MONTEREY PENINSULA
WATER MANAGEMENT DISTRICT

2008-2009 ANNUAL REPORT
(July 1, 2008 - June 30, 2009)

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
September 2010

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September 2010

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MONTEREY PENINSULA WATER MANAGEMENT DISTRICT
September 2010

I. INTRODUCTION AND BACKGROUND:

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

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 2008-2009 Annual Report for the MPWMD Mitigation Program responds to these requirements, and is the seventeenth 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 2008-2009 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 2008-09 (July 1, 2008 through June 30, 2009, 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 2008-09 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 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 increased bird diversity in MPWMD restoration project areas compared to control areas; fewer miles of dry river in summer and fall than in the past; and higher water tables in the Carmel Valley alluvial aquifer at the end of 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 14 out of 18 years. Actions by federal resource agencies under the Endangered Species Act (ESA) or the SWRCB under its Order WR 95-10 have provided strong incentive for CAW and other local water producers to examine and amend water production practices to the degree feasible, and for the community to reduce water use. Except for one year in 1997, the community has complied with the production limits imposed on CAW by the SWRCB since Order 95-10 became effective in July 1995.

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

Water Resources 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 2009, 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 unilaterally proposed a dam seismic strengthening program. State and federal environmental agencies urged CAW to reconsider their position and urged CAW to consider the dam removal and river reroute option.

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

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

To address this storage depletion trend, the District initiated efforts in the 2000-2001 timeframe to prepare a Seaside Basin Groundwater Management Plan in compliance with protocols set by the State of California (AB 3030, as amended by SB 1938). This process was superseded by litigation filed by CAW on August 14, 2003, requesting a court adjudication of water production and storage rights in the Seaside Basin. The District participated in all litigation proceedings as an intervening "interested party". The Superior Court held hearings in December 2005 and issued a final adjudication decision in March 2006, 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. 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 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 2008-2009 included: (1) development of the permanent Phase 1 ASR Project at the Santa Margarita site as well as future expanded ASR projects; (2) continued operation of the existing full-scale Santa Margarita ASR-1 Well; (3) pursuit of water rights from the SWRCB for Phase 2 of the ASR project; (4) completion of a dual-well injection test 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 action and facilities to enable expanded ASR; and (7) 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 in 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 recovered from remnant levels that prevailed as a result of the last drought and past water supply practices. Since 1992, the spawning population has recovered from a handful of fish to levels approaching 900 adults per year as counted at San Clemente Dam. In the past nine years, the spawning population has generally trended downward, from 804 fish in 2001 to a recent low of 222 fish in 2007, back up to 413 in 2008, and down to 95 in 2009. Monitoring of the juvenile population at several sites along the mainstem Carmel River below Los Padres Dam shows that the population is recovering from low densities during the 1987-91 drought period (ranging below 0.50 fish per foot [fpf] of stream) to levels mostly above 1.00 fpf, values that are typical of well-stocked steelhead streams. In the 2008-2009 reporting period, the average population density was 64% above the long-term average for the Carmel River, partially due to the higher adult returns in 2008. 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;

- District and the SWRCB rules to actively manage the rate and distribution of groundwater extractions and direct surface diversions within the basin;

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

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

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

- Extensive rescues (and rearing) by MPWMD of juvenile steelhead over 20 years, now totaling 275,495 through 2009 rescue season; and by the transplantation of the younger juveniles to viable habitat below Los Padres Dam, and of older smolts to the lagoon or ocean; and

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

Though overall populations are improved since the inception of the Mitigation Program in 1990, District staff has noticed a period of overall decline in the adult run from 2001 to 2009, even though the juvenile population density has increased or fluctuated within a "normal" range. Even though, the 2008 adult run was the highest count since the 2003 run of 483 fish and nearly double the low 2007 count of 222 fish, the run again declined to only 95 fish in 2009. As previously reported, the reasons for the period of decline in adult returns remain unclear, but may be related to a combination of controlling and limiting factors including:

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

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

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

- Adult migration barriers such as the Old Carmel River Dam;

- Juvenile migration barriers such as the Los Padres Dam Spillway;

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

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

- Poor ocean conditions; and

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

A recent challenge that may remain for some years is the potential effects of substantive physical and operational changes to San Clemente Dam required by the California Department of Water Resources, Division of Safety of Dams (DWR/DSOD), including possible removal of the dam. The most significant issue is the effect of released sediment from the reservoir on downstream river habitat, proper functioning of MPWMD's Sleepy Hollow Steelhead Rearing Facility, and downstream property owners (flood elevations). Major changes include:

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

In addition, improvements in State and Federal permit conditions in 2006 have extended by two weeks, until at least May 1 of each year, the time that the reservoir will remain full and that the fish ladder can operate to pass adult steelhead upstream. This improvement over past standards may result in allowing up to a dozen or more adult steelhead each year to pass San Clemente Dam under the revised draw-down regimen.

District staff continues to provide technical expertise and scientific data to CAW engineers and environmental consultants, DWR/DSOD, CDFG, National Marine Fisheries Service (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 the California Department of Parks and Recreation, Monterey County Water Resources Agency, Monterey County Public Works Department, California Coastal Commission, U. S. Army Corps of Engineers, and Carmel Area Wastewater District, other regulatory agencies and stakeholders involved in the management of the Carmel River Lagoon and barrier beach.

Riparian 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 impacted by increased groundwater extraction. In this reach, only irrigated areas are able to sustain a diversity of plant species. Plant stress in the late summer and fall is evident in non-irrigated portions of the 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 September 30 (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) and 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 shown some of the highest diversity since monitoring began in 1992, indicating that the District mitigation program is preserving and improving riparian habitat.

Integrated Regional Water Management Plan

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 restoration of the Odello West property and the Odello East property across Highway 1. Because of the restoration activities on the south side of the lagoon, the District has concentrated its monitoring efforts on the relatively undisturbed north side. District staff have also continued to attend meetings and hold discussions with other agencies regarding the use of an old agricultural well and treated water from the Carmel Area Wastewater District to augment the lagoon during periods of low water.

The District expanded its long-term monitoring around the lagoon in 1995 in an attempt to determine if the reduction in freshwater flows due to ground water pumping upstream might be changing the size or ecological character of the wetlands. Demonstrable changes have not been identified. Because of the complexity of the estuarine system, a variety of parameters are monitored, including vegetative cover in transects and quadrats, water conductivity, and hydrology. It is notable that due to the number of factors affecting this system, it would be premature to attribute any observed changes solely to groundwater pumping. During this period, for example, there have been four extremely wet water years (1995, 1998, 2005, and 2006), three wet water years (1996, 1997, and 2000), and two above-normal water years (1999 and 2003), in

terms of runoff. Other natural factors that affect the wetlands include introduction of salt water into the system as waves overtop the sandbar in autumn and winter, tidal fluctuations, and long-term global climatic change. When the District initiated the long-term lagoon monitoring component of the Mitigation Program, it was with the understanding that it would be necessary to gather data for an extended period in order to draw conclusions about well draw-down effects on wetland dynamics. It is recommended that the annual vegetation, conductivity, topographical and wildlife monitoring be continued in order to provide a robust data set for continued analysis of potential changes around the lagoon.

In April 2008, the Monterey County Water Resources Agency (MCWRA) confirmed that it had suspended its work with California State Department of Parks and Recreation (CDPR) to develop a draft *Interim Adaptive Management Plan* for the annual flood-prevention management of the beach's sandbar at the Carmel River Lagoon, pending the outcome of potential litigation by the Carmel River Steelhead Association and the Sierra Club under the Federal Endangered Species Act. The MCWRA continues to seek the funding necessary to develop the information needed to pursue permit application and review. CDPR continued work on its own towards acquiring permits for the closure of the lagoon in the spring to maximize habitat volume, by producing a second draft of an *Initial Study – Mitigated Negative Declaration for the Carmel River Lagoon Water Elevation Adaptive Management Project* in April 2008 for interagency review by the CRL-TAC. CDPR circulated a final draft for public review and comment on July 16, 2008. During this reporting year, CDPR finalized the document and acquired permits for the closure of the lagoon in spring to maximize habitat.

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. As indicated in the survey plots, the sandy bed of the lagoon can vary significantly from year to year. In September 2009, staff completed the annual surveys of cross sections (XS) 1-4. Close inspection of the September 2009 XS surveys indicated very little change in lagoon substrate elevation at the four XS from the previous year's surveys (August 2008). The unchanged substrate conditions from 2008 to 2009 may be related to the fact that peak streamflow into the lagoon only reached about 2,500 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 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.

Program Costs (Section XIII)

Mitigation Program costs for FY 2008-09 totaled approximately $2.85 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 fiscal year 2008-09 were approximately $821,487 less than the prior fiscal year. 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 expenditure total to over $2.6 million that year. More recently,

expenditures continue to trend upward: FY 2005-06 expenditures were $3.17 million; and FY 2006-07 expenditures were $3.29 million. The expenditures exceeded revenues in FY 2005-06 by $423,292; the expenditures exceeded revenues in FY 2006-07 by $93,399, and for this fiscal year revenues exceeded expenditures by $445,526.

During fiscal year 2008-09, revenues totaled $3.29 million including user fee revenues, tax revenues, reimbursements, interest, grants and minor miscellaneous revenues. The Mitigation Program Fund Balance as of June 30, 2009 was $1,284,554.

Table I-1

SUMMARY OF COMPONENTS OF MPWMD MITIGATION PROGRAM
July 1, 2008 – June 30, 2009

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 Mitigation Program Accomplishments in 2008-2009

MITIGATION ACTION	MAJOR ACCOMPLISHMENTS IN FY 2008-09
Monitor Water Resources	Regularly tracked precipitation, streamflow, surface and ground water 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 1,524 properties, which save an estimated 3.918 acre-feet of water per year (AFY) through required retrofits; approved retrofit refunds for 988 applications, saving an estimated 20.553 AFY; provided water credit incentives for 344 applicants; 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 the expansion of the Cal-Am System to provide service and water use permits for Sand City. Processed 975 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 2009.
Augment Water Supply	Long-term efforts to augment supply included: (1) Continued participation in the CPUC Division of Ratepayer Advocates' meetings to review alternatives to Cal-Am's Coastal Water Project; (2) Held a special workshops and committee meetings to review seven regional water supply projects including the Regional Plenary Oversight Group's proposal; (3) Participated in Division of Ratepayer's Advocates meetings regarding Cal-Am's Coastal Water Project; (4) Accepted a report from the Citizens Advisory Committee on the merits and drawbacks of seven local water supply projects; (5) Received an updated Matrix of Water Supply Alternatives comparing three

MITIGATION ACTION	MAJOR ACCOMPLISHMENTS IN FY 2008-09
	desalination projects based on an updated Water Supply Yield Target developed by both the TAC and PAC committees; (6) Requested and received an update from Cal-Am regarding the Coastal Water Project; (7) Prioritized water supply alternatives by directing staff to renew pursuit of the 8,400 AFY MPWMD 95-10 Project and prepare a constraints analysis; (8) Obtained the MPWMD's Board endorsement of the final draft of an MOU to form the Monterey Bay Regional Water Solutions Task Force; (9) Provided technical support to the Monterey Regional Water Pollution Control Agency for its Groundwater Replenishment Project; (10) Adopted a resolution in opposition to the State Water Resources Control Board's Draft Cease and Desist Order to further reduce CAW pumping, then lobbied and provided testimony to the SWRCB in support of the Board's opposition; (11) Implemented water rights permit from the SWRCB for Phase 1 of the Aquifer Storage and Recovery (ASR) project; (12) Conducted a dual-well injection test for ASR wells #1 and #2 and coordinated with Cal-Am, federal and state entities to construct the necessary infrastructure for the ASR project; (13) Coordinated with CAW on necessary action and facilities to enable expanded ASR; (14) Implemented an MOU with Cal-Am to operate the ASR facilities; (15) Coordinated with the SWRCB on the petition to change the MPWMD's water rights permit to serve Phase 2 of the ASR project. Near Term water supply efforts included injecting 182 AF into Seaside Basin in 2008-09 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 evaluating options for seismic safety and sediment management at San Clemente Dam.
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 95 adult fish passing San Clemente Dam; rescued 84,322 young steelhead from drying reaches of the Carmel River

MITIGATION ACTION	MAJOR ACCOMPLISHMENTS IN FY 2008-09
	in July-September 2008; stocked 46,635 fish total at Sleepy Hollow Steelhead Rearing Facility, with a 31% survival rate; modified and improved Facility physical plant; continued preparation of the Rescue and Rearing Management Plan for Facility in consultation with state and federal experts (Final Draft is expected to be completed in 2010); conducted annual juvenile fish population survey; conducted California Stream Bio-assessment Procedure (benthic invertebrate sampling at 6 stations); coordinated with CAW regarding operations to maximize fish habitat; helped restore Carmel River Lagoon water levels to ensure fish over-summer habitat; provided engineering expertise to Carmel River Steelhead Association for fish habitat enhancement project at Carmel River Lagoon; monitored lagoon water quality for fish.
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 2008-09
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 2009 (October 1, 2008 through September 30, 2009), are summarized below.

A. Precipitation Monitoring

Description and Purpose

During the period from October 1, 2008 through September 30, 2009, 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 conditions.

Implementation and Activities During 2008-2009

Work during this period involved continuing maintenance of the existing precipitation monitoring network. A summary of daily precipitation at San Clemente Dam during Water Year (WY) 2009 is shown in **Figure II-1**. In WY 2009, 18.14 inches of precipitation were recorded at San Clemente Dam. The average annual recorded precipitation at this site for the period from 1922 through 2009 is 21.34 inches, making rainfall in WY 2009 about 85 percent of average. **Figure II-2** shows a comparison of WY 2009 rainfall at San Clemente Dam and the average monthly rainfall at this site. As indicated in **Figure II-1**, more than half of the annual rainfall occurred during the February 5 through March 5 period. Other than February and March, all other monthly rainfall totals in WY 2009 were at or below average.

B. Streamflow Monitoring

Description and Purpose

Since its inception, the District has collected streamflow measurements at approximately 15 mainstem sites on the Carmel River and on 16 tributaries to the Carmel River. The District's principal streamflow measuring sites within the Carmel River Basin (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 18 continuous recording gaging stations.

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

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

Implementation and Activities During 2008-2009

During the 2008-2009 period, the District operated and maintained (O&M) 15 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:

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

Tributary/other
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

Continious 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 1992-2009 period, except for WY 2009 tributary sites which have yet to be computed. In addition, **Table II-1** includes annual flow values for the two USGS operated mainstem sites for the 1992-2009 period.

During the 2008-2009 period, District staff continued to maintain the existing streamflow monitoring network. Streamflow within the Carmel River Basin during WY 2009 was classified as "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 September 2009, staff completed the Carmel River Basin Surface Water Data Report – Water Years 2004 – 2008, the fourth volume in a series of four-year reports beginning in WY 1992. This District publication summarizes the results of the District's streamflow data collection activities over the above 5-year period. More specifically, the report summarizes computed mean daily streamflow, peak streamflow, instantaneous discharge measurements, as well as reservoir and lagoon levels/surveys at the associated 18 gage sites for each of five water years.

In 2009, staff continued to access seven of the 18 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 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 2009 within the Carmel River (CR) Basin was classified as "normal". The heaviest storm flow event of the year occurred on March 4, 2009. Peak streamflow along the Upper CR on March 4 reached 2,930 cubic feet per second (cfs) at the Carmel River at Don Juan Bridge gaging station (river mile 10.9), and 2,460 cfs along the Lower CR at the CR at Highway 1 Bridge station (river mile 1.1).

During WY 2009, 47,506 acre-feet (AF) of unimpaired runoff were estimated at San Clemente Dam. This total represents 69% of the average annual runoff (68,600 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 2008. This runoff provided streamflow to the ocean from February 16, 2009 through May 18, 2009, 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 became 37,662 acre-feet (AF) due to changes in the Los Padres Reservoir maximum usable storage from 1,478 to 1,626 AF. 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 2008-2009

At the end of September 2009, system storage totaled 27,180 AF or 72 percent of capacity. This total was approximately 96 percent of the 28,030 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 2008 – September 2009 period. Of the total storage at the end of September 2009, an estimated 1,050 AF were in Los Padres and San Clemente Reservoirs, 24,190 AF were in the Carmel Valley Alluvial Aquifer, and 1,940 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 2009. 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 and Seaside Groundwater Basins. The data collected as part of this program are used to support a variety of programs, including storage monitoring, compilation of annual and long-term well hydrographs, water table contour mapping, Carmel River Management Program, Seaside Basin Watermaster Program, and 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 2008-2009

- **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 20 feet between the beginning of February 2009 and the middle of March 2009, 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. Groundwater levels declined steadily from May through September 2009 in response to receding surface flows and increased groundwater pumping.

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 five 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, a seasonal rise in water level at the CAWD-Rio North well lags relative to the Rancho Cañada East monitor well, as can be seen in comparing **Figures II-6** and **II-7**. 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 2008-September 2009 period, the monitoring data indicated that groundwater storage in the Carmel Valley aquifer remained relatively full during the water year. In the river reach between San Clemente Dam and the Narrows (i.e., aquifer subunits 1 and 2), the lowest storage capacity estimate was 88% of capacity at the end of December 2008. 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 79% of capacity at the end of January 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 --** Monthly water level measurements were collected from 16 monitor wells in the Seaside Coastal Subareas, and four were monitored in the Seaside Inland Subareas. An additional 18 wells in the Seaside Inland and Laguna Seca Subareas were monitored on a semi-annual or quarterly schedule during the year.

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 CAW Paralta production well. 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 testing have not been sufficient to reverse the observed downward water-level trend. Additional information on the ASR testing program is available at the District office. Discussion of the District's 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 the Monterey County Consolidated Chemistry Laboratory in Salinas. 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 2008-2009

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 2008 and 2009, samples from six of the wells in the Seaside Basin monitoring network are collected 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 2009. 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 is 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 decreased noticeably in this well in 2009 after four straight years of increases. However, even the 2008 level did not approach the levels observed at this location in the early 1990's. These higher values observed early in the period of record at this site are at least partially attributable to the fact that there was no fresh water 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 was almost unchanged from 2006 to 2009 at well 16S/1W-13Lc, located at RM 0.65 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. Data for one well, 16S/1W-13Md, located at RM 0.31 were not collected in Fall 2009 due to high water in the Carmel River Lagoon preventing access to the well at the time. 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 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, and remained below 2004 levels in 2009 although it increased relative to 2008 levels. The high chloride concentration in well number 16S/1E-23La in Spring 1993 is anomalous. Staff will continue to track future results for trends.

- **Seaside Groundwater Basin --** Twelve monitor wells in the coastal subareas of the Seaside Basin were sampled in July and August 2009. This total includes two wells that were added to the monitor well network in 1997 and two that were added in 1999. 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. **Figure II-9d** shows specific conductance 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 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 and for determining the timing of fish rescues.

Since 1991, surface water quality data have been collected at three sampling stations along the Carmel River on a semi-monthly basis. The locations of the sampling stations are as follows: below Los Padres Reservoir at River Mile (RM) 25.4, below San Clemente Reservoir at the Sleepy Hollow Weir (RM 17.1), and at the Carmel River Lagoon (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 2008-2009

District staff carried out a semi-monthly surface water quality sampling program for the Reporting Year (RY) 2009 (July 1, 2008 to June 30, 2009); data were collected for the following chemical and physical parameters: 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--** Water temperature for the Carmel River Lagoon was sampled in the south arm of the lagoon on the Carmel Area Wastewater District (CAWD) sewer pipe. Water temperature for the South Arm Lagoon (SAL) station is shown in **Figure II-11**. Water temperature was collected in the south arm from November 7, 2008 to June 21, 2009. No data were collected from January 30, 2009 to May 22, 2009, and June 22, 2009 to June 30, 2009, due to a data logger malfunction. Maximum instantaneous water temperature was 72.4 degrees Fahrenheit (°F) occurring on June 10, 2009. Average water temperature

at this station during the sampling period was 56.6°F. Water quality data collected at this station are listed in **Table II-2**. Maximum water temperature during water quality sampling was 74.8°F occurring on August 21, 2008. The minimum dissolved oxygen measurement recorded was 7.7 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 8.5. Carbon dioxide measurements ranged from 5 to 25 mg/L. The upper end of the carbon dioxide readings observed was in the months of October and November 2008. This is usually caused by an increase of marine organic debris entering the lagoon during high surf events, which is typical during this time period. Carbon dioxide is a byproduct of decomposition of this material. Fish in waters with free carbon dioxide concentrations above 20 mg/L show signs of distress (Wedemeyer, 1996). The conductivity measurements ranged from 518 to 8,600 uS/cm. The surface salinity ranged from 0.1 to 4.8 ppt. The conductivity and salinity are highly variable at the lagoon due to tidal influences and river inflows. The turbidity measurements ranged from 0 to 9.5 NTU. Summertime water temperatures were within stressful ranges and probably decreased growth rates and survival capabilities. Steelhead likely searched for cold water refuges within the lagoon.

- **Garland Park--** Water temperature for the Garland Park (GAR) station is shown in **Figure II-12**. The maximum annual water temperature was 68.5°F occurring on July 10, 2008. Average water temperature during the reporting year at this station was 57.2°F. Maximum daily average water temperature was 64.0°F occurring on August 21, 2008. 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-13**. The maximum annual water temperature was 72.3°F occurring on July 10, 2008. Average water temperature during the reporting year at this station was 56.5°F. The maximum daily average water temperature was 69.1°F occurring on July 10, 2008. Average daily water temperatures over 68°F occurred 5 times, all in July 2008. This represents 1.4% of the time during the sampling period. Constant temperatures over 68°F are considered stressful for steelhead (Brungs and Jones, 1977). Water quality data collected at this station are listed in **Table II-3**. The minimum dissolved oxygen measurement recorded was 9.2 mg/L, which is within the suitable criteria recommended by the EPA for steelhead (Chapman, 1986). Carbon dioxide measurements ranged from 5-20 mg/L. The pH measurements ranged from 7.5 to 8.0. The conductivity measurements ranged from 165 to 377 uS/cm. The turbidity measurements recorded were between 0.2 to 8.6 NTU. None of the parameters measured were harmful to steelhead with the exception of high average water temperatures during the month of July 2008. The high average water temperatures were in the suboptimal range and considered stressful for rearing.

- **Above San Clemente Reservior--** Water temperature for the Above San Clemente (ASC) station is shown in **Figure II-14**. The sampling period for this station was July 1, 2008 to March 9, 2009. A large rain event caused high flows, moving the logger out of the water resulting in a loss of data from March 10, 2009 to June 30, 2009. The maximum annual water temperature was 73.2°F occurring on July 10, 2008. Average water temperature during the reporting period at this station was 54.5°F. Maximum daily average water temperature at this station was 69.4°F occurring on July 10, 2008. Average daily water temperatures over 68°F occurred 3 times, all in July 2008. This represents 0.8% of the time during the sampling period. These maximum daily average water temperatures were within suboptimal range and considered stressful for steelhead rearing. The rest of the reporting year water temperatures were within adequate rearing range.

- **Below Los Padres Reservoir--** Water temperature for the Below Los Padres (BLP) station is shown in **Figure II-15**. The maximum annual water temperature observed was 69.0°F occurring on September 26, 2008. Average water temperature observed at this station during the sampling period was 56.7°F. The maximum average water temperature at this station was 67.5°F on September 26, 2008. 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 7.2 mg/L, which is within the suitable criteria recommended by the EPA for steelhead (Chapman, 1986). Carbon dioxide measurements ranged from 5 to 25 mg/L. The pH and conductivity measurements ranged between 7.0 to 8.0 and 151 to 354 uS/cm, respectively. Turbidity measured at this station ranged from 0.0 to 9.1 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-16**. The maximum annual water temperature was 69.4°F occurring on July 10, 2008. Average water temperature during the reporting period was 53.7°F. Maximum daily average water temperature at this station was 66.9°F occurring on July 10, 2008. Daily average water temperatures were within adequate range for steelhead rearing during the entire reporting year.

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, 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 2008-2009

During the 2008-2009 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 February 2009 shown in **Figure II-17** illustrates the first lagoon opening of the 2008-2009 rainy season, on February 16, 2009. Prior to this event, the lagoon mouth was closed, and the Carmel River (CR) streambed upstream of the lagoon was completely dry. For the first time in WY 2009, CR mainstem flow reached the Highway 1 Bridge gaging station and the lagoon late on February 15, and the lagoon began to fill. Early on February 16, an outlet channel connecting the lagoon to the ocean was cut by bulldozers operated by the Monterey County Public Works Department. The lagoon level continued to rise through the morning hours even though a channel had been cut to the ocean, because initially, the inflow rate of approximately 700 cfs was greater that the outflow rate. Gradually, the outflow channel to the ocean widened and migrated several hundred feet south. It should be noted that at 11:00 am, street flooding was observed at the south end of River Park Place, as the high lagoon level entered the street. By 12:45 pm on February 16, the lagoon level began to recede after reaching a peak level of 10.36 feet, ending any threat of flooding along the north margin of the wetlands. As indicated in **Figure II-17**, lagoon inflows through the remainder of February 2009 were sufficient to maintain an outlet channel to the ocean and the lagoon mouth remained open, with lagoon levels responding to daily tidal fluctuations.

