clearly identified and certain text is clarified to be consistent with previous action. The following link on the District website includes the most recent information on the CAW moratorium request, which continued past the July 2009-June 2010 period for this report:
http://www.mpwmd.dst.ca.us/puc/CAWMoratorium_2011/InfoPage.htm

December 2009 Water Supply Goals

The following paragraphs focus on District efforts through June 2010 to address the goals adopted by the Board in December 2009.

> ***Goal 1: Actively join with Marina Coast Water District (MCWD), California American Water (CAW), Monterey County Water Resources Agency (MCWRA), Monterey Regional Water Pollution Control Agency (MRWPCA), and Jurisdictions to provide input on the regional water supply planning process. Have meaningful influence over the type, management and financing of the selected regional project.***

The Final EIR for CAW's proposed Coastal Water Project (CWP) was certified by the California Public Utilities Commission (CPUC) in December 2009. A combination of projects, known as the Regional Water Project (RWP), was identified as the preferred alternative. The RWP features a 10 million gallons per day (MGD) desalination project to be constructed by MCWD in north Marina, in concert with CAW and MCWRA, along with aquifer storage and recovery and recycled wastewater components. MPWMD and other parties had not been included in the discussions on how the RWP would be constructed, operated, managed and financed. Thus, MPWMD formally requested that the CPUC include MPWMD in the settlement discussions. This request was granted in fall 2009.

From November 2009 through March 2010, MPWMD participated in CPUC-sponsored "alternative dispute resolution" meetings on the RWP, with emphasis on costs, management, oversight and

accountability to the community. The CPUC set deadlines for settlement resolution or identification of issues remaining to be resolved by April 6 and 7, 2010, respectively.

MPWMD Resolution 2010-01, supporting the RWP as the best alternative, was approved at the February 28, 2010 meeting. In addition, the resolution stated that MPWMD must be involved in decision-making for the RWP "to ensure that the water needs of the citizens and environmental resources within the District are reliably met in a cost-effective manner," and that the water users within the Monterey Peninsula area are entitled to full and fair representation in all water supply planning efforts that affect their present and future water resources. The resolution may be viewed at: http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2010/20100225/17/item17.htm.

On March 25, 2010, the Board voted 4-3 in closed session to sign the settlement agreement. Based on the March 30, 2010 release of the final project financing documents by MCWD, MCWRA and CAW, the MPWMD Board reconsidered its position on April 5, 2010 and voted 4-3 to not sign the settlement agreement. This is due to the limited opportunity for public review of the documents, the much higher project costs than were previously disclosed, and lack of protection for Peninsula ratepayers. Counsel and staff prepared formal comments on the Water Purchase Agreement (WPA) by the April 30, 2010 CPUC deadline and suggested ways the WPA and financing information could be amended to satisfy MPWMD concerns. The District reiterated its support for the RWP but not the financing and oversight.

MPWMD staff, counsel and financial consultant participated in CPUC workshop hearings in San Francisco on May 10-12, 2010, where the parties agreed on a common financial model. A revised WPA was completed on May 19, 2010 and MPWMD comments and suggested modifications were provided by the May 27, 2010 deadline. The District again participated in CPUC evidentiary hearings on the WPA on June 8-11, 2010. The Administrative Law Judge directed that the parties file legal briefs on several issues, including concerns raised by the District regarding ratepayer protection, accountability and oversight. She also encouraged the parties to continue to try to settle. To that end, the Chair/Vice Chair and General Manager met with MCWRA and MRWPCA on June 15, 2010. The District also helped publicize local hearings for the general public convened by the CPUC on June 28 and 29, 2010 in Monterey and Seaside. District counsel and staff worked through late June to submit the opening briefs by the July 2, 2010 deadline; reply briefs were submitted by the July 16, 2010 deadline. See next year's report for information on CPUC action that approved the RWP in December 2010. Last year's report provides more detailed background information.

Goal 2: For the Aquifer Storage and Recovery Phase 1 Project, (a) inject at least 500 acre-feet of water in the 2010 season (assuming adequate stream flow), with infrastructure in place to enable 100% efficiency, and (b) determine the full project completion date.

Aquifer storage and recovery entails diverting excess water flows, if available, in the winter season (December 1 through May 31) from the Carmel Valley Alluvial Aquifer (CVAA) through existing CAW facilities and injecting the water into the Seaside Groundwater Basin via wells constructed by MPWMD for later recovery in dry periods. The Phase 1 ASR Project is comprised of two MPWMD wells (Well #1 and Well #2)) at the Santa Margarita site located on the former Fort Ord military base, just east of General Jim Moore Boulevard near Eucalyptus Avenue. The two wells are operated in tandem during the injection season. The primary goal of the MPWMD Phase 1 project is better management of existing water resources to help reduce current impacts to the Carmel River,

especially during the dry season. The project is viewed as being complementary to other larger, long-term water augmentation projects that are currently being explored by various entities. The project entails a maximum diversion of 2,426 AFY from the Carmel River for injection, a maximum extraction of 1,500 AFY from the ASR wells in the Seaside Basin, and an average yield of about 920 AFY. The proposed operation of the Phase 1 ASR Project would result in reduced pumping of the Carmel River in the summer/fall and increased storage in the Seaside Basin, which are both considered to be environmentally beneficial.

The District Board certified the Final Environmental Impact Report and Environmental Assessment (EIR/EA) for the MPWMD Phase 1 ASR Project, including information on a CAW temporary pipeline associated with the ASR Project, on August 21, 2006. Permits were obtained in 2006 from the U.S. Army, City of Seaside, and Monterey County Health Department. Well construction was finalized in May 2007. Key support facilities, such as a new well pump and motor, electrical conduits, percolation basin, pipes and valves, were completed by mid-2008.

An extensive multi-year water rights effort resulted in the SWRCB issuing Orders WR 2007-0041-DWR and WR 2007-0042-DWR and Amended Permits 20808A and 20808B on November 30, 2007. These Orders approve, in part, the District's Petitions for Change to allow some of the water rights from the New Los Padres Dam and Reservoir Project in 1995 to be applied to the ASR Project. Please see last year's Annual Report for more background information.

In 2009-2010, District staff continued to regularly meet with CAW consultants and staff to coordinate roles, responsibilities and tasks needed to enable operation of the Phase 1 ASR Project at full capacity. A key issue was the potential disruption to the Phase 1 activities during the realignment of General Jim Moore Blvd. near the ASR site in early 2010, a crucial injection period. District staff closely coordinated with Fort Ord Reuse Authority (FORA) contractors and MCWD regarding a bypass pipeline to minimize ASR water delivery disruptions.

Carmel River flow allowed ASR Phase 1 operations to begin on December 13, 2009 and continued through the permit end date of May 31, 2010, except for 20 days when flow was inadequate. In the first week of March 2010, the 500 AF injection goal was achieved. At the March 25, 2010 Board meeting, a new annual goal of 1,000 AF was set, based on the wet conditions to date. By May 31, 2010, a record-setting 1,111 AF had been diverted and injected. This was the largest volume of ASR injection in any one year since the program began in 1998; the previous annual record was 411 AFY. As of mid-2010, the cumulative injection total into the Seaside Basin was 3,228 AF, equivalent to the annual supply for about 13,000 residences. In 2010, the ASR facilities had operated at roughly 2,100 gallons per minute (gpm), or 84% of the current operational capacity of 2,500 gpm.

A simultaneous task was constructing the Chemical/Electrical building at the ASR Phase 1 site. The final building permit was issued and the Board approved a contractor in March 2010. Construction began in mid-April 2010, and was scheduled for completion in early 2011.

Goal 3: For the Aquifer Storage and Recovery Project Phase 2, determine the timetable for project development/completion.

ASR Phase 2 entails a second set of two injection/recovery wells at the Seaside (formerly Fitch)

Middle School site. The project timeline is dependent on a variety of factors, especially permission from property owners to use the site for many years, given the high cost of well construction. MPWMD obtained permission from the Monterey Peninsula Unified School District (MPUSD) and a permit from the City of Seaside to drill an initial test/monitor well at the Seaside Middle School site in October 2009. The test results were positive, and discussions with MPUSD continued through June 2010 regarding construction of one full-scale test well in summer 2010 on the Seaside Middle School property. If the full-scale test well results are positive, the first well will become a production well and a second permanent well would also be drilled at the site in the future, subject to MPUSD approval.

As of the end of June 2010, the project was moving forward under the District's license agreement with MPUSD. However, a long-term easement agreement between CAW and MPUSD for the site had yet to be resolved, but was in progress. This easement was critical because of limited drilling opportunity (June 7 - August 9, 2010, when school was out of session) and also affected construction of CAW water pipelines to the site.

A second major issue affecting project development was obtaining water rights for the Phase 2 ASR project. On June 30, 2008, the District submitted a Petition for Change to its existing Permit #20808B for a joint water right with CAW to serve the Phase 2 ASR Project, similar to Phase 1 ASR. The diversion quantity sought is 2,900 AFY with a maximum diversion rate of 8.0 cubic feet per second during the period December 1 of each year through May 31 of the following year. This petition was noticed by the SWRCB in January 2009 with three protests received in February 2009: CAW, National Marine Fisheries Service (NMFS), and the Carmel River Steelhead Association (CRSA). The multi-month effort to obtain settlement agreements with these protestants began in mid-2009.

Subsequently, CAW dropped two water rights protests it had previously filed against the District's applications, and focused on functioning as partners with MPWMD in this effort. Through June 2010, District staff held separate water rights settlement meetings with NMFS and CRSA. Settlement with NMFS appeared to be feasible in the near-term, but limited progress had been made in resolving CRSA's protest.

A third issue was the capacity of the CAW distribution system to deliver injection water to the Phase 2 project. This matter is the subject of ongoing ASR coordination meetings between MPWMD and CAW staff. As of the end of June 2010, CAW has indicated that the needed infrastructure upgrades to deliver water supply to the ASR Phase 2 wells at full capacity may not be available until the Regional Water Project improvements are in place. However, additional infrastructure improvements in Monterey were planned for late 2010. More information will be provided in next year's report.

Goal 4: For the MPWMD "95-10 Desalination Project," determine if the Board should continue pursuit of project development.

At its March 27, 2008 Special Workshop, the Board received an overview by MPWMD staff on the major water supply alternatives evaluated to date, and began initial discussions on which water supply alternatives should be pursued by the District. The Board directed staff to revive pursuit of a MPWMD desalination project along the Fort Ord coastline, which had been tabled in 2004. A new name, the "MPWMD 95-10 Project," was suggested, as a key goal is compliance with SWRCB

Order WR 95-10. In fall 2009, District consultants completed more detailed hydrogeologic field work and laboratory analyses along the Fort Ord coastline. A technical report on desalination project feasibility was prepared and presented to the Board at its December 14, 2009 meeting. The report concluded that the coastal Fort Ord hydrogeology does not support its use as the source of subsurface feedwater for a desalination project, and the District should not pursue the project. This is primarily due to the fact that there is not a continuous clay barrier to protect the underlying Paso Robles and Santa Margarita aquifers from contamination by seawater extracted for the desalination project. The staff and consultant report is provided on the District website at: http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2009/20091214/23/item23.htm

The Board directed staff to provide a description of desalination projects investigated by MPWMD in the past in order to assess whether there are any remaining viable local desalination options within the District. This staff report was provided to the Water Supply Planning Committee at its March 8, 2010 meeting. The staff report is provided on the District website at: http://www.mpwmd.dst.ca.us/asd/board/committees/watersupply/2010/20100308/02/item2.htm.

The committee recommended that staff proceed with investigation of the potential for a project or projects within the District boundary, with emphasis on desalination. In May 2010, the Monterey Bay National Marine Sanctuary (MBNMS) released its final guidelines for desalination projects within the Sanctuary; copies were provided to each Board member. As of July 2010, the District Engineer had met with representatives of MBNMS, City of Sand City, Pebble Beach Company, CPUC Division of Ratepayer Advocates, City of Santa Cruz, and CAW regarding the potential for desalination projects within the District boundary. The District Engineer continued to lead this effort through 2010.

Goal 5: For the MRWPCA Groundwater Replenishment Project (2,000+ AFY), schedule a presentation from MRWPCA to the MPWMD Board on cost, legal issues, timeline and next steps.

The Groundwater Replenishment Project (GRP) entails potential injection or percolation of highly purified recycled water into the Seaside Groundwater Basin by MRWPCA. It is modeled after a successful replenishment project in Orange County, California. Studies were initiated to determine whether a similar type of project is feasible in the Seaside Basin east or west of General Jim Moore Boulevard. Possibilities include surface percolation and/or underground injection of purified wastewater for ultimate reuse, including potable supply. In 2006, the MPWMD Board adopted Resolution No. 2006-05 expressing support for the MRWPCA replenishment efforts. Since then, MPWMD staff has continued to meet and advise MRWPCA staff and consultants, and review technical and planning documents prepared by MRWPCA, as requested.

The MPWMD and MRWPCA boards held a special joint meeting on October 29, 2008 aimed at providing additional structure and incentive for moving forward on this project. On January 29, 2009, the District Board approved adoption of a Memorandum of Agreement (MOA) with MRWPCA to cooperate in all matters in which a joint interest may exist. The two agencies will develop and approve a further Joint MOU that would outline key provisions needed for a more detailed agreement to better achieve their mutual needs. This would include consideration of a funding assistance plan to help advance the GRP. More information is found at the District website at:

http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2008/20081029/1029agenda.htm
http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2008/20081117/15/item15.htm
http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2009/20090129/03/item3.htm
http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2009/20090129/19/item19.htm

In the past year, the MPWMD Board directed staff to assess current status of the GRP. A presentation by the MRWPCA General Manager was received at the MPWMD Board meeting of January 28, 2010. Notably, the MRWPCA board had placed the GRP project temporarily "on hold" in 2010 so that MRWPCA can focus on its role in the Regional Project described above in Goal 1. The MRWPCA presentation is available on the District website at: http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2010/20100128/ppt/13_files/frame.htm.

3-Year and 5-Year Water Supply Goals

As expected, work was in the early stages of the 3- and 5-year goals in 2009-2010. The 3-year goal to begin construction on a Desalination Project is reflected in Goal 4 above. Well #1 for the Phase 2 Aquifer Storage and Recovery Project was completed, as described in Goal 3 above. Delivery of water from the Groundwater Replenishment Project is pending action by MRWPCA, as described in Goal 5 above. No action to establish a public/private partnership for water development took place. Work in 2009-2010 to resolve the fate of San Clemente and Los Padres Dams is described below.

Similarly, initial efforts in 2009-2010 helped lay the groundwork to achieve the long-term goals for year 2015 and beyond. The ASR Projects (Goals 2 and 3 above) and a major water supply project (Goal 1 above) are needed to cease illegal pumping on the Carmel River and to operate within the safe yield of Seaside Basin. Interagency collaboration was stymied somewhat by the CPUC proceedings, but the District General Manager continued to meet quarterly with other special district water agency managers. No action was taken to update earlier assessments of jurisdictions' unmet water needs. It is notable that the Regional Water Project (see Goal 1) is focused solely on legalizing the existing supply; a second, expanded phase is needed to address future needs of the jurisdictions such as legal lots of record and new subdivisions to be served by CAW.

Resolve Fate of San Clemente and Los Padres Dams: For many years, District staff has participated in inter-agency workshops, technical discussions, and detailed environmental review of the removal of San Clemente Dam. These efforts culminated in a January 11, 2009 signing ceremony, hosted by U.S. Rep. Sam Farr, wherein numerous entities, including the District, pledged cooperation on dam removal and re-routing of the Carmel River. As of July 2010, efforts continued to secure funding for such a project.

At the direction of the Board, District staff pursued options for increasing storage at Los Padres Dam and Reservoir, owned by CAW. This effort stalled when CAW responded to District inquiries in an October 5, 2009 letter, which stated that CAW has "no interest" in making modifications to the dam. A written report is provided in the January 28, 2010 agenda packet at: http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2010/20100128/03/item3.htm

B. Near-Term Water Supply Projects

Description and Purpose

Section VI-A above describes long-term water-supply alternatives, including the MPWMD Phase 1 and Phase 2 ASR Projects. This section focuses on annual ASR testing. Since 1996, the District has evaluated the feasibility of ASR at greater levels of detail. As of June 2010, the District had constructed three wells in the Seaside Basin: (1) a shallower ASR pilot test well into the Paso Robles Formation (located at Mission Memorial Park in Seaside) in 1998; (2) a 720-foot deep, full-scale test well into the Santa Margarita Formation in March 2001 (Well #1); and (3) another 790- foot deep full-scale test well at the Santa Margarita site (Well #2). Injection in 2010 primarily occurred at Well #1. To comply with the SWRCB water rights permit conditions, MPWMD submits detailed annual reports to the SWRCB after each testing season.

Implementation and Activities During 2009-2010

Between Water Years (WY) 1998 and 2009, the District injected approximately 2,117 AF of excess winter flow from the Carmel River Basin into the Seaside Basin. When in operation, about 1,000-1,100 gallons per minute (gpm) were injected at the ASR Well #1 (roughly 4.5 AF/day). During this period, 1,139 AF was recovered from the ASR wells and delivered to the community via the CAW system as part of the test program.

As described in Goal 2 above, diversion for ASR Phase 1 began on December 13, 2009 and continued through May 31, 2010. By May 31, 2010, a record-setting 1,111 AF had been diverted and injected. The cumulative injection total was 3,228 AF by June 2010. Also, the ASR facilities in 2010 had operated at roughly 2,100 gpm, or double that of previous years. MPWMD staff also continued its ongoing ASR monitoring program. At its March 15, 2010 meeting, the Board received the ASR Report for Year 2009. Refer the MPWMD website at: http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2010/20100315/05/item5.htm.

Other Relevant Action

The District has solicited grants to help fund its water supply efforts, particularly ASR. In May 2009, District staff submitted a grant application to expand the MPWMD ASR Project. The application package included letters of support from NOAA Fisheries and the Carmel River Watershed Conservancy. The grant program is funded through the federal government's 2009 American Recovery and Reinvestment Act (i.e., economic stimulus package), and is administered by the U.S. Bureau of Reclamation. Unfortunately, the District was not awarded a grant under this program, but staff have continued to pursue other grant options.

The District also has taken the lead in development of an Integrated Regional Water Management Plan (IRWMP) for the Monterey Peninsula, Carmel Bay, and South Monterey Bay Area, including grant applications and extensive coordination with local agencies and groups. These efforts will culminate in a comprehensive planning grant application in September 2010.

VII. ALLOCATION OF NEW WATER SUPPLY

The Water Allocation Program requires that each new water Connection or Expansion of Use be accounted for so that water production limitations would not be exceeded. Ordinance No. 70, adopted by the District Board on June 21, 1993, ended the moratorium on the issuance of New Connections that was imposed beginning in January 1991 as a result of the Water Allocation Program EIR. The ordinance established an Allocation of new water that could be used by each Jurisdiction from a total of 358 acre-feet (AF) of Cal-Am metered sales, based on 385 AF of new production capacity from the Paralta Well (see also Section V). Of this 358 AF, a 15.280 AF District Reserve Allocation for community benefit projects was subsequently apportioned. In February 1995, Ordinance No. 73 was adopted to eliminate the District Reserve and allocate the remaining water equally among the eight Jurisdictions. Of the original 50 AF that was allocated to the District Reserve, 34.72 AF remained and was distributed equally (4.34 AF) among the Jurisdictions.

Implementation and Activities During 2009-2010

Since the Paralta Well Allocation became available in August 1993, a total of **317.679** AF of the 342.720 AF Paralta Well Allocation had been permitted for use by Jurisdictions through June 30, 2010, leaving a total of **25.041** AF remaining, or **7.3** percent of the Jurisdictions' Paralta well Allocations (**Table VII-1**). Pre-Paralta credits from expired or canceled Water Permits ("pre-Paralta credits") are added to the appropriate Jurisdiction and may be used in addition to the Paralta Allocation. Also, credits were available for public retrofit projects from March 1995 to July 1998 (Ordinance Nos. 75 and 91).

More detailed information is presented in **Table VII-1**, which provides is the status of water Allocations to the Jurisdictions as of June 30, 2010. The "changes" columns in the table refer to the month of June 2010 only; the "remaining" columns refer to the quantities that are available for use by the Jurisdictions according to District rules. All told, **96.296** AF was available from all sources for Jurisdiction use as of June 30, 2010.

As described in Section IV of this report, specific water Entitlements associated with funding of the Pebble Beach Reclamation Project are identified for areas within the Del Monte Forest pursuant to Ordinance No. 109. These entitlements are not water "Allocations", and are tracked separately.

Table VII-1

MONTHLY ALLOCATION REPORT
Reported in Acre-Feet
June 2010

Jurisdiction	Paralta Allocation*	Changes	Remaining	PRE-Paralta Credits	Changes	Remaining	Public Credits	Changes	Remaining	Total Available
Airport District	8.100	0.000	5.224	0.000	0.000	0.000	0.000	0.000	0.000	5.224
Carmel-by-the-Sea	19.410	0.000	1.397	1.081	0.000	1.081	0.560	0.000	0.492	2.970
Del Rey Oaks	8.100	0.000	0.000	0.440	0.000	0.000	0.000	0.000	0.000	0.000
Monterey	76.320	0.000	0.035	50.659	0.000	0.181	38.121	0.000	6.775	6.991
Monterey County	87.710	0.000	10.280	13.080	0.000	0.428	7.827	0.000	2.424	13.132
Pacific Grove	25.770	0.000	0.000	1.410	0.000	0.048	15.874	0.058	0.517	0.565
Sand City	51.860	0.000	0.000	0.838	0.000	0.000	24.717	0.000	23.373	23.373
Seaside	65.450	0.287	8.105	34.438	0.000	34.438	2.693	0.000	1.498	44.041
TOTALS	342.720	0.287	25.041	101.946	0.000	36.176	85.391	0.058	35.079	96.296

* Does not include 15.280 Acre-Feet used from the District Reserve prior to adoption of Ordinance No. 73.