Figure II-1
San Clemente Reservoir Daily Rainfall: Water Year 2009

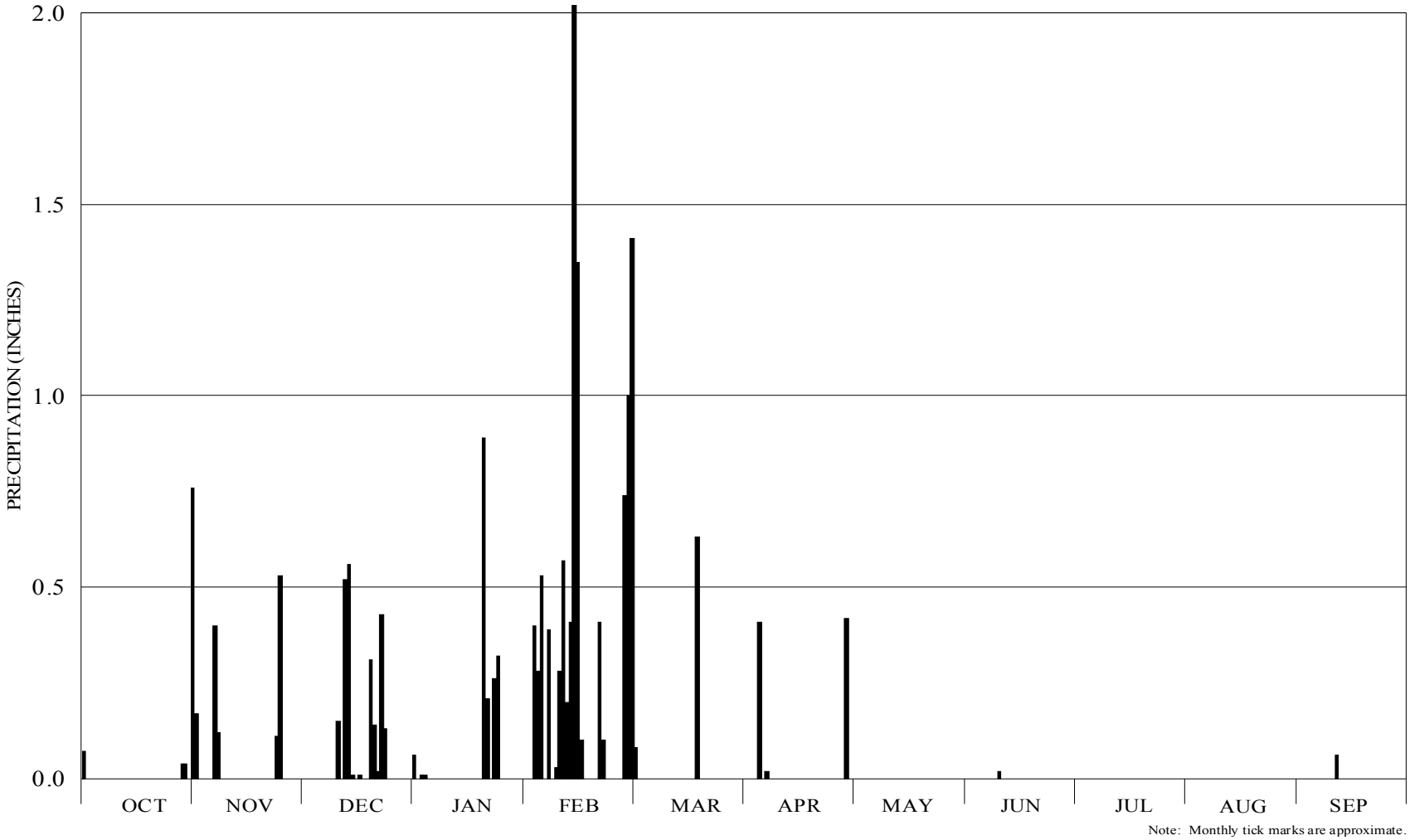


Figure II-2
Monthly Distribution of Rainfall at San Clemente Reservoir

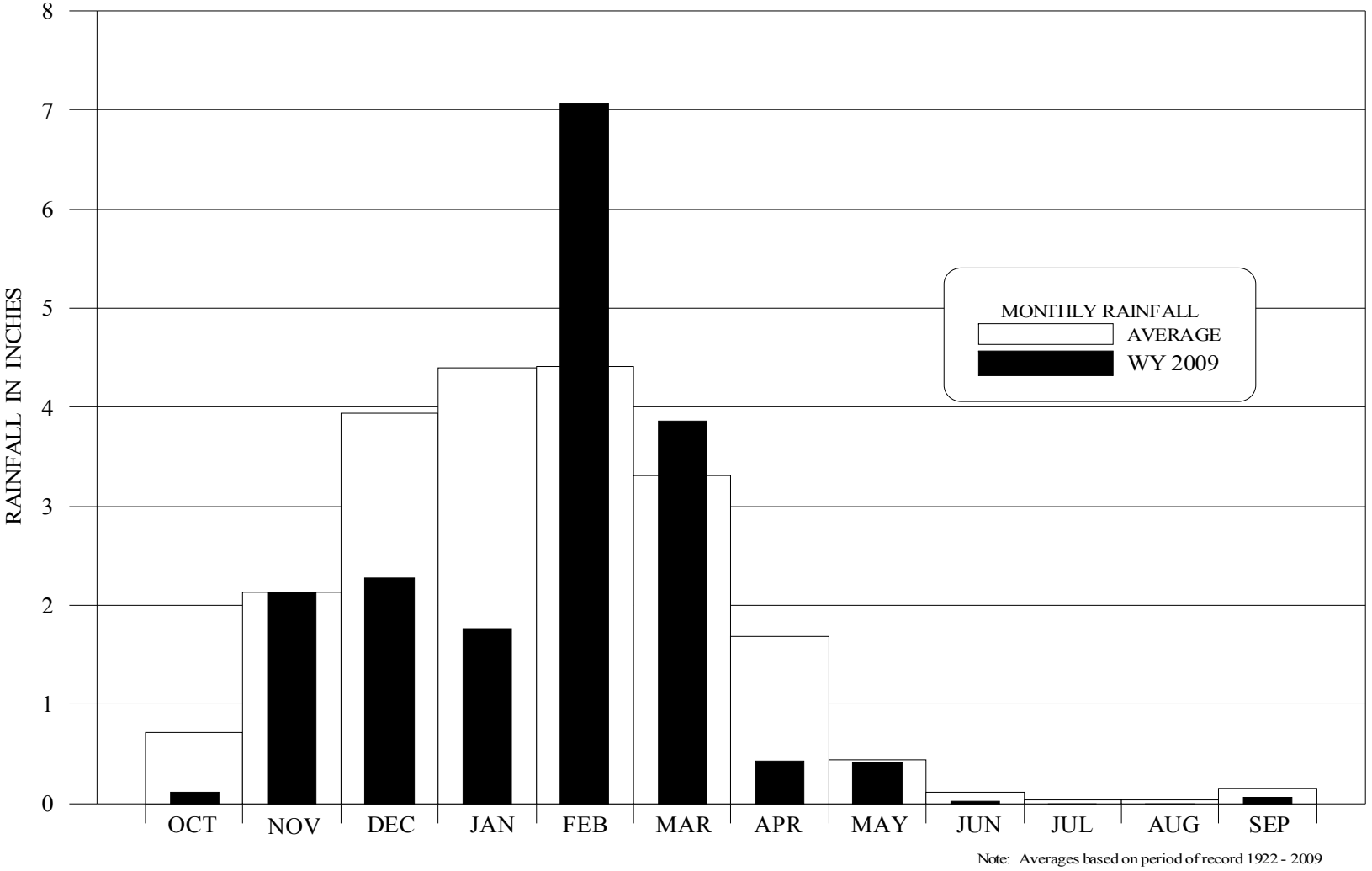


Figure II-3
Carmel River Basin Principal Streamflow Gaging Stations

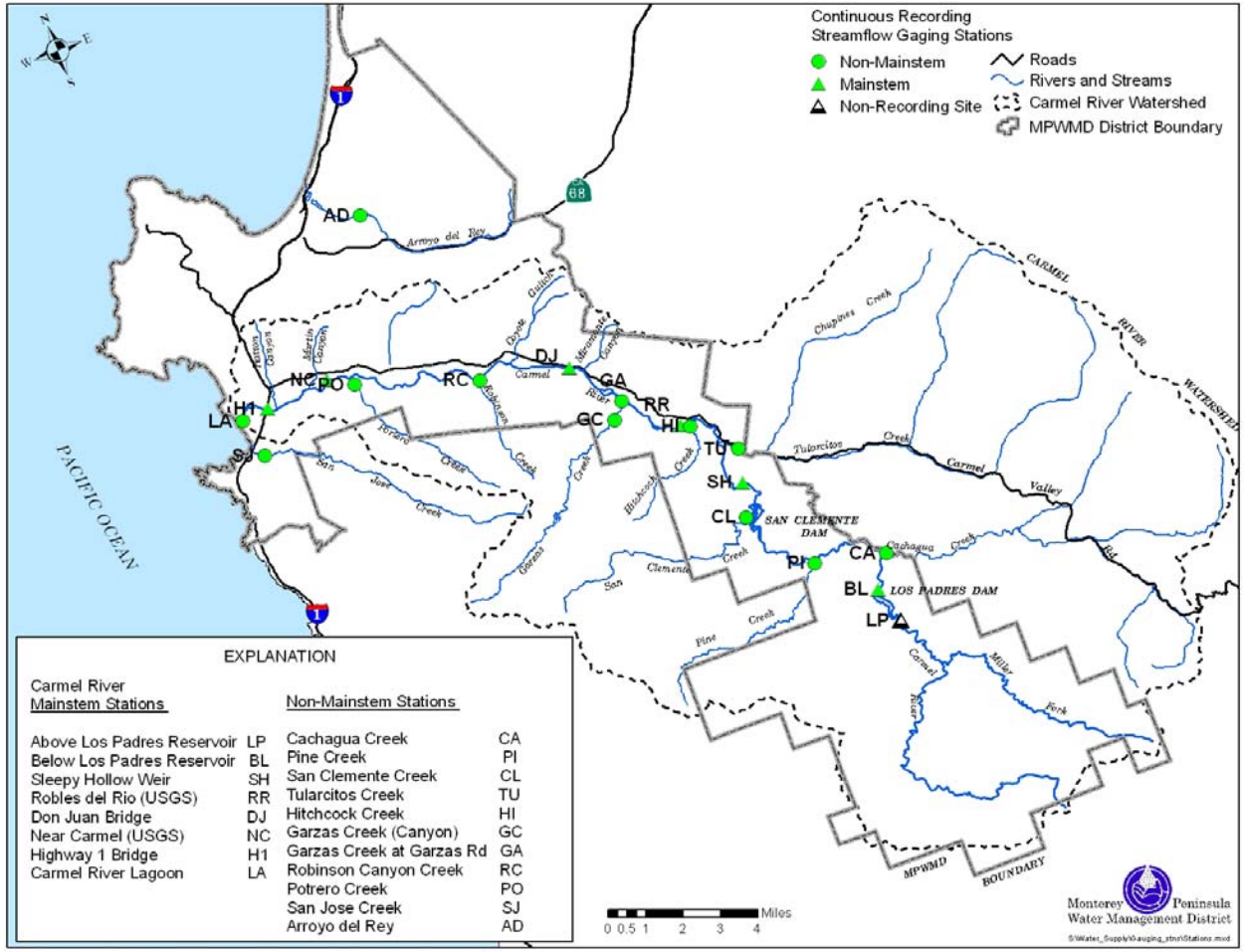


Figure II-4
Cumulative Unimpaired Runnoff: Carmel River at San Clemente Dam

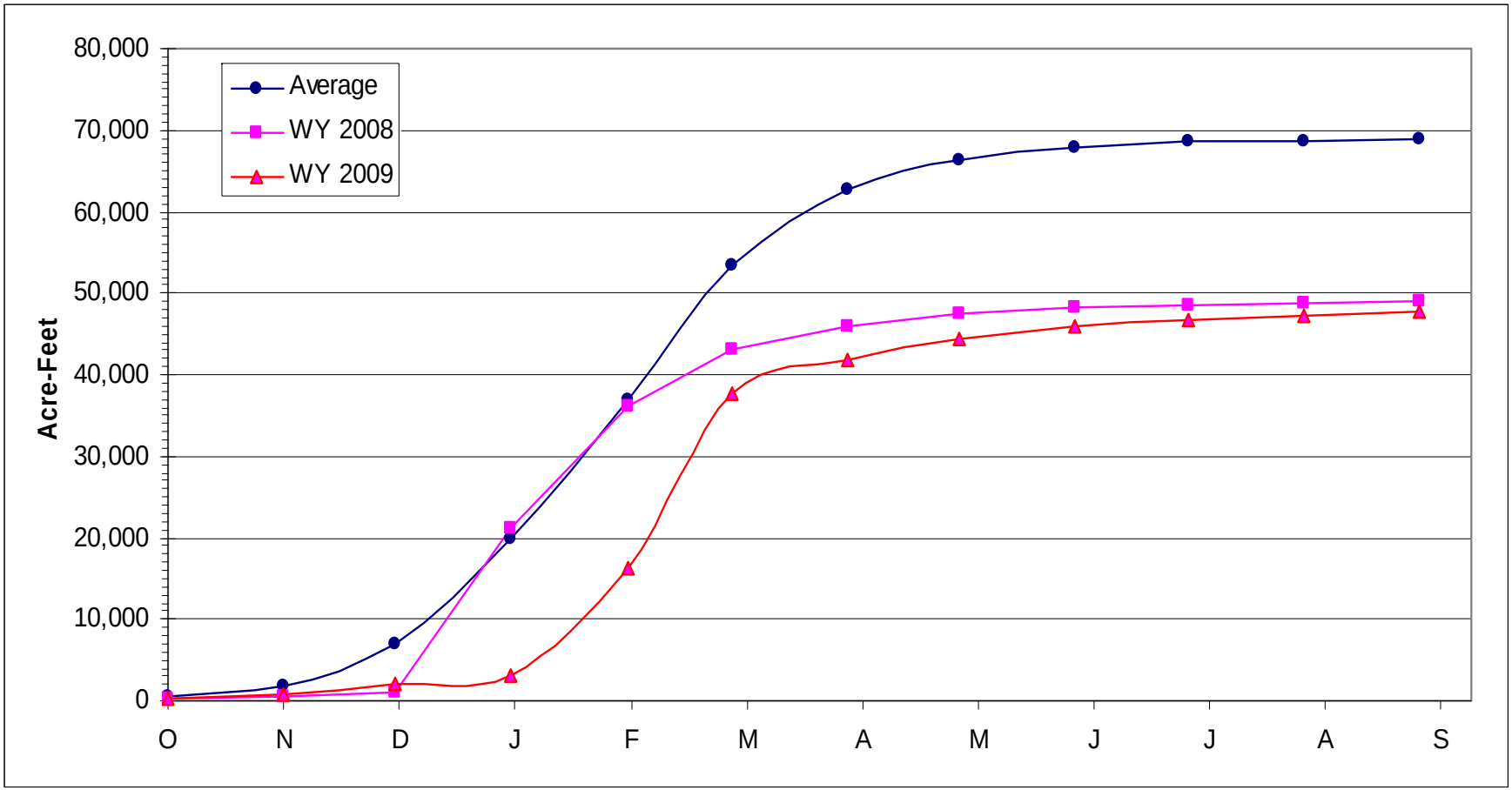


Figure II-5
End-of-Month Usable Storage for the Monterey Peninsula Water Resources System; Water Year 2009

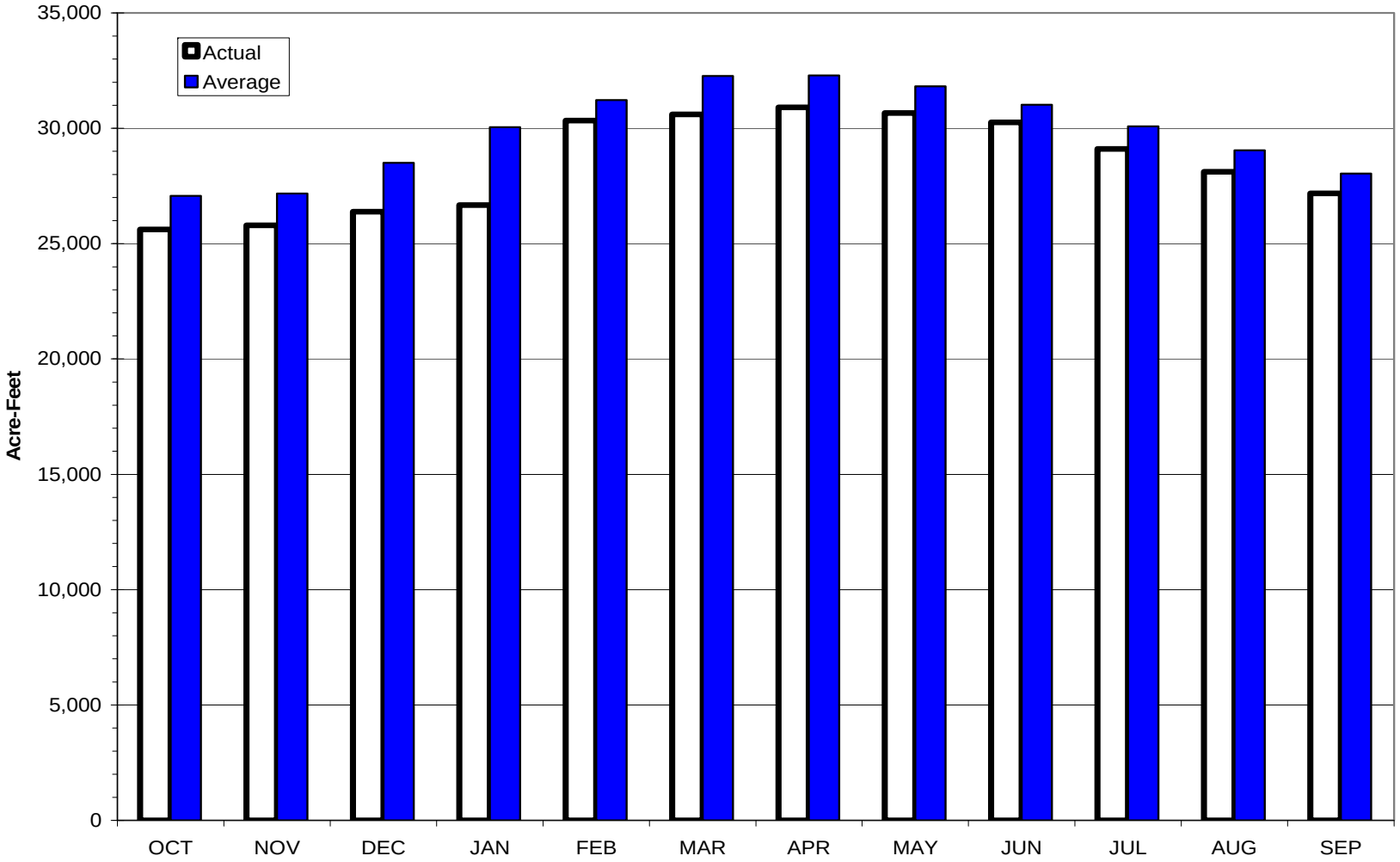


Figure II-6
Mean Daily Streamflow and Groundwater Elevation at the Rancho Canada East Well

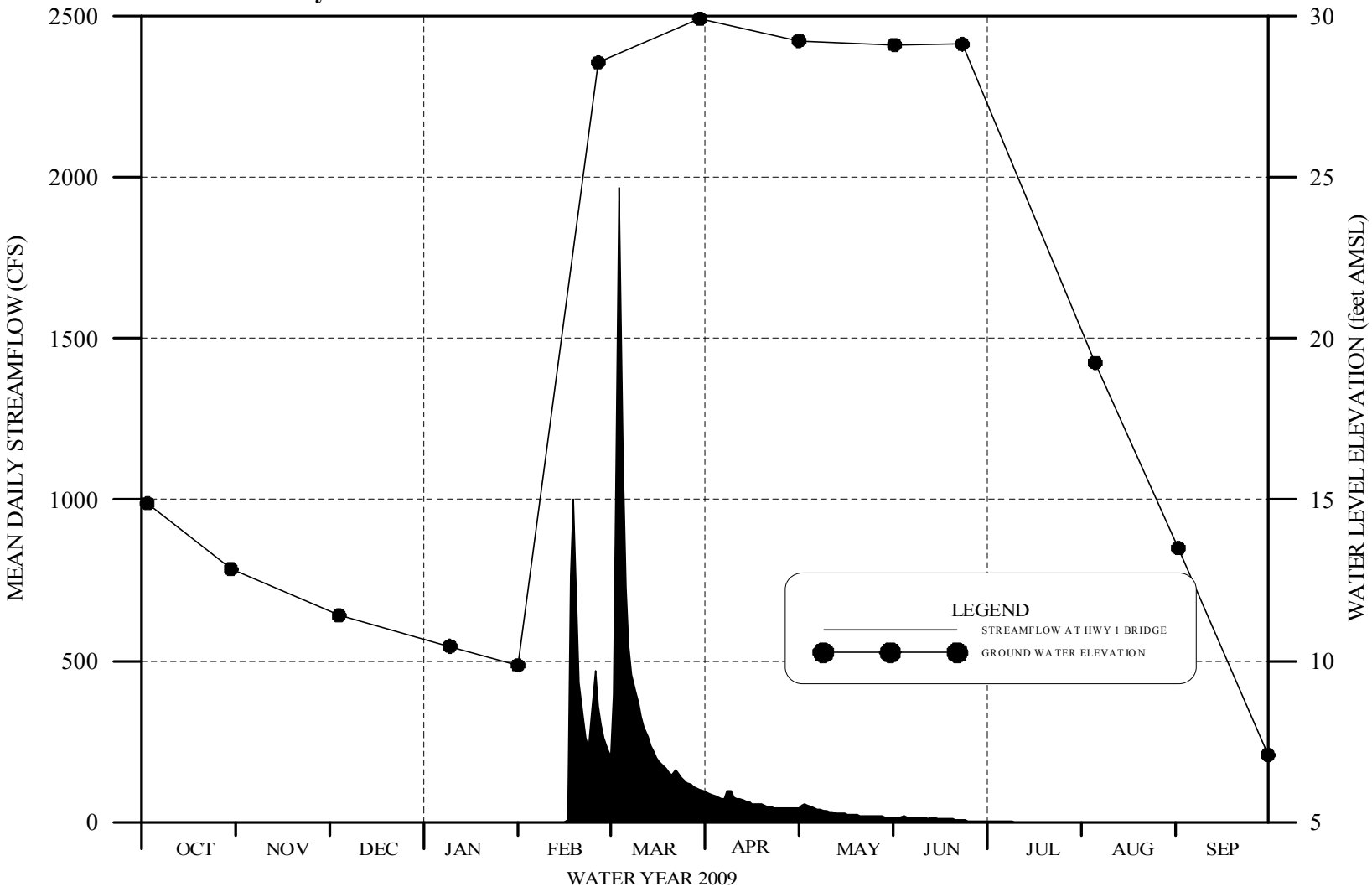


Figure II-7
Mean Daily Streamflow and Groundwater Elevation at the CAWD Rio North Well