VIII. DETERMINE DROUGHT RESERVE

Description and Purpose

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

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

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

Implementation and Activities During 2009-2010

In 2010, District staff determined that approximately **25,980 acre-feet** (AF) of usable storage were required on May 1, 2010 to avoid requesting a District-wide voluntary 15 percent reduction in water demand. Similarly, approximately 20,440 AF were required to avoid imposing mandatory 20 percent water rationing. Given that actual, usable storage on May 1 was estimated at **33,050 AF**, no demand reductions beyond existing Stage 1 restrictions were necessary for 2010 based on physical water availability. The 2010 trigger values are based on the maximum California American Water (CAW) production limit set by the State Water Resources Control Board in Order No. WR 2009-0060 (10,429 AF) for CAW's diversions from the Carmel River, the maximum production limit for CAW's diversions from the Coastal Subareas of the Seaside Groundwater Basin set by the Court as a result of the Seaside Groundwater Basin adjudication (3,333 AF), and the non CAW water production limit that was specified in the District's Water Allocation Program (3,046 AF). The 2010 trigger value for requesting voluntary 15 percent water conservation (25,980 AF) includes the water demand for the remainder of the current water year (9,170 AF) and one full year of carryover storage (16,810 AF).

IX. STEELHEAD FISHERY MITIGATION MEASURES

The Findings for Certification of the Water Allocation Program Final EIR (Findings Nos. 388-A through D) identified mitigation measures to reduce impacts to the Carmel River steelhead population, including: (a) expansion of the program to capture and transport smolts during spring, (b) prevent stranding of early fall and winter migrants, (c) rescue juveniles downstream of Robles del Rio during summer, and (d) implement an experimental smolt transport program at Los Padres Dam. Monitoring of adult returns and juvenile populations provides an indication of the overall success of the steelhead mitigation measures. The following sections briefly describe the purpose of each mitigation measure and activities during the reporting period. Accordingly, results from the 2009 rescue season are included in this report and the results for the 2010 rescue season, i.e., May through September 2010, will be included in next year's report.

A. Capture and Transport Emigrating Smolts during Spring

Description and Purpose

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

Implementation and Activities During 2009-2010

Between July 2009 and mid-October 2009, the Carmel River at the Highway 1 Bridge was dry. A rare October storm event raised mean daily flows to 682 cubic feet per second (cfs), and declined to 11 cfs by November 21 **(Figure IX-1)**. The next major storm event did not occur until mid-January, which increased flows to above 2,000 cfs and opened up the migration corridor until late June **(Figure IX-2).** By late July 2010, the river flows were down to 10 cfs at Highway 1. These flows allowed for a full-length, smolt-migration period of 6 months, and provided good conditions for the emigration of smolts from the Carmel River into the Carmel River Lagoon. No smolts were captured during regular rescue operations in June 2009 and no smolt trapping was needed during Spring 2010 **(Figure IX-3).**

B. Prevent Stranding of Fall/Winter Juvenile Migrants

Description and Purpose

As in other central California streams, juvenile steelhead in the Carmel River move downstream into lower reaches of the river well ahead of the peak emigration of smolts. Depending on river conditions and diversions during the previous dry season, there is some risk that pre-smolts and other juvenile steelhead will be stranded following early fall and winter storms, which increase flows and

stimulate the fish to move downstream into habitats that are subsequently dewatered after the storm peak passes. This risk occurs primarily from October through February, although during severe droughts, the risk period may extend into March. The District mitigates this problem by capturing and transporting juveniles when necessary during the high-risk period from October through February. Currently, juveniles trapped during fall/winter months are transported upstream to viable habitats above the Narrows or held at the District's Sleepy Hollow Steelhead Rearing Facility (SHSRF).

Implementation and Activities During 2009-2010

District staff monitored river conditions during the fall and winter months of 2009-2010. A rare October storm event raised mean daily flows to 682 cfs at the Highway 1 gage, and declined to 11 cfs by November 21 **(Figure IX-1)**. During this recession, staff walked the river in search of stranded fish and evaluated the necessity to rescue. No rescues were needed during this time. On December 13, another storm increased mean daily flow to 163 cfs at the Highway 1 gage. This provided enough flow for adequate juvenile habitat through the end of July 2010 **(Figure IX-2)**. The highest average daily discharge at the Highway 1 gage was 2,070 cfs, reached on January 20, 2010. As a result of these flows there was little risk of fish stranding, although conditions were carefully monitored throughout the fall and winter, and no rescues of juvenile fish were needed.

C. Rescue Juveniles Downstream of Robles Del Rio during Summer

Description and Purpose

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

Implementation and Activities during 2009-2010

- **MPWMD Annual Rescue Totals –** The surface flow of the Carmel River dropped to 10 cfs at the Highway 1 Bridge by June 19, 2009. In response to the decline in surface flow, District staff began rescues on June 22, 2009 and these efforts continued through September 1, 2009. During these months, staff conducted 21 rescue operations, yielding a total of 13,477 fish including 12,658 young-of-the-year (YOY), 710 yearlings, and 109 mortalities **(Table IX-1a)**. Since 1989, District staff has rescued 360,281 steelhead out of drying reaches in the mainstem Carmel River and compared to previous rescue seasons, rescue totals in the 2009 dry season were below the 1989-2009 average of 17,156 **(Figure IX-4)**.

- **2009 Dry Season, MPWMD Transplant Location –** During the 2009 dry season, a total of 13,368 juvenile steelhead rescued by MPWMD were transported and released at 3 different locations within the Carmel River watershed **(Table IX-1b)**. Staff released fish into the District's SHSRF (12,773), various locations along the Carmel River (457), and the Carmel River Lagoon (138).

- **CRSA Annual Rescue Totals –** During the 2009 dry season, May through September, a total of 5,899 steelhead were rescued from Carmel River watershed by the Carmel River Steelhead Association (CRSA), including 1,383 from the mainstem and 4,516 from the tributaries. The total number rescued included 5,559 YOY and 340 yearlings.

- **2009 Dry Season, CRSA Transplant Location –** During the 2009 dry season, juvenile steelhead rescued in the mainstem by the CRSA, were transported and released into the Carmel River Lagoon (1,371). Juvenile steelhead rescued in the tributaries where released in the mainstem at the confluence of that tributary (4,389). The mortality of rescued and transported fish was 2.36% (139).

- **Sleepy Hollow Steelhead Rearing Facility (SHSRF)** - The District's Water Allocation Mitigation Program includes construction and operation of a facility for rearing juvenile steelhead through the dry season. In early 1997, the District completed construction of the SHSRF, which includes: (1) a diversion and pump station, (2) two large circular tanks, (3) an 800-foot long rearing channel, (4) electrical, water, pressurized air and drainage systems, (5) an office/shop/lab building and (6) miscellaneous equipment.

Significant additional upgrades and modifications were made to the Facility between 2000 and 2003. These included: (a) a cooling tower, (b) large emergency generator, (c) upgraded impellers on the existing pumps, (d) purchases of an additional backup pump and a mobile emergency pump, and (e) installation of a centrifugal separator to reduce the buildup of coarse sediment in the cooling tower and rearing channel. In 2005 and 2006, new wooden weir boards were installed and waterproofed in the rearing channel to prevent fish movement between bays and add an additional backup mechanism. If the river pumps were to fail, the channel would hold more water longer, giving staff more time to correct the problem without fish loss. In 2007, eight 250 -gallon insulated rearing troughs were installed. These rectangular, flow-through troughs replaced a defunct 22-foot diameter tank. These tanks can be used to rear small rescued fish, for additional quarantine treatments, or for growth and survival experiments. In early 2008, filters, chillers, and UV sterilizer equipment were purchased for the rearing troughs to make them capable of operating in a closed, recirculation mode. Additional sizes of fish graders were purchased to enable staff to more effectively separate incoming fish by size before stocking in the rearing channel. In late 2008, Tank 3, the 22-foot diameter holding tank, was outfitted with a large re-circulating pump, filtration, and UV sterilization system. This allows staff to hold fish into the winter season even during large storm events when the river's water quality is suboptimal for fish survival or if the Facility's river pumps should fail.

Facility Modifications in Reporting Year 2009 – No major modifications were done at the Facility during the 2009 rearing season.

Summary of 2009 SHSRF Fish Stocking and Releases - Steelhead rescues began in June 2009. Between June 22 and September 1, staff received approximately 12,773 rescued fish at the Facility. All fish brought into the facility go through a quarantine process, after which they are recounted and stocked into the rearing channel. During this process, there are some numerical differences between what is brought in for quarantine from the field and what is stocked into the channel. These differences represent fish that are consumed by other fish during transport and while in the quarantine tank or numerical counting errors in the field during rescue operations. A total of 12,759 fish were stocked in the Facility after quarantine, 12,400 were placed in the rearing channel (RC) and 359 were placed in a circular tank (QT-3) **(Table IX-2)**.

During the 2008 rescue and rearing season, record number of steelhead were rescued and theoretical maximum stocking densities in the rearing channel were tested, with stocking densities of up to 4,900 fish per RC bay. High density rearing or crowding of fish encourages increased intraspecific predation (cannibalism) and incidence of disease. This resulted in an overall survival of 32%, which is below the Facility's 14-year average survival rate of 41%. Staff initiated a stocking density experiment at the Facility during the 2009 rearing season with the objective of acquiring data on adjusting stocking densities in order to gain maximum rearing survival within the rearing channel. In this experiment, nine randomly selected rearing channel bays were stocked with 3 different densities of rescued young-of-the-year steelhead. Stocking densities were approximately 500 fish, 750 fish and 1,000 fish, plus two replicates of each density. Results of the experiment showed no statistical differences between the groups stocking densities (ANOVA, p-value = 0.653, $\alpha = 0.05$). This suggests that the experiments stocking densities had no effect on overall rearing survival between groups. Future experiments at higher stocking densities need to be tested in order to find the maximum stocking density with the maximum survival associated with it.

During the 2009 five-month holding period, 14% of the Facility's fish died as a result of disease, stress, or general poor health, and 17% were unaccounted-for mortalities, potentially through intraspecific predation (cannibalism). This is an 8% and 21% decrease from the 14-year averages of 22% diseased mortalities and 38% unaccounted-for mortalities.

Subsamples of fish were measured in July (first batches brought to the Facility) and in mid-November from each rearing channel bay as fish were being released back into the Carmel River **(Figure IX-5)**. The rapid growth of the majority of fish in the RC is clearly shown in the graph, as incoming fish averaged 77 mm fork length (FL) in July and they more than doubled in size to 171 mm (FL) by November. In an effort to decrease the amount of intraspecific predation in the RC, all fish were fed large quantities of dry, pellet feed and frozen krill, supplemented by naturally occurring benthic macroinvertebrates (BMI) in the channel's substrate, and flying insects killed by overhanging bug zappers. Even though the fish are graded and separated by size at the time of stocking, some fish readily adapt to the RC environment and quickly start eating pellet feed, while other fish never do take to the pellet feed and thus stay much smaller. During the 2009 rearing season, staff significantly increased the amount of frozen krill fed in order to see if fish would adapt more readily to a more natural feed. This appears to have worked, due to the significant decrease in disease and unaccounted-for mortality observed. The decrease in mortality could also potentially be attributed to a decrease in stocking density.

Due to the "natural" RC habitat (riffles and pools, cobbled bottom, boulders, logs, etc.) the fish cannot be graded into different sizes once they have been stocked in the channel. Because these are wild fish, not hatchery stock, individual fish can behave quite differently from each other. The original goal of the Facility was to match the size of the fish reared in the Facility to the size of the fish reared naturally in the river. Fish size distribution histograms comparing the November 2009 Facility fish to the October 2009 population survey results from the Sleepy Hollow and Garland Park stations **(Figure IX-6)** clearly show that the sample of Facility fish are larger on average than their wild counterparts (171 mm FL versus 102 mm FL and 95 mm FL, respectively). Recent studies in the Scott Creek watershed (Santa Cruz County) support past investigations that show that ocean survival is size-dependent and the larger the fish is at ocean entry increases the chances it will return.

In October 2009, a large storm hit the central coast increasing the river flow and opening the migration route at the Carmel River Lagoon. In consultation with the National Marine Fisheries Service (NMFS) and the California Department of Fish and Game (CDFG), staff decided to release all the fish from the Facility in mid-November 2009. Average lengths, weights and condition factors for each pool are shown in **Table IX-3**. Most fish were in excellent physical condition, and ranged in size from approximately 2.6 to 12.6 inches, and averaged 6.7 inches (171 mm). A total of 8,802 fish were released from the RC, 4,091 small and large (less than 6 and greater than 9 inch) fish were released back into the lower Carmel River between San Clemente Reservoir and CAW's Berwick #7 Well and 4,711 pre-smolt sized (6 to 9 inch) fish were released at the Carmel River Lagoon **(Table IX-4)**.

The overall survival rate of fish held at the Facility in the 2009 rearing season was 69%, which is 28% above the Facility's 14-year average of 41%. This was likely due to lower stocking densities and an increase in food consumption, from an increased use of frozen krill, which the fish appeared to eat immediately after stocking.

- **Development of a Rescue and Rearing Management Plan for the SHSRF** – The District has had a Section 10 Permit application on file with NOAA Fisheries since 1999, to comply with the Federal Endangered Species Act (FESA). Cooperative efforts to develop the application with NMFS, CDFG, and CRSA began in earnest in 2006. In RY 2009-2010, the District hired a consultant to assist staff to develop a Final Draft of the "Rescue & Rearing Management Plan" (RRMP) for the SHSRF and the District's rescue operations, as required by NOAA for any fish rearing facility to receive a Section 10 Permit. A complete draft of the RRMP was submitted to NOAA and CDFG for agency review and comment in mid 2009, and the consultant revised his work to address most of those comments by the end of the year. The Senior Fisheries Biologist is working to address additional comments and finalize the draft in order to incorporate it into a formal public application to NMFS for a Section 10 Permit in 2011.

D. Monitoring of Steelhead Population

Description and Purpose

The District uses three primary techniques to monitor the health of the steelhead population: (1) counts of adult steelhead passing San Clemente Dam and Los Padres Dam, (2) surveys of

winter steelhead redds, and (3) surveys of the juvenile steelhead population in freshwater at the end of the dry season in October.

Implementation and Activities during 2009-2010

- **Winter Steelhead Adult Run** - The fish counter at San Clemente Dam was operated continually between October 2009 and May 2010. The video monitoring equipment was reinstalled and operated between October 17, 2009 and May 31, 2010. As of May 31, 2010, a total of 157 fish passed by the counter, including 3 in November, 1 in December, 18 in January, 55 in February, 65 in March, 12 in April, and 3 in May **(Figure IX-7)**. Analysis of the video in July 2010 showed that the first sea-run adult steelhead passed the counter on January 13, 2010. Some counts before January 13 were verified to be resident trout moving upstream and were stricken from the record. Some counts were not verifiable by the video, thus were not removed from the record, but it is highly likely that the November (3) and December (1) fish that passed the counter were resident trout, based on the river flows available at the time and the amount of time the lagoon was breached. The 2010 run was the third lowest during the 1994-2010 period that fish have been reliably counted using the District's continuous mechanical counter **(Figure IX-8)**. The flows were optimal for adult migration from mid-January through May.

The Los Padres Dam Fish Trap is operated and monitored by CAW. A total of 55 adult steelhead were reported trapped during the 2010 migration season, including 21 in February, 24 in March, and 10 in April **(Figure IX-9)**. The 2010 run size was more then double the 2009 run size of 21 fish, but was well below the 1949-2010 long-term average of 95 fish **(Figure IX-10)**.

- **Winter Steelhead Redd Surveys –** Since 1994, the District has periodically conducted winter steelhead redd (nest) surveys downstream of Los Padres Dam. Originally, these surveys were part of the District's spawning habitat restoration project to track how many adult fish actually spawned in the injected gravel between the dams and to record the downstream movement of the gravel itself. In 2001, the survey area was enlarged to include the Stonepine Resort area and several tributaries. In 2003 and 2004, complete mainstem surveys were conducted from Via Mallorca Road Bridge to Los Padres Dam. No redd surveys were conducted in the mainstem in 2005 and 2006 due to high river flows throughout much of the winter that precluded wading most river reaches and large late storms that effectively "erased" existing redds. Due to time constraints and the existence of the adult fish counter at San Clemente Dam (SCD), staff discontinued redd surveys above SCD in 2007, and instead focused on the lower Carmel River. In the spring of 2007, 2008 and 2009, one thorough survey pass was completed between the Highway 1 Bridge and San Clemente Dam. The survey's goals were to: a) quantify the number of spawning redds (nests) and adult fish (including spawning pairs, singles, kelts, and carcasses) in the mainstem river below SCD, and compare those numbers to the fish passage counts at SCD in order to make a better estimate of the river's total steelhead run size; b) assess locations where adult steelhead may become stranded and need to be rescued as flows decrease; and c) assess the relative numbers of steelhead smolts that may be remaining in the river. No redd surveys were done during 2010 due to high river flows throughout the entire migration period that precluded wading the lower river.

- **Juvenile Population Surveys** - Since Fall 1990, the District has surveyed the juvenile

steelhead population in the Carmel River below Los Padres Dam. This information is crucial to assess the success of adult reproduction and to determine whether or not freshwater habitats are adequately seeded with juveniles.

In October 2009, the population was surveyed at five stations in a 17.0-mile reach between the Red Rock area in mid-Carmel Valley and Los Padres Dam. Six stations were not sampled due to a rare October storm event which increased the river flow to above 600 cfs. At these flows, techniques for sampling juvenile populations are not possible. The stations that were unable to be sampled were Scarlett Narrows (RM 8.7), Boronda (RM 12.7), Stonepine Resort (RM 15.8), San Clemente Reservoir Delta Lower (RM 19.0), San Clemente Reservoir Delta Upper (RM 19.6) and Los Compadres (RM 20.7). In 2009, the juvenile steelhead population density at the five stations sampled averaged 0.39 fish-per-foot (fpf) of stream and ranged from 0.24 fpf at the Red Rock Station (RM 7.7) to 0.72 fpf at the Cachagua Station (RM 24.7) **(Table IX-5).**

The 2009 juvenile steelhead population density was the second lowest observed overall since the District began population surveys in 1990 **(Figure IX-11)**. It was considerably less than the long-term (1990 - 2009) average density of 0.83 fpf. Weather and river flow patterns in the winter of 2009, coupled with the low numbers of returning adults (95) and observed redds (39) during the 2009 migration season likely led to low seeding levels. These factors likely contributed to the low overall fall abundance of juvenile fish in the Carmel River.

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

During the 2009 dry season, it is estimated that this mode of operation and flow releases from Los Padres Reservoir resulted in approximately 1.6 mile of additional viable aquatic habitat. Based on estimated population density at the Lower River site (see **Table IX-5**), this habitat produced about 2,028 additional juveniles. The graphic (Figure IX-9) from the 2008-2009 report, which shows the estimated number of juvenile steelhead reared below San Clemente Dam from 1990 to present was omitted this year because of insufficient data, due to a high flow event in October that precluded staff from collecting juvenile population index's at half the stations during the Fall 2009.

- **Adult Steelhead Monitoring in the Lower Carmel River (DIDSON) -** The District operates and maintains the fish counting station on the San Clemente Dam (SCD) fish ladder. This current monitoring station which is located at RM 18.6, is a component of our overall environmental monitoring program. Redd surveys are currently used to estimate escapement conditions in the lower river below SCD. Redd surveys can only be conducted when river conditions allow safe passage and good visibility. Redd surveys also tend to have validity

(accuracy and precision) bias associated with them. More accurately enumerating the total run size of steelhead in the lower river will enable more valid and precise monitoring of the population's response to current river conditions, implemented mitigation activities, and fish passage improvement projects. In a staff report to the District's Board on June 16, 2008 (Technical Memorandum 2008-01), staff identified the problems with attempting to install a replacement mechanical fish counting device and weir in the lower river, and identified that acoustic sonar technologies (DIDSON) were likely the most feasible alternative to enumerate fish passage in the lower river. The District applied for and was awarded funds from the CDFG Fisheries Restoration Grant Program to purchase equipment to operate the DIDSON. CDFG will purchase and loan the District the DIDSON camera, while the District will fund staff to maintain the DIDSON counting station. Implementation of the DIDSON counting station will occur during the 2011-2012 migration season.

E. Other Activities Related to the Steelhead Resource

The District carried out several activities in RY 2010 that were not specifically identified as part of the original Allocation EIR Mitigation Program, but will improve habitat conditions, help restore the steelhead resource, or provide additional key data on the steelhead resource. These include: (a) rescue and transportation of kelts, (b) spawning habitat restoration and monitoring, (c) assessment of the benthic macro-invertebrate (BMI) communities, and (d) Carmel River Lagoon water quality monitoring.

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

In April 2010, staff applied to the California Department of Fish and Game's (CDFG) Fisheries Restoration Grants Program to acquire funds for spawning habitat restoration and for adult steelhead monitoring in the lower river.

In November 2000, the District began a bioassessment program using benthic macro-invertebrates (BMI) as an indicator of water and habitat quality at four locations between Los Padres Dam and the Red Rock steelhead population survey site. In 2004, a new site above Los Padres Reservoir was added. The above Los Padres location can be used as a reference site to compare "pristine" habitat to habitat below the dams, and that of the lower, developed valley. Results from the BMI analysis can be used as an indicator of water quality and food quantity and quality for juvenile steelhead, both between the sites and over time. Low BMI abundance may be attributable to: (a) poor substrate quality [little available gravel or filled-in interstitial spaces (embeddedness)], (b) high levels of suspended particulates/turbidity, (c) poor oxygen concentration, or (d) high water temperature. Following CDFG's California Stream Bioassessment Procedure (CSBP), BMI samples are collected from each site in the fall and sent to a laboratory for analysis.

In addition to the bioassessment program, the District also began detailed monitoring of substrate

conditions at its juvenile steelhead population survey sites in 2000. Substrate size distribution and embeddedness are analyzed and compared over time and space at each location. Substrate size and embeddedness affect both steelhead spawning and rearing success, as well as the presence and abundance of BMI that fish feed on.

Implementation and Activities in 2009-2010

- **Rescue and Transportation of Kelts** – Normally, steelhead kelts migrate downstream in late spring through June. Not surprisingly, no kelts were rescued in Spring/Summer 2010 as flow downstream to the District's Highway 1 gage remained at least marginally adequate for adult passage through mid- June.

- **Spawning Habitat Restoration Project-** Los Padres Dam has been trapping native gravel behind it for approximately 60 years. During that period, suitable spawning materials below the dam have became scarce as the existing gravel continued to move downstream during high flows. In an effort to increase spawning habitat by at least 50%, the District applied to the CDFG Fisheries Restoration Grants Program for funding to inject gravel below the dam.

- **California Stream Bioassessment Procedure** – During RY 2010, District staff collected BMI samples in Fall 2009 from five river locations between RM 26.0 (Above LPD site) and RM 7.7 (CAW's Begonia Treatment Plant at mid-Carmel Valley). The four sites below LPD match District steelhead population survey stations and the above LPD site is near a CDFG steelhead population survey site.

The index of biotic integrity (IBI) is a well known indexing procedure to assess watershed condition. This index has been used throughout the United States and has proven to be a reliable means of assessing the effect of human disturbance on watersheds. The scoring range is divided into five categories: 0-19 = "very poor", 20-39 = "poor", 40-59 = "fair", 60-79 = "good" and 80-100 = "very good". IBI values for the monitoring sites in the Carmel River Basin are shown in **Figure IX-12.** In 2009, IBI values for the five sites were as follows: CRLP = 90 (very good), CRCA = 31 (poor), CRSH = 16 (very poor), CRSP = 20 (poor) and CRRR = 53 (fair). This data is consistent with the long-term trend that the reference site, located above Los Padres Dam in the Ventana Wilderness Area has the least effect from human disturbance, the three middle elevation sites, located in close proximity to the two mainstem dams has the greatest effect from human disturbance and the lowest elevation sites have a moderate effect from human disturbance. This suggests that the two mainstem dams continue to have a significant influence on the biological integrity of the Carmel River.

From the five composite site samples, 2,514 BMIs were processed, comprising 63 taxa. Dominant taxa observed at the monitoring sites in 2009 were caddis fly (*Micrasema*) and black fly (*Simulium*). Caddis flies dominated samples at the reference site (CRLP) and the lowest elevation site (CRRR). Black flies dominated samples at the middle elevation sites (CRCA, CRSH and CRSP). Estimated biological metric values (abundance and biovolume) by site for all years sampled are shown in **Figure IX-13**. Biovolume provides an indirect measure of sample mass and supplemental information for evaluating organism abundance and insight into bioenergetics in riffles. In 2009, biovolume values ranged from 2.1 ml/m^2 at the CRSH site to 54

ml/m^2 at the CRCA site. High biovolume at the CRCA site was due to the presence of one large crane fly (*Tipula*) larva in the subsample. For perspective the next highest biovolume value estimated was 16 ml/m^2 measured at the CRSW site in 2007. With the exception of the high biovolume value estimated at the CRCA site in 2009, the highest biovolume values occurred at the lowest elevation sites (i.e., CRSW in 2007 and 2008 and CRRR in 2005, 2006 and 2009).

- **Carmel Lagoon Water-Quality Monitoring** – The District continued to monitor lagoon water quality (i.e., dissolved oxygen, temperature, and salinity) by taking vertical depth profiles of the lagoon at five sites on a monthly basis in 2009-2010. The monthly water-quality reports have been distributed to the Carmel River Lagoon Technical Advisory Committee to aid in Carmel River Lagoon management.

OBSERVED TRENDS, CONCLUSIONS AND/OR RECOMMENDATIONS:

Monitoring conducted by the District shows that the Carmel River steelhead population has recovered somewhat from remnant levels that prevailed as a result of the last drought from 1987 to 1991 and past water-supply practices. Since 1992, the spawning population had recovered from a handful of fish to levels approaching 900 adults per year as counted at San Clemente Dam before a six-year downward trend from 804 fish in 2001 to 222 fish in 2007, rebounding somewhat in 2008 to 412 adults. However, in 2009 and 2010, the population underwent a dramatic reduction to 95 and 157 adults respectively, at SCD, which is below the 1994-2010 average of 427 adults. Past redd surveys below SCD confirm that some of the spawning habitat in the lower river is excellent and potentially adults are spawning in the lower river instead of passing the SCD fish counting station. In addition, juvenile steelhead rescued by the District from the lower river that survive to adulthood are more likely to return to the lower river to spawn. The District's acquisition of grant funds in order to implement in the 2011-2012 migration season, a DIDSON counting station in the lower river will help identify if more adults are in fact spawning in the lower river. River bank stabilization and restoration projects by the District have matured and now provide improved rearing habitat, shade and food production for juvenile steelhead in the lower reaches of the river.

Monitoring of the juvenile population at several sites along the mainstem Carmel River below Los Padres Dam shows that in general the population is recovering from low densities during the 1987-91 drought period (ranging below 0.40 fish per foot [fpf] of stream) to levels frequently ranging above 1.00 fpf, values that are typical of well-stocked steelhead streams. In the 2009-2010 reporting period, the average population density was below the long-term average of 0.83 fpf for the Carmel River due primarily to low adult returns in 2009-2010. 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 and 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 to each dams facilities and operations;

- Recovery of riparian habitat, tree cover along the stream, and an increase in woody debris, especially in the reaches between Robles del Rio and Highway One;

- Extensive rescues by MPWMD of juvenile steelhead over the last 20 years, now totaling 360,281 fish through 2009;

- Rearing and releases of rescued fish from the SHSRF of nearly 80,000 juveniles and smolts back into the river and lagoon over the past 14 years, at sizes larger then the river-reared fish, which in theory should enhance their ocean survival.

Though overall fish populations have improved since the inception of the Mitigation Program in 1990, District staff has noticed a period of general decline in the adult run from 2001 to 2010. In 2009-2010, the adult run size was the third lowest since 1994. At present, the reasons for this period of apparent 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, encouraging fish to spawn before they reach the counter at the dam;

- Lagoon conditions, including chronic poor water quality, that can cause annual fish die-offs, and high predation by birds and recently by striped bass, especially in low-flow years, thus resulting in fewer returning adults;

- Low numbers of juvenile fish in 2004, 2007, and 2009 affecting subsequent adult populations;

- Impediments to adult immigration and seasonal barriers, such as the Old Carmel River Dam, sub-optimal ladders at San Clemente and Los Padres Dams, and intermittent periods of low flows creating critical riffles below the Narrows during the normal winter-spring immigration season.

- Barriers or seasonal impediments to juvenile and smolt emigration, such as the lack of juvenile passage facilities at Los Padres Dam and intermittent periods of low flow below the Narrows during the normal spring emigration season

- Chronic, and occasionally acute, fall temperature and hydrogen sulfide levels below LPD, and the increase in suspended sediment from the SCD summer draw-down;

- Potential for enhanced predation on smolts and YOY migrating through the sediment fields of LPD and SCD;

- Poor ocean conditions; and

- Ongoing but limited impacts of fishing (i.e., approximately 0.5 - 1.5% incidental mortality associated with catch-and-release fishing for adults in the winter season, and fishing for juvenile steelhead from in the upper watershed during the Spring/Summer trout season may slightly reduce the adult spawning stock or the number of juvenile 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 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 SHSRF, 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.

District staff continues to provide technical expertise and scientific data to CAW engineers and environmental consultants, DWR/DSOD, CDFG, NMFS, 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 California Department Parks 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.

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Figure IX-1

Streamflow in the Carmel River at the MPWMD Highway One gaging station, October 2009 through December 2009.

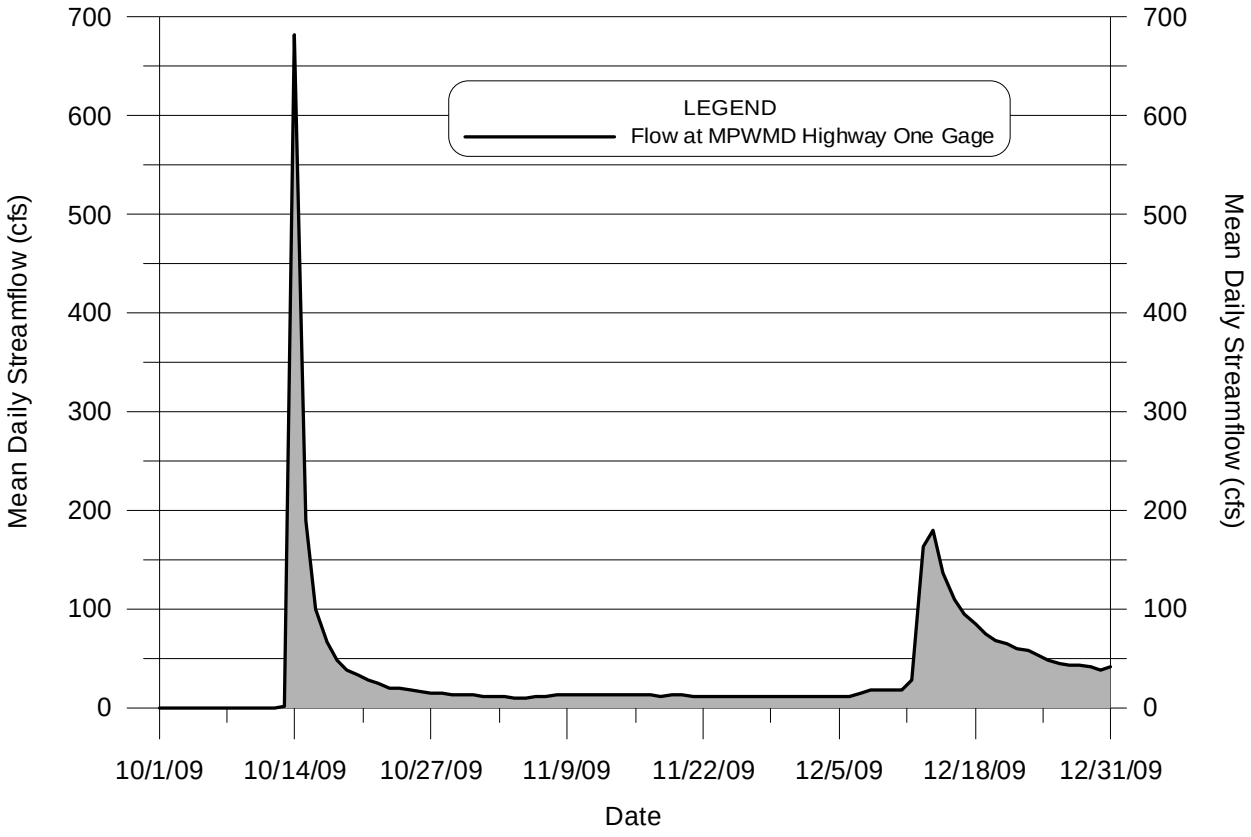
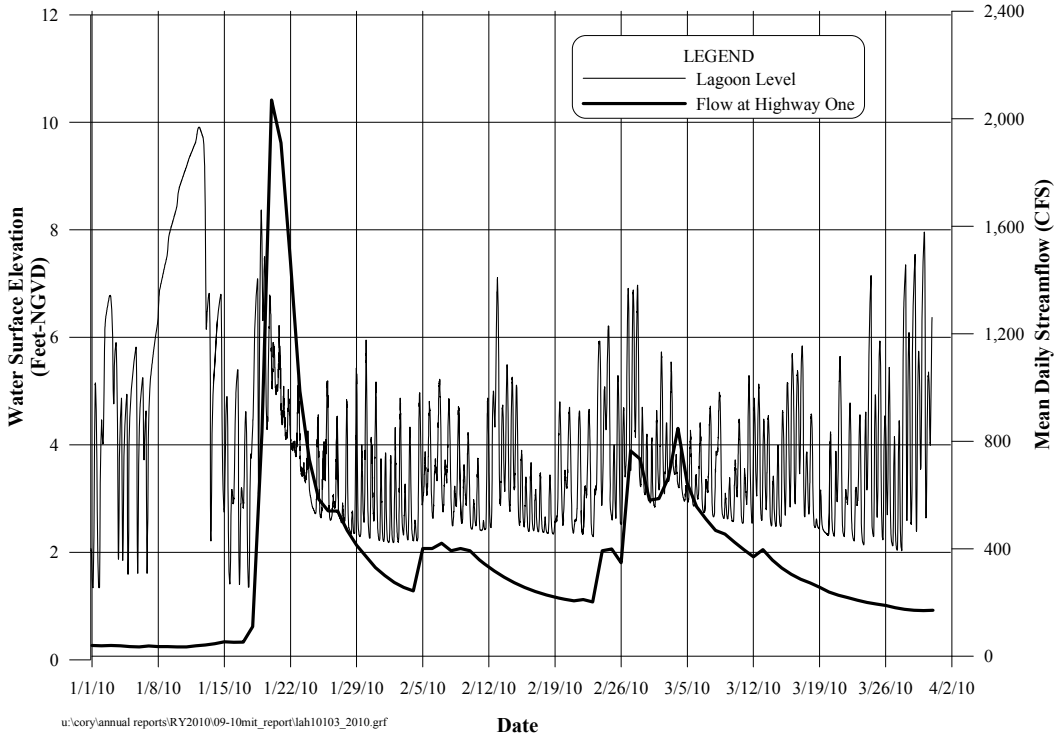


Figure IX-2

Water Surface Elevation in the Carmel River Lagoon and Highway One Bridge, January-July, 2010