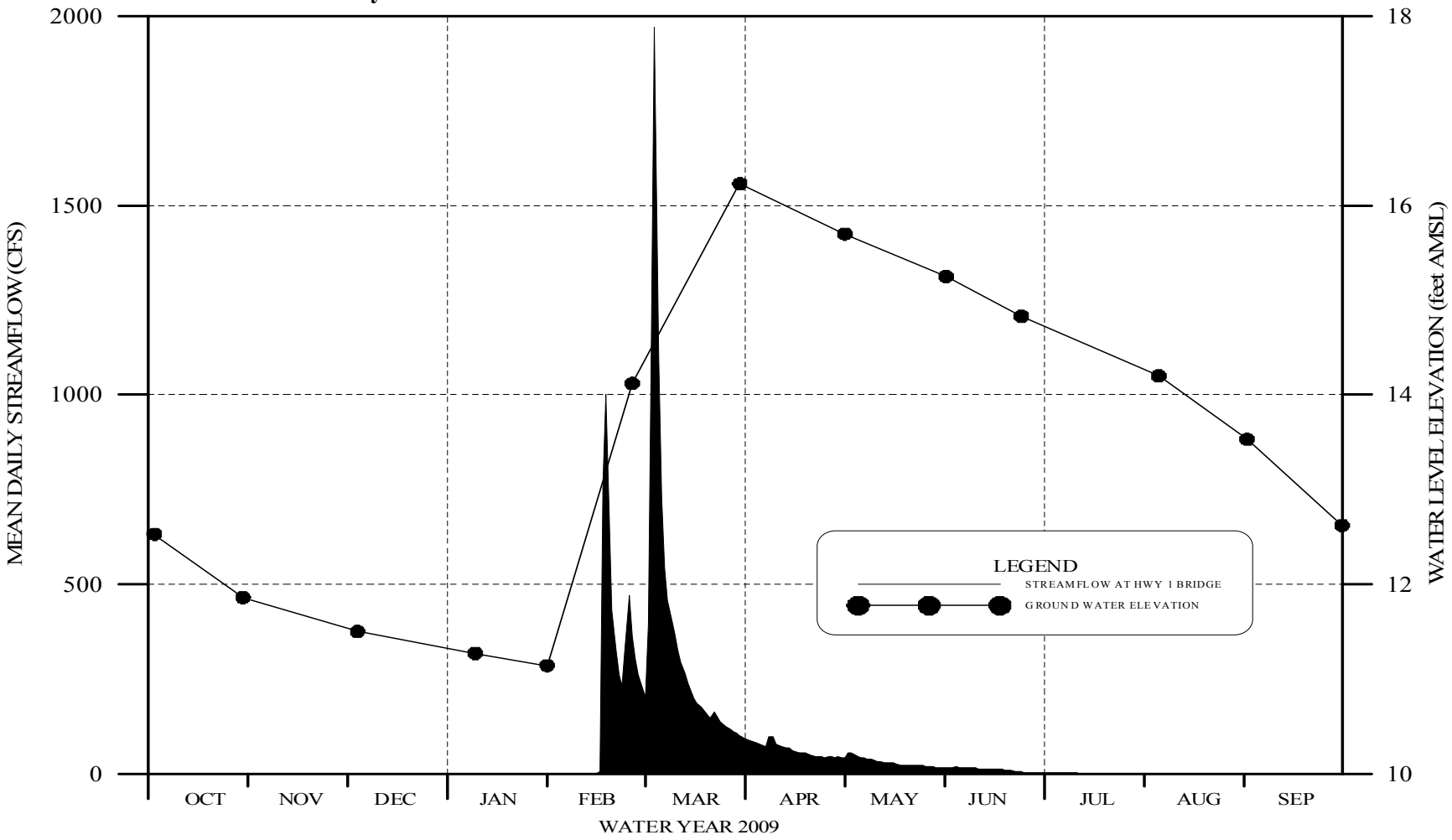


Figure II-8
Seaside Basin Groundwater Monitoring Wells

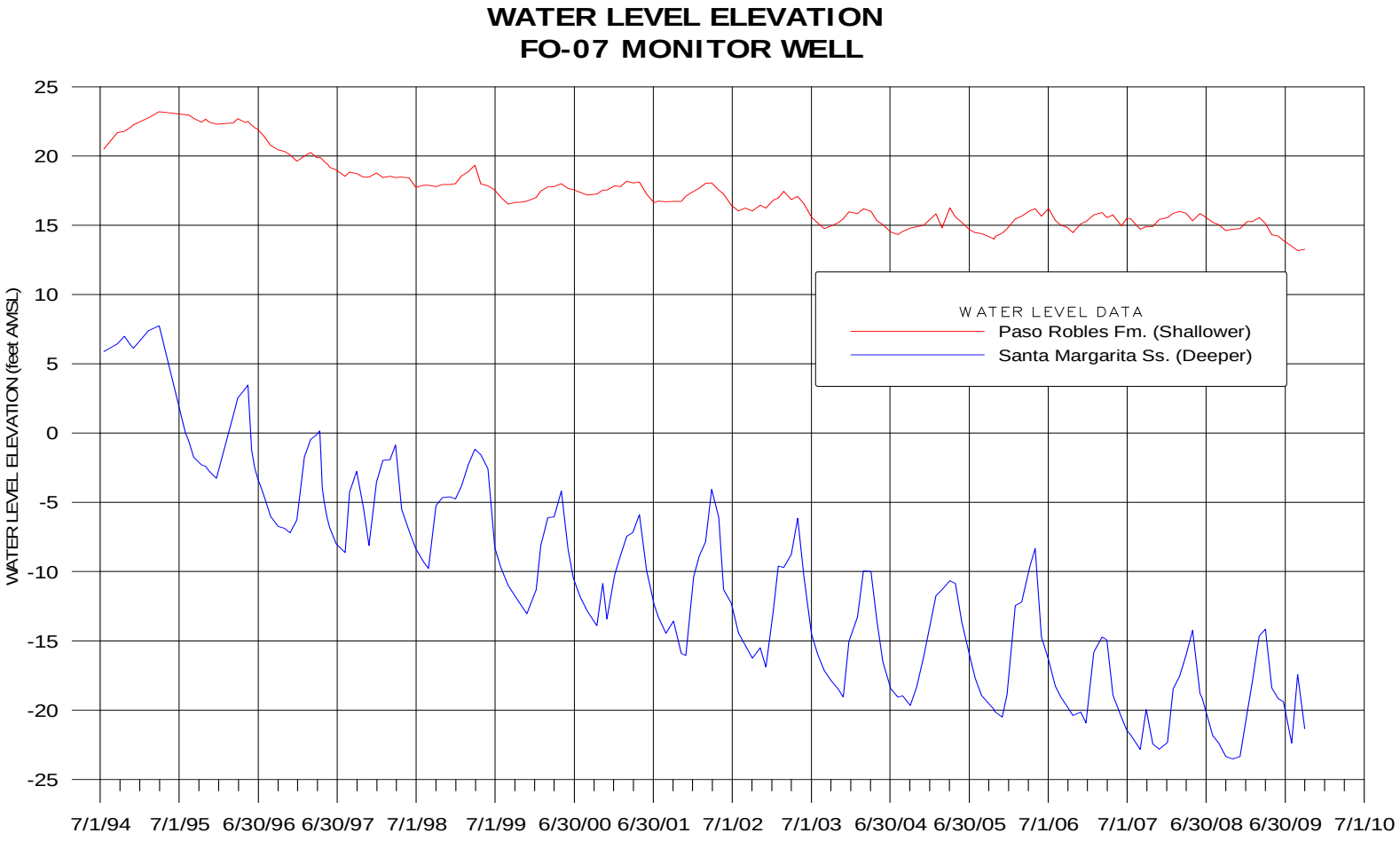


Figure II-8 cont.
Seaside Basin Groundwater Monitoring Wells

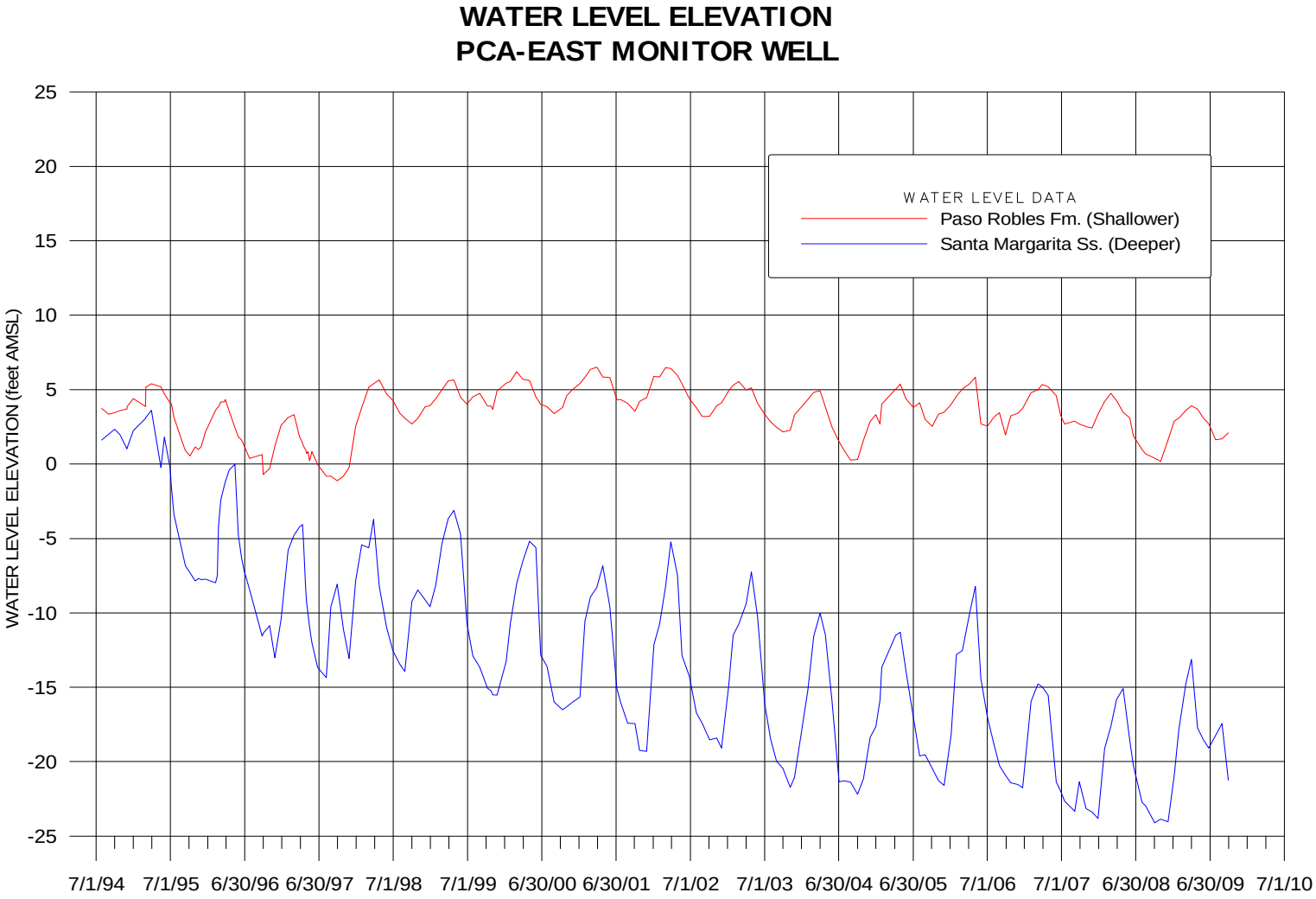


Figure II-9a
Water Quality 0.07 Miles from Coast in Carmel Valley

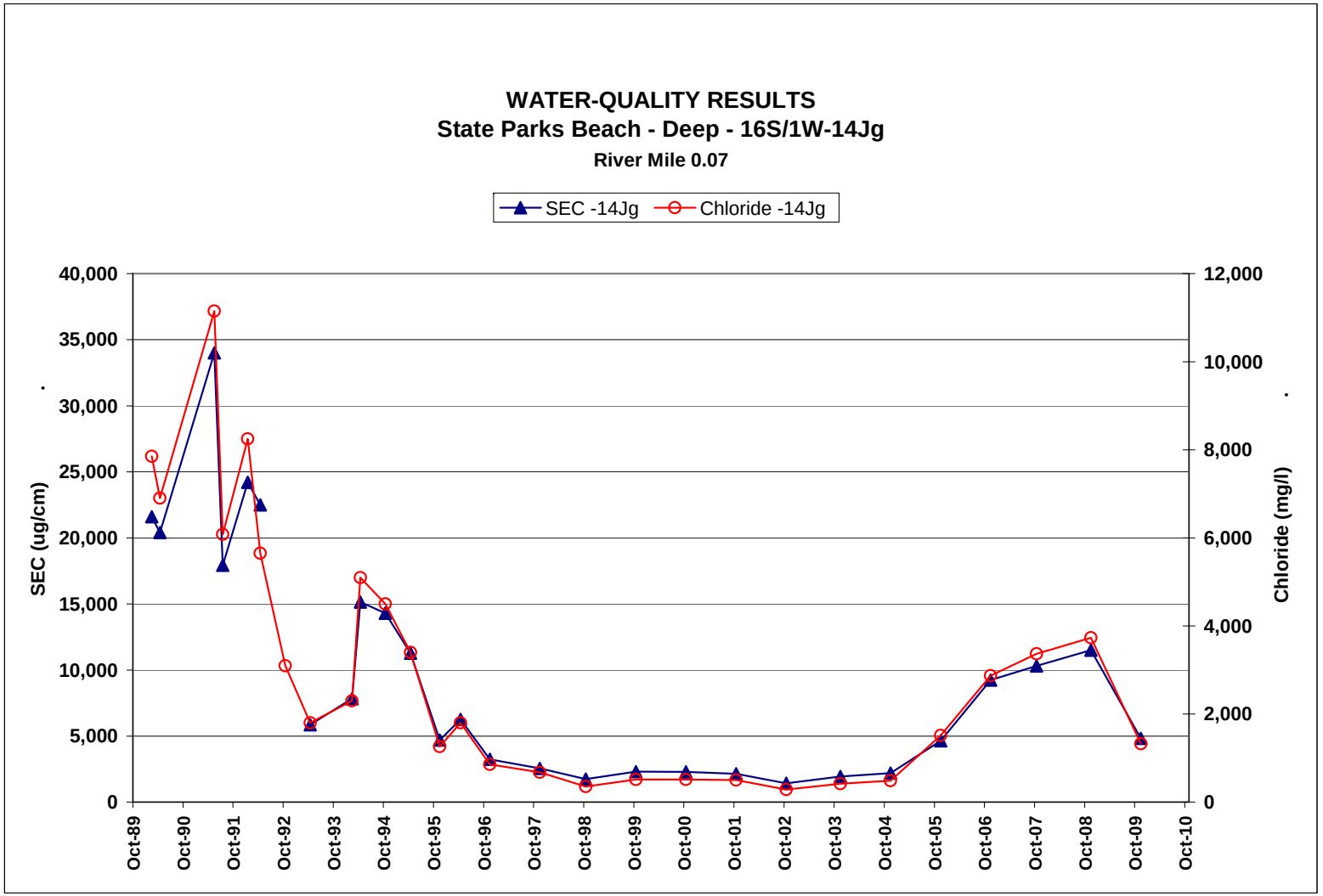


Figure II-9b
Water Quality 0.30 Miles from Coast in Carmel Valley

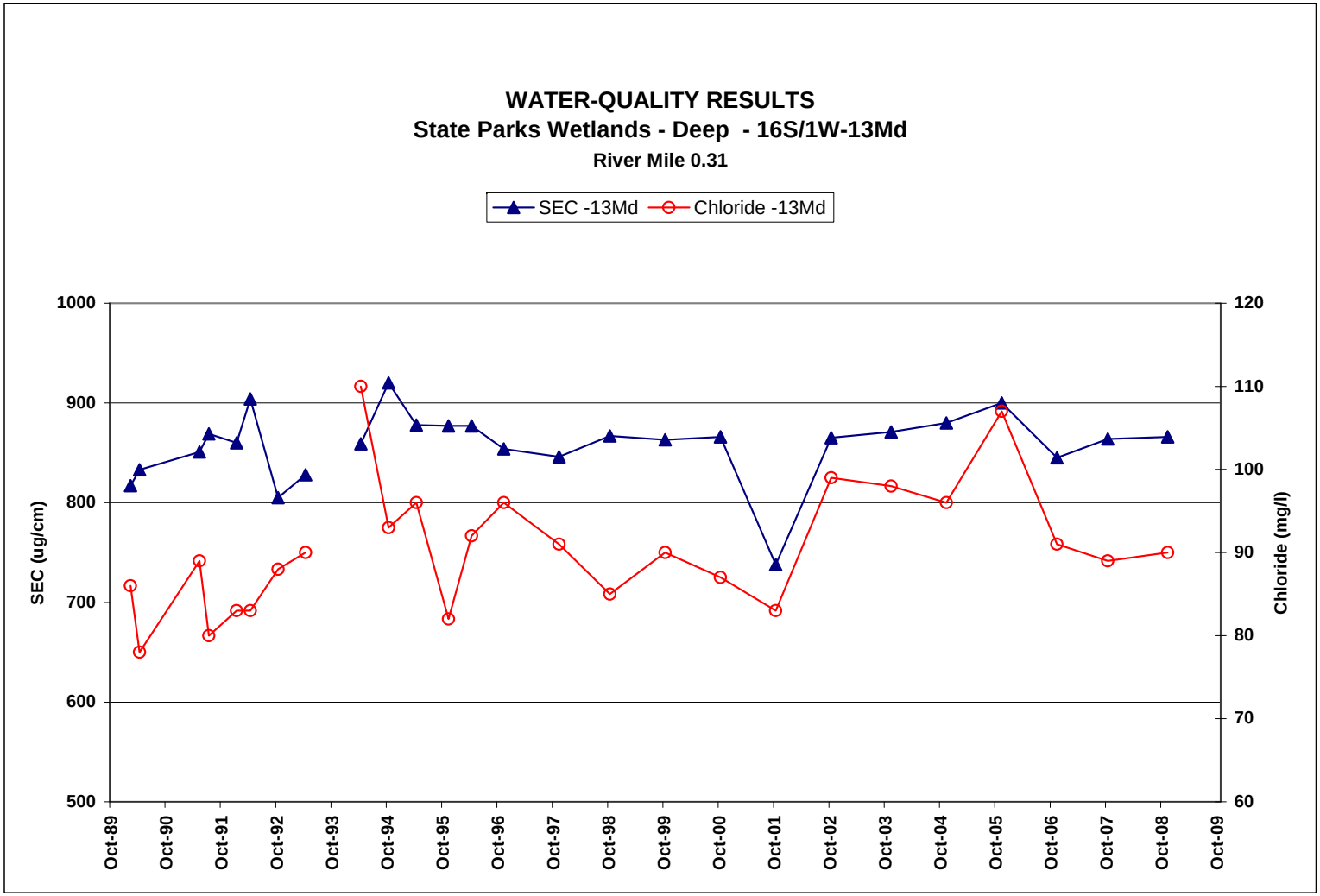


Figure II-9c
Water Quality 0.65 Miles from Coast in Carmel Valley

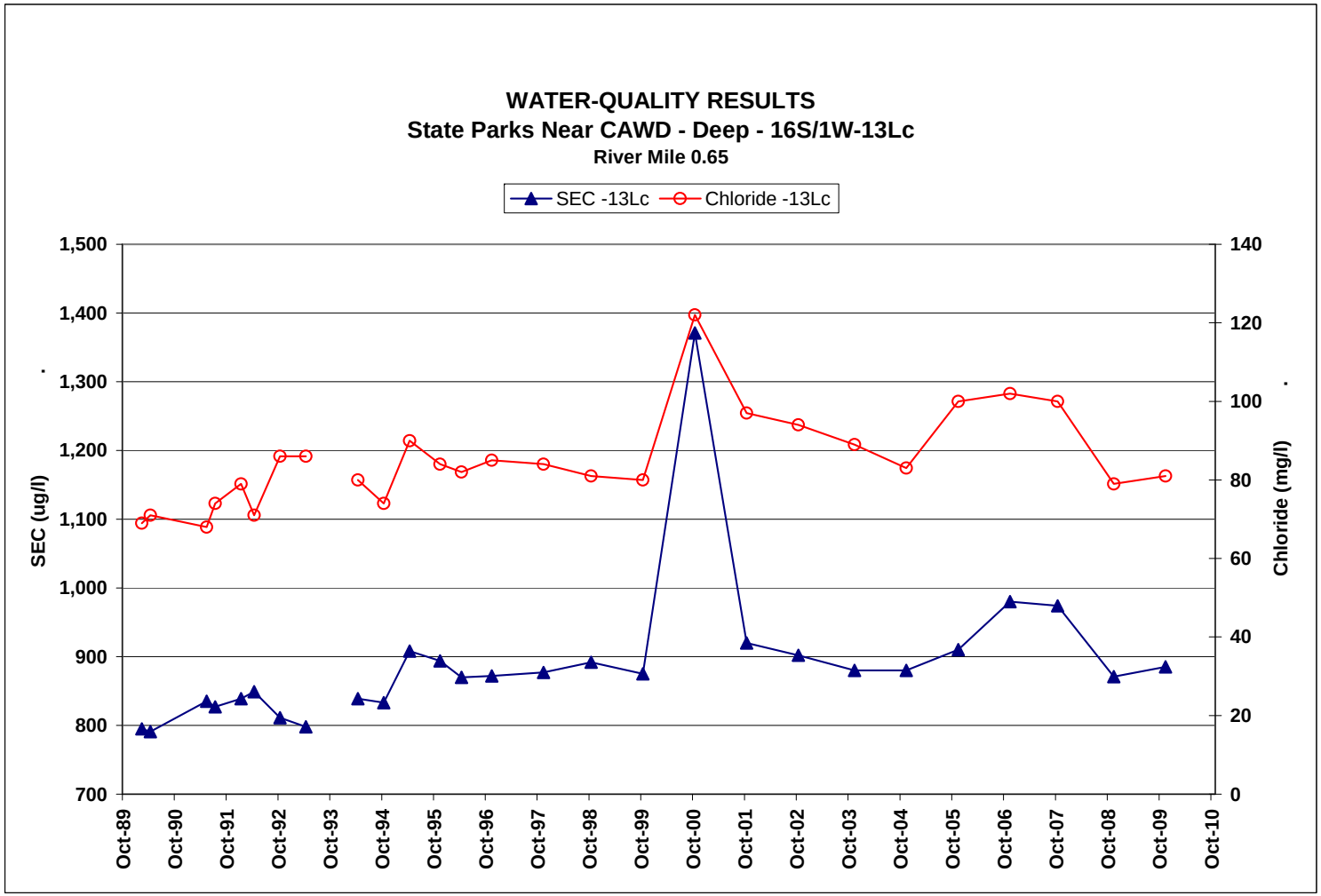


Figure II-9d
Water Quality 6.70 Miles from Coast in Carmel Valley

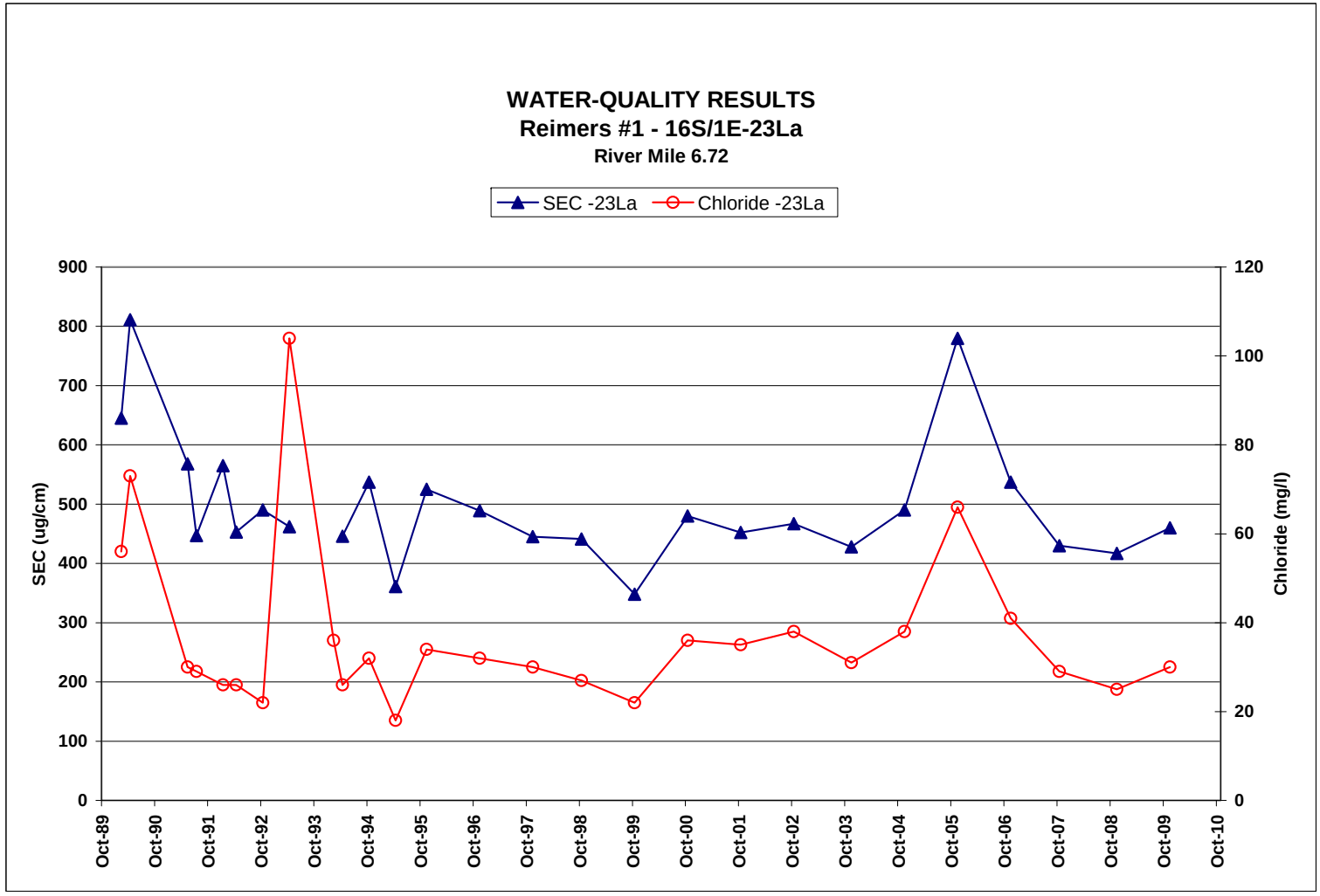


Figure II-9e
Water Quality in two coastal wells in Seaside

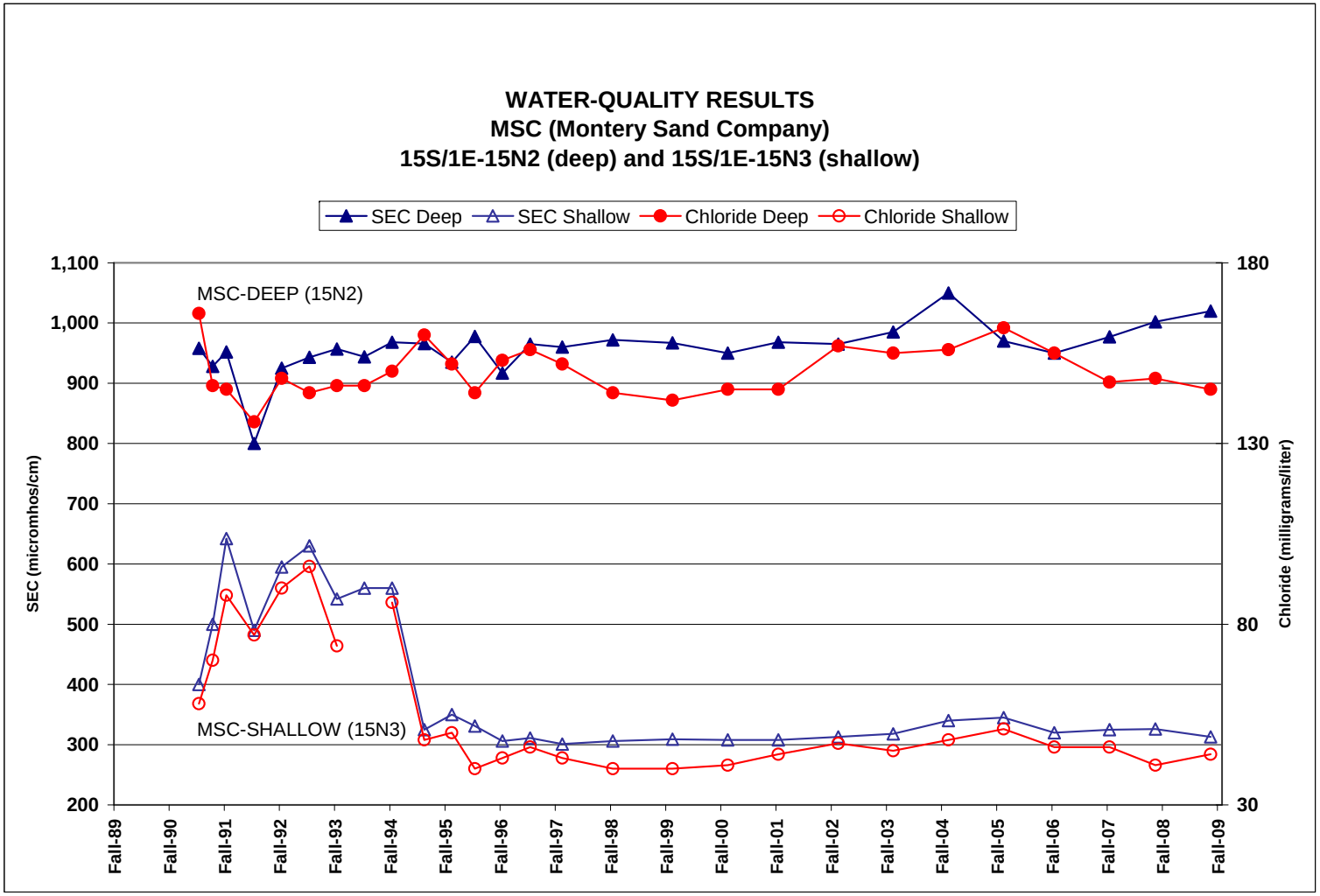


Figure II-10
Temperature and Semi-Monthly Water Quality Monitoring Locations Within the Carmel River Basin During RY 2009