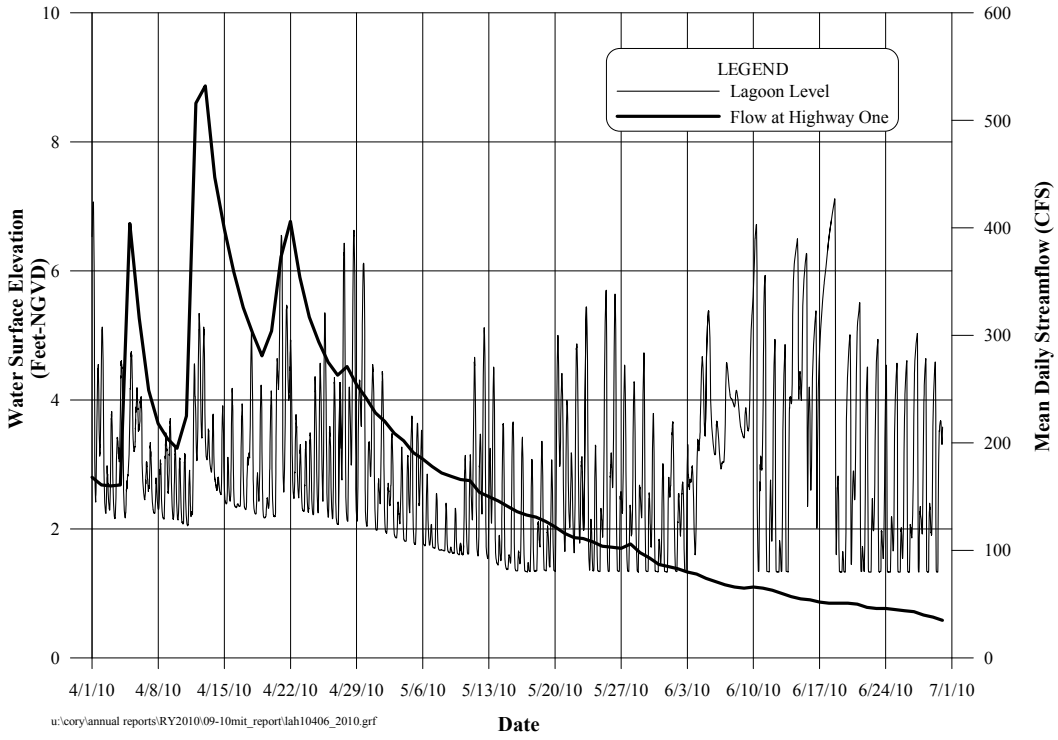


Figure IX-3

Number of Steelhead Smolts Rescued in Carmel River Basin

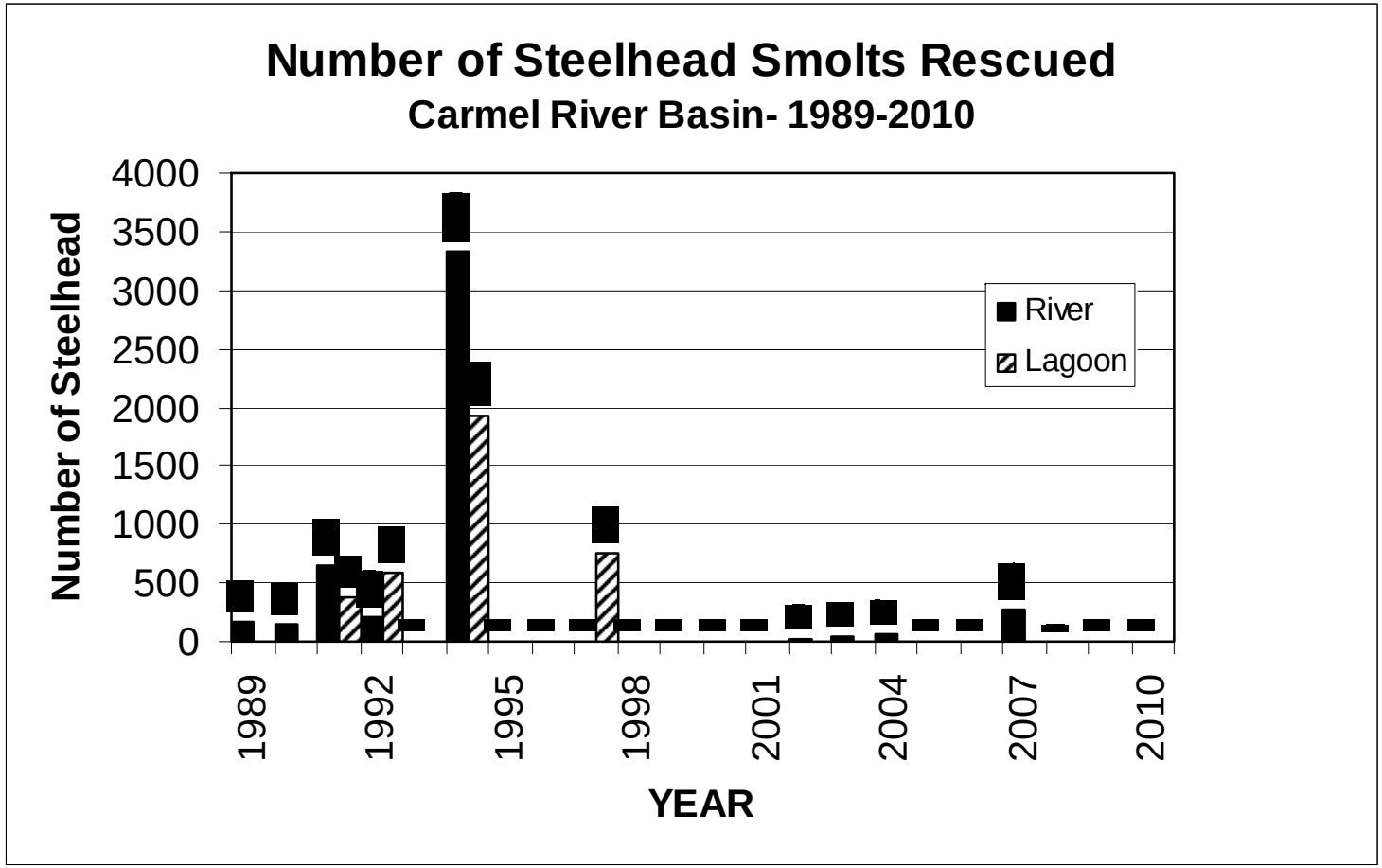


Figure IX-4

Annual Number of Steelhead Rescued by MPWMD in the Mainstem Carmel River

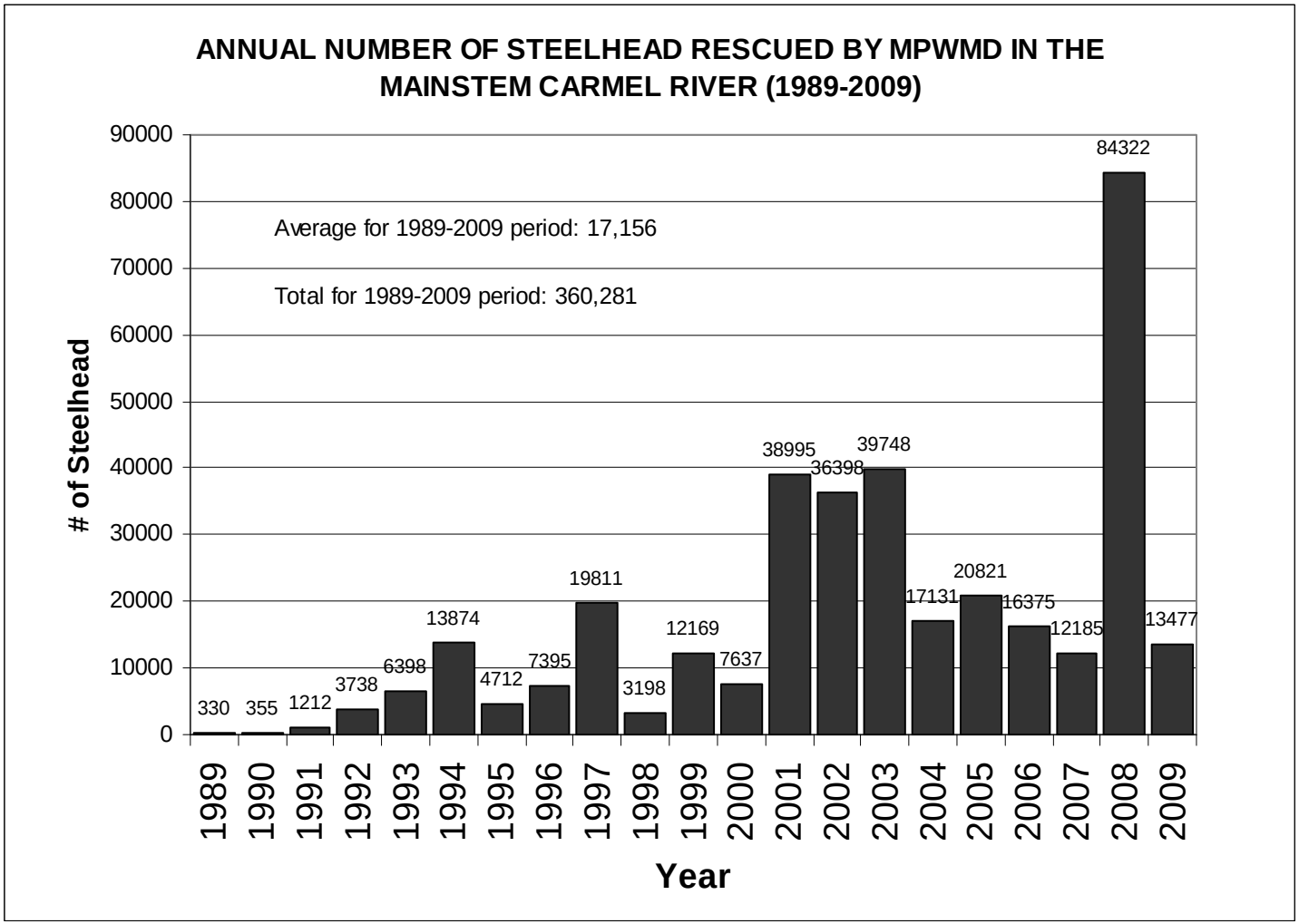


Figure IX-5

Sleepy Hollow Steelhead Rearing Facility, Rearing Channel Fish Size Distribution

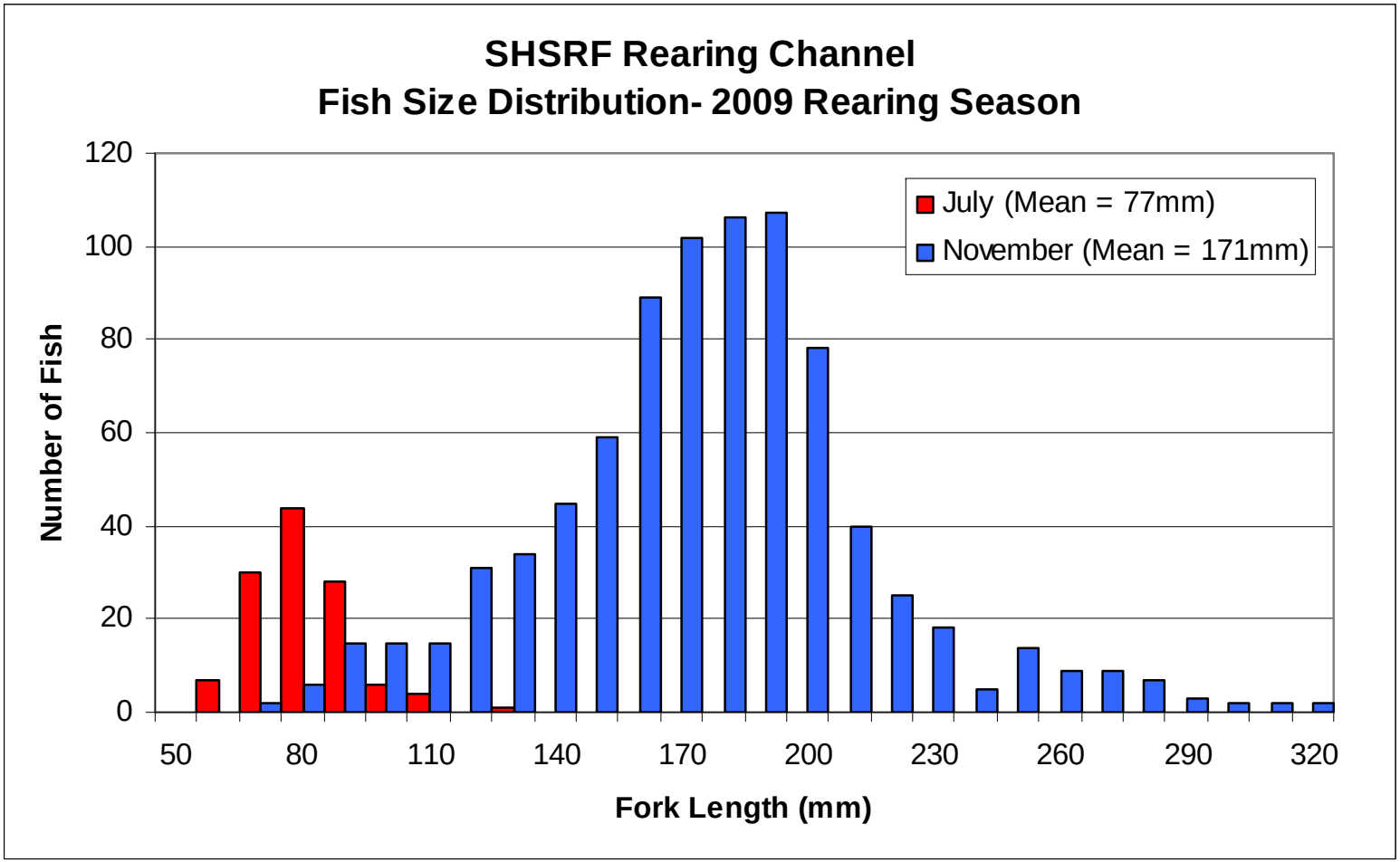


Figure IX–6

Fish Size Distribution, Carmel River vs. Sleepy Hollow Steelhead Rearing Facility

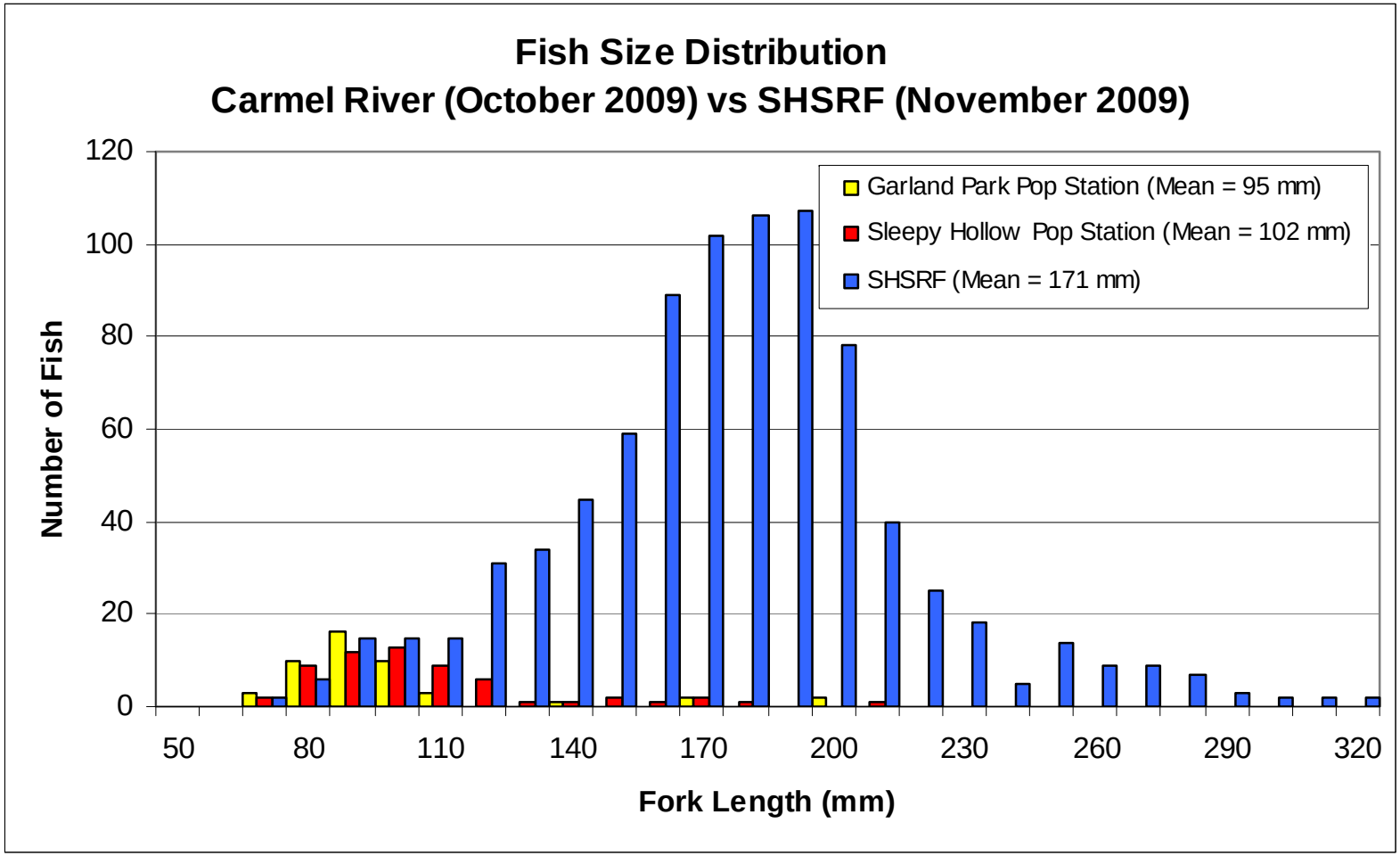
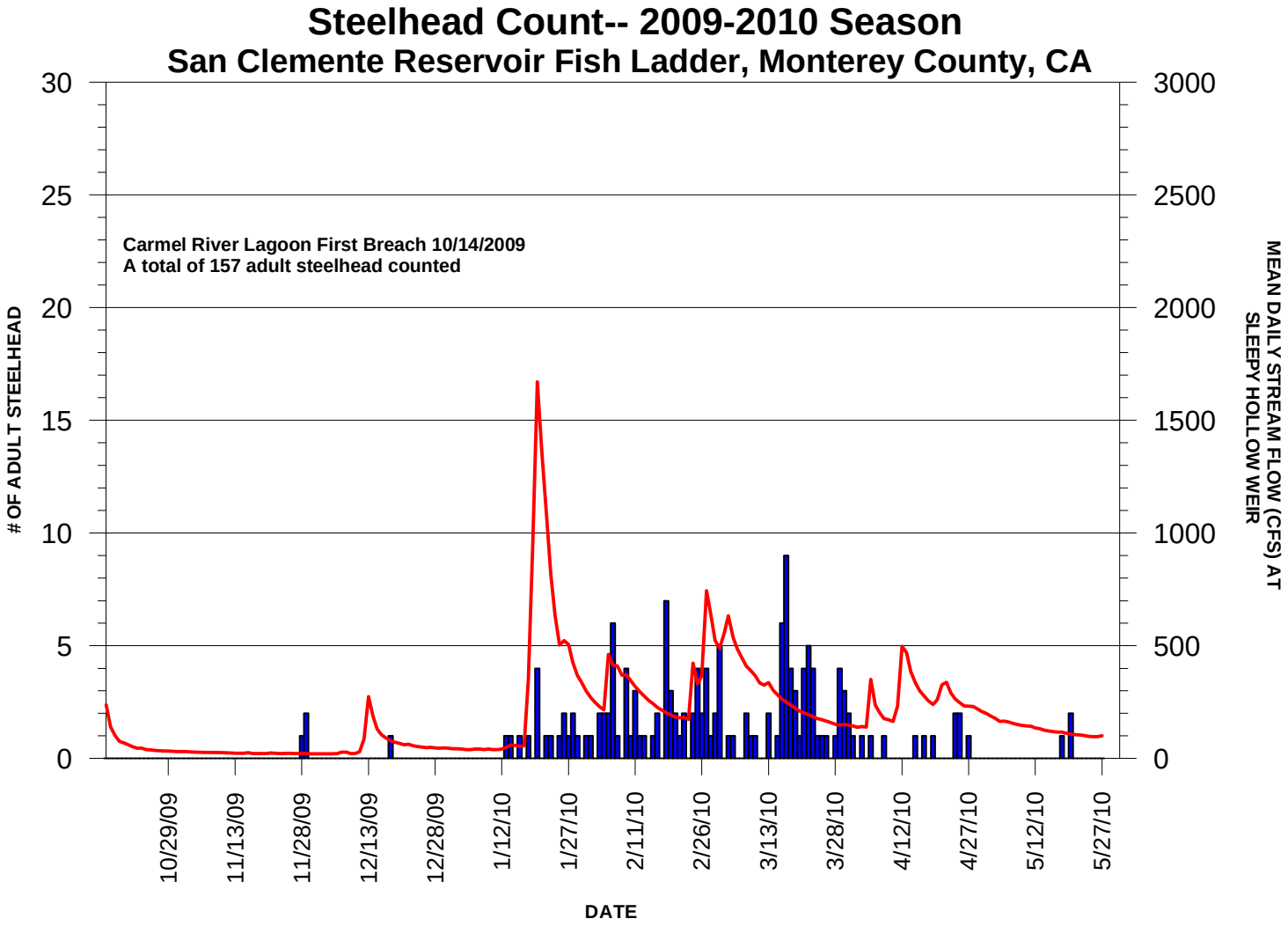


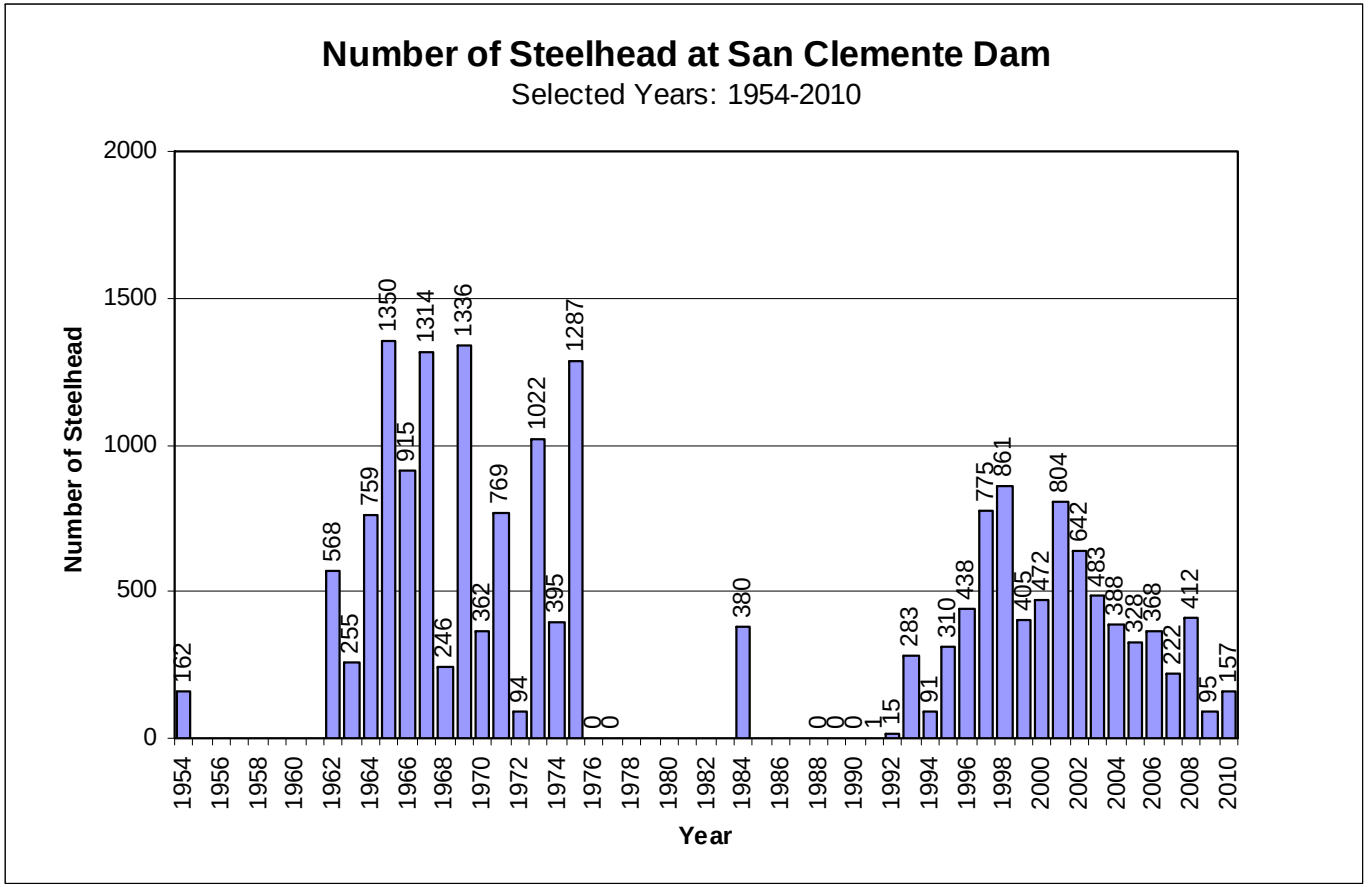
Figure IX-7



Note: Streamflow measured at MPWMD Sleepy Hollow Weir gaging station

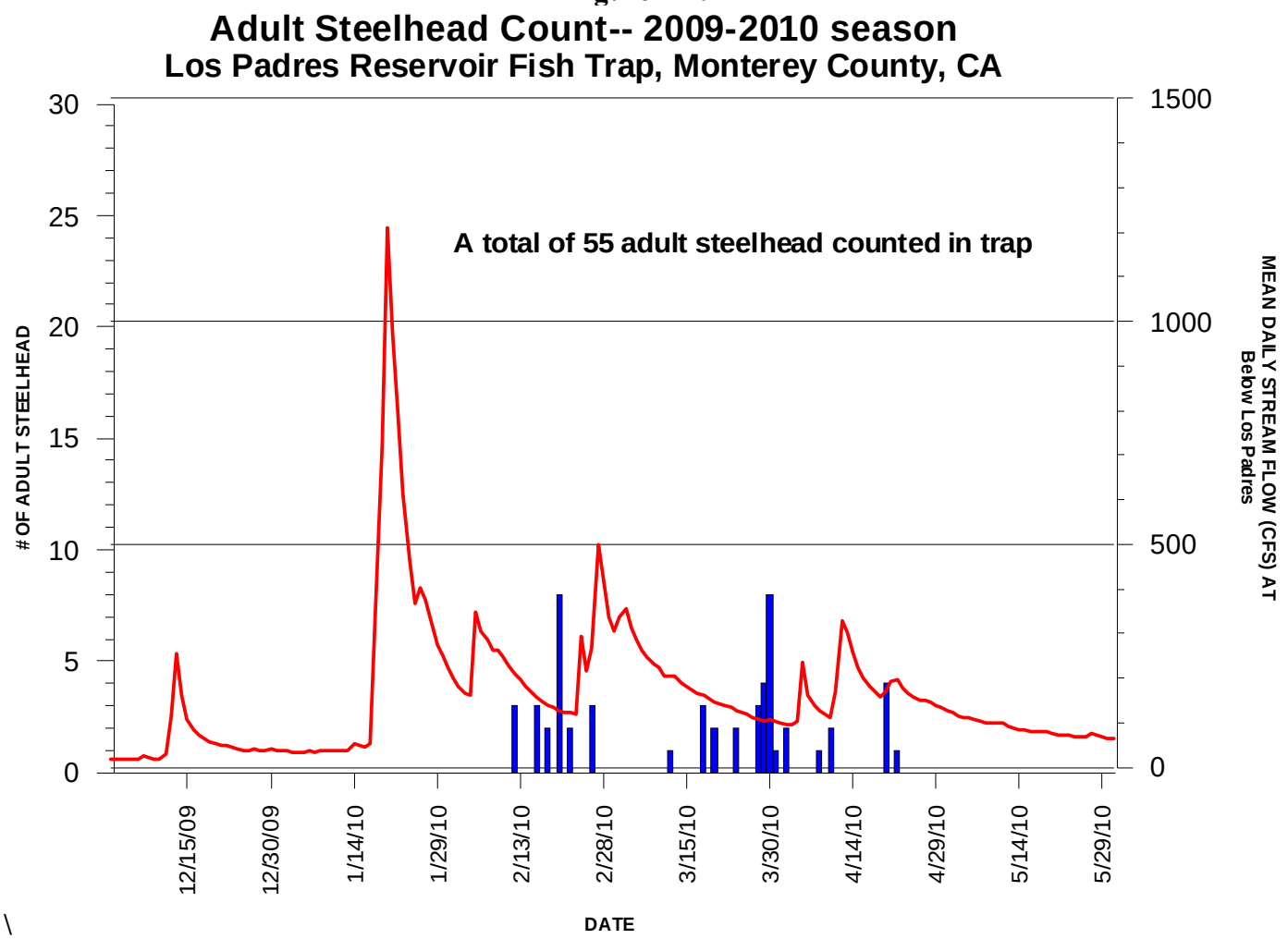
Figure IX-8

Number of Steelhead at San Clemente Dam



NOTE: 2007 counts are incomplete, low flows caused district to pull counter on April 2, video was caught of migrating fish after this time and needs to be evaluated before count is finalized.
Counts are based on Snider (1983), Dettman (1986), CDFG and MPWMD files. The 1962-73 and 1991-93 counts at San Clemente Dam are the sum of daily numbers of fish observed by shutting off the flow in the fish ladder. The 1974, 1975, 184, and 1994-06 data are complete counts registered on an automatic counter.

Figure IX-9



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Note: Streamflow measured at MPWMD Below Los Padres gaging station

Figure IX-10

Number of Steelhead at Los Padres Dam

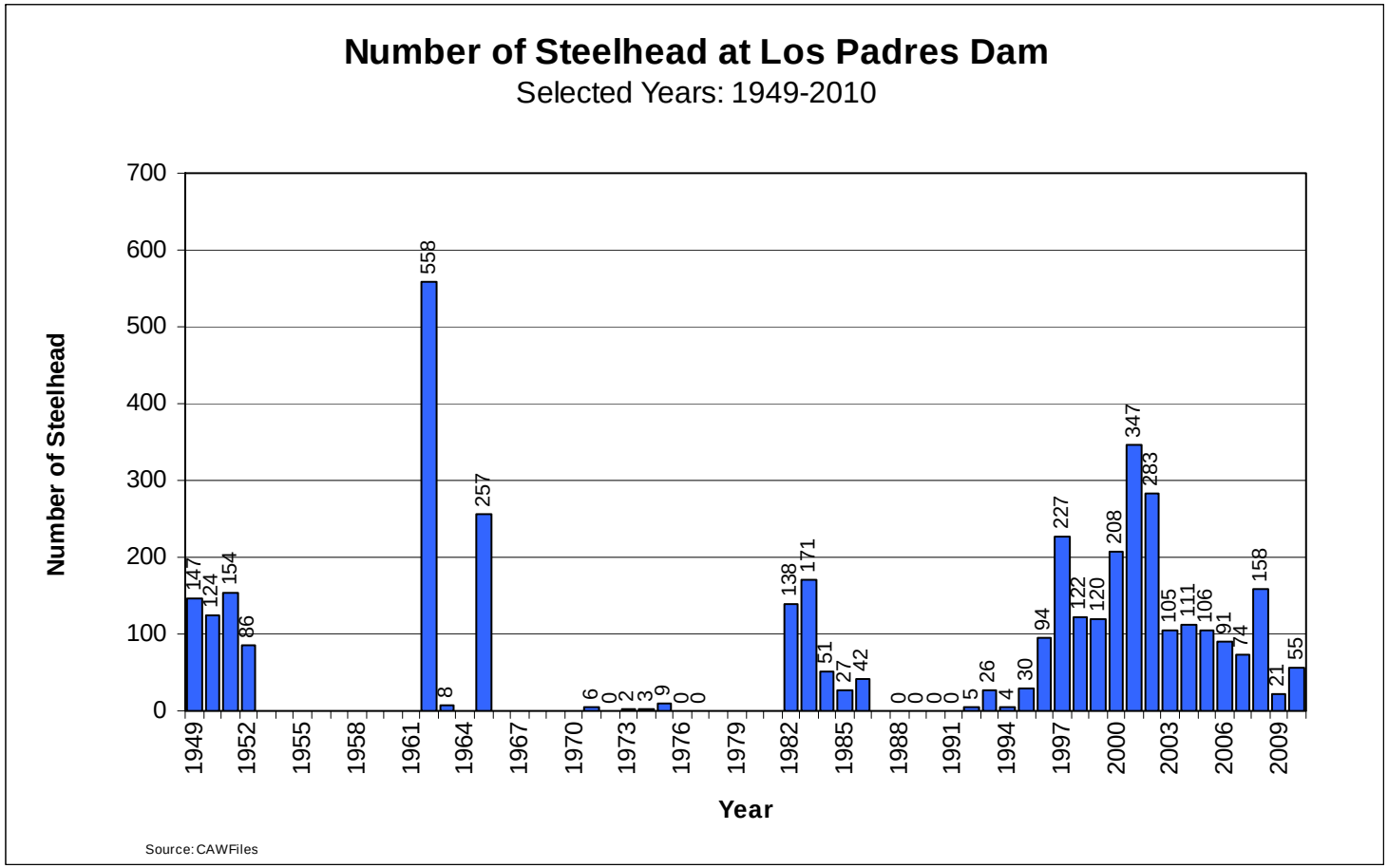
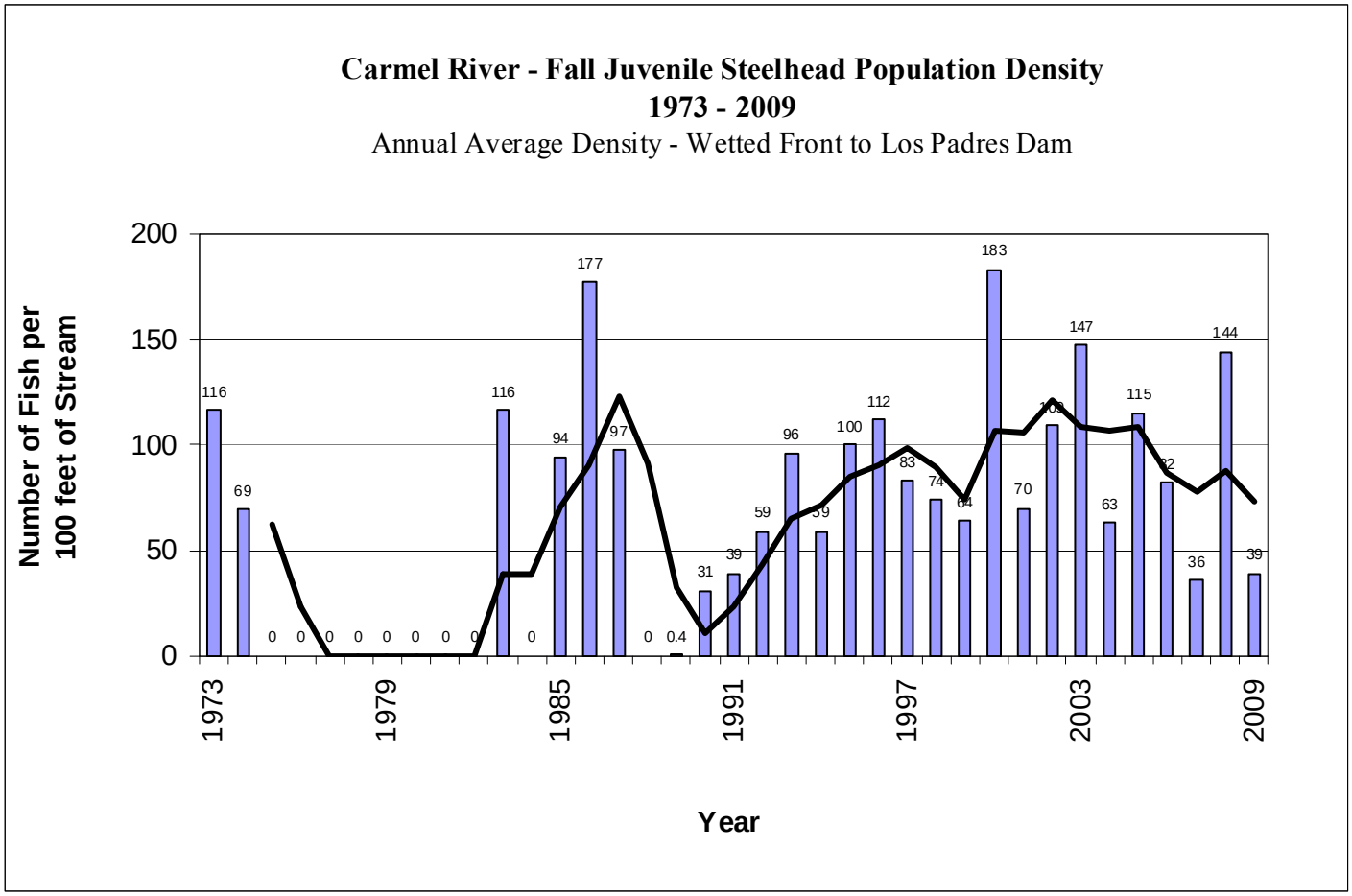


Figure IX-11

Carmel River – Fall Juvenile Steelhead Population Density



Source: CDFG files (1973-1987) and MPWMD files (1989-present)

Table IX-1a

Number of Juvenile Steelhead Rescued in the Mainstem Carmel River, by Age Group and General Location, Rescue Year 2009.

Age Group	General Location	MPWMD June-Sept. 2009	CRSA May-July 2009
Young-of-the-Year	Mainstem	12,658	1,222
Age 1+	Mainstem	710	149
Smolts	Lagoon and Lower River	0	0
Adults	Mainstem and Lagoon	0	0
Mortalities	Mainstem	109	12
Totals		13,477	1,383
Percentage Mortality		0.8	0.9

Table IX-1b

MPWMD Release Locations of Juvenile Steelhead Rescued in the Mainstem Carmel River - Rescue Year 2009.

RELEASE LOCATION	RIVERMILE	# OF FISH TRANSPLANTED
Carmel River Lagoon	0.1	138
SHSRF	17.1	12,773
Sleepy Hollow Ford	17.3	457
TOTAL		**13,368**

NOTE: River miles are approximations.

Table IX-2

SLEEPY HOLLOW STEELHEAD REARING FACILITY

Fish Rearing Summary: July 7, 2009 - November 24, 2009

Holding Location	# Fish Stocked [1]	# Morts (Disease)[2]	# Morts (Unaccount-ed for) [3]	Total # Released	% Survival	Ave Condition Factor (K)	# by Release Location	Notes
Rearing Channel 12 Pools (smaller YOY)	10,367	1,265	2,100	7,002	67.5	1.37	3,638-Lagoon 1,097-Redrock 1,420-RV Park 847-Garland Park	Size at release varied greatly from ~ 3 - 10 inches FL. Mean size of fish sampled was 159mm (6 in)
Rearing Channel 2 Pools (larger YOY)	1,386	284	172	930	67.1	1.37	689-Lagoon 154-Redrock 87-RV Park	Larger YOY fish were graded out after quarantining and placed in one of two separate pools. Size range at release was 99 to 284mm (4 - 11 inches) (FL).
Rearing Channel 2 Pool (Lrg 1+ Juvs)	647	132	13	502	77.6	N/A	452-Lagoon 50-SCD	Fish were ~ 2 yrs old at release. Sizes ranged from approx.149 to 319mm (6 - 13 inches) (FL).
QT Tank #3 (YOY)	359	118	see note	243	67.7	N/A	243-Don Juan Bridge	These fish were rescued from poor water quality conditons, and were kept separate to reduce possible disease transmission to rearing channel
Tailworks Pool	0	0	0	125		N/A	125-Tailworks pool mainstem	2285-125= 2158 total unaccounted for. Fish were of facility size 5-8 inches and were likely fish that went down drain.
Totals	**12,759**	**1,799**	**2,285**	**8,802**	**69%**	**1.35**	**4,779 (54%)- Lagoon 4,023 (46%)- River**	

Notes:

1. Fish were segregated in separate RC pools by size/age at the start of the rearing season.
2. Disease was primarily bacterial infection (*Flavobacterium columnare*), but there were minor outbreaks of *Ich.* High concentration salt baths were used throughout the season to treat for infections.
3. Unaccounted-for-fish [# fish stocked - (# of morts + # released)] were likely due to predation by larger fish.

"**Morts**" refer to mortalities. "**FL**" refers to fork length - the length of the fish from snout to the fork in its tail.
"**Condition Factor**" refers to a mathematical formula for determining the physiological state of a fish, including its reproductive capacity. It is calculated by dividing fish weight by length cubed (W_g/L_{mm}^3). The heavier a fish for a given length, the higher its condition factor (K). (x 10^{-5})

Table IX-3

Sleepy Hollow Steelhead Rearing Facility- 2009 Rearing Season					
Pool #	**Ave FL (mm)**	**Ave Wt (g)**	**Ave K Factor**	**Fish Size (at stocking)**	**Date Sampled**
RC 1	188	n/a	n/a	1+	11/24/2009
RC 2	235	n/a	n/a	1+	11/24/2009
RC 3	189	96.0	1.42	Medium YOY	11/23/2009
RC 4	150	47.1	1.40	YOY	11/23/2009
RC 5-7	162	57.4	1.35	YOY	11/19/2009
RC 8	181	79.7	1.34	YOY	11/17/2009
RC 9	167	60.7	1.30	YOY	11/17/2009
RC 10	164	67.7	1.53	YOY	11/16/2009
RC 11	149	43.5	1.32	YOY	11/13/2009
RC 12	166	59.3	1.30	YOY	11/13/2009
RC 13	150	44.3	1.31	YOY	11/12/2009
RC 14	161	53.2	1.27	YOY	11/10/2009
RC 15	142	39.7	1.39	YOY	11/9/2009
RC 16	190	90.3	1.32	Medium YOY	11/6/2009
OVERALL (at release)	**171**	**61.6**	**1.35**		
1+	212	n/a	n/a		November-09
medium YOY	190	93.2	1.37		November-09
YOY	159	55.3	1.37		November-09
Entering SHRSF	77	5.2	1.14		July-09

Table IX-4

Sleepy Hollow Steelhead Rearing Facility
Fish Release Location Summary: 2009

Location	# Released	Percent of Total
Lower River: San Clemente Dam (RM 18.6) to Redrock Area (RM 8.0)	4,023	46%
Carmel River Lagoon	4,779	54%
Total	**8,802**	

Table IX-5

Carmel River Juvenile Steelhead Annual Population Survey [1]

Lineal Population Density at Survey Stations (numbers per foot of stream) [2, 3]													
	Red Rock (Mid Valley)	Scarlett Narrows	Garland Park	Boronda	DeDamp Park	Stonepine Resort	Sleepy Hollow	SCR Delta Lower Station	SCR Delta Upper Station	Los Compadres	Cachagua	**Overall Annual Average**	
YEAR	RM 7.7	RM 8.7	RM 10.8	RM 12.7	RM 13.7	RM 15.8	RM 17.5	RM 19.0	RM 19.6	RM 20.7	RM 24.7	**(nos./ft)**	**(nos./mi)**
1990				ND		0.50	0.27			0.26	0.22	**0.31**	**1,650**
1991				0.12		0.74	0.39			0.09	0.62	**0.39**	**2,070**
1992			0.67	0.36		0.96	0.30			0.40	0.83	**0.59**	**3,098**
1993		0.62	0.91	0.92	0.82	0.84	0.52			1.22	1.84	**0.96**	**5,075**
1994	ND	0.44	0.23	0.43	ND	0.50	0.29			1.51	0.71	**0.59**	**3,100**
1995	0.49	0.65	1.01	1.61	ND	1.42	0.69			0.50	1.63	**1.00**	**5,281**
1996	0.24	1.52	0.82	1.05	2.03	1.22	0.29			0.95	1.92	**1.12**	**5,890**
1997	0.02	0.22	1.02	1.74	1.15	0.5	0.22			1.15	1.41	**0.83**	**4,359**
1998	0.19	0.30	0.67	0.34	1.50	0.27	0.60			0.54	2.24	**0.74**	**3,901**
1999	0.17	0.26	0.50	0.32	0.62	1.67	0.45			0.46	1.35	**0.64**	**3,403**
2000	0.91	1.03	0.64	1.38	5.66	1.71	1.46			1.41	2.3	**1.83**	**9,680**
2001	ND	0.48	0.35	0.63	0.68	1.08	0.32			0.47	1.62	**0.70**	**3,716**
2002	ND	0.68	0.85	1.67	0.83	1.07	0.5	0.33	0.68	1.52	2.73	**1.09**	**5,734**
2003	1.53	0.82	2.16	1.86	1.45	1.55	1.23	0.58	1.09	1.69	2.16	**1.47**	**7,738**
2004	0.25	0.46	0.78	1.21	0.43	1.24	0.55	0.21	0.41	0.45	0.89	**0.63**	**3,302**
2005	1.23	0.60	1.34	1.16	0.91	1.62	1.63	0.21	0.85	0.98	2.10	**1.15**	**6,062**
2006	1.13	0.64	0.86	0.87	0.47	0.37	0.95	1.65	0.28	0.82	1.00	**0.82**	**4,339**
2007	ND	0.15	0.50	0.77	0.06	0.33	0.16	0.36	0.25	0.49	0.50	**0.36**	**1,885**
2008	ND	0.9	2.61	3.64	1.11	1.19	1.38	0.17	0.71	1.13	1.56	**1.44**	**7,603**
2009	0.24	NS	0.25	NS	0.27	NS	0.48	NS	NS	NS	0.72	**0.39**	**2,070**
Station Ave (#/ft)	**0.58**	**0.61**	**0.90**	**1.12**	**1.20**	**0.99**	**0.63**	**0.50**	**0.61**	**0.84**	**1.42**	**0.85**	**4498**
Station Ave (#/mile)	**3,072**	**3,225**	**4,743**	**5,890**	**6,332**	**5,219**	**3,348**	**2,648**	**3,221**	**4,457**	**7,484**		
Overall Station Averages:												**0.85**	**4,513**

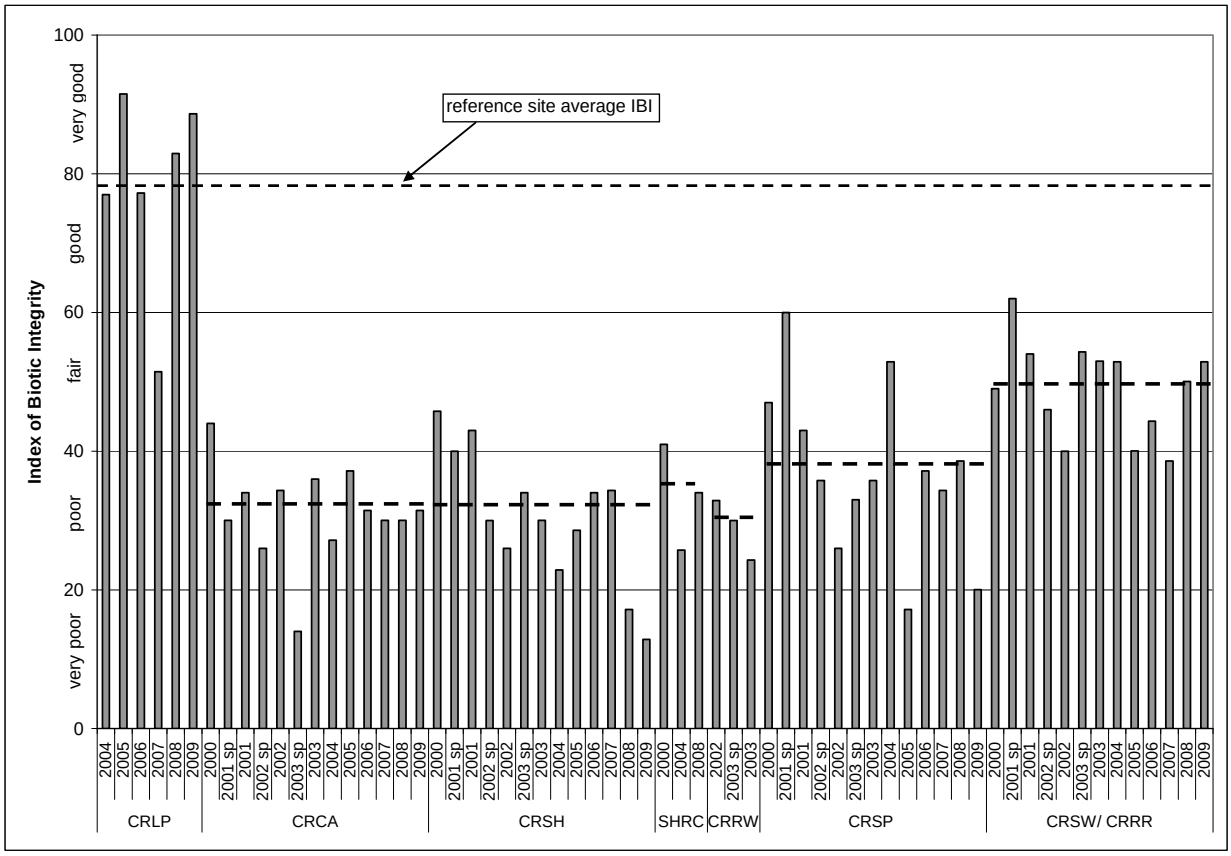
[1] Surveys completed in October and results based on repetitive 3-pass removal method using an electrofisher.

[2] RM; indicates miles from rivermouth

[3] ND indicates stream was dry at sampling station. NS indicates that site was not sampled that year. Blanks = site not added yet.

u/beverly/excel/popsurvey/stat linial density1990_08 updated 101509

Figure IX-12
Indices of biotic integrity (IBI) for benthic macroinvertebrates sampled from monitoring sites within the Carmel River.

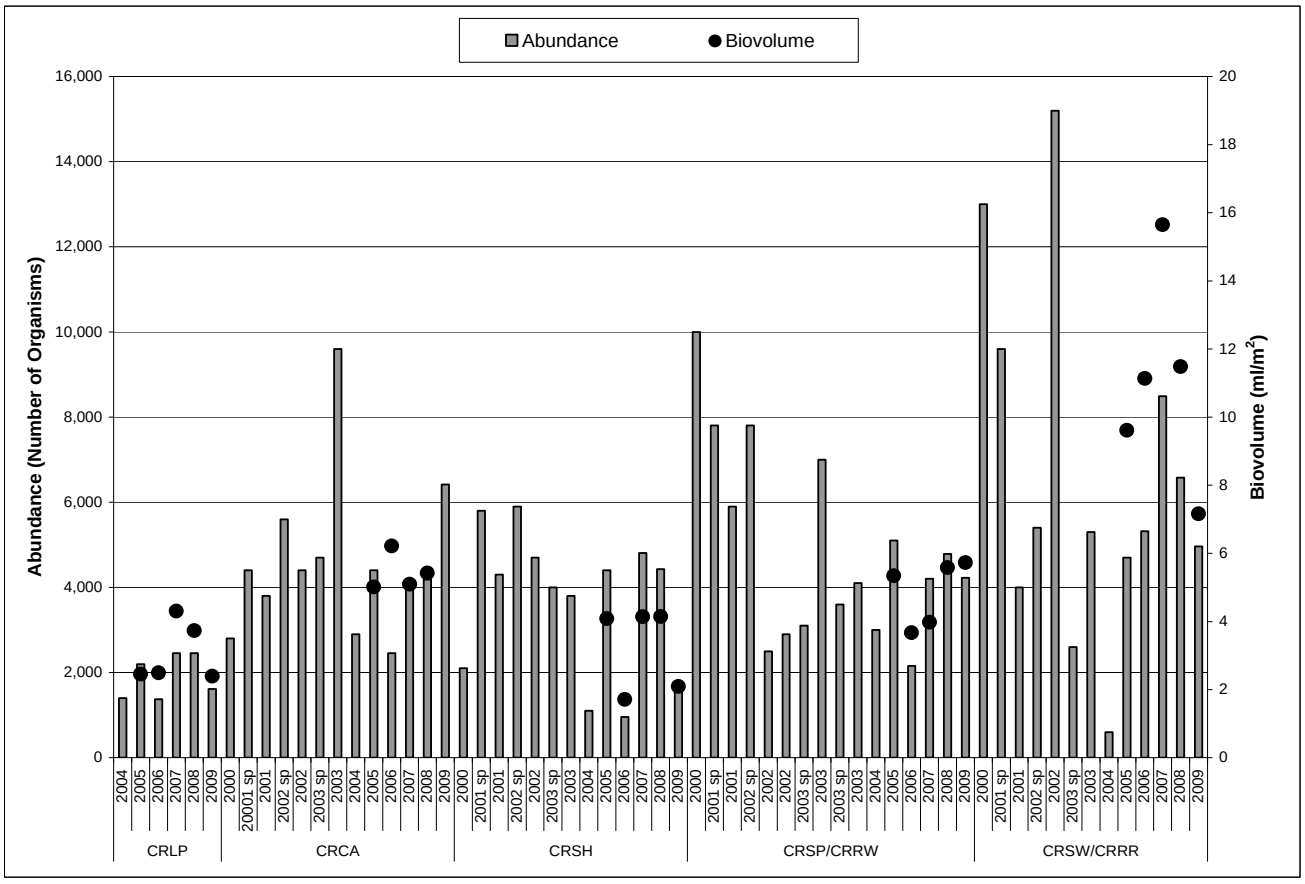


NOTE: IBI values are for the fall season unless noted otherwise with a "sp", which denotes spring season samples. Site average IBI values are shown as horizontal dashed lines.