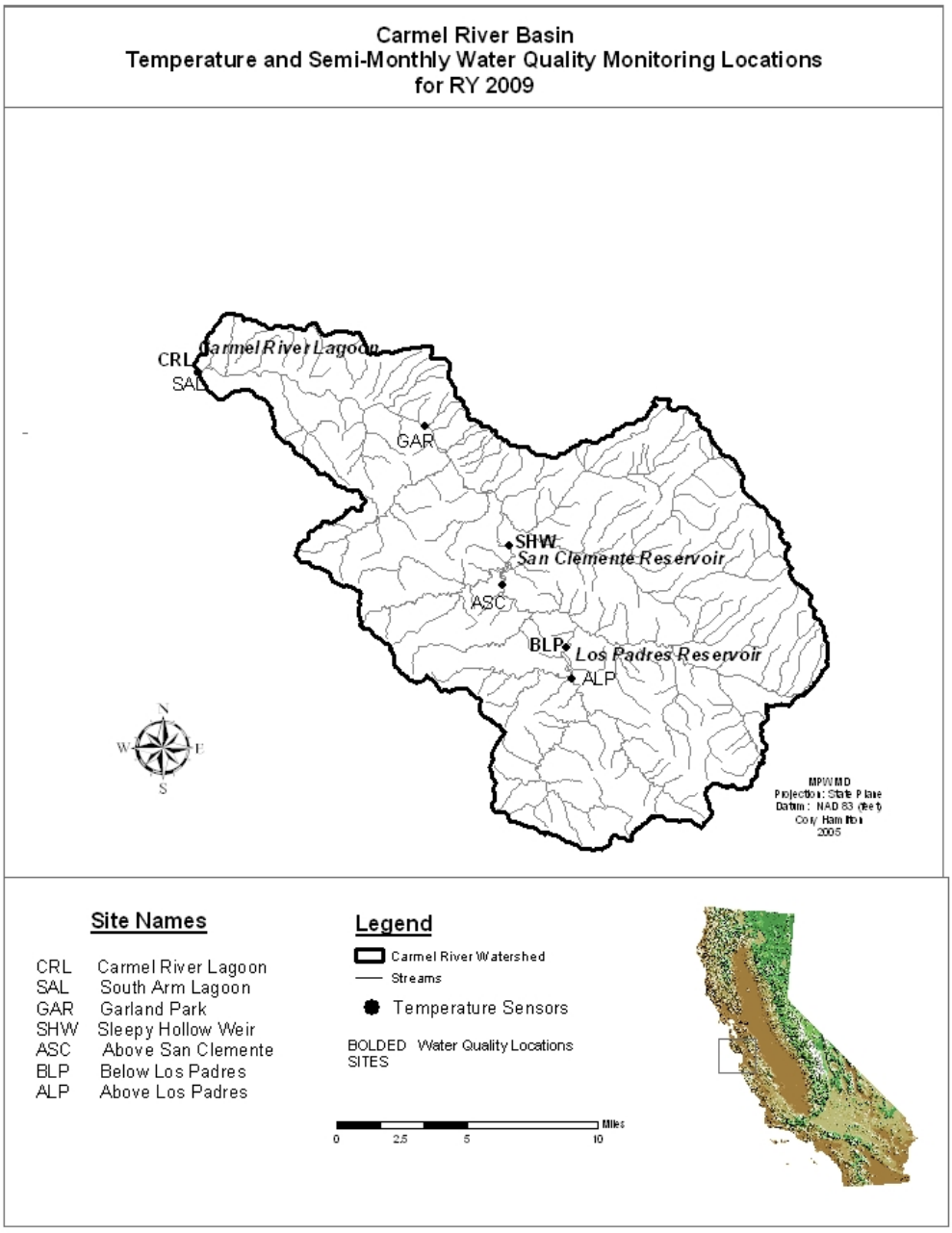


Figure II-11
Daily temperatures recorded from a continuous temperature data logger at the South Arm Lagoon (SAL) station during RY 2009

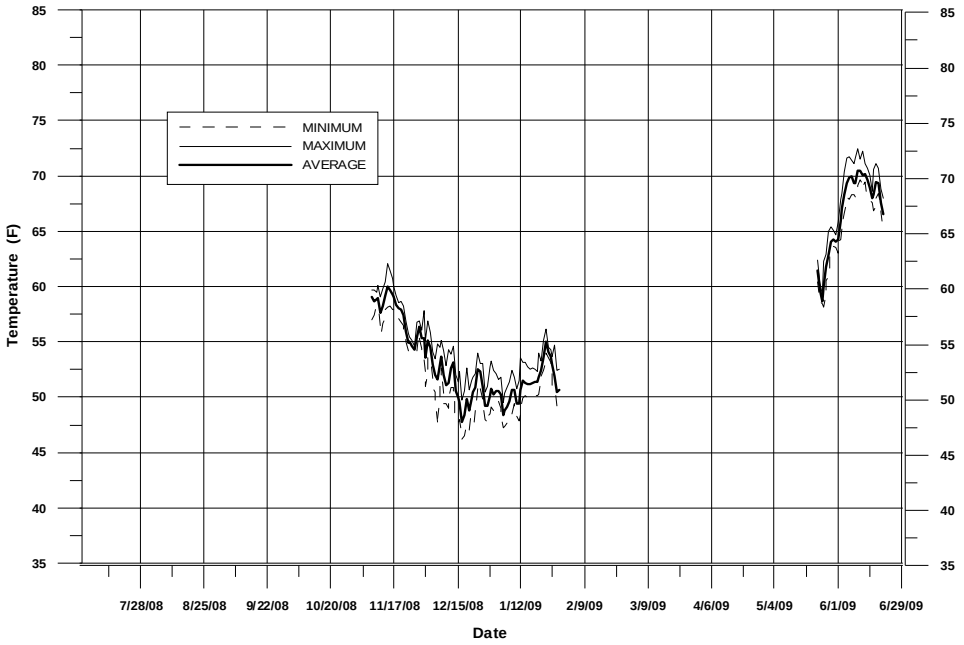


Figure II-12
Daily temperatures recorded from a continuous temperature data logger at the Garland Park (GAR) station during RY 2009

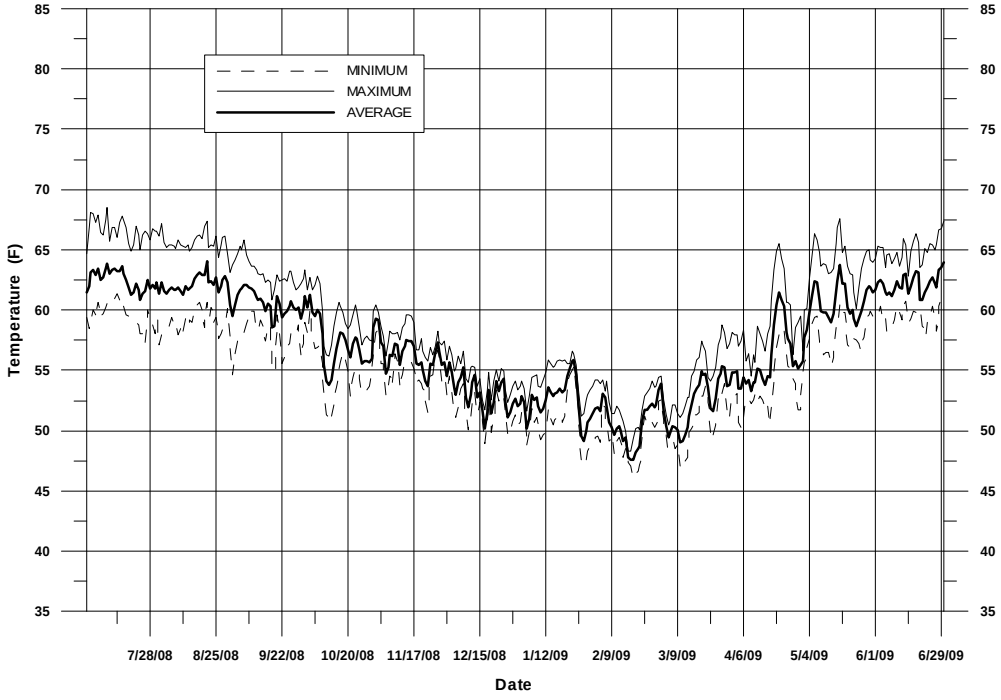


Figure II-13
Daily temperatures recorded from a continuous temperature data logger at the Sleepy Hollow Weir (SHW) station during RY 2009

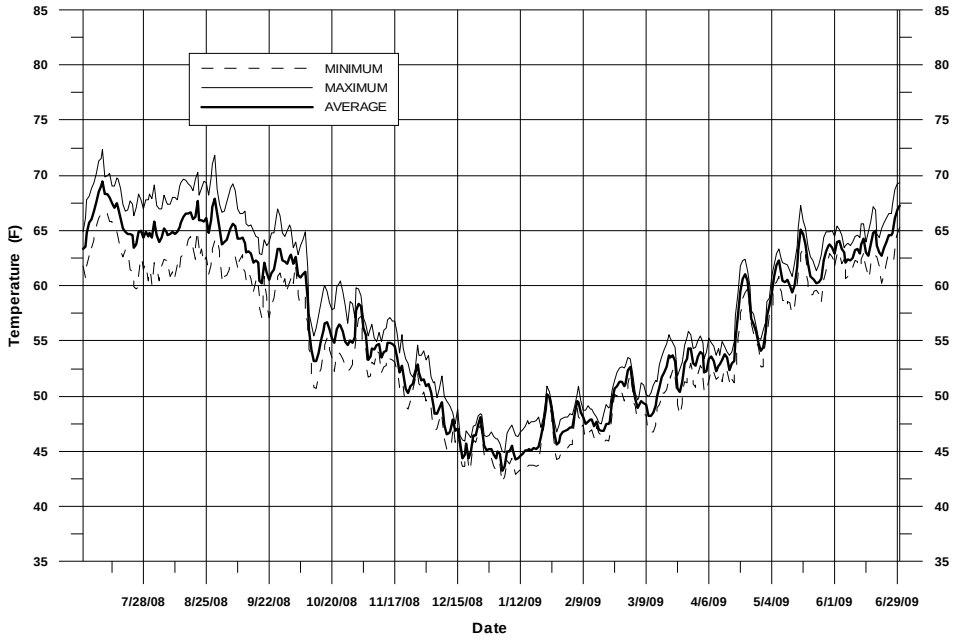


Figure II-14
Daily temperatures recorded from a continuous temperature data logger at the Above San Clemente (ASC) station during RY 2009

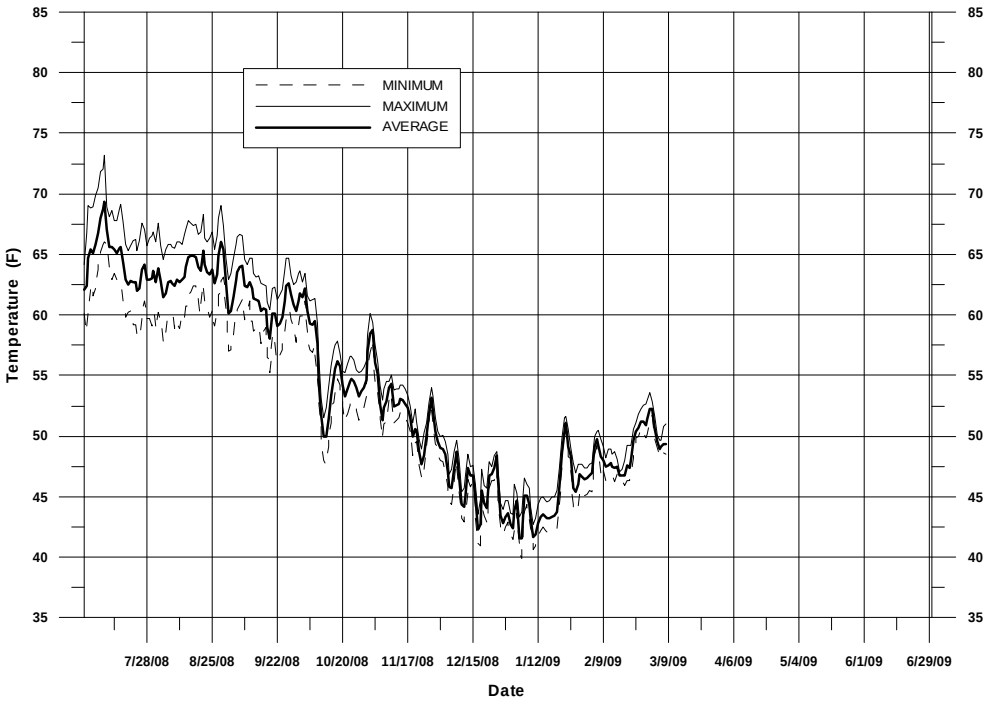


Figure II-15
Daily temperatures recorded from a continuous temperature data logger at the Below Los Padres (BLP) station during RY 2009

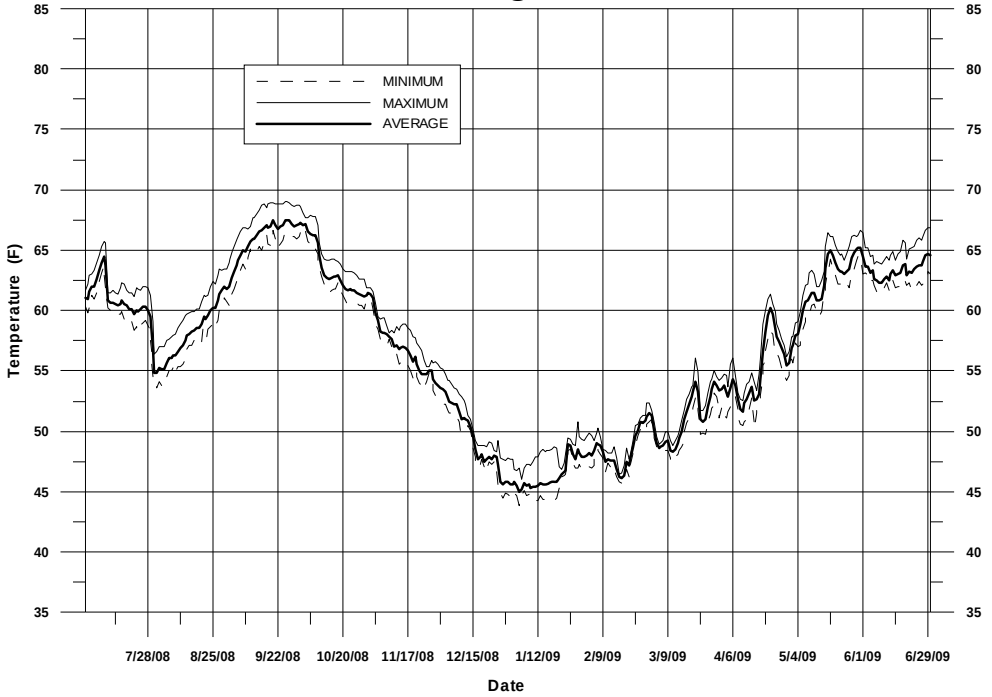


Figure II-16
Daily temperatures recorded from a continuous temperature data logger at the Above Los Padres (ALP) station during RY 2009

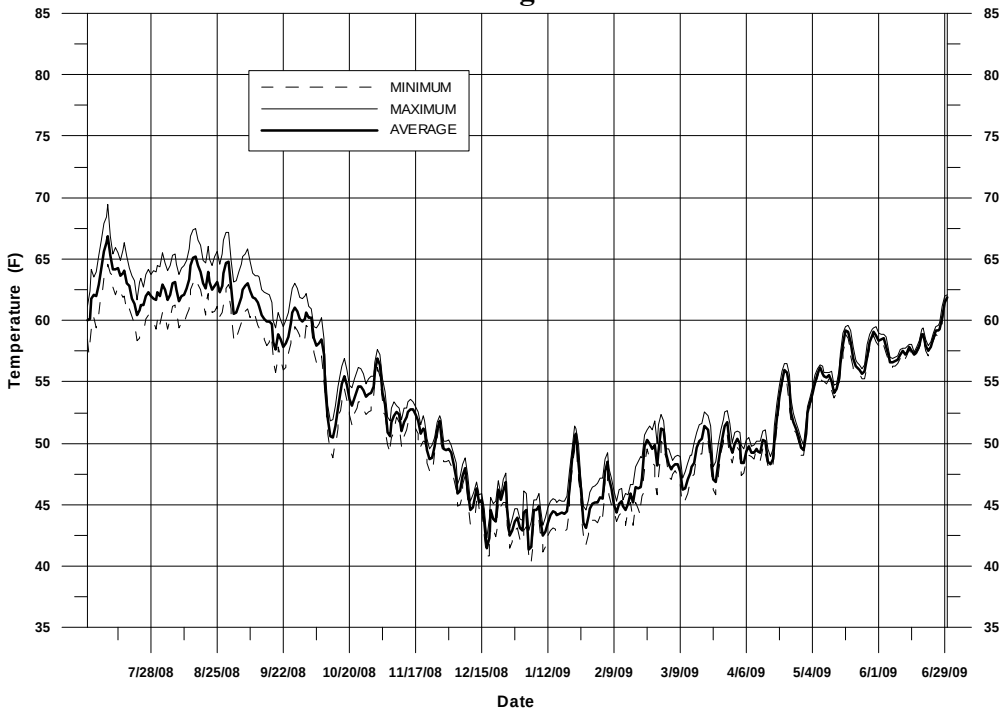
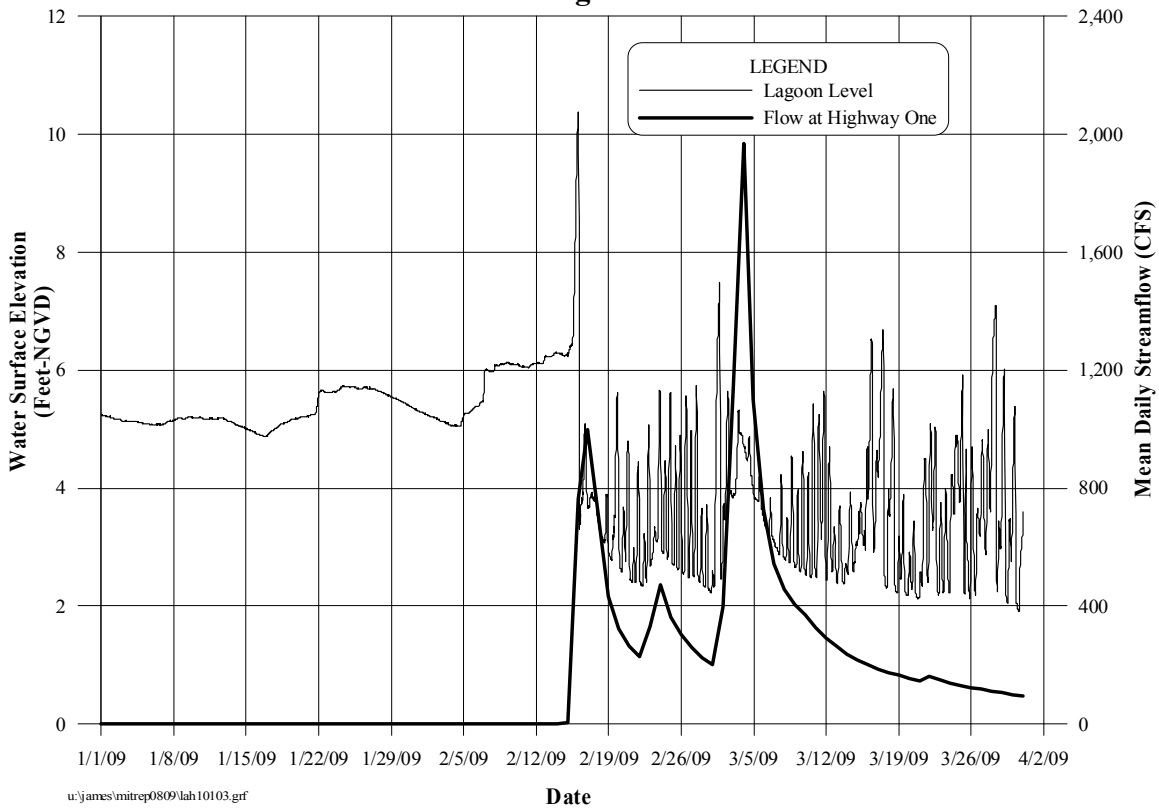


Figure II-17
Carmel River Lagoon Water Level



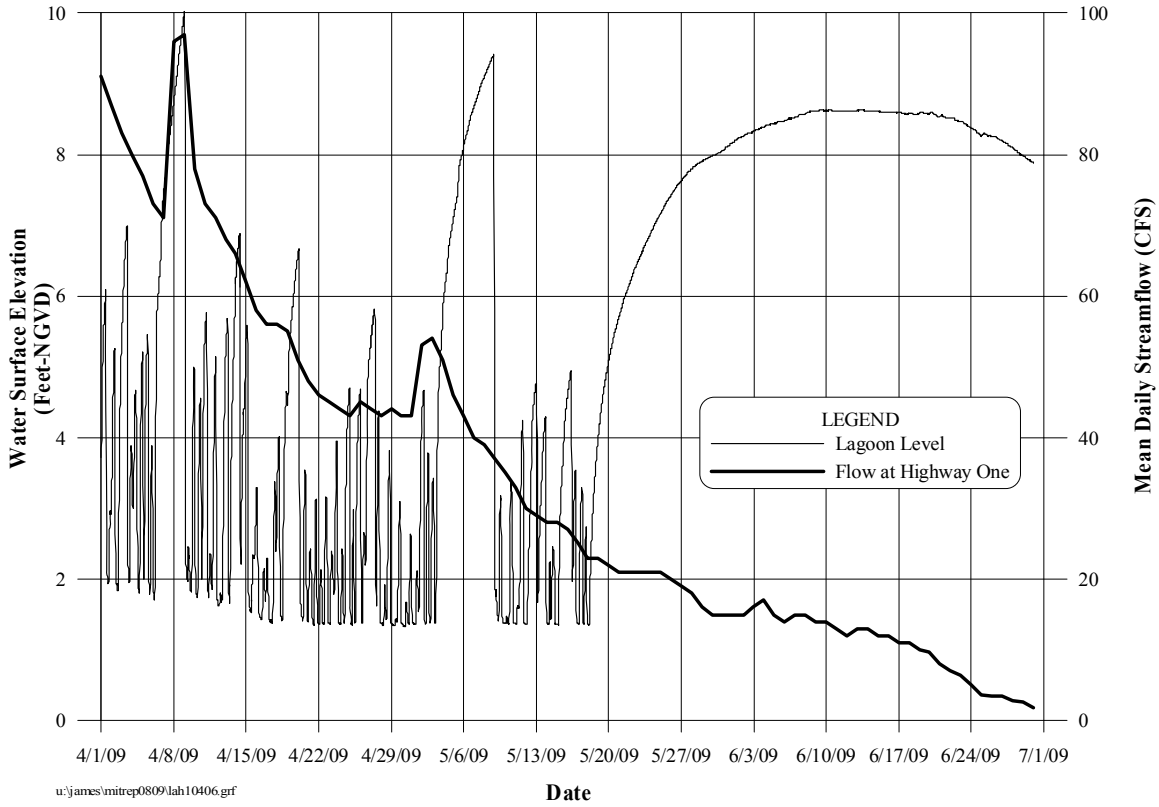


Table II-1
Carmel River Basin Total Annual Streamflow: Water Years 1992-2009

CARMEL RIVER BASIN - ANNUAL STREAMFLOW SUMMARY
WATER YEARS 1992 - 2009
(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
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
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
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
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
HITCHCOCK CREEK	4.6	*	*	52	1,820	451	716	2,970	169	482	214	18	274	234	863	691	2	383	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
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
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
SAN JOSE CREEK	14.2	*	*	*	*	*	*	*	6,400	6,260	2,890	1,100	1,880	1,480	7,640	6,870	862	1,740	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
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
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
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	39,150

Notes: 1. Carmel River (CR) at Robles del Rio and near Carmel sites are maintained by the USGS.

Table II-2
Water Quality Data Collected by MPWMD During RY 2009 at Carmel River Lagoon (CRL)

Date	Time	Temperature	Dissolved Oxygen	Carbon Dioxide	pH	Conductivity	Nacl	Turbidity	WSE
	24 Hr	(F)	(mg/L)	(mg/L)		(uS/cm)	(ppt)	(NTU)	(ft)
18-Jul-08	1205	69.9	9.1	20	8.5	2955	1.5	0	3.72
08-Aug-08	1215	68.0	9.3	25	8.0	2608	1.4	0	3.24
21-Aug-08	1230	74.8	10.5	10	8.0	3321	1.7	0	3.52
11-Sep-08	1215	n/a	n/a	10	8.5	6370	3.5	2.1	4.26
26-Sep-08	1145	68.0	13.0	10	8.0	3790	2.0	1.6	4.12
10-Oct-08	1200	60.9	9.9	15	8.0	5460	3.0	2.5	4.58
27-Oct-08	1245	58.6	8.9	25	8.0	8600	4.8	2.8	4.80
07-Nov-08	1145	57.9	9.9	25	8.0	6630	3.7	3.6	4.68
21-Nov-08	1200	57.0	9.5	20	8.0	5790	3.2	2.2	4.34
02-Jan-09	1105	50.4	10.3	20	8.0	5220	2.8	2.4	5.18
16-Jan-09	1200	51.6	12.4	20	8.0	4010	2.1	3.0	4.94
30-Jan-09	1105	49.8	10.5	25	8.0	2894	1.5	2.7	5.46
13-Feb-09	1130	53.8	8.9	20	7.5	8460	4.7	10	6.26
19-Feb-09	1235	49.8	10.6	10	7.5	393	0.2	9	2.82
06-Mar-09	1140	50.9	11.2	5	7.5	304	0.1	9.5	3.62
18-Mar-09	1245	56.5	10.0	15	7.5	547	0.3	.95	2.36
03-Apr-09	1200	55.7	10.0	20	8.0	1558	0.8	.55	7.00
16-Apr-09	1240	56.3	9.3	15	7.5	2892	1.5	3.1	1.45
05-May-09	1315	64.8	8.9	15	7.5	1360	0.7	.85	7.30
29-May-09	1225	62.8	9.0	15	8.0	388	0.2	.3	8.00
12-Jun-09	1225	68.4	7.7	15	8.0	440	0.2	.7	8.70
26-Jun-09	1240	66.2	8.3	15	7.5	518	0.3	.8	8.36
Minimum		49.8	7.7	5.0	7.5	304	0.1	0	
Maximum		74.8	13.0	25.0	8.5	8600	4.8	9.5	
Average		59.6	9.9	16.8	7.9				

Table II-3
Water Quality Data Collected by MPWMD During RY 2009 at Sleepy Hollow Weir (SHW) Site

Date	Time 24 hr	Temperature (F)	Dissolved Oxygen (mg/L)	Carbon Dioxide (mg/L)	pH	Conductivity (uS/cm)	Turbidity (NTU)
18-Jul-08	1130	65.5	10.3	20	8.0	313	.81
08-Aug-08	1105	65.3	10.2	15	8.0	313	2.6
21-Aug-08	1145	68	9.2	15	8.0	323	2.8
11-Sep-08	1110	n/a	n/a	10	8.0	331	3.6
26-Sep-08	1100	62.4	12.5	15	7.5	346	4.6
07-Oct-08	1110	55.7	11.6	15	8.0	370	2.3
10-Oct-08	1130	56.5	11.6	15	7.5	354	3.7
27-Oct-08	1200	55	11.6	20	7.5	362	8.6
21-Nov-08	1110	52.5	11.3	20	8.0	377	4.8
02-Jan-09	1020	45.3	11.9	10	7.5	339	6.3
16-Jan-09	1045	45.3	12.4	15	8.0	330	5.8
30-Jan-09	1020	46.2	11.5	15	8.0	303	1.5
13-Feb-09	1045	47.8	11.7	10	8.0	263	1.2
19-Feb-09	1135	48.4	11.4	5	7.5	185	4.6
06-Mar-09	1045	49.6	10.9	5	7.5	165	7.7
18-Mar-09	1145	51.8	11.9	10	7.5	212	.3
03-Apr-09	1100	53.2	10.6	10	8.0	229	.2
16-Apr-09	1200	53.4	10.3	10	7.5	234	.3
05-May-09	1120	60.9	10.4	15	8.0	248	.65
29-May-09	1145	64.2	9.5	10	8.0	260	.3
12-Jun-09	1130	63.3	9.5	10	8.0	268	1.1
26-Jun-09	1150	65.1	9.2	15	7.5	283	3.1
Minimum		45.3	9.2	5.0	7.5	165	0.2
Maximum		68.0	12.5	20.0	8.0	377	8.6
Average		56.0	10.9	13.0	7.8	291	

Table II-4
Water Quality Collected by MPWMD During RY 2009 at below Los Padres (BLP) Site

Date	Time 24 hr	Temperature (F)	Dissolved Oxygen (mg/L)	Carbon Dioxide (mg/L)	pH	Conductivity (uS/cm)	Turbidity (NTU)
18-Jul-08	1030	60.6	8.6	25	7.0	264	1.3
08-Aug-08	1000	57.0	7.7	25	7.0	261	0
21-Aug-08	1030	60.1	7.2	20	7.0	276	2.3
11-Sep-08	1000	65.3	7.2	15	7.5	312	9.1
26-Sep-08	1000	68.0	7.5	20	7.5	334	3.4
10-Oct-08	1015	64.9	7.8	20	7.5	336	2.9
27-Oct-08	1045	62.4	8.2	20	7.5	348	7.5
07-Nov-08	1000	59.0	10.3	15	7.5	347	7.5
21-Nov-08	1015	57.4	8.9	20	7.5	354	3.5
02-Jan-09	0940	47.1	10.7	10	7.5	297	7
16-Jan-09	1000	46.6	11.0	15	8.0	297	4.6
30-Jan-09	0945	48.6	11.2	10	7.0	288	0.85
13-Feb-09	1000	48.4	11.8	10	7.5	256	1.2
19-Feb-09	1100	48.4	11.8	10	8.0	167	6.7
06-Mar-09	1000	49.6	11.3	5	7.5	151	7.3
18-Mar-09	1100	53.4	11.2	10	7.5	189	.3
03-Apr-09	1025	54.5	10.0	5	8.0	210	.45
16-Apr-09	1100	53.9	11.2	10	7.5	216	.35
05-May-09	1045	60.4	9.6	10	7.5	233	.2
29-May-09	1050	65.7	9.4	15	7.5	247	.7
12-Jun-09	1050	63.7	8.5	15	7.5	248	1.9
26-Jun-09	1110	64.6	8.4	15	7.5	254	1.5
Minimum		46.6	7.2	5.0	7.0	151	0.0
Maximum		68.0	11.8	25.0	8.0	354	9.1
Average		57.3	9.5	14.5	7.5	267	

III. MANAGE WATER PRODUCTION

Cooperative operation plans and quantification of California American Water (Cal-Am) 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 2008-2009

- **2008 MOA** – The 2008 MOA was developed on May 7, 2008, approved by the District Board on May 19, 2008, and signed by all the MOA representatives by July 18, 2008. 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 eleven cfs in June, nine cfs in July, seven cfs during August, five cfs during September, and four cfs during the period from October through December 2008. The 2008 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 2008 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.

- **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.

B. Quarterly Water Supply Strategy and Budget

Implementation and Activities During 2008-2009

During 2008 and 2009, 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 UCV. Beginning in 1998, the quarterly budgets were formulated with an annual production goal of 11,285 AF during the Water Year from the Carmel River Basin, in conformance with goals and requirements established by SWRCB Orders WR 95-10, WR 98-04, and WRO 2002-0002. 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 (3,191 AF) with its production allocation from the Laguna Seca Subarea (271 AF). Accordingly, in WY 2009, Cal-Am was allowed to produce a maximum of 3,462 AF from its sources in the Seaside Groundwater Basin.

- **Cal-Am Main System Production in Water Year 2009**[1] – During Water Year 2009, Cal-Am produced 12,916 acre-feet (AF) of water from all sources for its main system, including 182 AF diverted from the Carmel River Basin and injected into the Seaside Basin by the District. Totals of 595 AF, 10,285 AF (including the 128 AF injected into the Seaside Basin), and 3,140 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 fifth 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 Cal-Am and non Cal-Am 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. In 1981 and 1982, the first two years of production reporting, well owners were required to report water production twice a year. In subsequent years, this requirement was reduced to an annual basis.

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 2008-2009

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

Tables III-1 and **III-2** show summaries of reported production from Cal-Am and non-Cal-Am wells in WY 2009 and WY 2008, respectively. The report for Water Year 2009 has not been revised since it was first presented to the Board on May 17, 2010.

Figure III-1 compares reported production from Cal-Am and non-Cal-Am wells and surface diversions located within the MPWRS in WY 2009 with production limits set by the District's Water Allocation Program. The MPWRS includes the Carmel River Basin, Carmel Valley Alluvial Aquifer and the Coastal Subareas of the Seaside Groundwater Basin. With respect to the District's Water Allocation Program limits, Cal-Am production [2] from the MPWRS in WY 2009 was 12,916 acre-feet, or 1,322 acre-feet (9.0%) less than the Cal-Am production limit of 14,476 acre-feet that was established with the adoption of Ordinance No. 87 in 1997. Non Cal-Am production within the MPWRS in WY 2009 was 3,209 acre-feet (including surface diversions), or 162 acre-feet (5.3%) more than the non Cal-Am production limit of 3,046 acre-feet established by Ordinance No. 87. Combined production from Cal-Am and non Cal-Am sources within the MPWRS was 16,308 acre-feet in WY 2009, which is 4,379 acre-feet (21.2%) less than the 20,687 acre-feet production limit set for the MPWRS as part of the District's Water Allocation Program.

During WY 2009, District staff inspected 21 new water-meter installations to ensure compliance with the District's water-meter installation standards and guidelines. In addition, staff received copies of 15 permits for construction of new wells within the District from the Monterey County Health Department, 5 of which constituted permits for replacements of older wells, and advised the permitees that MPWMD permits were also needed.

U/MPWMD/Allocation/RY09/Production_wrd_JLedits.doc
Finalized November 2010
Water Resources Division

[2] The Cal-Am well production values for WY 2009 include 128 AF that were produced from its Carmel Valley wells for "diversion" to storage in the Seaside Basin in the winter, and 128 AF that were "recovered" from Seaside Basin storage in the summer.

Table III-1

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
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
LSS	10	515.2	3	1.2	13	516.4	4	515.9	17	1,032.4
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. Future reports will include the LSS in the Monterey Peninsula Water Resources System.

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.

DISTRICT-WIDE PRODUCTION		
SURFACE WATER DIVERSIONS:		
	CAW Diversions (San Clemente Dam):	0.0
	Non Cal-Am Diversions:	27.9
CAW WELLS:		
	SEASIDE:	2,631.2
	CARMEL VALLEY:	10,467.6
	Within the Water Resources System:	13,098.8
	Outside the Water Resources System:	515.9
	CAW TOTAL, Wells and Diversion:	13,614.8
NON CAW WELLS:		
	Within the Water Resources System:	3,208.8
	Outside the Water Resources System:	1,906.4
	NON CAW TOTAL, Wells and Diversion:	5,143.1
	GRAND TOTAL:	18,757.8

Table III-2

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT
REVISED DRAFT WATER PRODUCTION SUMMARY FOR WATER YEAR 2008
October 1, 2007 - September 30, 2008

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	7	144.2	1	0.1	8	144.3	2	471.6	10	615.9
AS2	41	171.9	36	38.0	77	209.9	3	124.0	80	333.9
AS3	115	1,035.7	52	58.0	167	1,093.8	8	8,760.8	175	9,854.6
AS4	31	834.1	7	2.4	38	836.5	1	1,478.7	39	2,315.2
SCS	9	929.5	1	1.1	10	930.7	5	3,389.8	15	4,320.5
CAC	3	35.8	8	11.7	11	47.5	0	0.0	11	47.5
CVU	250	626.8	42	42.5	292	669.3	0	0.0	292	669.3
LSS	8	523.4	2	2.7	10	526.1	4	533.9	14	1,059.9
MIS	82	299.6	11	8.8	93	308.5	0	0.0	93	308.5
ACTIVE	546	4,601.0	160	165.3	706	4,766.3	23	14,758.9	729	19,525.2
INACTIVE	308		34		342		20		362	
NOT REPORTING	50		23		73		0		73	
METHOD TOTALS:	904	4,601.0	217	165.3	1,121	4,766.3	43	14,758.9	1,164	19,525.2

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. Future reports will include the LSS in the Monterey Peninsula Water Resources System.

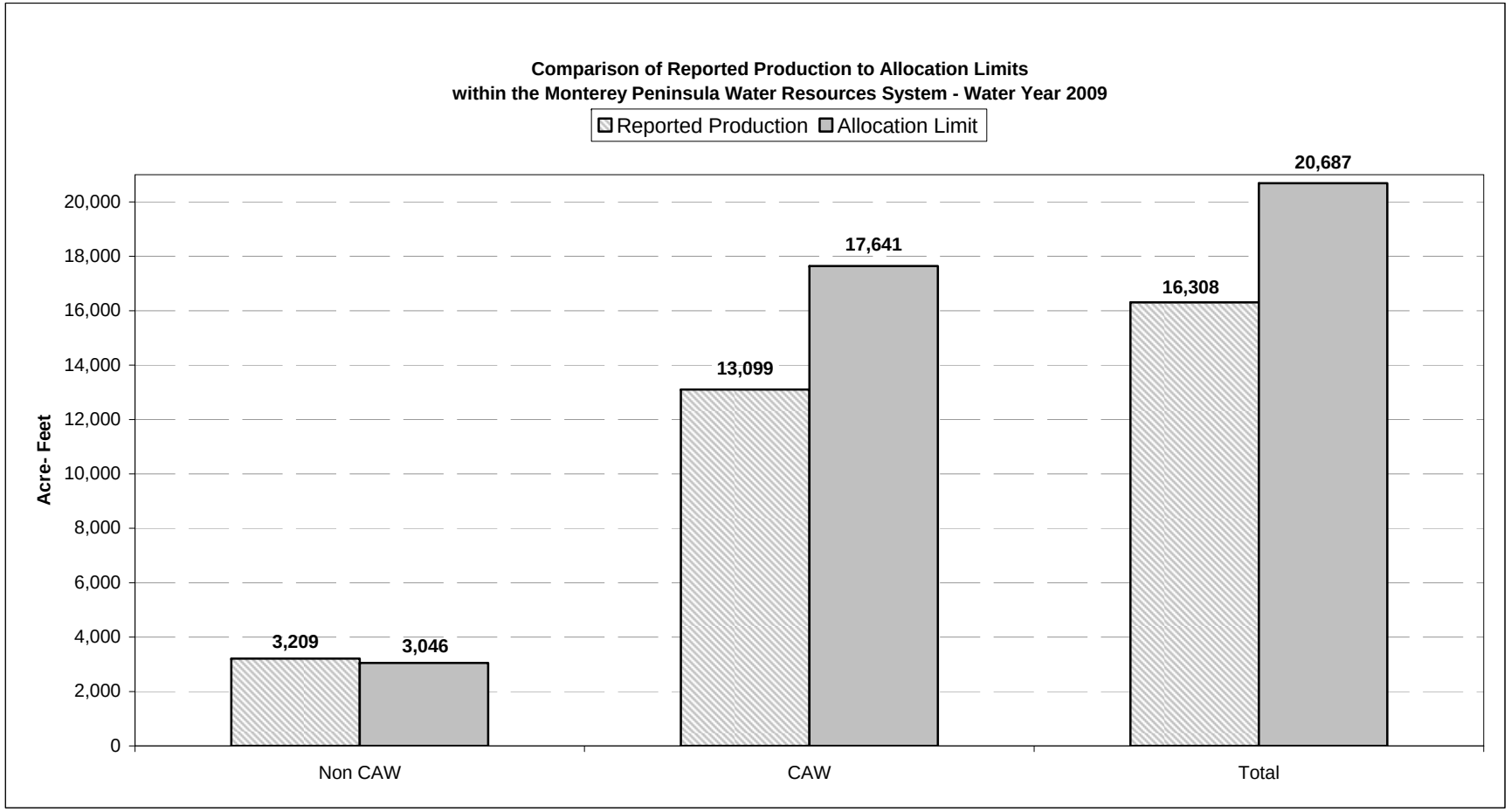
2. CAW - California American Water

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.

DISTRICT-WIDE PRODUCTION		
SURFACE WATER DIVERSIONS:		
	CAW Diversions (San Clemente Dam):	0.0
	Non Cal-Am Diversions:	32.4
CAW WELLS:		
	SEASIDE:	3,389.8
	CARMEL VALLEY:	10,835.1
	Within the Water Resources System:	14,225.0
	Outside the Water Resources System:	533.9
	CAW TOTAL, Wells and Diversion:	14,758.9
NON CAW WELLS:		
	Within the Water Resources System:	3,215.1
	Outside the Water Resources System:	1,551.3
	NON CAW TOTAL, Wells and Diversion:	4,798.8
	GRAND TOTAL:	19,557.6

Figure III-3


Comparison of Reported Production to Allocation Limits
within the Monterey Peninsula Water Resources System - Water Year 2009
Reported Production
Allocation Limit
Acre- Feet
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
3,209
3,046
13,099
17,641
16,308
20,687
Non CAW
CAW
Total

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 conservation 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 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 with 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. 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.

A cornerstone of the District's program is its water conservation regulation (Regulation XIV). This Regulation requires retrofit of inefficient plumbing fixtures to ultra-low flow fixtures at the time a property changes ownership, for new construction and remodels, and for commercial changes in use or expansion. 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 conditions of Water Permits or other approvals; (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 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.

A second key element was added in 1997 when the District began issuing rebates for voluntary toilet replacements with 1.6 gallons-per-flush toilets. The initial program shared funding with California American Water (Cal-Am). The rebate program has been expanded over the years and is now

funded by Cal-Am and administered by the District. Rebates are available for high efficiency toilets, low consumption dishwashers and washing machines, instant-access hot water systems, Smart (weather-based) irrigation controllers, soil moisture sensors, rain sensors, cisterns and other irrigation system components and non-residential retrofits.

Other components of the District's conservation program include an aggressive commercial retrofit program; the Expanded Water Conservation and Standby Rationing Plan (Regulation XV) to maintain water use with the limits set by the State Water Resources Control Board (SWRCB) Order WR 95-10 and the Seaside Adjudication Decision; 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 2008-2009

- **Conservation Inspections** -- District staff continued an intensive inspection program to ensure compliance with the conservation regulations; inspections focused on change of ownership requirements and new construction or remodel Water Permit requirements and conditions.

Transfer of title inspections make up the bulk of the District's inspection program. Most of the **1,524** properties that changed ownership from July 2008 through June 2009 (FY 08-09) were inspected for installation of ultra-low flow fixtures prior to the close of escrow. **Eighty-two percent (82%)** of the inspected properties were found to meet the conservation requirements during the first inspection. An additional 1% passed the second inspection, typically after replacing older toilets identified during the initial inspection. To establish 100% compliance with the retrofit requirements, staff continues enforcement until compliance is achieved.

Water saving equipment is required as a condition of Water Permits issued for new construction and remodels. District staff inspected **817** properties in this category to verify compliance with Water Permit conditions. Inspections included verification of conservation measures, such as drip irrigation and "instant-access" hot water (systems that make hot water available within six seconds), as well as installation of ultra-low flow fixtures and efficient irrigation systems throughout the property.

For the above two categories, a total of about **1,524** inspections were conducted from July 2008 through June 2009. An estimated **3.918** acre-feet (AF) of water is being saved each year by the retrofits verified for these two categories during FY 08-09.

- **Other Conservation Incentives** -- The District continued to offer incentives for property owners who agree to install state-of-the-art water appliances to offset new water fixtures as a condition of their Water Permit. Credit, in the form of water fixture units, remained available for installing ultra-low water consumption dishwashers and washing machines, High Efficiency Toilets (i.e. toilets using 1.28 gallons per flush on average), and "instant-access" hot water systems in remodels and additions. During 2008-2009, **344** property owners agreed to one or more of these conditions for credit. This incentive program is one way to allow limited remodeling and expansions in use without increasing water use.

● **Rebate Program --** In January 1997, the District enacted a program that offered rebates of up to $100 for every older residential toilet replaced with an ultra-low flow model. The program is co-funded with California American Water. Water saved through this program is set aside to reduce community water use. Initially designed to facilitate toilet replacements that might not otherwise occur for years, the program was expanded in 2003 to provide rebates for ultra-low consumption appliances, (HET) high efficiency toilets, and cisterns. In September 2007, the rebate program was amended to add rebates for smart controllers and sensors, and to increase the rebate amount for (HET) high efficiency toilets, ultra-low water consuming dishwashers, high efficiency clothes washers and instant-access hot water systems.

Between July 1, 2008, and June 30, 2009, an estimated **20.553** acre-feet of water was permanently saved by the rebate program. A total of **1,288** applications were received, and **988** applications were approved. Most denied applications were received from applicants located outside of the District or were for water fixtures that did not meet the program's criteria. The District and California American Water rebated **$8,998.81** for ultra-low flush toilets; **$33,550.42** for high efficiency toilets, and **$151,961.69** for ultra-low water consumption appliances (including zero water consuming urinals, hot water demand pumping systems, smart controllers and cisterns). The average refund per ultra-low flush toilet was **$99.99,** and **$149.11** was the average rebate for each High Efficiency Toilet. A breakdown of the refunds is as follows:

- In the Single-Family Residential sector, **949** rebate applications were approved. This included: Replacement of **90** toilets for an annual savings of **2.07** AF or **674,512** gallons per year; **225** High Efficiency Toilets were installed for an annual savings of **6.75** AF or **2,199,494** gallons per year; **109** high efficiency dishwashers were installed for an annual savings of **0.327** AF or **106,553** gallons per year; and **551** high efficiency clothes washers were installed for an annual savings of **8.265** AF or **2,693,159** gallons per year.

- In the Multi-Family Residential sector, **27** rebate applications were approved. This included rebates for **10** toilets with an annual savings of **0.23** AF or **79,946** gallons per year; **8** high efficiency toilets were installed for an annual savings of **0.24** AF or **78,204** gallons per year; **7** high efficiency dishwashers were installed for an annual savings of **0.021** AF or **6,843** gallons per year; and **9** high efficiency clothes washers were installed for an annual savings of **0.135** AF or **43,990** gallons per year.

- In the Non-Residential sector, **13** rebate applications were approved. Rebates included **5** toilets for an annual savings of **0.115** AF or **37,473** gallons per year; **79** high efficiency toilets were installed for an annual savings of **2.37** AF or **772,267** gallons per year; and **2** high efficiency clothes washers were installed for an annual savings of **0.03 AF** or **9,776** gallons per year.

● **Conservation Education** -- District activities remained focused on public education as a means of encouraging Peninsula residents and businesses to continue water conservation practices. Individual water waste education took place as necessary to remind water users not to wash sidewalks, leave hoses running or ignore leaks. The Expanded Water Conservation and Standby Rationing Plan has been successful in keeping community water use below the limits set by the State Water Resources Control Board.

The District also 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 and contributes annual financial and staff support. WAC provides books on water-efficient landscaping, drip irrigation, and other water related subjects to libraries in Monterey County, and provides numerous opportunities for the public to learn about local water issues.

The District participated in the Water Awareness Committee of Monterey County's 4th Annual Xeriscape Design Awards at the Monterey County Fair by judging the garden displays. Again in 2008, there was a water "passport" program (Water Adventure Travels). This program provided visitors with an opportunity to "earn while they learn." Various water-related booths gave visitors a stamp for visiting. By visiting all the related booths (and receiving stamps), visitors had an opportunity to participate in a drawing for several water saving prizes. Prizes included a High Efficiency washing machine, a dual-flush toilet, a SMART irrigation system controller and a $150 gift certificate.

District staff attended a "Water Conservation Practioner" workshop that covered conservation practices, ideas and technology. The information presented confirmed the success of the District's conservation policies and practices. Two District staff continued their training by testing and becoming certified Water Conservation Practioners.

District staff participated in numerous meetings with Cal-Am staff regarding implementation of the District's Expanded Water Conservation and Standby Rationing Program. Subjects included completion of landscape irrigation audits, public outreach, addressing distribution system losses and other topics related to conservation and contingency planning for possible future rationing. Representatives from Cal-Am and the District met in San Francisco to organize and coordinate ideas and future conservation budgets for Cal-Am's upcoming General Rate Case.

District staff partnered with Cal-Am, AMBAG, the Monterey County Hospitality Association, Marina Coast Water District, Soquel Water and Santa Cruz Water to design and printed linen and towel placards for a local reuse program. In addition, a restaurant table tent informing customers that water is provided only on request was developed. The Monterey Peninsula products were distributed by door-to-door visitations by District and Cal-Am staff. Additional distribution and messages of product availability were distributed by the MCHA.

District staff participated and handed out water conservation devices and information at Monterey Peninsula College's Earth Day Celebration. The public learned about the District's extensive activities and programs.

District staff attended a 2-day workshop on Commercial/Industrial and Institutional (CII) water conservation at the Food Service Technology Center in San Ramon. The class provided key concepts for CII audits and retrofits. Topics included: Food Service Operations, Process Water, Thermodynamic Processes, Laundry and Dry Cleaning Operations, Photo and Film Processing, Pools/Spas/Fountains, Medical Facilities and Laboratories, Vehicle Washes, Alternative On-Site Water Sources, and others. The intensive workshop was sponsored by the California Urban Water Conservation Council, East Bay Municipal Utilities District (EBMUD), Kennedy/Jenks Consultant

and the Food Service Technology Center.

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.

District staff gave presentation on the District's implementation of the State Model Landscape Ordinance. The presentation included how it was adopted and future plans for a possible regional revision. 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.

B. Water Distribution 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 permit program. A comprehensive listing of ordinance 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 Cal-Am 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. 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 finite water entitlements: Water West, a water company purchased by Cal-Am in the early 1990's has an independent allocation of water for properties within the boundaries of the former system. Properties located in the Quail Meadow's subdivision also have an independent entitlement of water.

● **Permit Activity** -- From July 1, 2008, through June 30, 2009, a total of **975** Water Permits were issued. As shown in **Table IV-1**, **20** new houses and **596** residential remodels/additions were permitted in the California American Water system. There were **31** non-residential Water Permits issued for remodels/additions and changes in use in the California American Water system. As of June 30, 2009, a total of **108.728 AF** of water remained available for use in the areas served by the Monterey Division of 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, 2008, the District had issued Water Use Permits allowing **68.600** 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 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 Cal-Am System to provide connections to, and potable water service for the use on and benefit of property located within Sand City. This rule enables the issuance of Sand City Water Use Permits for new and expanded water uses on Sand City sites, in a cumulative amount of no more than 206 acre feet per year.

● **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 Water Permits Issued

Main CALIFORNIA AMERICAN WATER System Permits Issued (July 2008-June 2009)			
Type of Use	No. of Permits	Use (acre-feet)	Average Use Per Permit (acre-feet)
PARALTA & PRE-PARALTA			
New Residential	20	3.150	0.158
*Pebble Beach Entitlements**	4	0.844	0.211
Residential Remodels/Additions	596	1.056	0.002
*Pebble Beach Entitlements**	17	0.879	0.052
New Non-Residential	1	4.800	4.800
*Pebble Beach Entitlements**	0	0	0
Non-Residential Remodels/Additions	31	0.442	0.015
*Pebble Beach Entitlements**	0	0.0	0

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

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 AF to 20,673 AF per year. The Cal-Am annual production limit of 16,744 AF (Option V from Finding No. 403 of the Final Water Allocation Program EIR; Ordinance No. 53) was revised to 17,619 AF, and the non-Cal-Am production limit of 3,137 AF was revised to 3,054 AF per year. This new water supply limit reflected the 385 AF of new water production 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 acre-feet and the non-Cal-Am annual production limit at 3,046 acre-feet, 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 AF/year.

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 acre-feet per year of production to the Community Hospital of the Monterey Peninsula. Ordinance No. 87 increased the total annual Cal-Am production limit to 17,641 AF/year, but did not change the non-Cal-Am limit. Thus, the new limit for the MPWRS as a whole is 20,687 AF/year.

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 2008-2009

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 2009 (October 1, 2008 through September 30, 2009) data.

As shown in **Table V-1**, total water produced within the Monterey Peninsula Water Resources System during WY 2009 was 16,336 AF, or 1,137 AF less (6% decrease) than the MPWRS production of 17,473 AF in WY 2008. Cal-Am's WY 2009 production of 13,099 AF was a decrease of 1,126 AF (8% decrease) compared to WY 2008. Non-Cal-Am WY 2009 production of 3,237 AF (including surface diversions) was a decrease of 11 AF (0.3% decrease) compared to WY 2008. In WY 2009, 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 2009 was 13,099 AF, or 74% of the 17,641 AF annual limit (4,542 AF lower than the limit). (**Table V-1**). Please refer to Section III-C for more information.

Regarding compliance with SWRCB Order WR 95-10, Cal-Am production from the Carmel River Basin in WY 2009 for the SWRCB tally was 10,286 AF. This number is derived from the 10,468AF Carmel Valley Cal-Am well total shown in **Table III-1**, minus the 182 AF that were injected into the Coastal Subareas of the Seaside Basin as part of the Seaside Basin ASR program that is under a separate permit from the SWRCB Order 95-10 tally. Thus, Cal-Am diversions were 999 AF (9%) below the 11,285 AF diversion limit from the Carmel River Basin imposed by the SWRCB[1]. WY 2009 was the 12th straight year in which compliance with Order WR 95-10 was achieved. A major purpose of the District's *Expanded Conservation Plan and Standby Rationing Program* is to ensure continued compliance with the Order. The community was in Stage 1 of the conservation program throughout the 2008-2009 reporting period.

B. Water-Use Trends

Description and Purpose

[1] It should be noted that the SWRCB adopted a new order on October 20, 2009, i.e., the "Cease and Desist Order", which included revised Cal-Am pumping limits for its diversions from the Carmel River system. Tracking of these new limits will be discussed beginning with the WY 2010 production data in next year's Mitigation Report.

Based on data provided by Cal-Am, District staff tracks water use (Cal-Am metered sales) over time to assess community water use trends. This can be 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 2008-2009

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 2009, as represented by consumption in AF per Cal-Am connection (AF/connection) for customers[2] 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 2009, the use per connection is based on Cal-Am's total metered sales[3] (11,515 AF) divided by Cal-Am's total customers (38,389) and equaled 0.300 AF/connection.

Water consumption per connection in WY 2009 was the lowest rate on record during the 1980- 2009 period, due in part to increased awareness of the need for conservation. Review of **Figure V-1** indicates that water use per connection for the last 21 years (1989-2009) 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 1989-2009, annual water consumption has remained relatively stable, with a range from approximately 0.30 to 0.40 AF/connection, and average of 0.346 AF/connection, compared to the average of 0.563 AF/connection for the 1980-1988 period. Notably, water consumption in WY 2009 (0.300 AF/connection) was 40% less than the pre-drought consumption in RY 1987 (0.503 AF/connection).