Sampling location abbreviations:
CRLP = Carmel River Los Padres (u/s LPD) (RM ~ 28)
CRCA = Carmel River Cachagua (d/s LPD) (RM 24.2)
CRSH = Carmel River Sleepy Hollow (RM 17.4)
SHRC = Sleepy Hollow Rearing Channel (at the SHSRF) (RM 17.4)
CRSP = Carmel River Stonepine Resort (RM 15.7)
CRSW = Carmel River Scarlett Well (RM 9.1)

Figure IX-13

Benthic macroinvertebrate abundance and biovolume from benthic samples collected at Carmel River monitoring sites.



Sampling location abbreviations:
CRLP = Carmel River Los Padres (u/s LPD) (RM ~ 28)
CRCA = Carmel River Cachagua (d/s LPD) (RM 24.2)
CRSH = Carmel River Sleepy Hollow (RM 17.4)
SHRC = Sleepy Hollow Rearing Channel (at the SHSRF) (RM 17.4)
CRSP = Carmel River Stonepine Resort (RM 15.7)
CRSW = Carmel River Scarlett Well (RM 9.1)
CRRW = Carmel River Russell Wellfield (RM 16.2)
CRRR = Carmel River Red Rock (RM 8.0)

X. RIPARIAN HABITAT MITIGATION MEASURES

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

In addition to the above measures, MPWMD is facilitating the implementation of an Integrated Regional Water Management Plan (IRWM Plan) for the purposes of coordinating water resource management projects in a planning region consisting of coastal watershed areas in Carmel Bay and south Monterey Bay between Pt. Lobos on the south and Sand City on the north – a 38.3-mile stretch of the Pacific coast. The area encompasses the six Monterey Peninsula cities of Carmel-by-the Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, Seaside, and extends into portions of the unincorporated area of Monterey County in the Carmel Highlands, Pebble Beach and the inland areas of Carmel Valley and the Laguna Seca area. Many of the activities and projects proposed in the plan adopted by MPWMD in November 2007 will benefit the Carmel River streamside corridor. During FY 2009-2010, MPWMD completed the Regional Acceptance Process set up by the Department of Water Resources to accept an IRWM region into the Proposition 84 IRWM grant program. District staff also began the process for completing grant applications to the program. Additional information is contained at the end of this chapter, immediately before **Table X-1**.

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

The purpose of this measure is to reduce pumping impacts on riparian vegetation, particularly in the region of Aquifer Subunit 2 (Scarlett Narrows to Carmel Valley Village). Activities to further this goal during 2009-2010 are summarized above in Sections II (Monitoring Water Resources), III (Manage Water Production), and IV (Manage Water Demand).

B. Oversee Riparian Corridor Management Program

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

C. Implement Riparian Corridor Management Program

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

During Fiscal Year (FY) 2009-2010, MPWMD accomplished the following:

- Continued revegetation efforts at exposed banks with little or no vegetation located in Aquifer Subunits 2 and 3 (Via Mallorca Rd. to Esquiline Rd.);
- Operated under a Routine Maintenance Agreement with California Department of Fish and Game and a Regional General Permit with the U.S. Army Corps of Engineers for maintenance activities associated with vegetation encroachment and restoration projects;
- Made public presentations showing MPWMD-sponsored restoration work since 1984 and presented recent documentation of Carmel River State Beach, lagoon, and Scenic Road concerns;
- Diversified restoration projects and experimented with planting techniques that allow trees to mature more quickly and depend less on irrigation;
- Continued long-term monitoring of physical and biological processes along the river in order to evaluate the District's river management activities;
- Continued the annual inspections of the Carmel River from the upstream end of the lagoon at River Mile (RM) 0.5 to Camp Steffani at RM 15.5. Staff members responsible for vegetation management and erosion prevention annually walk the entire river to observe and record erosion damage, conditions that could cause erosion (e.g., in-channel vegetation or debris), riparian ordinance infractions, presence of deleterious material, and the overall condition of the riparian corridor;
- Completed an enforcement action in September 2010 against two property owners that began in December 2003 with a serious violation of the District's riparian ordinances on two residential properties on the north bank of the river just upstream of the Rancho Cañada Golf Club. District staff worked with the owner's representatives to design and implement a streambank restoration project that satisfied the District's requirements and reduces the potential for additional bank erosion;
- Carried out vegetation management activities at five sites (Ward Area, Boronda Bridge Area, Robinson Canyon Road Bridge Area, Red Rock Area, and Quail 8 Area) and concrete removal at one site (River Ranch Area);
- Completed a final review of the preliminary design for additional work at the Lower San Carlos Restoration Project located between the Via Mallorca Road Bridge and Rancho San Carlos Road Bridge. Graham Matthews & Associates (GMA) was the consultant for the design.

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

● Carmel River Erosion Protection and Restoration

Lower San Carlos Restoration Project: During the spring of 2006 and 2007, the District coordinated emergency streambank repairs to the north streambank along a portion of the Carmel River between

Rancho San Carlos Road Bridge and the Via Mallorca Road Bridge. Continued channel incision has been documented in this reach and there is evidence that previous stabilization efforts are being undercut. GMA focused on two alternatives to improve the long-term stability of the reach and MPWMD commented on the set of documents. Work to complete the final changes will carry over into FY 2010-2011.

Riparian Ordinance Enforcement Action - A serious violation of the District's riparian ordinances occurred in December 2003 on two residential properties on the north bank of the river upstream of the Rancho Cañada Golf Club. One of the property owners had directed workers to cut riparian vegetation and place concrete slurry on the river bank in an area that had been armored with rip-rap following high flows in 1998. About half of the work was carried out on an adjacent property.

District staff took enforcement action against both property owners and recorded Notices of Non-Compliance on the titles of both properties. The District Board authorized legal proceedings to enforce District Rules concerning these activities within the streamside corridor. On March 8, 2007, the District filed a complaint in Monterey County Superior Court and requested that the Court issue an injunction to the first property owner to remove the work and obtain a permit from the District. District staff was able to resolve the violation through mediation with representatives of the property owners and construction work was completed in the river in September 2009.

San Clemente Dam: The DWR and the U.S. Army Corps of Engineers finalized a combined EIR/EIS in 2008 concerning alternatives to remediate the safety deficiencies that have been identified at San Clemente Dam. DWR continued to direct CAW to draw San Clemente Reservoir down and maintain it 10 feet lower than the spillway, except between February 1 and May 31 (to allow for downstream migration of steelhead). The California Coastal Conservancy and other State and Federal agencies, along with citizens groups, support the Dam Removal and Reroute Alternative which consists of: storing sediment in the Carmel River portion of the reservoir; removal of the dam, and rerouting the Carmel River into San Clemente Creek. During FY 2009-2010, MPWMD entered into a Memorandum of Understanding that commits the project stakeholders (including MPWMD) to provide staff expertise to develop an implementation strategy for the project. During the fiscal year, MPWMD participated in developing a long-term management plan for post-construction monitoring, maintenance and management activities.

- **Vegetation Restoration --** Various techniques for vegetation installation were employed at District restoration projects in FY 2009-2010. Planting techniques involved either rooted seedlings or cuttings sustained by irrigation, or deeper plantings set to tap summer groundwater without supplemental water applications. The District continued work on barren streambanks by planting with willows, black cottonwoods, and sycamores, and installing new drip irrigation systems. A total of 300 riparian plants were planted this year throughout the river corridor.

The primary objectives of the District's restoration planting effort are to stabilize eroded stream banks with native vegetation and to enhance habitat values near the stream, on adjacent floodplains, and terrace areas. One of the goals of the habitat enhancement program is to diversify restoration plantings by identifying microhabitat areas and vegetating them with species typical of those riparian habitat sites. District staff provided riparian plants to several private property owners (**Table X-1**).

District staff also planted numerous rooted seedlings throughout degraded portions of the Carmel River including several private property areas and District restoration sites. **Table X-1** identifies the locations that riparian plantings were installed during FY 2009-2010. Rooted seedlings are obtained from cuttings and seeds collected from along the Carmel River and propagated by a local nursery.

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

Table X-2 and **Figure X-1** show water use for FY 2009-2010. Please note that these figures include irrigation during two separate irrigation seasons. For the fiscal year, 5.22 acre-feet (AF) of water were applied. The single 2010 irrigation season began in April and continued through the end of November. Total water use for the season was 5.04 AF. This compares to 5.66 AF during the 2009 irrigation season, and is considerably less than the 1994 irrigation total of 51.1 AF, when drought conditions prevailed.

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

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

During the fall of 2009, six areas (five vegetation management areas and one concrete removal project) with virtually 100% vegetation encroachment in the channel bottom were selected for vegetation removal:

1. Ward Area: beginning in a reach that passes through Ward's private property River Mile (RM) 15.0 and extending approximately 30 feet downstream; several large trees have fallen in the main channel. These trees were notched (partially cut) and branches were trimmed. Some sections of the trees were placed in the flowing stream to provide large wood habitat.

2. Downstream of Boronda Road Bridge Area: two reaches beginning approximately 20 feet and 100 feet downstream of the Boronda Road Bridge, which is located at RM 12.7, one large tree was notched and had branches trimmed, the second section downstream with trees blocking the channel on a gravel bar (150 feet in length) had trees trimmed. One additional reach about ¼ mile

downstream (200 feet in length) was also trimmed. Some trees were placed in the flowing stream to provide large wood habitat. The rest of the branches were chipped.

3. Robinson Canyon Bridge: beginning approximately at RM 8.4, downstream of Robinson Canyon Road Bridge and extending 230 feet; many trees have become established across the active channel. This section was opened up to allow debris and high flows to pass by removing trees on a gravel bar.

4. Red Rock Area: beginning approximately at RM 8.2 at the Red Rock Restoration Project and extending 150 feet downstream; trees blocking the channel on a gravel bar were removed. Some trees were cut and placed in the flowing stream to provide large wood habitat. The rest of the branches were chipped.

5. Quail 8 Area: beginning approximately at RM 4.2 at the Quail 8 condominiums and extending 80 feet downstream; trees extending out and blocking the channel were trimmed back.

6. In addition to the vegetation management activities, MPWMD with the help of the California Conservation Corps, removed two large concrete slab/abutments (one 6 feet long, 6.5 feet wide, and 3 feet thick and another 5 feet long, 4 feet wide, and 1.5 feet thick) that were located on a gravel bar (in the dry) along the Carmel River (Garland Park Area: approximately at RM 11.6). These slab/abutments were associated with an old bridge that failed in the past.

A total of approximately 965 lineal feet of stream encompassing approximately 0.44 acres in the channel bottom was affected by the vegetation removal.

In addition to erosion hazard reduction, vegetation management objectives include removing trash and inorganic debris from the river channel. During FY 09-10, trash such as plastic, paper, cans, bottles and car parts were removed from the channel and disposed by the District.

In general, the health of the riparian corridor appears to be good with continued development of naturally recruited species, such as black cottonwoods and sycamores, on some of the engineered floodplains as well as natural gravel bars. While most of the alluvial channel remained clear of major obstructions, District staff documented increases in vegetation encroachment into the channel bottom that will likely require continued monitoring and vegetation management activities in the future. District staff believes that continued selective removal of encroaching vegetation will be necessary during the summer of 2011. Without such a program, it is possible that unauthorized vegetation removal will increase, which may lead to a decline in the health and stability of the riparian corridor.

- **Public Information and Partnerships**

In July 2009, the District presented an update on planning efforts for long term adaptive management of the Carmel River State Beach and Lagoon to the Carmel Point and Lagoon Preservation Association. A similar presentation was given in January 2010 at a public meeting coordinated by the Carmel River Watershed Conservancy.

In February 2010, the District gave a presentation to the Carmel River Steelhead Association on using engineered large wood in streams to improve habitat for steelhead and other aquatic species.

On March 2, 2010, the MPWMD gave a presentation to seniors in the Advanced Placement Environmental Science Class at Carmel High School. Topics included information on the Monterey Peninsula Water Resource System, MPWMD's Environmental Protection Program, the Carmel River steelhead life cycle, and specific issues related to the Carmel River watershed.

In April 2010, District staff gave an overview presentation to the Carmel Residents Association on the history and issues affecting past and present management of the Carmel River.

D. Expand Monitoring Programs for Soil Moisture and Vegetative Stress

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

In FY 09-10, staff collected weekly canopy ratings of individual trees at four study sites in mid and lower Carmel Valley. Soil moisture was evaluated weekly with tensiometers at Rancho Cañada, San Carlos, Schulte Restoration Project, and the Valley Hills Restoration Project. Photo documentation and measurements of foliage volume occurs in other areas as well, depending on river flow conditions and depth to groundwater.

In addition to vegetation and soil moisture monitoring, avian (bird) species diversity monitoring was continued during Summer 2009 and Spring 2010 by the Ventana Wildlife Society's Big Sur Ornithology Lab (BSOL). Data collected by Dr. David Mullen and the BSOL since 1992 compares habitat values at permanent monitoring stations and provides an indication of changing patterns of avian use in District restoration projects. The information collected on avian species diversity has helped document the response of populations to habitat enhancements implemented by the District. Since 1992, the avian monitoring work has shown healthy avian species diversity along river reaches where the District has implemented restoration projects, while diversity-index readings in control sites with established riparian vegetation seem to fluctuate depending on the presence of flow in the river channel, the quality of the habitat, and off site conditions during migration.

OBSERVED TRENDS, CONCLUSIONS AND/OR RECOMMENDATIONS:

The Carmel River is showing many signs of recovery and stabilization 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 been washed out of the system leaving behind a more complex channel with improved steelhead spawning substrate, diverse habitat, and a richer riparian community. Areas with perennial or near perennial flow (upstream of Schulte Bridge) or a high groundwater table, such as downstream of

Highway 1, 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 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 streamside areas subjected to annual dewatering continues to show impacts from groundwater extraction. 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.

Staff has observed that many pool areas in the lower 15 miles of the river have been scoured out and appear to be much deeper than at any time since the Mitigation Program went into effect in 1990. This condition is likely the result of a lack of sediment from the upper watershed and the stabilization of streambanks in the lower river. With the banks relatively stable and little or no sediment from upstream, the stream power (i.e., the energy available to move sediment) of the lower river is directed into the channel bed. This incision into floodplain deposits is referred to technically as channel degradation. Thus, pools become deeper and when combined with scour along the outside of streambanks this creates "cut" banks. Although this leads to a more complex and dynamic channel, which is a desirable condition, continued degradation can result in bank collapses and trigger an episode of erosion along the river. District staff continues to document degradation in the river bed including at the Carmel Area Wastewater District pipe across the river downstream of Highway 1 and at bridge infrastructure in the active channel.

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

- increased encroachment of vegetation into the active channel bottom,
- effects to areas with increased groundwater extraction downstream of Schulte Road,
- channel scour due to a lack of sediment from upstream and from bank erosion
- healthy avian species diversity, and
- maturing of previous restoration projects.

Carmel River Erosion Protection and Restoration

With the exception of the channel area between the Via Mallorca Road bridge and the Rancho San Carlos Road bridge, the streambanks in the main stem appear to be relatively stable during average water years with "frequent flow" storm events (flows with a return magnitude of less than five

years). Although there has not been a significant flood event since February 1998, the program began by MPWMD in 1984 (and later subsumed into the Mitigation Program) to stabilize streambanks appears to be achieving the goals that were initially set out, i.e., to reduce bank erosion during high flow events up to a 10-year return flow, restore vegetation along the streamside, and improve fisheries habitat.

Consistent with previous reports, it is likely that the following trends will continue or develop in the near future:

- State and Federal agencies consider the Carmel River watershed to be a high priority area for restoration, as evidenced by the interest in addressing water supply issues, San Clemente Dam safety, impacts to the Carmel Bay Area of Special Biological Significance, and management of threatened species. Stringent avoidance and mitigation requirements will continue to be placed on activities that could have negative impacts on sensitive aquatic species or their habitats.
- Activities that interrupt or curtail natural stream functions, such as lining streambanks with riprap, will come under increasing scrutiny. Activities that increase the amount of habitat or restore natural stream functions are more likely to be approved or funded through State and Federal grant programs.
- Additional work to add instream features (such as large logs for steelhead refuge or backwater channel areas for frogs) can restore and diversify aquatic habitat.
- Major restoration projects completed between 1992 and 1999 have had extensive and successful work to diversify plantings. However, maintenance of irrigation systems is ongoing and requires extensive work in water years classified as below normal, dry and critically dry.
- Downstream of the Robinson Canyon Road bridge, the river continues to cut into the channel bottom and form a more complex system of pools, riffles and gravel bars.

Downcutting into channel deposits has both positive and negative aspects. On the plus side, it is clear that sand and fine material deposited during the mid-1990's has been winnowed out, exposing gravel and cobble layers as far downstream as the lagoon. This has created spawning habitat for steelhead in some areas where spawning had not been recorded since records have been kept (since the early 1980's). In addition, the scouring of pools and streambank areas has added much needed complexity to the bottom of the river channel. 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 as 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.

Between the mouth and Robinson Canyon Road bridge, many areas of the river appear to be deeper than at any previous time since measurements have been recorded (i.e., beginning in 1978), with many reaches showing several feet of downcutting. This trend, which was identified as a concern in the 1984 Carmel River Management Program EIR, appears to have accelerated in the period from 1998 to 2010. This was a period of exceptional (for the Carmel River) stability as streambanks

hardened with structural protection over the past several decades resisted erosion and the force of the river during high flows was directed into the channel bottom. This condition has resulted in the undermining of rip-rap protection and bridge infrastructure in some reaches and recently, in the spring of 2010, the Carmel Area Wastewater District's concrete-encased pipe across the bottom of the river was exposed for the first time since it was constructed in 1973. District staff measured a maximum of three feet of scour from the top of the encasement, which is approximately five feet wide and 4.5 feet high (see **Figure X-2**). When the pipe encasement was installed, it was buried two feet below the riverbed. Eventually, without corrective measures to balance the sediment load with the flow of water or to mitigate for the effect of the downcutting, streambanks will begin to collapse and the integrity of bridges and other infrastructure in the active channel of the river may be threatened.

Vegetation Restoration and Irrigation

To the maximum extent possible, MPWMD-sponsored river restoration projects incorporate a functional floodplain that 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 Cal-Am and NOAA Fisheries) supplemental irrigation has been installed on engineered floodplains and on vulnerable banks.

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 the California Department of Fish and Game to renew a long-term Routine Maintenance Agreement (RMA) with

CDFG to conduct regular maintenance and restoration activities. The District is currently operating under a new RMA that expires in December 2012. 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. Since 1998, species diversity recovered and now fluctuates depending on habitat conditions. Values indicate that the District mitigation program is preserving and improving riparian habitat.

Strategies for the future

A comprehensive long-term solution to overall environmental degradation requires a significant increase in dry-season water flows in the lower river, a reversal of the incision process, and reestablishment of a natural meander pattern. Of these, MPWMD has made progress on increasing summer low flows by aggressively pursuing a water conservation program, implementing the first phase of the Seaside Groundwater Basin Aquifer Storage and Recovery Project, and recommending increasing in summer releases from Los Padres Reservoir. However, additional planned MPWMD-sponsored water supply and water conservation projects cannot completely meet municipal demand and restore dry-season flows to the lower river.

Reversal, or at least a slowing, of channel incision may be possible if the supply of sediment is brought into better balance with the river's sediment transport forces. Additional sediment from the area between San Clemente Dam and Los Padres Dam is likely to pass into the lower river in the foreseeable future no matter what happens at San Clemente Dam. However, any increase in the sediment supply may not reach the lowest portion of the river for many years.

In January 2009, CAW agreed to proceed with the removal of San Clemente Dam. MPWMD supported the dam removal and re-route project that the California Coastal Conservancy proposed. In addition to a significant improvement in fish passage, removal of San Clemente Dam would likely reduce the time it takes for sand and gravel from the upper watershed to move through the river bottom and replenish the Carmel River State Beach at the mouth of the river. 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 May 31 (to allow for downstream migration of steelhead). The draw down results in fine material prograding (moving downstream) toward the dam and eventually over the spillway (see **Figure X-3**).

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.

- **Integrated Regional Water Management (IRWM) Grant Program**

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

In November 2007, the District adopted the final IRWM plan for a region encompassing Monterey Peninsula areas within the District boundary, the area in the Carmel River watershed outside of the MPWMD boundary, Carmel Bay and the Southern Monterey Bay. The plan combines strategies to improve and manage potable water supply, water conservation, stormwater runoff, floodwaters, wastewater, water recycling, habitat for wildlife, and public recreation. MPWMD agreed to facilitate development of this plan on behalf of more than 40 stakeholders identified within the region.

In addition, MPWMD facilitated the formation of a Regional Water Management Group (RWMG) to guide the continued development and implementation of the IRWM Plan. The RWMG is comprised of representatives of the Big Sur Land Trust, City of Monterey, Monterey County Water Resources Agency, Monterey Regional Water Pollution Control Agency and MPWMD. The members of the RMWG signed a Memorandum of Understanding that formalized the RWMG and described their responsibilities.

During FY 2009-2010, District staff worked with representatives of the Department of Water Resources (DWR) to gain acceptance of the Monterey Peninsula planning region into the Proposition 84 IRWM grant program. This was accomplished through the DWR Regional Acceptance Process (RAP). Completion and adoption of an IRWM Plan, formation of the RWMG, and acceptance into the program during the RAP are all requirements to be eligible for planning and implementations grants from DWR, which are funded from the sale of Proposition 84 bonds. In April 2010, District staff held the first of several stakeholder meetings to outline a process for the region to complete grant applications to DWR due in late 2010 and early 2011. At the time, MPWMD was recommending that the region ask DWR for $1 million in planning funds and for $6 million to begin implementing the highest priority projects.

Funding from this program could provide the incentive to undertake a set of projects that would continue to improve the Carmel River environment and engage a larger number of organizations in helping to develop and implement a comprehensive solution to problems in the watershed.