U/mpwmd/Allocation/RY09/V_usage_JOedit13aug10.doc
Finalized November 2010

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

[3] 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[4] IN THE MONTEREY PENINSULA WATER RESOURCE SYSTEM
Data from Water Years 2008 and 2009

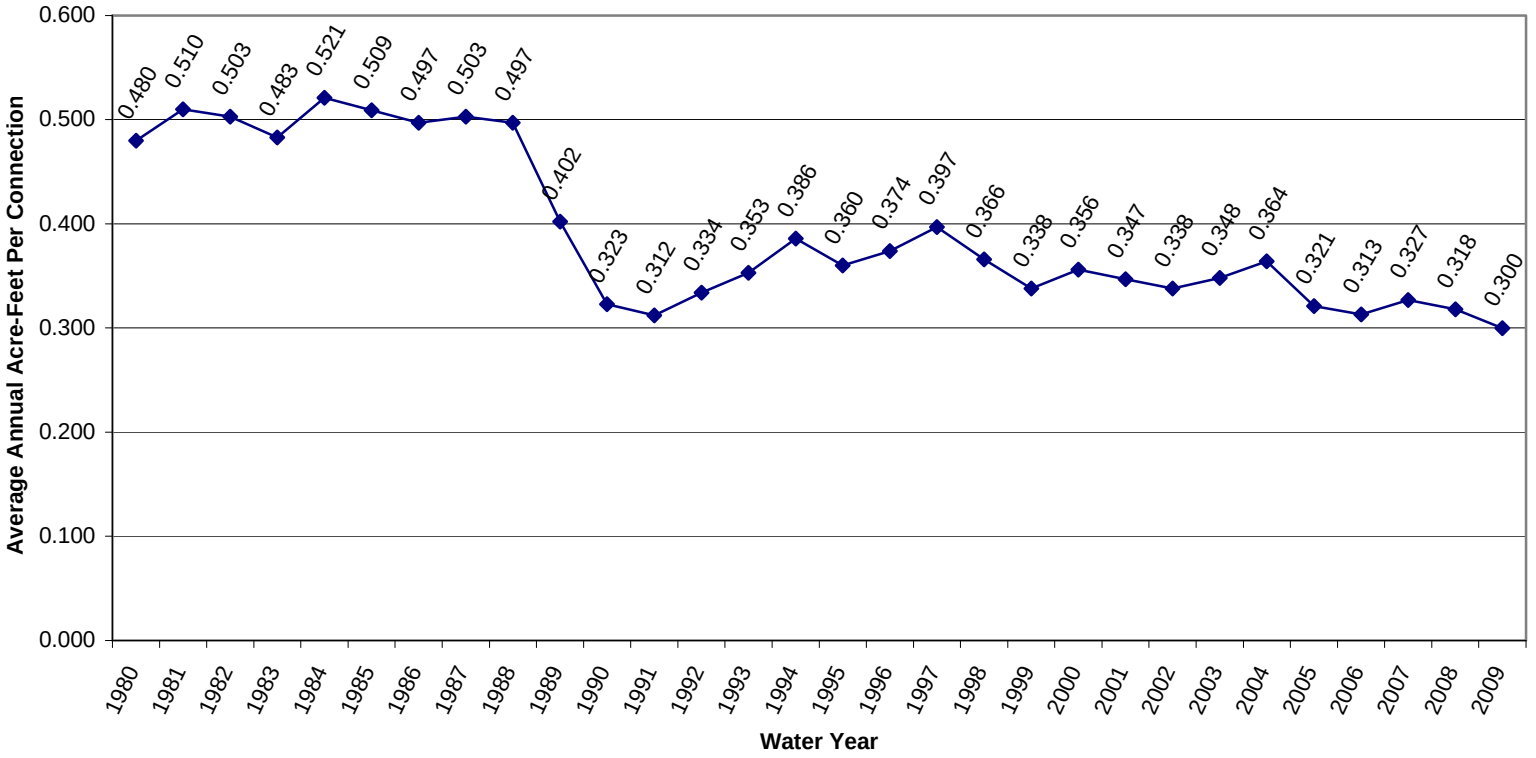
WATER USER	ALLOCATION LIMIT	WY 2008 PRODUCTION	% LIMIT	WY 2009 PRODUCTION	% LIMIT
Cal-Am	17,641 AF	14,225 AF	81%	13,099 AF	74%
Non-Cal-Am	3,046 AF	3,248 AF	107%	3,237 AF	106%
TOTAL	**20,687 AF**	**17,473 AF**	**84%**	**16,336 AF**	**79%**

Notes:
1. MPWRS includes production from the Carmel River and underlying Carmel Valley alluvial aquifer and Coastal Subareas 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

[4] 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 – 2009



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 2008 through June 2009 period.

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 2008 through June 2009. Please refer to quarterly water supply project updates in the January, April, July and October Board agenda materials for years 2008-2009 for additional information. District staff also makes monthly presentations 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 2009. 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 parties filed the requisite paperwork to be parties in this proceeding. The hearings in Sacramento were split into two parts:

- Part 1: June 19 and 20, 2008; focus on compliance with Order 95-10 and state water code.
- Part 2: July 23-25, 2008 and August 7-8, 2008; focus on content of CDO, and rationale for suggested 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 ASR Project. 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. 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 held monthly meetings since its formal commencement on April 5, 2006.

District staff sits on the Watermaster Technical 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 2008-2009: The Strategic Planning Workshop was held on February 13, 2008 to allow two new Board members elected in November 2007 to take office, receive committee assignments, and become more familiar with District programs. New goals and objectives were adopted at the February 28, 2008 Board meeting, as follows:

Goal: Determine and Participate in Long-Term Water Supply Solution(s)

- **LS1**: Present to the MPWMD Legislative Committee a briefing paper on the draft CDO.
- **LS2**: Recommend to the Board for action a MPWMD position on the Draft CDO.
- **LS3**: Lobby local, state and federal legislators and boards regarding the MPWMD position on the draft CDO.
- **LS4**: Prepare and coordinate testimony for the draft CDO hearing based on Board policy and direction.
- **LS5**: Refine and present to the Board the matrix of water supply alternatives (using the quantified supply target).

- **LS6**: Ensure that CAW presents updated water supply proposals, alternatives and timeline.
- **LS7**: Prioritize water supply alternatives.
- **LS8**: Ensure the remaining entities adopt a Memorandum of Understanding (MOU) for participation in the Monterey Bay Regional Water Solutions Task Force to evaluate regional water supply solutions.
- **LS9**: Provide technical support or guidance to the Monterey Regional Water Pollution Control Agency (MRWPCA) for its Groundwater Replenishment Project in the Seaside Basin.

Goal: Complete ASR Phase 1 and Expanded ASR Project(s)

- **ASR1**: Notify and make a presentation to the Watermaster, informing them of MPWMD's water storage rights.
- **ASR2**: Conduct a dual-well injection test and report results to the Board.
- **ASR3**: Achieve consensus with CAW on final MPWMD and CAW Phase 1 ASR facilities design, including a schedule.
- **ASR4**: Achieve consensus with CAW on the yield and schedule for the next phase of ASR expansion.
- **ASR5**: Complete negotiations with CAW for joint ownership of water rights to obtain future ASR and other water rights permit(s).

Implementation and Activities During 2008-2009

The following paragraphs describe action on the water supply objectives identified above in the July 1, 2008 through June 30, 2009 period, with discussion about events in early July 2009, if needed. For brevity, some objectives are consolidated. For clarity, background information is provided for certain objectives. The following paragraphs are organized as follows to represent the three major topics addressed by the Board:

- Draft CDO
- Water Supply Alternatives
- Complete ASR Phase 1 and Expanded ASR Project(s)

Draft Cease and Desist Order

Objectives LS1, 2 and 3: Brief Legislative Committee, Develop MPWMD Position on Draft CDO, and Advocate that Position

The MPWMD Legislative Committee was formed in February 2008, and was comprised of Directors Dave Potter, Bob Brower and Judi Lehman. A briefing paper was presented by staff and counsel to the committee on February 15, 2008, as scheduled. The Committee developed a position in opposition to the Draft CDO, which was approved by the Board via Resolution No. 2008-08 at its May 19, 2008 meeting. The Board approved a contract with a government relations consultant at its April 19, 2008 meeting. Legislative Committee members contacted elected representatives and SWRCB Board members, as allowed, and continued to remain involved in the CDO process throughout 2009.

Objective LS4: Prepare and Coordinate Testimony for the Draft CDO Hearings

Participation in the SWRCB hearing process was an intensive effort led by District Counsel. As directed by the Board, General Manager Darby Fuerst prepared written and oral testimony for the June 19-20, 2008 Part 1 hearing, accompanied by the District Engineer and District Counsel. A major effort by several members of District technical staff and Counsel in July and August 2008 included preparation of written testimony and many exhibits for the July 23-25 and August 8-9, 2008 hearings. District staff members provided direct testimony and were cross examined at length at these hearings. District Counsel and the General Manager, as directed by the Board, engaged in activities related to settlement negotiations and preparation of final briefs in October and November 2008, respectively. As of June 30, 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. Next year's report will address a series of events associated with the CDO in 2009-2010.

Water Supply Alternatives

Objective LS5: Refine and Present to the Board the Matrix of Water Supply Alternatives, using the Quantified Supply Target

The Comparative Matrix of Water Supply Alternatives is a spreadsheet used to compare various projects for subjects such as cost and financing, implementation timeline, water yield, environmental review, and others. The most recent update to the matrix was received by the Board at its March 17, 2008 meeting, as scheduled. It incorporated MPWMD consultant information received in February 2008 and suggestions from an ad hoc Community Advisory Committee (CAC) received in September 2007, Minor refinements were made to the matrix for the March 27, 2008 special workshop on water supply alternatives. Refer to the District website at:
http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2008/20080317/15/item15.htm and
http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2008/20080327/0327agenda_rev.htm.

The current matrix includes three shore-based desalination projects as well as preliminary information on the ship-based Seawater Conversion Vessels (SCV) technology, now known as the "Offshore Desalination Project" (ODP). The matrix also includes information on the MPWMD ASR Project and two projects featuring purified recycled water, one combined with desalination. Please review the 2007-2008 Mitigation Program Annual Report or the quarterly water supply reports to the Board for more detailed background information.

A key Matrix component addresses how well various projects meet the water supply targets adopted by the Board on April 16, 2007, based on a series of meetings in 2006 and 2007. The targets are 12,500 acre-feet per year (AFY) for existing needs and 4,545 AFY for future needs. Refer to the District website for more detailed information:
http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2007/20070416/14/item14.htm .

Objective LS6: Ensure That CAW Presents Updated Water Supply Proposals, Alternatives and Timeline

Coastal Water Project: The major components of CAW's proposed Coastal Water Project (CWP) are a seawater desalination plant in Moss Landing at the Moss Landing Power Plant; a desalinated water conveyance system to the Monterey Peninsula, including a transmission pipeline, terminal reservoir and pumping stations; and an ASR project in the Seaside Groundwater Basin. The yield goal for the "basic project" is defined as 11,730 AFY to: (a) provide 10,730 AFY to replace CAW's Carmel River withdrawals to comply with SWRCB Order WR 95-10, and (b) 1,000 AFY to help alleviate over-pumping in the Seaside Groundwater Basin. CAW Vice President Tom Bunosky made a presentation to the MPWMD Board at its March 27, 2008 Special Workshop on the current regulatory situation, CAW efforts on the CWP, and updated timelines. Project completion is not envisioned until late 2015 or early 2016. The CAW presentation is on the MPWMD website at: http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2008/20080327/ppt/1_files/frame.htm. A special MPWMD meeting was held on October 30, 2008 which focused on coordination with CAW regarding water supply issues. Information is available on the District website at: http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2008/20081030/1030agenda.htm.

The CPUC, as lead agency, released the Draft EIR on the proposed CWP in late January 2009. The Board held a special workshop on March 16, 2009 to hear a CPUC staff presentation on the DEIR, receive initial technical comments by MPWMD staff, and provide initial impressions by individual Board members. Consolidated MPWMD comments were submitted to the CPUC by the April 15, 2009 deadline. On April 16, 2009, Director Brower and District staff participated in a tour of CAW's pilot desalination project at the Moss Landing Power Plant. Test results will be used to refine the proposed desalination project design for the CWP.

District staff also attended several public meetings on the CWP and alternatives. In a March 26, 2009 joint ruling, the CPUC Administrative Law Judge and the Commissioner assigned to the CWP set a schedule that includes placing the final decision on the project on the CPUC's March 2010 agenda. For reference, the materials for the March 16, 2009 special meeting may be viewed at: http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2009/20090316/0316agenda.htm. It is also notable that public participation hearings hosted by the CPUC in Monterey were conducted on July 13 and 14, 2009.

Regional Project: District staff and Director Lehman also participated in monthly meetings of various stakeholders that led to development of the "Regional Project," which is analyzed in detail as an alternative in the Coastal Water Project DEIR. The Regional Project description has evolved over time, but consists of various project components including water conservation, City of Sand City Desalination Facility using brackish water, Regional Urban Water Augmentation Program (RUWAP) using recycled water, Aquifer Storage and Recovery (ASR) Project using Carmel River water, Salinas River Diversion Facility using Salinas River water, and a Regional Desalination Facility in the North Marina area using seawater-intruded groundwater from the Salinas Valley Groundwater Basin. As currently proposed, the Phase 1 Regional Project is designed to produce 15,200 acre-feet per year of potable water supply; a Phase 2 project would meet regional growth needs. At its February 26, 2009 meeting, the Board considered a request by WFMCC to formally express support for the Regional Project as the best solution, and urge the CPUC to encourage CAW to forgo the CWP and agree to purchase water from the Regional Project. The Board determined such a decision should await certification of the Final EIR.

On March 18, 2009, CAW and MCWD executed a Memorandum of Understanding (MOU) regarding data sharing for environmental review of the proposed CWP and Regional Project. Under the MOU, CAW and MCWD agreed to work together to expedite the selection and implementation of a water supply project to address the Monterey Peninsula's water needs and insure that the CPUC is provided with complete comments and information on which to make an informed decision.

On April 1, 2009, Jim Heitzman, MCWD General Manager, made a presentation on the status of agreements in progress for the Regional Project. These agreements between and among MCWD, Monterey Regional Water Pollution Control Agency (MRWPCA), Monterey County Water Resources Agency (MCWRA), Monterey County, and CAW were in various stages of completion as of June 30, 2009.

Beginning in December 2008, at its regular monthly meetings, the Board received an oral report by CAW's General Manager, which provides an opportunity to pose questions about water supply issues. On April 22, 2009, CAW announced a new president, Robert MacLean. Mr. MacLean attended the District Open House on May 14, 2009, and has met or conversed with the MPWMD General Manager many times since then regarding water supply issues.

Objective LS7: Prioritize Water Supply Alternatives (and Pursue Priority Project)

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. Options included the Coastal Water Project and regional alternatives; an 8,400 AFY MPWMD Seawater Desalination Project in the Sand City/Fort Ord area; and offshore, ship-based desalination facilities. The Board directed staff to revive pursuit of the MPWMD desalination project, 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. The Board also directed staff to develop a scope of work and cost estimate for engineering and environmental consultant contracts associated with the certifying a Final EIR for the Project, to be considered at the April 21, 2008 Board meeting. Given uncertainties and disagreement about the feasibility of the project, the Board authorized retaining consultants to prepare a Phase 1 Constraints Analysis report before committing significant funds and resources towards evaluation of the project in an EIR. The overview of the MPWMD 95-10 Project, initial discussion of setting priorities, and information for the April 21, 2008 meeting may be viewed at the MPWMD website at:
http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2008/20080327/02/item2.htm;
http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2008/20080327/03/item3.htm; and
http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2008/20080421/23/item23.htm.

The District consultants presented their Constraints Analysis for the MPWMD 95-10 Project at the August 18, 2008 Board meeting. This analysis identified significant impediments to the MPWMD desalination project feasibility, and ranked various seawater intake and brine disposal sites and technologies. The Board directed that additional work be performed to address three specific policy issues related to the feasibility of implementing the project in the former Fort Ord coastal area, with a report due in October 2008. The report was presented as scheduled. The Board then directed the consultant to develop a scope of work, cost and timeline for the next phase of technical and environmental studies, with a focus on the Bunker and Stilwell sites, for presentation at the

December 8, 2008 meeting. Also, the Board directed that its Legislative Committee should meet and develop a plan to confer with agencies that have jurisdiction over land or resources that would be needed to accomplish the project. Based on the scope and costs of the detailed plan presented on December 8, 2008, the Board directed staff to describe alternative approaches to investigating the project, including proceeding first with the hydrogeologic investigation, but not the engineering portion of the project until the hydrogeologic studies are completed. The results of the field studies would determine the best course of action. More information is available on the District website at:
http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2008/20080818/16/item16.htm
http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2008/20081020/17/item17.htm
http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2008/20081208/16/item16.htm
http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2009/20090129/20/item20.htm

Staff and consultant efforts in January-June 2009 focused on obtaining a variety of permits needed to conduct the hydrogeologic field tests at the most promising sites for desalination intake facilities located within Fort Ord Dunes State Park. The federal Right-of-Entry permit was obtained for test wells on March 25, 2009. However, in April 2009, staff learned that a Coastal Development Permit (CDP), or waiver from obtaining a CDP, was needed from the California Coastal Commission (CCC). On June 25, 2009, the CCC issued a proposed waiver, which was ratified at its meeting of July 9, 2009. The County of Monterey also completed its approval form that same week. These permitting delays meant that field work could not begin until September 2009 due to previous scheduling commitments by the hydrogeologic consultant.

Objective LS8: Ensure the Remaining Entities Adopt an MOU for Participation in the Monterey Bay Regional Water Solutions Task Force to Evaluate Regional Water Supply Solutions

Throughout the year, MPWMD staff coordinated with other entities on regional water supply solution opportunities in a variety of settings. The original concept of the Monterey Bay Regional Water Solutions Task Force has evolved, but the consistent goal remains regional cooperation towards a sustainable water supply. The District has consistently coordinated with MRWPCA, MCWRA, MCWD and other entities on regional water supply solution opportunities. The District General Manager continues to participate in Monterey County-led meetings of a Managers Working Group comprised of water/wastewater districts and cities from the Monterey Peninsula and north Monterey County, including the northern Salinas Valley, regarding a potential governance structure for a regional water supply planning entity currently known as the Monterey Bay Regional Water Authority (MBRWA).

On June 5, 2009, the District received a response to its May 14, 2009 request to be included in the planning process for the proposed Regional Water Supply Program. The response suggested a joint meeting of the managers of MPWMD, MRWPCA, MCWD and MCWRA to discuss the request and consider options. District efforts to be fully involved with regional planning will be addressed in next year's report. .

On June 16, 2009, the District General Manager testified at the Monterey County Board of Supervisors' meeting in support of staff's recommendation to approve the Cooperative Planning and Joint Analysis Memorandum of Understanding (Planning MOU) for a Monterey Regional Water

Supply Program. The purpose of the Planning MOU is to provide a common framework to conduct planning-level analyses for the proposed Regional Water Supply Project as an alternative to the Coastal Water Project. A draft Planning MOU was approved with minor changes by the Board of Supervisors.

Objective LS9: Provide Technical Support or Guidance to MRWPCA for its Groundwater Replenishment Project in the Seaside Basin

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 are underway to determine whether a similar type of project is feasible in the Seaside Basin east of General Jim Moore Boulevard. 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.

At its September 26, 2008 meeting, the District Board determined it would hold a joint meeting with the MRWPCA Board in October 2008 to discuss partnership opportunities on a joint project. 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. At its November 17, 2008 meeting, the District Board established a three-member ad hoc Water Supply Planning committee to develop an MOU with MRWPCA regarding roles and responsibilities related to water supply planning in the Monterey Peninsula area. The Ad Hoc Water Supply Planning Committee met on December 9, 2008, reviewed a draft charge, and requested that it be revised. A revised charge was adopted at the January 29, 2009 meeting.

Also 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 managers of the two agencies are to regularly meet to discuss matters of common interest, and the governing bodies of the two agencies are to hold joint meetings as needed. 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

ASR Phase 1 and Expanded ASR Projects(s)

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 through existing CAW facilities and injecting the water into the Seaside Groundwater Basin for later recovery in dry periods. The Phase 1 ASR Project is comprised of a pre-existing full-scale test well (Well #1) at the

Santa Margarita site in addition to a new, second ASR well (Well #2) immediately adjacent to the first well site. The two wells would be 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. The well construction was finalized in May 2007. Key support facilities such as a new well pump and motor, electrical conduits, percolation basin, pipes and valving, were completed by mid-2008. Please see last year's Annual Report for background information on water quality and financing.

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 Objective ASR5 below for more information on water rights.

Objective ASR1: Notify and Make a Presentation to the Watermaster, Informing Them of MPWMD's Water Storage Rights

This objective relates to the fact that the Seaside Basin Watermaster is the Court-appointed entity with authority over storage and extraction rights of water in the Seaside Basin. A legal opinion on MPWMD and CAW's right to store water injected into the Seaside Basin via the Phase 1 ASR Project and potential future projects was prepared by General Counsel in 2007. A presentation was made in 2008 to the Watermaster Technical Committee. Confirmation of these rights was needed to facilitate dual well testing using non-Carmel River sources (see Objective ASR2 below).

Objective ASR2: **Conduct a Dual-Well Injection Test and Report Results to the Board**

Typically, the Phase 1 ASR well testing would use Carmel River water, as allowed by the SWRCB permits. Lack of flow in the Carmel River or access to flow during certain periods, combined with operational constraints in the CAW system, resulted in the inability to test the Phase 1 ASR project at full capacity (i.e., Well #1 and #2 operating together). Thus, District staff has been working with MCWD and MCWRA since 2007 to use treated water from the MCWD distribution system to support a "dual-well" injection test for roughly two weeks at the Phase 1 ASR site. Agreements with MCWD and MCWRA were approved by all parties in 2007-2008.

The actual dual-well test was originally scheduled for completion by September 30, 2008, subject to

completion of several required actions. Assuming 3,000 gallons per minute of flow, these tasks included: (1) make a temporary physical connection between the MCWD system and the ASR site; (2) complete the ASR Well #1 rehabilitation work and Well #2 development work; and (3) provide geochemical modeling results for review and approval by the Regional Water Quality Control Board (RWQCB). These tasks took longer than expected due to additional review requested by the RWQCB, a materials shortage associated with the motor for Well #2, MCWD information requests, and service interruptions associated with road grading and water pipeline installation for the General Jim Moore Boulevard realignment in the area of the test site.

In cooperation with MCWD and MCWRA, MPWMD successfully completed a test in late January 2009 to divert approximately 69 AF from the MCWD system for roughly two weeks to run the ASR project at full capacity. Through June 2009, District staff and consultants analyzed data collected in the dual–well injection test. These results will be incorporated into the WY2009 ASR operations report, scheduled for completion in late 2009.

Objective ASR3: Achieve Consensus with CAW on Final MPWMD and CAW Phase 1 ASR Facilities Design, Including a Schedule

The ability of CAW infrastructure to support the Phase 1 ASR Project at full capacity has been challenging. In 2006, CAW indicated that a temporary pipeline along the west side of General Jim Moore Boulevard would enable delivery of diverted water for full capacity injection. However, in April 2007, CAW consultants stated that an improved CAW pipeline from Carmel Valley as well as a new pipeline into Monterey is needed for full use of the Phase 1 ASR facilities.

In 2008-2009, District and CAW staff and consultants continued to meet to address current and future demands on the CAW system from a hydraulic and engineering perspective. A related task is to balance near-term operations and ASR needs with longer-term plans by CAW to construct the Coastal Water Project.

The District and CAW met at the Phase 1 ASR site in late April 2009 to review progress on completion of facilities and to discuss potential design enhancements for compatibility with proposed Coastal Water Project ASR facilities. On June 23, 2009, District staff participated in a meeting with representatives of CAW and the CPUC Division of Ratepayer Advocates in San Francisco. The meeting was called by CAW to provide an update on its plans and activities for system improvements that will allow full use of the District's Phase 1 ASR Project wells.

In late June 2009, CAW General Manager, Craig Anthony, provided District staff an update on the status of CAW's planned water pipeline installation in the City of Del Rey Oaks. This pipeline is needed to facilitate the design injection water delivery rate to the Phase 1 ASR Project site (up to 3,000 gallons per minute [gpm]) as compared to the 1,000 gpm possible with current facilities. The completion goal was by December 2009, the beginning of the 2009-2010 injection season. District staff wrote letters of support and attended hearings before the City of Del Rey Oaks to speak in support of the CAW pipeline. However, due to CAW's concerns regarding the requirements that would be imposed by City of Del Rey Oaks, and the inability for CAW to recover the costs associated with these requirements, CAW indicated in July 2009 that the project may be jeopardized

or significantly delayed. As described in next year's report, this issue was resolved later in 2009 and the pipeline went forward.

In late May and early June 2009, District staff and consultants submitted application materials to the City of Seaside Board of Architectural Review (BAR) and met with city planning staff regarding the planned new "Chemical/Electrical" building that is to be constructed at the Phase 1 ASR site on the east side of General Jim Moore Boulevard. The submittal included architectural sketches of two design options for the building and the entry gate to the facility. The application was considered by the Seaside BAR on June 18, 2009. The BAR added several conditions to their selected Spanish-style design option in order to blend the design with the surrounding area. The site's water use for landscaping will be provided through an existing service connection with the Marina Coast Water District (the water service provider for the former Fort Ord). The building was approved by the Seaside City Council later in 2009.

Regarding financing, the Board determined that the project could be funded on a pay-as-you-go basis at its November 19, 2007 meeting. On November 17, 2008, two actions were taken to re-authorize the 1.2% existing water use fee used to fund ASR facilities and related water supply projects, including passage of an Ordinance. More information is available on the District website at: http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2008/20081117/12/item12.htm http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2008/20081117/13/item13.htm.

Objective ASR4: Achieve Consensus with CAW on the Yield and Schedule for the Next Phase of ASR Expansion

As described above, efforts to date have focused on the Phase 1 ASR Project. However, meetings continue between District and CAW staff/consultants regarding future ASR phases. District staff has provided computer simulations to CAW and reviewed CAW technical reports on a conceptual plan for expanded ASR.

In May 2009, MPWMD received a license agreement from the Monterey Peninsula Unified School District for a dedicated monitor well site on the Fitch Middle School property in Seaside. This monitor well installation, planned for completion in Fiscal Year 2009-2010, will serve the dual purpose of providing exploratory hydrogeologic data for potential future ASR project expansion and satisfying requirements for offsite "far-field" water-quality monitoring associated with the California Regional Water Quality Control Board's oversight of the Phase 1 ASR Project.

Also in May 2009, District staff submitted application materials seeking grant monies for expansion of 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. Successful applicants are to be notified of grant awards in July 2009, and grant funds must be spent by September 30, 2011.

Objective ASR5: Complete Negotiations with CAW for Joint Ownership of Water Rights to Obtain Future ASR and Other Water Rights Permits

In 2006, the District and CAW finalized a Management and Operations Agreement (MOA) regarding ASR testing, mutual aid, cost-sharing, water rights and other issues. This agreement includes provisions for sharing rights for the Phase 1 ASR project and to negotiate additional agreements for acquiring and sharing ownership of water rights for present and future potable water supplies for the Monterey Peninsula area. In 2007, efforts focused on securing water rights for the Phase 1 ASR Project. Efforts for Phase 2 ASR water rights began in 2008, but were limited due to the focus on the Draft CDO. Please review last year's report for more detailed background information.

On June 30, 2008, the District submitted a Petition for Change to its existing Permit #20808B to serve a Phase 2 ASR Project, conceptually viewed as a second set of two wells, 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 a protest deadline of February 19, 2009. Three entities filed protests: CAW, National Marine Fisheries Service (NMFS), and the Carmel River Steelhead Association (CRSA), whose protest was initially not accepted by SWRCB. District staff responded to the CAW and NMFS protests in March 2009. The multi-month effort to obtain a settlement agreement with CAW and NMFS began in mid-2009. For reference, the SWRCB accepted CRSA's protest in August 2009, and the District responded to that protest in October 2009.

District staff also coordinated with CAW and SWRCB staff regarding water rights associated with the New Los Padres Reservoir Project (issued in 1995). The reservoir water rights are relevant because they are the basis for the Petitions for Change described above. In 2006, the District requested an extension of time for the reservoir permits to maintain the water rights associated with them, and responded to five objections that were filed by: CAW, NMFS, CDFG, CRSA, and Esselen Tribe of Monterey County. No agreements on terms and conditions for approval to extend the permit have been developed to date.

Other Related Action

Other District efforts relevant to overall water supply include:

- Conduct technical studies as a consultant to the Watermaster;
- Lead 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;
- Participate in evaluation of seismic retrofit of San Clemente Dam, including assessment of dam removal and rerouting the river.

B. Near-Term Water Supply Projects

Description and Purpose

Section VI-A above describes long-term water supply alternatives, including the MPWMD Phase 1 ASR Project. This section focuses on annual ASR testing. Since 1996, the District has evaluated the feasibility of ASR at greater levels of detail, including obtaining annual temporary water right

permits from the SWRCB to divert excess water from the Carmel River Basin through existing CAW facilities and inject it into the Seaside Basin for later recovery in dry periods. To date, the District has constructed two test 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; and (2) a 720-foot deep, full-scale test well into the Santa Margarita Formation in March 2001. Injection now primarily occurs at the MPWMD Santa Margarita Test Injection Well (now called ASR Well #1) located on the former Fort Ord military base, just east of General Jim Moore Boulevard near Eucalyptus Avenue. Water Year 2008 was the first year where Carmel River diversions were based on a long-term water rights permit rather than a temporary urgency permit. MPWMD submits detailed annual reports to the SWRCB after each testing season.

Implementation and Activities During 2008-2009

Between Water Years (WY) 1998 and 2008, the District injected approximately 1,936 AF of excess winter flow from the Carmel River Basin into the Seaside Basin via the two wells described above. During this period, 1,139 AF was recovered and delivered to the community via the CAW system as part of the test program.

The permitted diversion period began on December 1, 2008, but Carmel River streamflow did not allow diversions to ASR Well #1 until February 17, 2009. Diversions continued until the week of March 30, 2009, when CAW system constraints and declining streamflow halted the program. Diversions in the 2009 season through April 9, 2009, totaled 182 AFY, which is a significant increase as compared to the 60 AF injected in WY 2008. Thus, the total amount diverted and injected is 2,117 AFY through WY 2009. When in operation, about 1,000-1,100 gpm are injected (roughly 4.5 AF/day). MPWMD staff also continued its ongoing ASR monitoring program.

VII. ALLOCATION OF NEW WATER SUPPLY

The Water Allocation Program requires that each new water connection or expansion in 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 water 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 acre-feet that was allocated to the District Reserve, 34.72 acre-feet remained and was distributed equally (4.34 acre-feet) among the jurisdictions.

Implementation and Activities During 2008-2009

Since the Paralta Well allocation became available in August 1993, a total of 307.298 AF of the 342.72 AF Paralta Well allocation had been permitted for use by jurisdictions through June 30, 2009, leaving a total of 35.422 AF remaining, or 10.3 percent of the jurisdictions' Paralta well allocation (**Table VII-1**). Pre-Paralta credits from expired or canceled Water Permits ("pre-Paralta credits") are credited 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 the status of water allocations to the jurisdictions as of June 30, 2009. The "changes" columns in the table refer to the month of June 2009 only; the "remaining" columns refer to the quantities that are available for use by the jurisdictions according to District rules. A total of 108.728 AF was available from all sources for Jurisdiction use as of June 30, 2009.

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.

U/mpwmd/Allocation/RY09/vii_allocation.doc
Finalized November 2010

Table VII-1

MONTHLY ALLOCATION REPORT
Reported in Acre-Feet
June 30, 2009

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	0.015	50.659	0.000	0.332	38.121	0.000	6.619	7.266
Monterey County	87.710	0.000	9.901	13.080	0.000	0.497	7.827	0.000	2.424	12.822
Pacific Grove	25.770	0.000	0	1.410	0.000	0.048	15.874	0.000	2.404	2.252
Sand City	51.860	0.000	0.000	0.838	0.000	0.000	24.717	0.000	23.373	23.599
Seaside	65.450	0.000	18.885	34.438	0.000	34.438	2.693	0.000	1.498	54.821
TOTALS	342.720	0.000	44.157	101.946	0.000	37.577	85.391	0.000	37.911	108.728

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 2008-2009

In 2009, District staff determined that approximately **27,220 acre-feet** (AF) of usable storage were required on May 1, 2009 to avoid requesting a District-wide voluntary 15 percent reduction in water demand. Similarly, approximately 21,340 AF were required to avoid imposing mandatory 20 percent water rationing. Given that actual, usable storage on May 1 was estimated at **30,900 AF**, no demand reductions beyond existing Stage 1 restrictions were necessary for 2009 based on physical water availability. The 2009 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 95-10 (11,285 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 (3,462 AF), and the non CAW water production limit that was specified in the District's Water Allocation Program (3,046 AF). The 2009 trigger value for requesting voluntary 15 percent water conservation (27,220 AF) includes the water demand for the remainder of the current water (9,420 AF) and one full year of carryover storage (17,800 AF).

IX. STEELHEAD 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 2008 rescue season are included in this report and the results for the 2009 rescue season, i.e., May through September 2009, will be included in next year's report.

A. Capture and Transport Emigrating Smolts in 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 fresh water 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 2008-2009

Between July 2008 and mid-February 2009, the Carmel River at the Highway 1 Bridge was dry. February and March storms briefly raised the mean daily streamflow to 2,000 cfs before it slowly dropped back to 20 cfs in late May and 10 cfs by mid-June **(Figure IX-1).** By late June 2009, the river was dry again at Highway 1. These flows allowed for a full length smolt migration period of 4.5 months, and provided good conditions for the emigration of smolts from the lower Carmel River into the Lagoon. No smolts were captured during regular rescue operations in June 2009 **(Figure IX-2).**

B. Prevent Stranding of Fall/Winter Juvenile Migrants

Description and Purpose

As in other central California streams, juvenile steelhead in the Carmel River move downstream into lower reaches of the river well ahead of the peak emigration of smolts. Depending on river conditions and diversions during the previous dry season, there is some risk that pre-smolts and other juvenile steelhead will be stranded following early fall and winter storms, which increase flows and stimulate the fish to move downstream into habitats that are subsequently dewatered after the storm peak passes. This risk occurs primarily from October through February, although during severe

droughts, the risk period may extend into March. The District mitigates this problem by capturing and transporting juveniles when necessary during the high-risk period 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 2008-2009

District staff monitored river conditions during the fall and winter months of the 2008-09 reporting year (RY 2009). Mean daily streamflow below San Clemente Dam remained low; between about 5 and 10 cfs from October 2008 to mid-January 2009 (**Figure II-4**). A mid-February storm raised the daily flow to about 1,000 cfs. Continuous seasonal streamflow returned to the MPWMD gaging station at Highway 1 on February 15, 2009 **(Figure IX-1)**. The highest average daily discharge at the Highway 1 gage was 1,970 cfs, reached in early March. 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 in 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 2008-2009

- **MPWMD Annual Rescue Totals –** The surface flow of the Carmel River dropped to 10 cfs at the Highway 1 Bridge by May 13, 2008. In response to the decline in surface flow, District staff began rescues on May 14, 2008 and these efforts continued through September 6, 2008. During these months, staff conducted 57 rescue operations, yielding a total of 84,322 fish including 83,836 young-of-the-year (YOY), 83 older juveniles, 1 smolt, 1 adult and 401 mortalities **(Table IX-1a)**. Compared to previous rescue seasons, rescue totals in the 2008 dry season were the highest recorded number of steelhead rescued between 1989 and 2008, more than twice as many as the next highest year, 2003 **(Figure IX-3)**.

- **2008 Dry Season, MPWMD Transplant Location –** During the 2008 dry season, juvenile steelhead rescued by MPWMD were transported and released at 11 different locations within the Carmel River watershed. **(Table IX-1b)**. Staff released fish into the District's SHSRF (48,024), various locations along the Carmel River (26,283), and the Carmel River Lagoon.

- **CRSA Annual Rescue Totals –** During the 2008 dry season, April through September, a total of 24,818 steelhead were rescued from Carmel River watershed by the Carmel River Steelhead Association (CRSA), including 14,744 from the mainstem and 10,074 from the tributaries. The total number rescued included 24,650 YOY, 163 older juveniles, 5 adults and 436 mortalities.

- **2008 Dry Season, CRSA Transplant Location –** During the 2008 dry season, juvenile steelhead rescued in the mainstem by the CRSA, were transported and released into Garland Park (2,452), Camp Stefani (1,180), Knootz property (1,357), Carmel River Lagoon (9,688) and the Pacific Ocean (4). Juvenile steelhead rescued in the tributaries were released in the mainstem at the confluence of that tributary (10,074). The mortality of rescued and transported fish was 1.76% (436).

- **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.

Facility Modifications in Reporting Year 2008-2009 - In late 2008, Tank 3, the 22-foot diameter holding tank, was outfitted with a large recirculating 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.

Summary of 2008-2009 SHSRF Fish Stocking and Releases - Steelhead rescues began in May 2008. Between May 14 and July 30, 2008, staff received approximately 46,635 rescued fish at the Facility **(Table IX-2)**. All fish were quarantined then placed in the rearing channel (RC). This was by far the greatest number of fish brought to the Facility since it opened in 1997 (39%

more fish than the second highest year, 2003), resulting in record stocking densities of up to 4,900 fish per rearing channel pool. All incoming fish were separated into three general size classes and placed into the appropriate pools, generally filling each RC bay in an upstream to downstream manner. Staff's original 2008 goal was to have a maximum of 3,000 small fish and 1,000 larger fish per pool. But due to the record number of young-of-the-year fish being rescued, NMFS and CDFG decided to test out the maximum stocking density of the channel and most pools continued to get additional fish for weeks after their initial stocking. Of the total, 43,106 "small" (~ 1.0 to 2.5 inches at stocking) YOY fish were reared in 11 RC pools, 3,502 "large" (~2.5 to 3.5 inches) YOY fish were reared in two RC pools, and 27 large 1+ year old fish were reared in one RC pool. This year was unusual with the very low number of rescued large, older juvenile fish.

During the 2008 nine-month holding period, 20% of the Facility's fish died as a result of disease, stress, or general poor health, and 49% were unaccounted-for mortalities, potentially through fish predation due to the high stocking densities. This compares to 2007, when there were 60% disease mortality and 14% unaccounted-for fish, and the 13-year average of 22% disease morts and 39% unaccounted-for morts.

Subsamples of fish were measured in: (1) early June (first batches brought to the Facility), (2) in mid-October (to correspond to the juvenile population surveys the District does each year in the Carmel River), and (3) in December from each rearing channel bay as fish were being released back into the Carmel River **(Figure IX-4)**. The October subsample of Facility fish only included fish that could be captured with a dip net. It did not include any of the larger 1+ age juveniles, or the hard-to-catch fish that live in the riffles. The December data includes subsamples of all fish groups from the RC. The rapid growth of the majority of fish in the RC is clearly shown in the graph, as incoming fish averaged 79 mm fork length (FL) in June and they doubled in size to 150 mm (FL) by December. In an effort to decrease the amount of fish predation in the RC, all fish were fed large quantities of dry, pelleted feed, supplemented by frozen krill, the naturally occurring benthic macro-invertebrates (BMI) in the channel's substrate, and flying insects killed by overhanging bug zappers. This abundant feed mix allowed many of the more aggressive fish to grow quite large and, in conjunction with the high density of stocking, may have actually contributed to the high percentage of "unaccounted-for" fish (49%). Because these are wild fish, not hatchery stock, individual fish can behave quite differently from each other. 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 feed and thus stay much smaller. Due to the "natural" RC habitat (riffles and pools, cobbled bottom, boulders, logs, etc.) the fish can not be graded into different sizes once they have been stocked in the channel. Large fish are free to roam back and forth within each bay and small fish must keep hidden to avoid being eaten.

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 October 2008 Facility fish to the October 2008 population survey results from the Sleepy Hollow and Garland Park stations **(Figure IX-5)** clearly show that the subsample of Facility fish are larger on average than their wild counterparts (122 mm FL versus 78 mm FL and 101 mm FL, respectively).

In December 2008, with several large storms threatening to raise the river and the high risk of pump failure and/or extremely turbid water from the effects of the 2008 Basin Complex Fire, staff decided to remove all the fish from the RC. Most fish were in excellent physical condition, and ranged in size from approximately 3 to 11 inches, mostly in the 5-7 inch range **(Table IX-3)**. A total of 11,101 small to medium sized YOY fish were released from the RC back into the lower Carmel River between Garland Park and CAW's Manor Well **(Table IX-4)**. The largest 3,620 YOY and the 1+ age juveniles were moved from the RC to Tank 3 and held an additional three months until February 2009, then released into the lagoon.

The overall survival rate of fish held at the Facility in 2008 was 32%, slightly below the Facility's 13-year average of 39%. This lower survival rate was probably because of the high rate of intraspecies predation over the long holding period, likely due to the very high stocking densities.

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, (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.

- **Winter Steelhead Adult Run** - The fish counter was operated continually between January and May 2009. The video monitoring equipment was reinstalled and operated between February 14 and May 18, 2009. As of May 1, 2009, a total of 95 fish passed by the counter, including 37 in February, 47 in March, 10 in April, and one in May **(Figure IX-6)**. The 2009 run was the second smallest during the 1994-2009 period that fish have been reliably counted using the District's continuous mechanical counter **(Figure IX-7)**. It is important to note that because of the late rains, the lagoon did not breach until mid-February, resulting in a loss of approximately two months of the usual migration period. In addition, flows in the lower river dropped below 40 cfs by early May, further shortening the adult migration period to less than three months of unrestricted movement.

- **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 Valley. In the spring of both 2007 and 2008, one thorough survey pass was completed between the Highway 1 Bridge and San Clemente Dam.

Summary of 2009 Redd Survey: In early April 2009, staff walked the Carmel River from the Highway 1 Bridge (River Mile 1.1) to San Clemente Dam (SCD) (River Mile 18.6). 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 this year; 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.

Overall, spawning habitat in the lower river below the Boronda Road Bridge (RM 12.7) was very good with abundant clean gravel available, even to the lower end of the Rancho Canada Golf Course reach. In fact, the lower river spawning habitat, in both quality and quantity, was the best that staff has seen in over 15 years. Conversely, very little gravel was observed between SCD and the SHSRF (RM 17.6), despite the addition of large amounts of spawning gravel to this reach by MPWMD between 1994 and 2004. High flows have moved most of the gravel downstream over time. Between the SHSRF and Boronda Bridge (RM 12.7), spawning gravel was generally sparse and patchy.

Between the Highway 1 Bridge and SCD, 39 redds, one adult, four smolts, approximately 20 small juveniles, and a few fry were observed. Of these totals, eight redds were counted downstream of Robinson Canyon Bridge (RM 8.5). Unlike 2008, a few smolts and fingerling size steelhead were observed throughout the reach, but very few fry were seen. The difference is likely due to this year's mid-February river mouth opening, allowing only two months for spawning activity and fry emergence (compared to three full months in 2008). Some fry were observed in reaches where no redds were seen. Although fry can drift downstream, it is possible some redds were no longer visible due to the effects of time and flow.

- **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 2008, the population was surveyed at ten stations in a 16.0-mile reach between the Scarlett Narrows area in mid-Carmel Valley and Los Padres Dam, including two sites in the San Clemente Reservoir (SCR) inundation zone. The Red Rock survey station was dry. In 2008, the juvenile steelhead population density averaged 1.44 fish-per-foot (fpf) of stream and ranged from 0.17 at the SCR Delta Lower Station (RM 19.0) to 3.64 fpf at the Boronda Station (RM 12.7) **(Table IX-5).**

The 2008 juvenile steelhead population density was the highest overall since 2003 **(Figure IX-8)** and the third highest since the District began population surveys in 1990. It was considerably above the long-term (1990 - 2008) average density of 0.88 fpf. Weather and river flow patterns, coupled

with solid numbers of returning adults and improved spawning habitat led to high spawning success and better egg to fry survival. Greater food (BMI) abundance and better rearing conditions led to very high YOY survival as evidenced by the record number of fingerlings rescued in the summer of 2008. All these factors likely contributed to the high 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 2008 dry season, it is estimated that this mode of operation and flow releases from San Clemente Reservoir resulted in approximately 0.7 mile of additional viable aquatic habitat. Based on estimated population density at the Scarlett and Lower River sites (see **Table IX-5**), this habitat produced about 3,326 additional juveniles, representing approximately 3.3% of the total juvenile population downstream of San Clemente Dam **(Figure IX-9).**

E. Other Activities Related to the Steelhead Resource

The District carried out several activities in RY 2009 that were not required 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 monitoring, and (c) assessment of the benthic macroinvertebrate (BMI) communities.

"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 November 2000, the District began a bioassessment program using benthic macroinvertebrates (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. A three-year

summary report on the District's bioassessment program was completed in June 2005.

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 2008-2009

- **Rescue and Transportation of Kelts** - One kelt was rescued from the lower river and transported by District staff during the reporting period. The kelt was acclimated to saltwater and released in the Pacific Ocean at Stewarts Cove, Carmel Bay.

- **California Stream Bioassessment Procedure** – During RY 2009, District staff collected BMI samples in Fall 2008 from five river locations between above the LPD site and CAW's Begonia Treatment Plant at mid-Carmel Valley, and from the SHSRF's Rearing Channel. The four sites below LPR match District steelhead population survey stations and the above LPR site is near a CDFG steelhead population survey site. Because fish at the SHSRF are reared semi-naturally in the cobble bottom rearing channel, it is important to examine the BMI in the channel as a component of the overall food availability and as a comparison to the natural river adjacent to the Facility.

From the six composite site samples, 3,027 BMIs were processed, comprising 57 taxa. Biological metric values by site for both 2007 and 2008 sampling events are compared in **Table IX-6**. This table includes a biovolume metric that was introduced in the Fall 2005 sampling year. Biovolume provides an indirect measure of sample mass and supplemental information for evaluating organism abundance and insight into bioenergetics in riffles. A biovolume metric was used by Fields (1984) for a food habit study in the Carmel River drainage. In 2008, biovolume values ranged from 3.7 ml/m^2 at the CRLP site to11.5 ml/m^2 at the CRSW site. In each of the last four data years, the highest biovolume values occurred at the lowest elevation site (i.e., CRSW in 2007 and 2008 and CRRR in 2005 and 2006).

Black flies are fairly tolerant of poor water quality and are not a preferred food for salmonids. In the 2007 – 2008 mitigation report it was noted that black flies (*Simulium*) were particularly abundant in fall of 2007, comprising 25 percent to 58 percent of the organisms subsampled, which made them the most numerically dominant. Black flies were also abundant in 2008, ranging from 9 percent to 62 percent of organisms subsampled. However, their relative abundance at site CRLP was reduced from 58% in 2007 to 25% in 2008. The rearing channel had a fairly robust BMI assemblage. Of particular interest, black flies were only the fourth most abundant in the SHSRF rearing channel at 9%, much lower than the other sites, and while midge and caddisflies (mostly collector-gatherers) made up 63% of the BMI. The channel also had the lowest percentage of tolerant organisms, the third highest percentage of intolerant organisms and the second highest biovolume, all indicators of good water quality and habitat conditions.

- **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 2008-2009. The raw data and associated graphs have been distributed to the Carmel River Lagoon Technical Advisory Committee.

- **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 for a number of years. In RY 2008-2009, the District continued to develop 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. The final draft of the RRMP was submitted to NOAA for agency review and comment in mid 2009.

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, the population underwent a dramatic reduction to 95 adults at SCD. Redd surveys below SCD confirm that the spawning habitat in the lower river is excellent yet few adults were there to use it. 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. In addition, the large number of juvenile steelhead rescued by the District from the lower river that survive to adulthood are to likely return to the lower river to spawn.

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 0.50 fish per foot [fpf] of stream) to levels frequently ranging above 1.00 fpf, values that are typical of well-stocked steelhead streams. In the 2008-2009 reporting period, the average population density was far above the long-term average for the Carmel River due primarily to the good adult returns in 2008, the early January opening of the lagoon, and excellent fry survival due to the lack of scouring storms and good river conditions through April. 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;

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

- Extensive rescues by MPWMD of juvenile steelhead over the last 20 years, now totaling 346,804 fish through 2008;

- Rearing and releases of rescued fish from the SHSRF of nearly 70,000 juveniles and smolts back into the river and lagoon over the past 13 years.

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 2009. In 2009, the adult run size was the lowest since 1994. At present, the reasons for this period of decline in adult returns are not obvious, but may be related to a combination of controlling and limiting factors including:

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

- 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 1999, 2001, 2004, and 2007 affecting subsequent adult populations;

- Migration barriers such as the Old Carmel River and San Clemente Dams;

- 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 number of fish that reach the ocean).

A recent challenge that may remain for some years is the potential effects of substantive physical and operational changes to San Clemente Dam required by 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.

Figure IX-1

Water Surface Elevation in the Carmel River Lagoon and Highway One Bridge, January-July, 2009

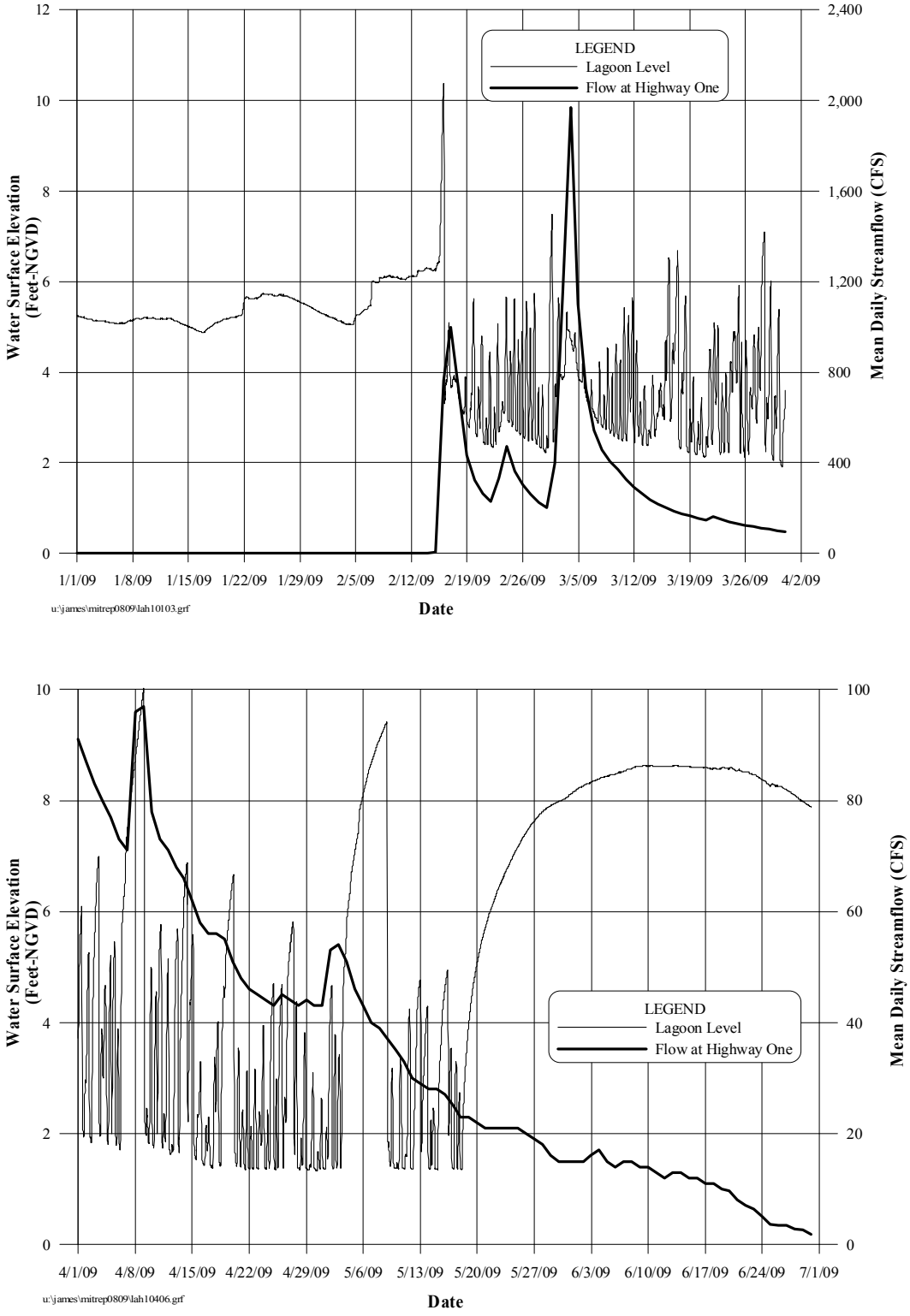


Figure IX-2

Number of Steelhead Smolts Rescued in the Carmel River Basin from 1989 to 2008.