More information about the IRWM Plan and the group of stakeholders in the planning region can be found at the following web site: http://www.mpwmd.dst.ca.us/Mbay_IRWM/Mbay_IRWM.htm

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Table X-1

Riparian Species Planted July 1, 2009 through June 30, 2010

Plant Species	Number	Location
Acer negundo **, box elder**	8	Carmel Valley Ranch (6) Dow (2)
Alnus rhombifolia, **white alder**	31	Red Rock (20) DeDampierre (11)
Populus balsamifera ssp. trichocarpa **, black cottonwood**	148	Schaefer (73) Woods/Marotta (40) Carmel Valley Ranch (10) Red Rock (22) Dow (3)
Plantanus racemosa, **sycamore**	3	Carmel Valley Ranch (3)
Quercus agrifolia **, coast live oak**	3	Carmel Valley Ranch (3)
Salix ssp **., willow**	107	Woods/Marotta (92) Carmel Valley Ranch (15)
Total Number of Plants	**300**	

Table X-2

Monthly Irrigation Water Use During 2009-2010

(Values in Acre-Feet)

Project Site	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
DeDampierre	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.000**
Trail and Saddle	0.273	0.014	0.259	0.096	0.000	0.000	0.000	0.000	0.000	0.000	0.073	0.229	**0.944**
Scarlett	0.017	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.030**
Begonia	0.026	0.043	0.026	0.009	0.000	0.000	0.000	0.000	0.000	0.017	0.015	0.021	**0.157**
Schulte South	0.005	0.003	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.004	**0.030**
Reimers	0.455	0.448	0.416	0.216	0.000	0.000	0.000	0.000	0.000	0.000	0.048	0.510	**2.093**
Schulte Bridge	0.052	0.100	0.104	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.256**
All Saints	0.027	0.010	0.012	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025	**0.090**
Cypress	0.188	0.331	0.475	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025	0.242	**1.261**
San Carlos	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.000**
San Carlos (Dow)	0.072	0.090	0.063	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.104	**0.360**
TOTAL WATER USE IN ACRE-FEET FOR DISTRICT RESTORATION PROJECTS IN 2009-2010 =													**5.221**

Figure X-1

Riparian Irrigation Totals

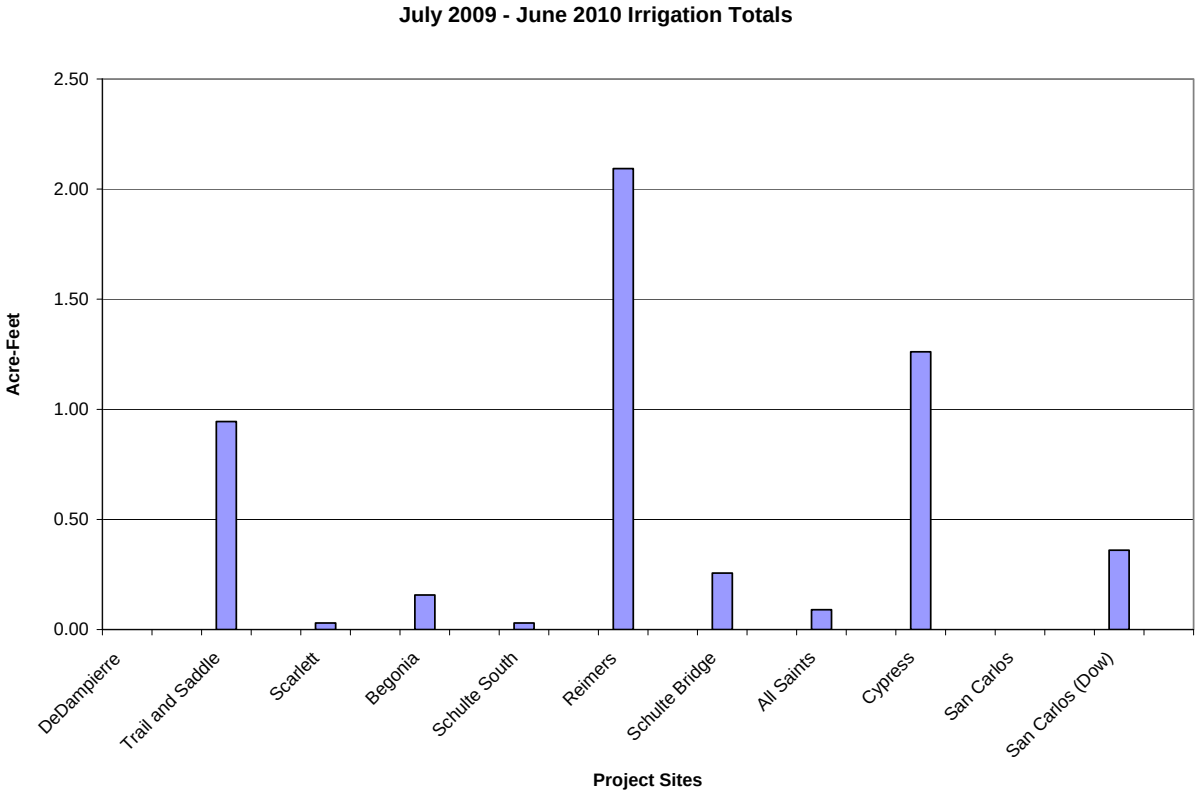

Figure X-2 – Carmel Area Wastewater District Pipe Crossing (looking upstream)

Figure X-3
San Clemente Dam Drawdown Project

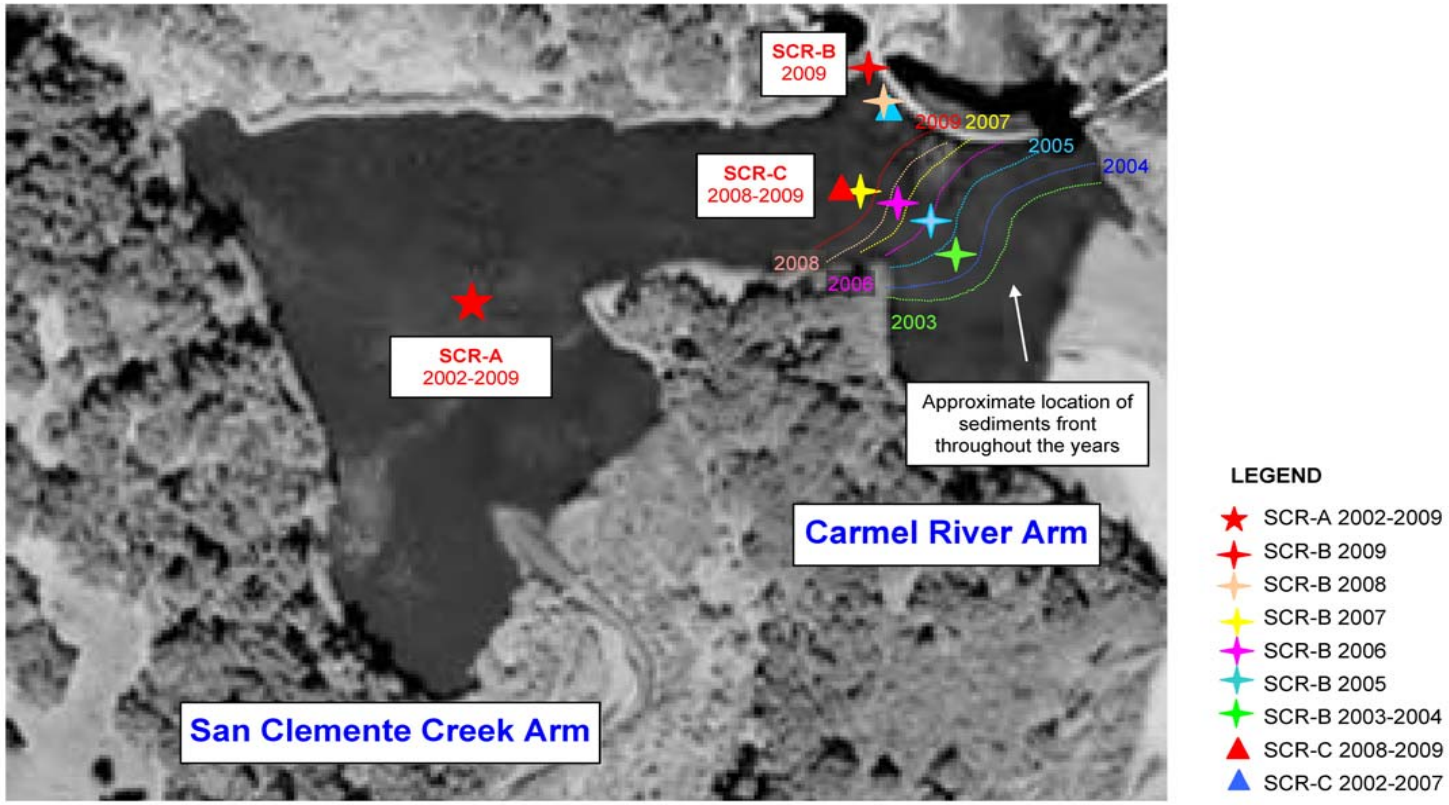

Figure 5-1 **Estimated Locations of Water Quality Monitoring Stations SCR-A, SCR-B and SCR-C and Sediment Front in the San Clemente Dam Reservoir during the 2003 to 2009 Drawdown Operations**

XI. LAGOON HABITAT MITIGATION MEASURES

The Findings for Adoption of the Water Allocation Program Final EIR identified three mitigation measures to reduce impacts to the Carmel River Lagoon, including wildlife that is dependent on it (Finding Nos. 390-A through C, and 392). They include: (a) assist with lagoon enhancement plan investigations, (b) expand long-term monitoring program, and (c) identify feasible alternatives to maintain adequate lagoon volume. This section briefly describes the purpose of these three programs and summarizes the mitigation activities from July 1, 2009 through June 30, 2010.

A. Assist with Lagoon Enhancement Plan Investigations

Description and Purpose

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

Implementation and Activities during 2009-2010

During this period, the CDPR, with funding from the Conservancy, continued their native riparian plant re-vegetation efforts within the 100-acre portion of the "Odello West" property that is now part of the Carmel River State Beach. The re-vegetation work and associated monitoring is ongoing. For a summary of the status of the lagoon restoration project in 2009, see CDPR's *2009 Carmel River Lagoon Enhancement Project Report* dated December 2009 (CDPR 2009). This will be the last year that such reports will be produced, though restoration efforts are ongoing. California State University, Monterey Bay (CSUMB) researchers also began a fall lagoon monitoring effort that they hope to continue annually as part of a graduate seminar. The third year's results for fall 2009 are in the January 2010 report *Evaluating Good Water Quality Habitat for Steelhead in Carmel Lagoon: Fall 2009* (CSUMB Class ENVS 660: Daniels et. al 2010).

One of the ongoing goals of the Carmel Area Wastewater District (CAWD) is to cease discharges to Carmel Bay by finding methods to recycle treated wastewater back to beneficial uses within the community. District staff provided hydrological data to the CAWD to aid them in evaluating and monitoring their efforts, funded by California American Water (CAW), to augment flow to the lagoon using recycled water. No treated waste water from the CAWD plant was released into the restoration area for percolation into the lagoon during this Reporting Year (RY). CAWD is exploring the potential to release recycled water directly to the lagoon as part of their discharge permit renewal from the Central Coast Regional Water Quality Control Board

(CC-RWQCB). The CC-RWQCB staff required further studies to characterize the background levels of trace metal concentrations in the lagoon's receiving waters before direct discharges to surface water would be permitted. Those studies include baseline monitoring of treatment plant effluent and lagoon water quality for specific metals, which might be elevated above acceptable limits for receiving waters by releases of CAWD's recycled water. The tertiary-treated CAWD discharges continue to meet water-quality standards for ground disposal and agricultural use, which would allow their release onto surrounding habitat to irrigate vegetation, but not directly into the lagoon. The Carmel River Lagoon Technical Advisory Committee (CRL-TAC) made recommendations to CAWD and the CC-RWQCB on when to undertake baseline monitoring efforts for metals in the receiving waters of the lagoon. CAWD continued its baseline monitoring for metals in this RY, with samples taken on July 20 and October 14, 2009, and on January 19 and May 5, 2010. The sampling will continue quarterly through at least 2010. CAWD also hired a consultant to develop a study plan for completing the necessary studies that could lead to direct disposal of discharges to the lagoon. CAWD is discussing opportunities for funding to undertake these studies with CDFG.

District staff monitored receiving water quality and continued to provide expertise to representatives from numerous state, federal and local agencies, as well as members of the public, regarding the best ways to provide additional water to the lagoon during the dry summer and fall months of the year. During the summer and fall, there is usually no natural surface flow to the lagoon, and the lagoon has historically experienced poor water quality and low water levels that could have contributed to fish mortality.

During this RY, CAWD did not release any tertiary treated wastewater for the purpose of percolating it into the soil adjacent to the lagoon in an attempt to improve lagoon water quantity and quality. The CDPR did utilize what is known as its "Cal-Trans" well to provide irrigation water for its demonstration organic farm and riparian restoration areas adjacent to the south arm of the lagoon. Most if not all of the water is consumed in evapotranspiration of the crops or riparian vegetation, although some could theoretically percolate into the aquifer adjacent to the lagoon. CDPR feels (Dave Dixon, pers. comm.) that significant lagoon recharge from these sources is unlikely as the demonstration farm is on drip irrigation, and the restoration area is watered during the dry season only two hours a week. Specifically, CDPR produced a total of 46.00 AF of groundwater between July 2009 and June 2010 to serve the organic demonstration farm and irrigate the riparian restoration area. This was approximately 39% of the level of their use in the prior RY (2008-2009), and is between 27% to 78% of their use in the prior three RYs (2007-2008, 2006-2007, 2005-2006). CDPR also pumped water from their "Highway 1" well at CRSA's behest into the South arm of the Lagoon for a total of 214.58 acre-feet of water over the RY, 65% of what they produced the year before. It appears most of this water was pumped between June and September, but operational records are incomplete, so this is only a generalization. There has of yet been no quantitative analysis of the effect of these releases on lagoon water quality.

District staff are also usually involved in ongoing discussions under the auspices of the CRL-TAC regarding Monterey County Public Works Department's (MCPWD) breaching of the sandbar that forms each year between the lagoon and the ocean. One CRL-TAC meeting was held in December 2009 during which there was a discussion of the potential to convey CAW-NOAA Fisheries Settlement Agreement funds managed by CDFG to the State Coastal

Conservancy (SCC) for disbursement on projects to benefit steelhead at the lagoon and in the Carmel River. However, CDFG subsequently found that a block grant to the SCC was not possible. CDFG continued to investigate administrative processes other than its Fisheries Restoration Grants Program to disburse the funds. The CRL-TAC remains operational and held a meeting on July 1, 2010, the first day of the next RY (2010-2011). Lagoon water levels frequently fall to less than two feet (NGVD 1929, measured in the south arm) after a breach. NMFS and CDFG have indicated that an elevation of from four to ten feet, depending on the time of year and life cycle needs of steelhead, would be an optimal management target to benefit steelhead rearing.

The lagoon was last connected to the ocean on a continuous basis during the prior RY on May 18, 2009, when it was closed by CDPR. CDPR's closure actions were described in the 2009 report. CDPR's actions, supported by the CRL-TAC and conducted with the full set of state and federal permits, were successful in maintaining lagoon elevations above the minimum target of four feet through August 7, 2009; approximately three weeks longer than in the prior year. Lagoon levels peaked on approximately June 14-15, 2009 at over 8.5 feet, then gradually declined to approximately 3.75 feet by August 12, 2009. Inflow to the lagoon ceased on July 25, 2009.

During the current RY, the lagoon's water volume gradually declined throughout the summer and fall of 2009, from mid-June through the end of August. Water levels rose slightly to 4 feet on August 30, and then to over 5.5 feet on September 11, 2009 due to saltwater wave over-wash. Lagoon levels then again slowly dropped to 4 feet by October 12, 2009. Continuous Carmel River main-stem flow reached the lagoon earlier than normal on October 13, 2009, rising to a daily mean of 682 cubic feet per second (cfs) at the MPWMD Highway 1 stream flow gage on October 14, 2009. River inflow raised the lagoon water elevation to over 10.5 feet on October 14, 2009 when the beach was mechanically breached by the MCDPW. Subsequently, the lagoon elevation fluctuated between 2.5 – 5 feet with the daily tidal cycle, reaching a daily minimum of approximately 1.5 feet on October 16, 2009.

After the initial early storm in October, though continuous flow was sustained to the lagoon, it closed again on October 20, 2009 with inflow at 33 cfs. There was not another storm sufficient to keep the lagoon open until December 13, 2009, when flows reached 163 cfs at the MPWMD Highway 1 Gage. From October 20, 2009, through the lagoon's next continuous reopening cycle beginning December 13, 2009, flows at the MPWMD Highway 1 Gage declined to a low of 10 cfs on November 5, 2009, then fluctuated between 10-13 cfs for all of November and early December. Even at these low flows, lagoon volumes still increased enough to raise lagoon elevations to a point where they threatened lagoon-side homes, and MCPWD breached the lagoon artificially three more times on November 7, December 7, and December 13, 2009. In between the succeeding smaller early winter storms, MCPWD breached the lagoon three more times on December 28 and 31, 2009 and January 12, 2010, until the lagoon remained open naturally, for the remainder of the RY.

Flows at the MPWMD Highway 1 Gage peaked with the third major winter storm to the mean daily high flow for the water year of 2,070 cfs by January 20, 2010, then fluctuated between 160 to 848 cfs with succeeding smaller storms in February through April 2010. Flows then steadily declined from May through July, to 23 cfs on July 12, 2010, when CDPR closed the lagoon.

Despite the early lagoon opening in mid-October 2009, declining river flows and winter ocean wave action built up the beach, closed the lagoon for more than 24 hours on eight occasions from mid-October 2009 to mid-January 2010, totaling approximately 61 of 91 days or 67% of the time during those three months. Then the lagoon was open for all but 2 days or 99% of the time for the 181 days between January 12 and July 12, 2010.

District staff continues to facilitate the CRL-TAC meetings, with the District General Manager as chair and the District Engineer, Senior Water Resources Engineer, and Senior Fisheries Biologist as staff support. The CRL-TAC meets as needed concerning management of the Carmel River lagoon and beach. The CRL-TAC met once between July 1, 2009 and June 30, 2010, and again on the first day of the next RY.
The District General Manager continued to work with other local agency managers and community representatives to pursue State funding to implement *Final Study Plan for the Long-Term Adaptive Management of the Carmel River State Beach and Lagoon* (April 17, 2007), but no applicable source of funding was found during this RY.

In April 2008, the Monterey County Water Resources Agency (MCWRA) suspended its work with CDPR to develop a draft *Interim Adaptive Management Plan* for flood-prevention management of the beach's sandbar at the Carmel River Lagoon, pending the outcome of potential litigation under the Federal Endangered Species Act. It was intended that the Interim Adaptive Management Plan would serve as the basis for a joint CDFG Stream Bed Alteration Agreement Application by CDPR and MCWRA for the annual breaching and re-closure of the lagoon, and eventually lead to a U.S. Army Corps of Engineers permit which would include ESA Section 7 consultations with the NMFS and USFWS. The MCWRA continues to seek the funding necessary to develop the information needed to pursue their own separate permit application for lagoon breaching. However, during the last RY, CDPR finalized its *Mitigated Negative Declaration for the Carmel River Lagoon Water Elevation Adaptive Management*, and acquired separate state and federal permits for the closure of the lagoon in the spring to maximize habitat volume.

B. Expand Long-Term Monitoring Program

Description and Purpose

Long-term monitoring of the lagoon and its associated plant communities provides data that can be used to evaluate the wetlands' response to groundwater pumping. The purpose of the monitoring is to: (1) determine if changes in hydrology or plant species distribution and coverage are occurring due to the removal of groundwater upstream, and (2) implement additional mitigations if pumping-induced changes to hydrologic characteristics or vegetation are identified. The Mitigation Program calls for extensive studies such as vegetation mapping and soil surveys to occur every five years. In practice, lagoon vegetation has been monitored annually from 1995 through 2005, and every other year thereafter. Saturation-paste conductivity of soils in the vicinity of the vegetation-monitoring stations was measured annually from 1995 through 2004. Wildlife surveys and bathymetric surveys continue to be conducted each year.

Implementation and Activities during 2009-2010

The District conducted three types of long-term monitoring during this period:

- Vegetation Surveys
- Topographic Surveys and hydrology
- Wildlife Surveys

● **Vegetation Monitoring –** In July 2009, the District re-occupied monitoring stations that had been sampled annually between 1995 and 2005. After this period, monitoring continued every other year, so the District did not conduct vegetation surveys in the wetlands in 2006, 2008, or 2010. The Allocation EIR only called for this monitoring to occur every two years.

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

Dramatic changes in vegetation were not observed between the summers of 1995 and 2009. Subtle differences in vegetative cover between years may be explained by slightly different sampling dates each year, made necessary by variations in the hydrologic regime from one year to the next, rendering some low-lying quadrats inaccessible until later in the season. The timing, magnitude and direction of wave action, runoff, and breaching of the sand bar at the mouth of the lagoon affect the duration of standing water in some of the lower-lying monitoring sites.

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

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

- **Wildlife Monitoring –** District staff contracted with the Ventana Wilderness Society and Big Sur Ornithology Lab (BSOL) to conduct avian studies in the riparian corridor of the Carmel River at sites from Carmel Valley Village to a point just upstream of the lagoon (Section X-C). One of the concluding recommendations of the November 1995 Habitat Restoration Group report was for the District to conduct more wildlife monitoring around the lagoon. The BSOL will continue the avian monitoring around the lagoon initiated in 1997 by Dr. David Mullen under contract to the District.

In 1997, Dr. Mullen calculated the "Species Diversity Index" of the avifauna in the wetlands north of the lagoon, along transects established in 1996. The project was envisioned to track possible changes in the utilization of this area by birds. Birds are often used as indicators of the suitability of an area for wildlife because they tend to be easier to identify and count than other creatures. By tracking the species diversity index at a specific location over time, scientists are able to infer if changes have occurred that may affect the area's dependent wildlife. The specific methods and results of the BSOL surveys are presented in annual reports to the District. The last one which covered sampling sites near the lagoon at the mouth of the Carmel River was for summer 2004. Sampling in the vicinity of the lagoon from there on was carried out by the California State Department of Parks and Recreation. Their results for summer 2007 are included in a separate report: Scullen, J. and N. Thorngate, December, 2007, *Carmel River Lagoon Avian Monitoring Program Report*, available from the District. In 2008 California State Department of Parks and Recreation ceased monitoring avian species in the lagoon area because of budget constraints. However, the District has Species Diversity Index numbers for an area in the Carmel River main-stem just west of Highway One from 1993 to present. These numbers are derived from a point count census that started with Dr. Mullen and is currently carried out by the BSOL. The current results for spring of 2010, show that Species Diversity near the lagoon, is slightly below the 18 year average.

Special Studies during 2009-2010

- **Steelhead Population Monitoring**

MPWMD applied for and acquired ESA Section 10 coverage for 2009 to conduct a mark-recapture study as part of its semi-annual renewal of staff Scientific Collecting Permits from CDFG. This will have to be renewed annually, and was for 2010. No pre-breaching population census was conducted this year in late November or early December, since the lagoon was breached on October 12, 2009 before a study could be conducted. The planned post-lagoon closure study in June was also not conducted due to the lagoon remaining open both to the ocean and connected to the river until after the end of the RY. An accurate mark-recapture population census of juvenile fish cannot be conducted when the lagoon is not an isolated body of water, and fish can move in and out of the lagoon freely.

C. Identify Feasible Alternatives to Maintain Adequate Lagoon Volume

Description and Purpose

The purpose of this mitigation measure is to determine the volume required to keep the lagoon in a stable condition that can adequately support plants and wildlife. It is envisioned that alternative means to achieve and maintain the desired volume will be compared, and the most cost-effective means selected. One alternative that may achieve these goals is the development of a water supply project that can reliably provide more water to the Monterey Peninsula and result in reduced diversions from the Carmel River; however, few other feasible alternatives have been identified. MPWMD staff previously estimated that approximately eight cfs, or about 16 acre feet per day (AFD), can percolate through the barrier beach when the outlet is closed and lagoon water levels are stable at relatively high elevations (8 – 9 feet). This seepage rate was determined utilizing continuous streamflow data from the Carmel River at Highway 1 Bridge gaging station and the existing (1997) lagoon stage volume relationship over the 1991-2005 period. However, in May and June 2009, following the manual lagoon mouth closure on May 18, 2009, streamflow and lagoon storage data showed that 12 cfs or 24 AFD percolated through the beach berm and into the surrounding wetlands (based on an updated 2007 lagoon storage table). It is postulated that increased infiltration capacity of the lagoon may be due to a combination of the excavation of an outlet channel to the south, the two South Arm excavations in 2004 and 2007, and that the manual lagoon mouth closure results in a higher water surface elevation than was typical of the 1991-2005 period. A higher water surface elevation likely results in flow through the outlet channel that then percolates into the beach. This volume of water passing through the beach is significant, and is equivalent to about two-thirds of the daily Carmel River diversions needed to meet a portion of the municipal demand of the Monterey Peninsula during the summer. Beginning in the summer of 2004, the addition of treated water from the Carmel Area Wastewater District was implemented on a seasonal basis, and some water from an existing agricultural well was also added. There were concerns about the effects these water sources could have on water quality and quantity in the lagoon that might affect both juvenile steelhead and red-legged frog habitat values (see Section XI-A of this chapter). Determination of desirable lagoon volume is conducted in conjunction with the monitoring studies noted above and the findings of the Lagoon Enhancement Plan. Development of alternative means to provide adequate volume will consider the implementation of the selected alternative in the final Lagoon Enhancement Plan.

In December 2009, CAWD estimated that a total of about $2.5 million would be needed to complete a project to augment lagoon volume from CAWD treatment plant water. Approximately 300 acre-feet per year could be made available. CAWD applied to the CDFG Fisheries Restoration Grant Program in early 2010 for Settlement Agreement funds to study the feasibility and potential impacts from this project. CDFG subsequently awarded a grant to CAWD and feasibility studies are expected to start in 2011.

Implementation and Activities during 2009-2010

District staff continued the annual survey of four key lagoon cross sections (**Figure XI-1**) to track changes in the volume of sand in the active portion of the lagoon over time. An initial survey of the four cross sections was conducted in January 1988. Subsequent annual surveys

have been conducted beginning in September 1994 through the present. Sedimentation in the lagoon is a concern because the Carmel River as a whole has taken on an increased load of sand from Tularcitos Creek and other drainages following the El Niño winter of 1998. Much of the sediment eventually washes into the main body of the lagoon, and subsequently some reaches the ocean. These four key cross sections provide a quantitative means to evaluate whether or not lagoon volume is changing significantly over time. The dynamic nature of the lagoon substrate is evident in **Figure XI-2**, which shows the results of the annual surveys conducted since 1994.

In September 2010, staff completed the annual surveys of cross sections (XS) 1-4. Close inspection of the September 2010 XS surveys indicated very little change in lagoon substrate elevation at the four XS from the previous year's surveys (September 2009) **(Figure XI-3)**. The unchanged substrate conditions from 2009 to 2010 may be related to the fact that peak streamflow into the lagoon only reached about 3,800 cfs or an average recurrence interval of two years (i.e., a two-year event), which is clearly not out of the ordinary. In other words, river energy was insufficient to mobilize sands within the lagoon. In addition, the Lower Carmel River (LCR) substrate now has much less sand and more gravel compared to pre-2006 conditions (based on qualitative field observation), therefore it is possible that at this time there is much less sand available to accumulate within the lagoon. **Figure XI-2** shows that the September 2010 lagoon substrate elevations for XS 1-3 are well within the range of previous surveys indicating no clear trend of either sand depletion or accumulation at the cross sections. However, XS 4 data indicate that the substrate elevation is close to the lowest ever since 1994. This is consistent with the steady loss of streambed material at the Highway 1 Bridge gaging station (and along reaches for several miles upstream) that has been occurring since 2006, suggesting a limited sand supply in the LCR at this time.

OBSERVED TRENDS, CONCLUSIONS AND/OR RECOMMENDATIONS:

The District continues to support and encourage the ongoing habitat restoration efforts in the wetlands and riparian areas surrounding the Carmel River Lagoon. These efforts are consistent with goals that were identified in the Carmel River Lagoon Enhancement Plan, which was partially funded by the District. The District continues to work with various agencies and landowners to implement ongoing restoration of the Odello West property and future restoration of the Odello East property across the highway. Because of the restoration activities on the south side of the lagoon, the District has concentrated its monitoring efforts on the relatively undisturbed north side. Staff have also attended meetings and had discussions with other agencies regarding the ongoing use of an existing CDPR agricultural well and potential future use of 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 change the size or ecological character of the wetlands. Demonstrable changes have not been identified. Because of the complexity of the estuarine system, a variety of parameters are monitored, including vegetative cover in transects and quadrats, water conductivity, and hydrology. It is notable that due to the number of factors affecting this system, it would be premature to attribute any observed changes solely to groundwater pumping. During the past 15-year period, for example, there have been two Extremely Wet (1995, 1998), two Wet (2005,

2006), and four Above Normal Water Year types (1996, 1997, 2000, 2010), in terms of total annual runoff. Thus, the hydrology of the watershed has been wetter than average two thirds of the time in recent years. 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 and are necessary to answer to questions concerning whether or not the lagoon is filling up with sand, thus losing valuable habitat. As indicated in the survey plots, the sandy bed of the lagoon can vary significantly from year to year. In general, no major trends indicating sand accumulation or depletion at the lagoon cross sections have been identified based on available data, with the exception of the upstream-most cross section number 4, which exhibits an overall loss in sand volume over the 1994-2010 period.

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

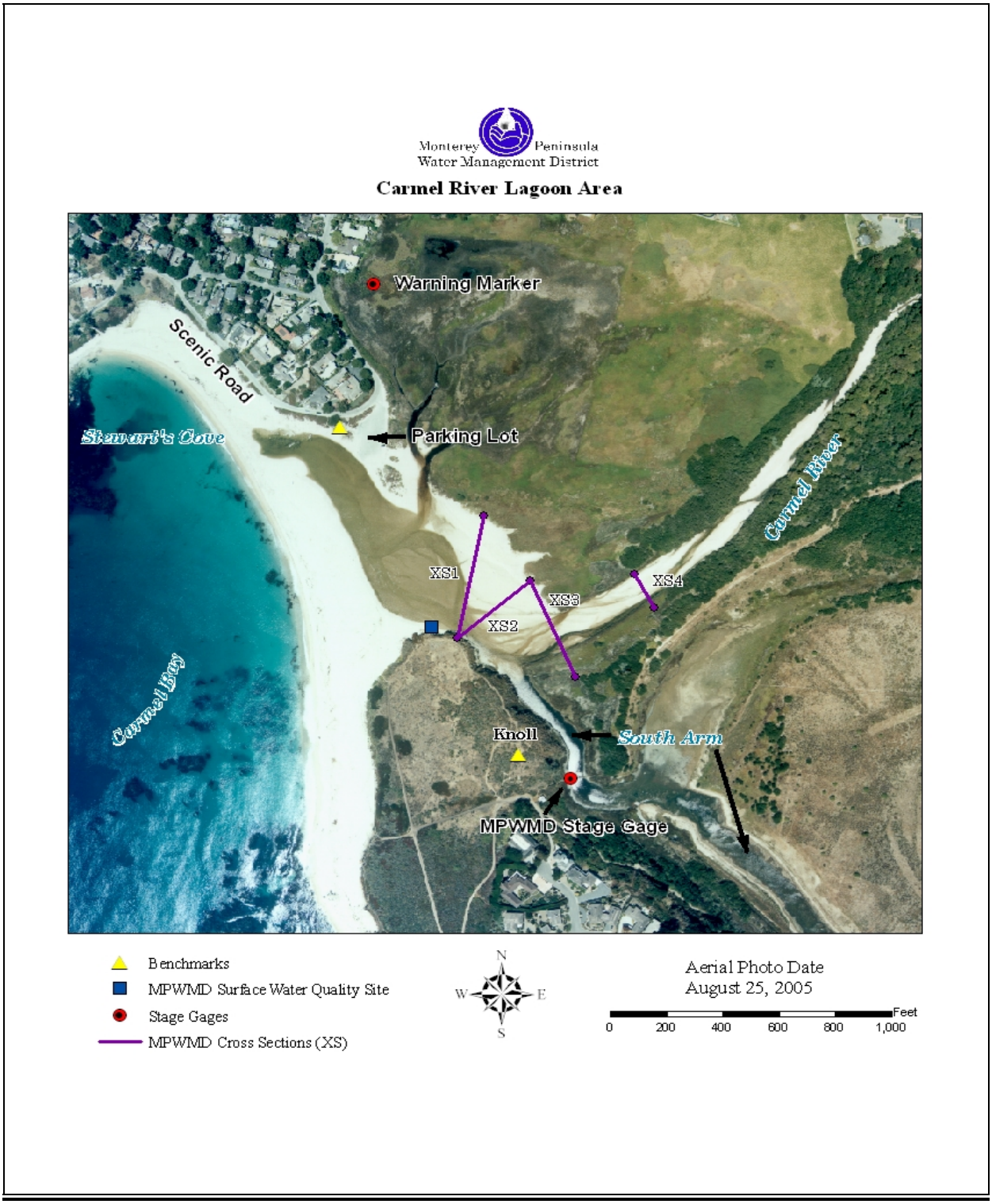

Figure XI-2
Carmel River Lagoon Cross Sections 1 through 4, based on Annual Surveys over the 1994-2010

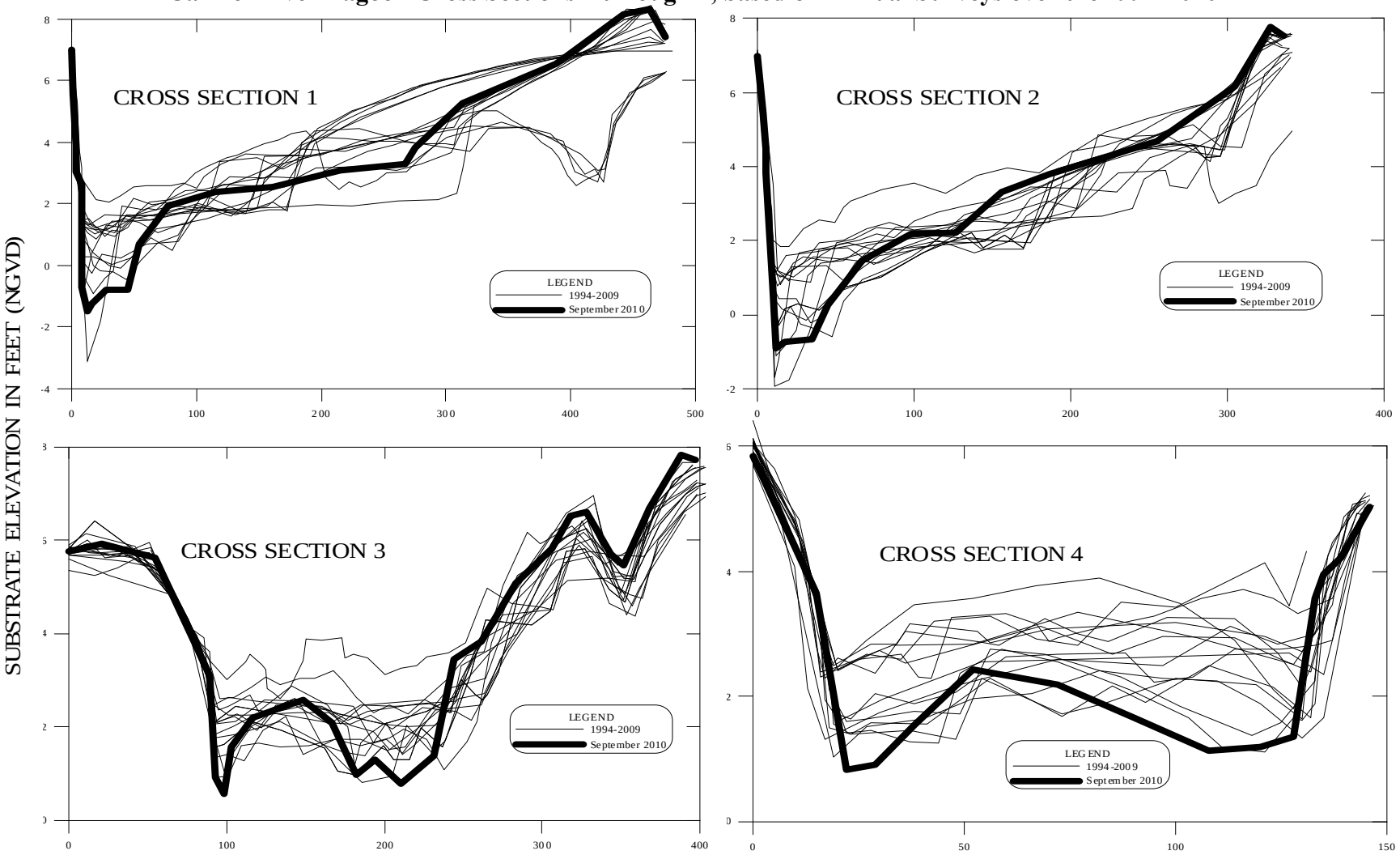

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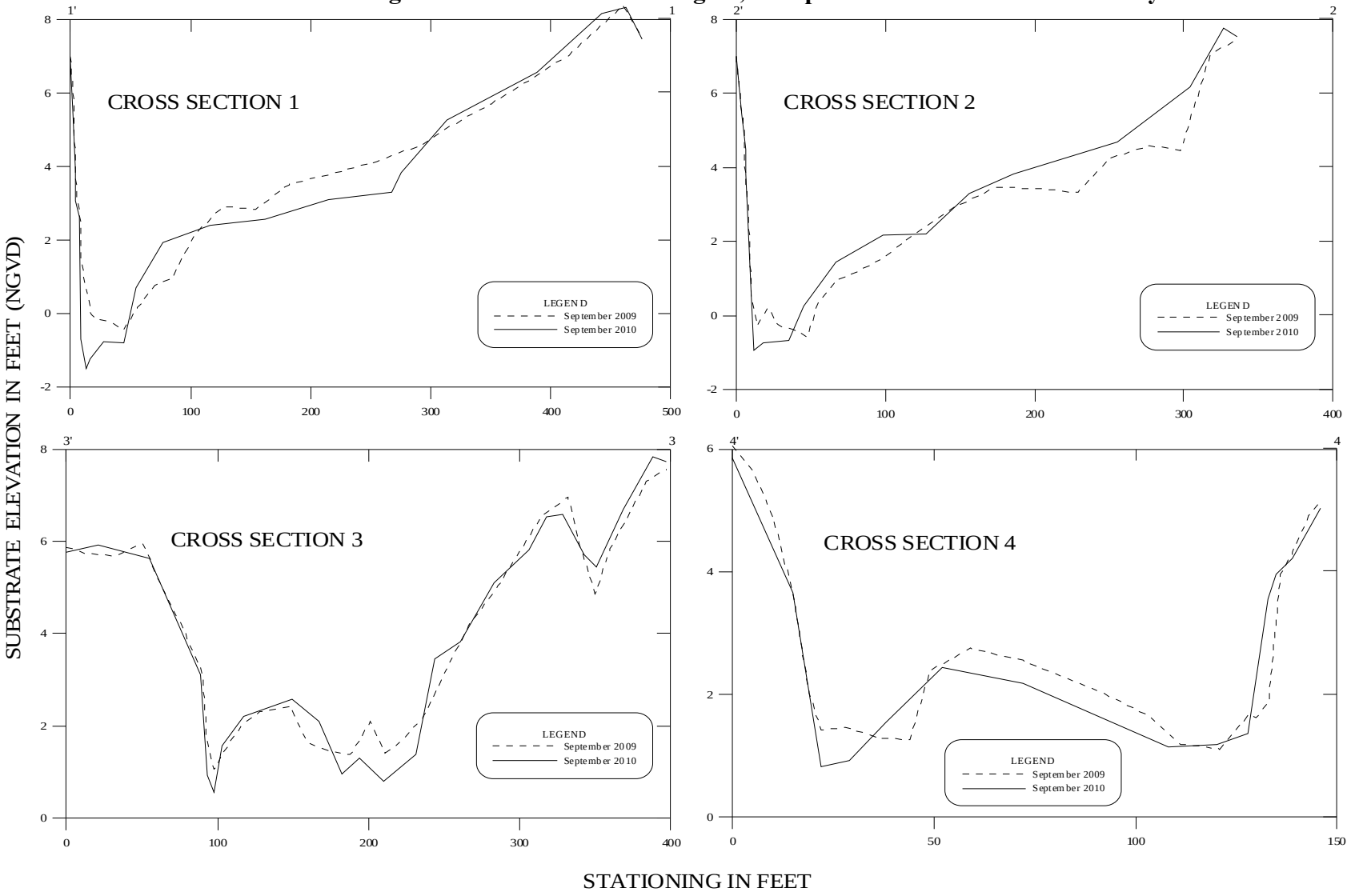
Figure XI-3
Carmel River Lagoon Cross Sections 1 through 4, Comparison of 2009 and 2010 Surveys



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XII. AESTHETIC MITIGATION MEASURES

The Findings for Adoption of the Water Allocation Program Final EIR identified one mitigation measure to reduce aesthetic impacts along the Carmel River associated with riparian vegetation -- to implement the riparian-habitat mitigation measures described above in Section X (Finding No. 393). Refer to Section X for information on riparian mitigation activities in the period July 2009 through June 2010.

XIII. SUMMARY OF COSTS FOR MITIGATION PROGRAM, JULY 2009 THROUGH JUNE 2010

Table XIII-1 summarizes the costs for hydrologic monitoring, biological mitigations (fish, riparian and lagoon), water-supply augmentation and integrated regional groundwater management activities for the Fiscal Year July 1, 2009 through June 30, 2010. The table also includes general administrative costs (e.g., rent, utilities, services and supplies) and capital asset expenditures incurred by the District and allocated to the Mitigation Program according to its proportional share of staff effort on mitigation activities.

Revenues for the Mitigation Program originate mostly from a user fee on the water bills of California American Water (CAW) and Seaside Municipal Water System customers. This fee originated in May 1991 when the Board established a user fee of 2.99 percent. The fee was increased to 4.765 percent effective October 1, 1991. Beginning in July 1993, activities of the Carmel River Management Program were included in the Mitigation Program and the separate user fees were combined for a total of 6.015 percent of the water bill. The fee was increased to 7.215 percent for only the customers of CAW in October 2005, to provide funds to expand the District's Aquifer Storage & Recovery Project. The rate remained at 6.015 percent for Seaside Municipal Water System (SMWS) customers.

During Fiscal Year 2009-10, revenues totaled $3,074,501, including user fee revenues of $2,491,569. Other revenue sources for the Mitigation Program included $417,497 in tax revenues, $100,236 in reimbursements, $55,911 in permit fees, interest earnings of $5,203 on the Mitigation Program Fund Balance and $4,085 of miscellaneous revenues. Out of the total reimbursements of $100,326, $98,886 was received from California American Water. This consisted of $91,886 for Aquifer Storage and Recovery operation and maintenance costs and $7,000 for operations and maintenance of irrigation systems. The Mitigation Program Fund Balance as of June 30, 2010 was $1,012,706.

The annual amount spent on mitigation efforts varies from year-to-year due to variances in project activities and because several mitigation measures are highly dependent on weather. Expenditures in Fiscal Year 2009-10 were $418,763 more than the prior fiscal year largely due to increased capital expenditures for ASR.

Table XIII-1

Mitigation Program Cost Breakdown for the Period July 2009 through June 2010

EXPENDITURES	Data Collection	Riparian	Fish	Lagoon	Water Supply	IRGWMP	Admin	Total
Personnel Costs	$246,037	$252,035	$337,002	$140,279	$239,967	$15,050	$546,424	$1,776,794
Operating Expenses	59,411	60,859	81,377	33,873	57,945	3,634	131,946	429,045
Project Expenses	49,418	21,826	83,653	0	885,802	0	5,450	1,046,149
Fixed Asset Acquisitions	3,675	2,241	2,996	1,247	2,133	134	4,858	17,284
TOTAL EXPENDITURES	**$358,541**	**$336,961**	**$505,028**	**$175,399**	**$1,185,847**	**$18,818**	**$688,678**	**$3,269,272**
REVENUES								
Permit Fees								$55,911
User Fees								2,491,569
Reimbursements								100,236
Tax Revenues								417,497
Interest Revenues								5,203
Miscellaneous								4,085
TOTAL REVENUE								**$3,074,501**
REVENUE OVER EXPENDITURES								**($194,771)**

This Report does not include the Rebate Program, salaries for the Conservation Office Staff or the project expenditures for "Ordinance Enforcement" even though they were booked as part of the Mitigation Program.

XIV. REFERENCES

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