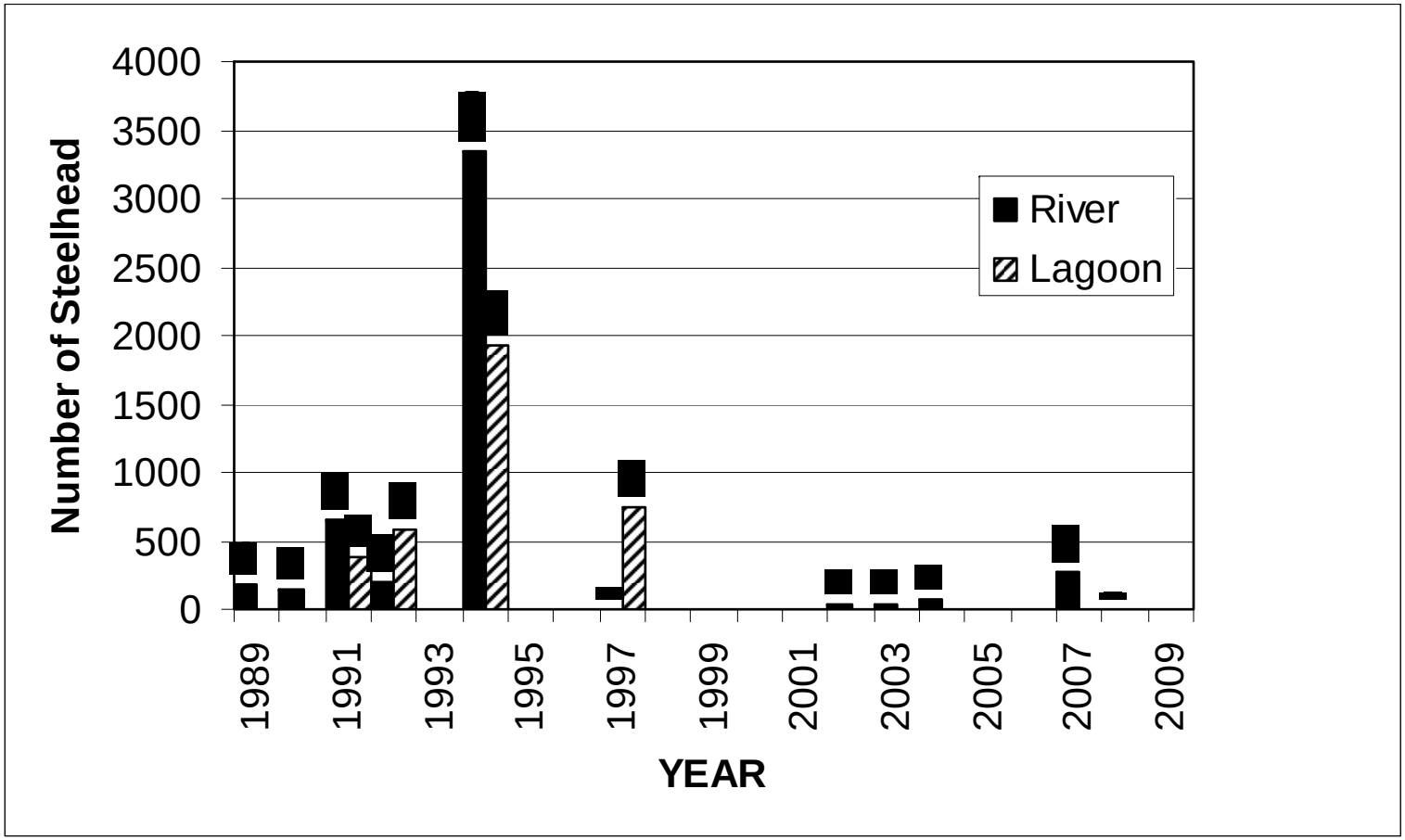


Figure IX-3

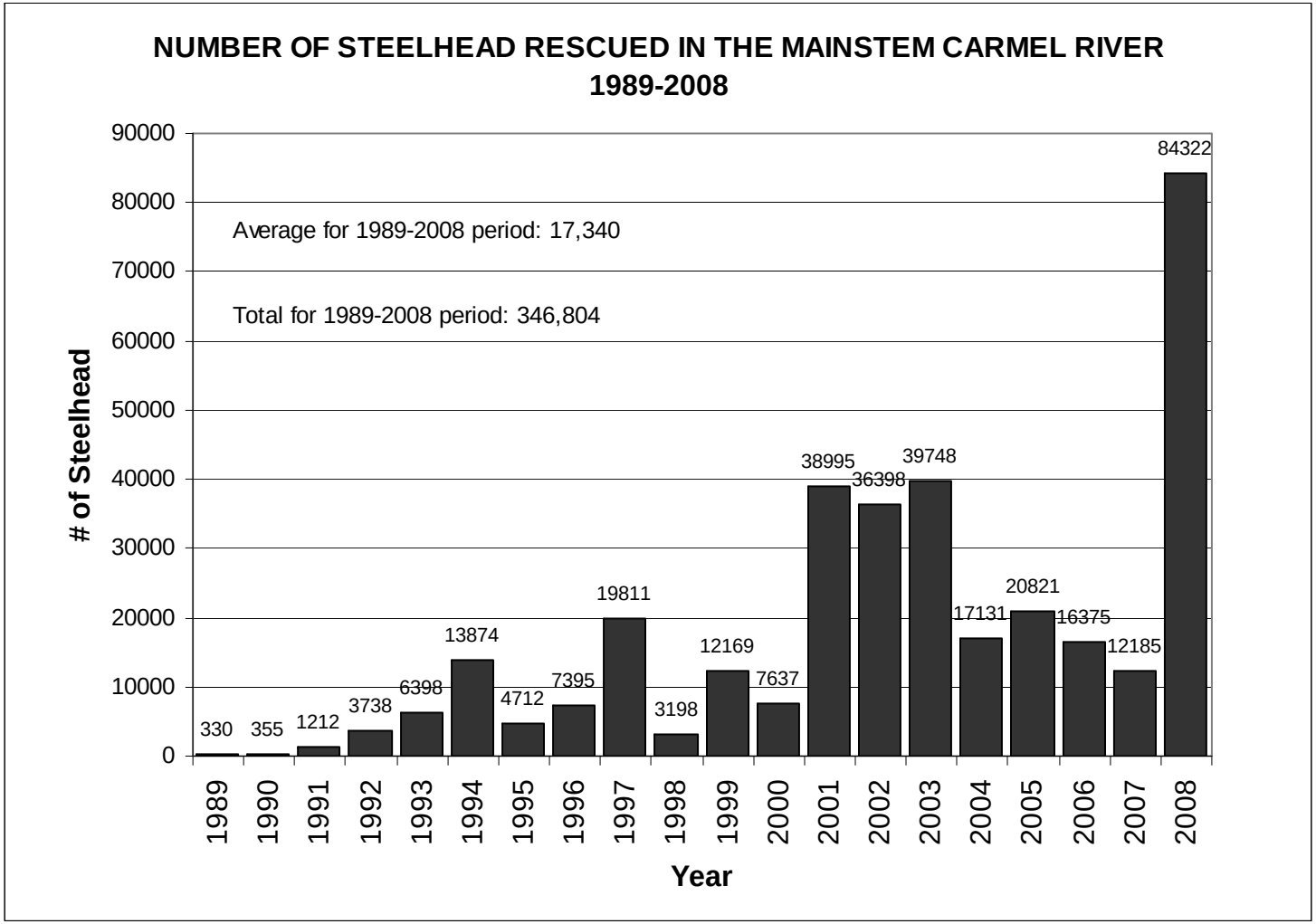

NUMBER OF STEELHEAD RESCUED IN THE MAINSTEM CARMEL RIVER
1989-2008
# of Steelhead
Year
Average for 1989-2008 period: 17,340
Total for 1989-2008 period: 346,804
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
330
355
1212
3738
6398
13874
4712
7395
19811
3198
12169
7637
38995
36398
39748
17131
20821
16375
12185
84322
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008

Figure IX-4

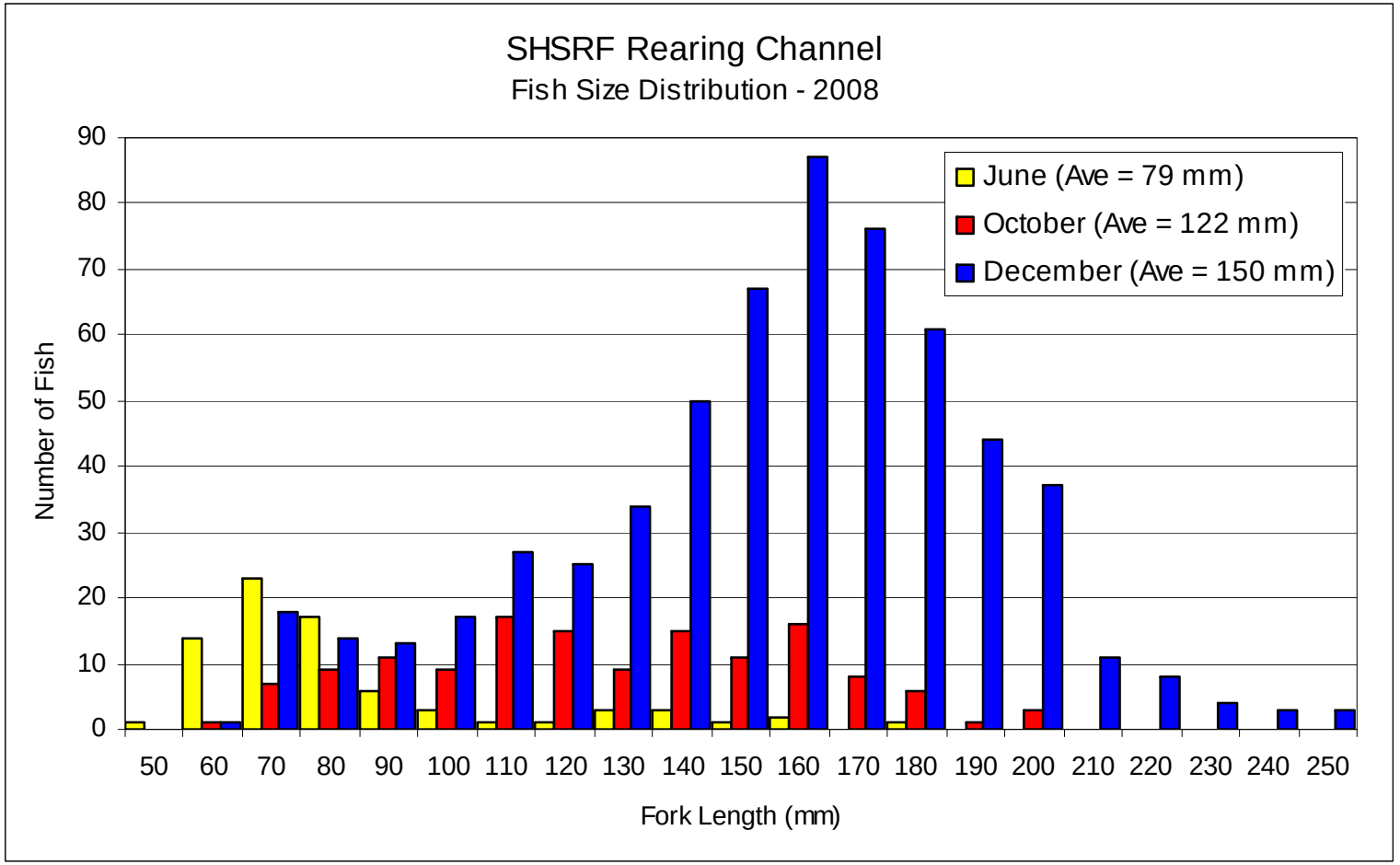

SHSRF Rearing Channel
Fish Size Distribution - 2008
Number of Fish
Fork Length (mm)
June (Ave = 79 mm)
October (Ave = 122 mm)
December (Ave = 150 mm)
0
10
20
30
40
50
60
70
80
90
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250

Figure IX–5

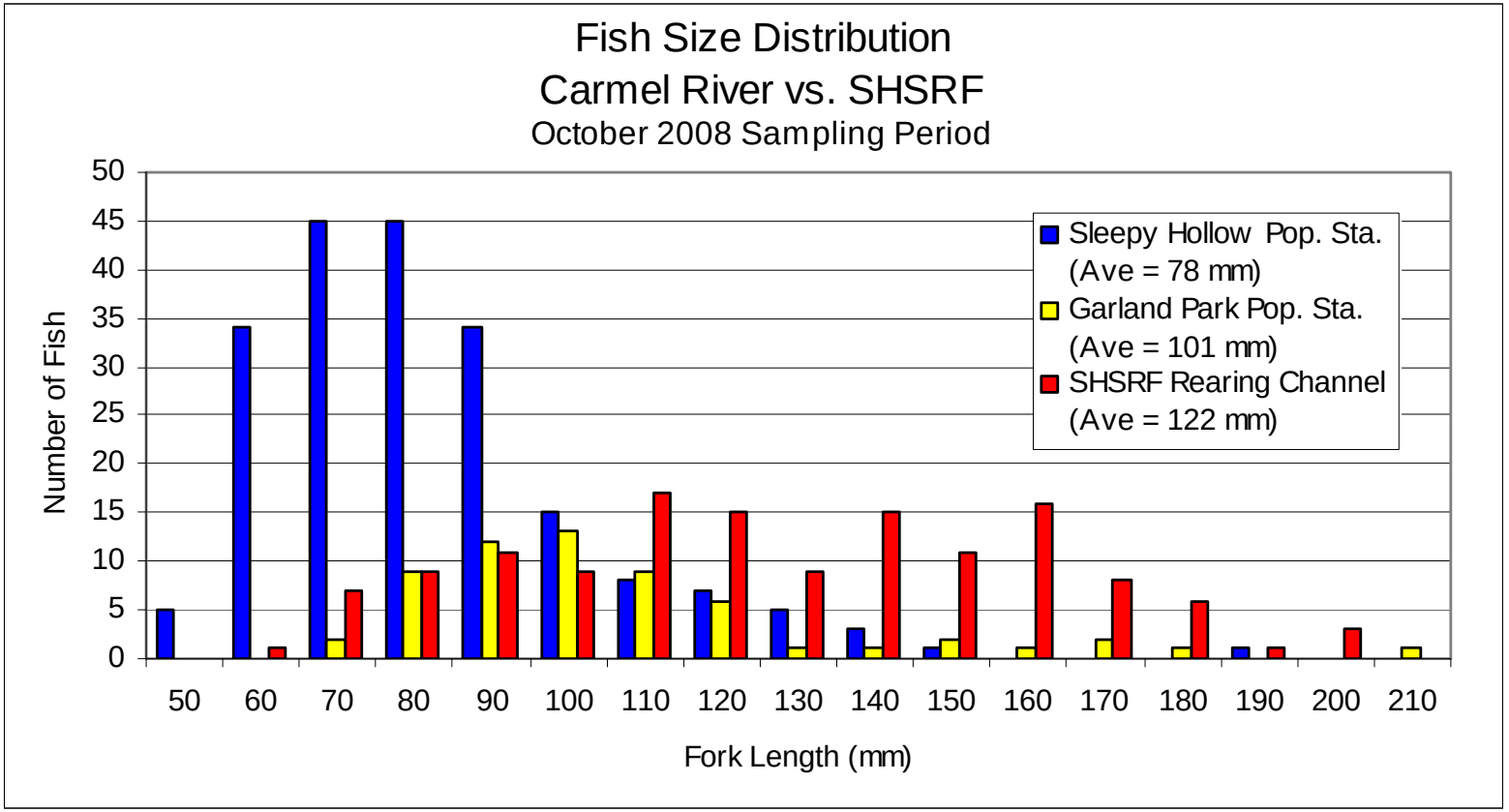
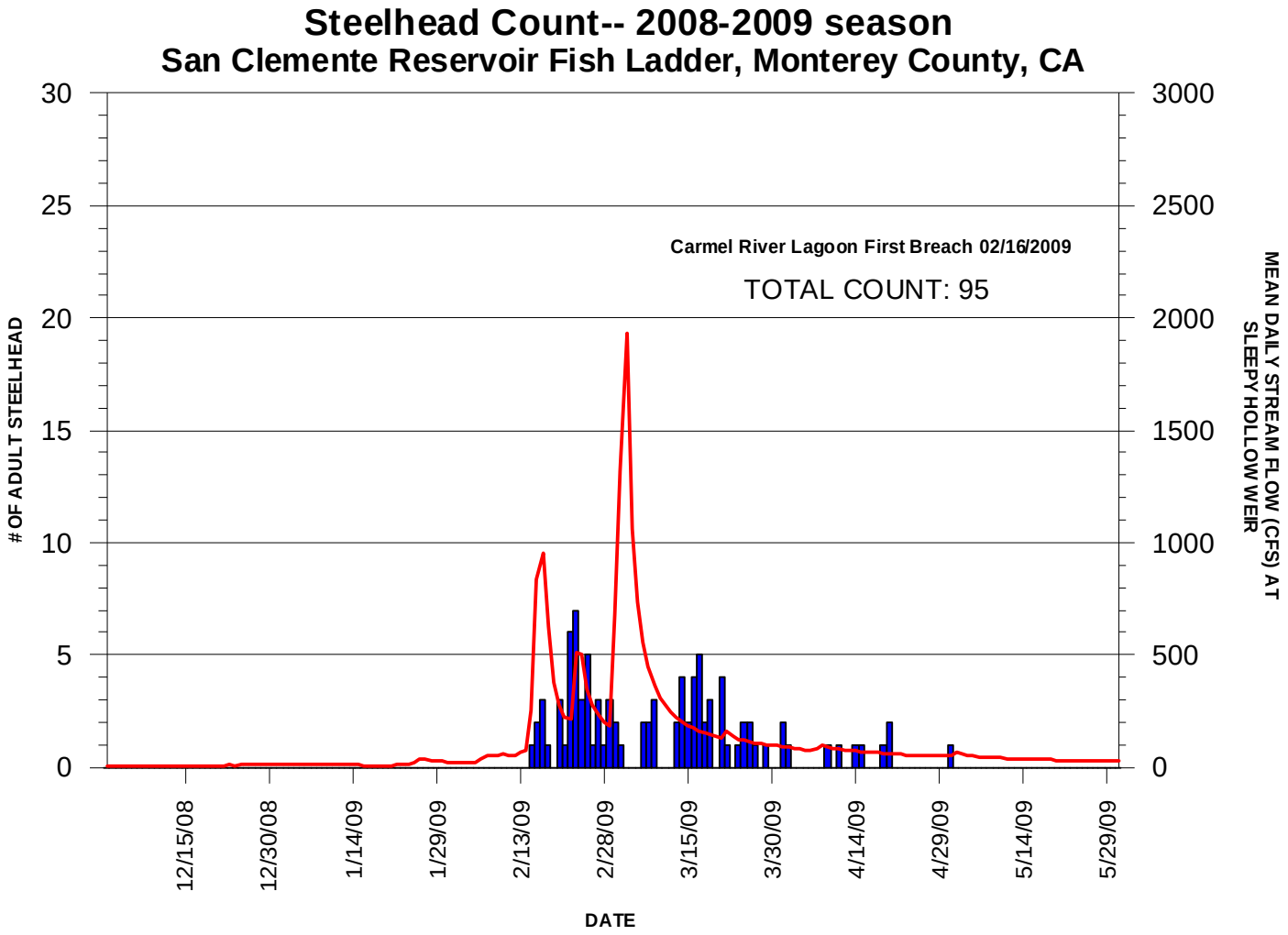

Fish Size Distribution
Carmel River vs. SHSRF
October 2008 Sampling Period
Number of Fish
0
5
10
15
20
25
30
35
40
45
50
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
Fork Length (mm)
Sleepy Hollow Pop. Sta. (Ave = 78 mm)
Garland Park Pop. Sta. (Ave = 101 mm)
SHSRF Rearing Channel (Ave = 122 mm)

Figure IX-6



** Streamflow measured at MPWMD gaging station at Sleepy Hollow Weir or San Clemente Spillway

Figure IX-7

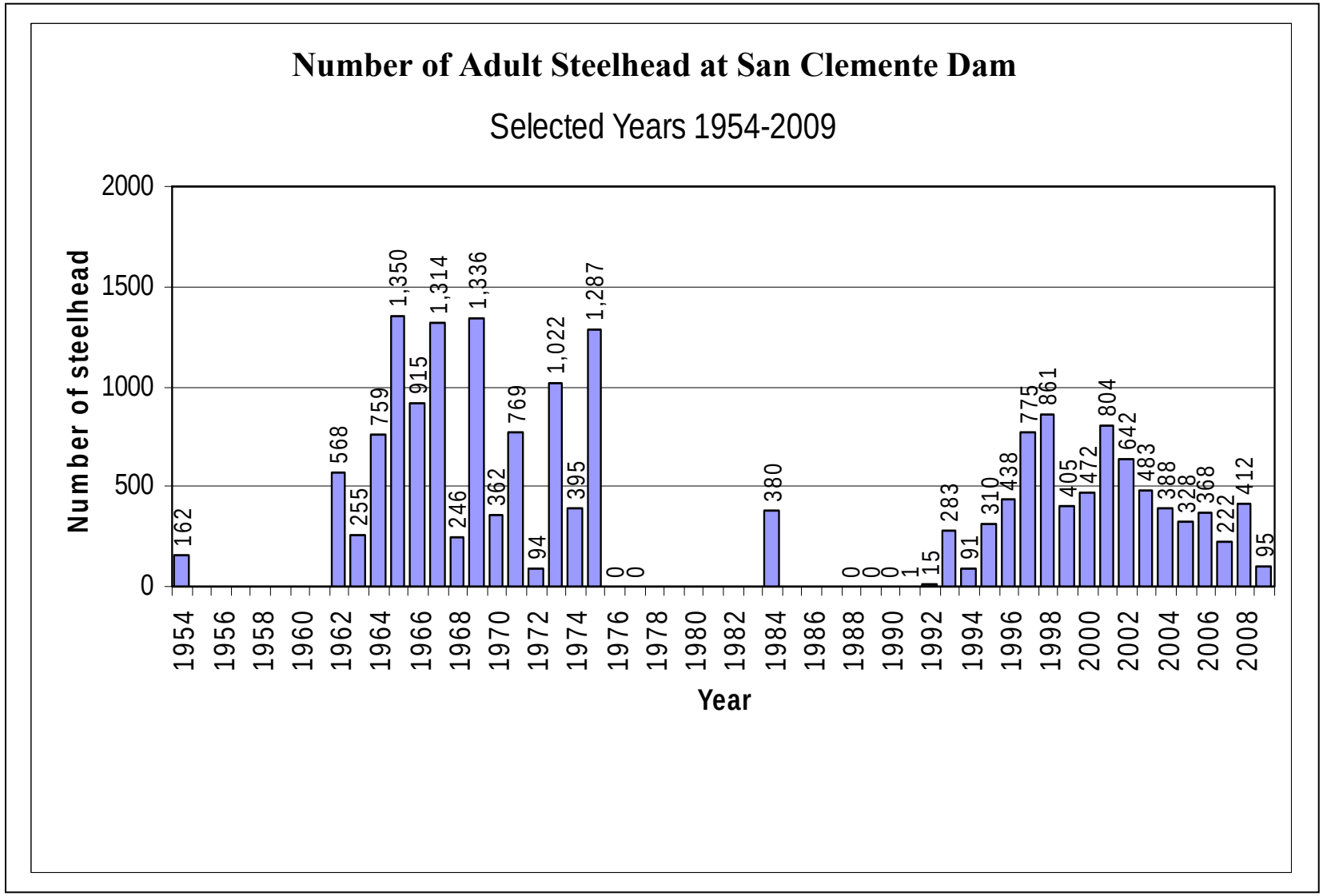
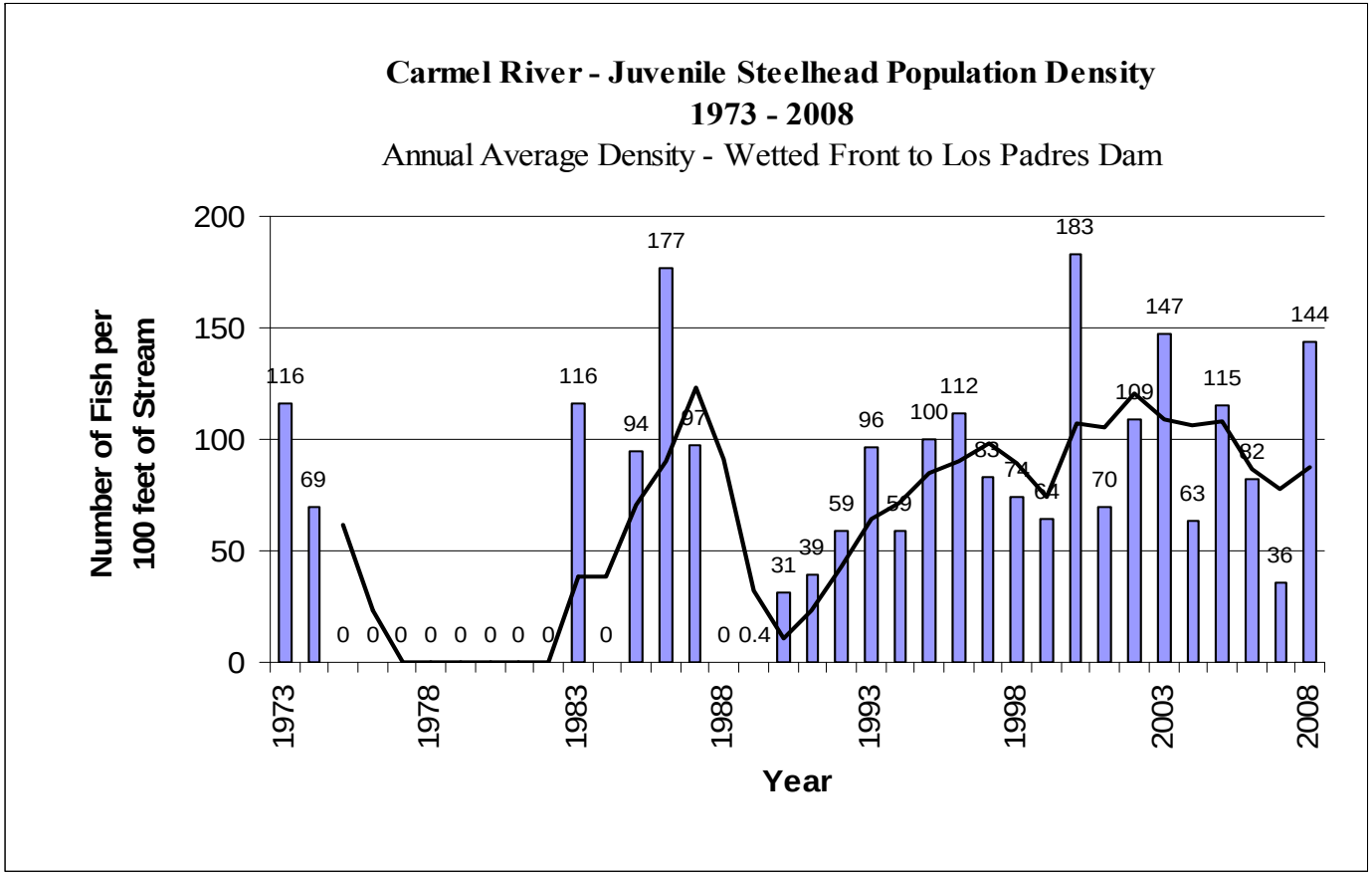

Number of Adult Steelhead at San Clemente Dam
Selected Years 1954-2009
Number of steelhead
Year
2000
1500
1000
500
0
162
568
255
759
1,350
915
1,314
246
1,336
362
769
94
1,022
395
1,287
0
0
380
0
0
0
1
15
283
91
310
438
775
861
405
472
804
642
483
388
328
368
222
412
95
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008

Figure IX-8

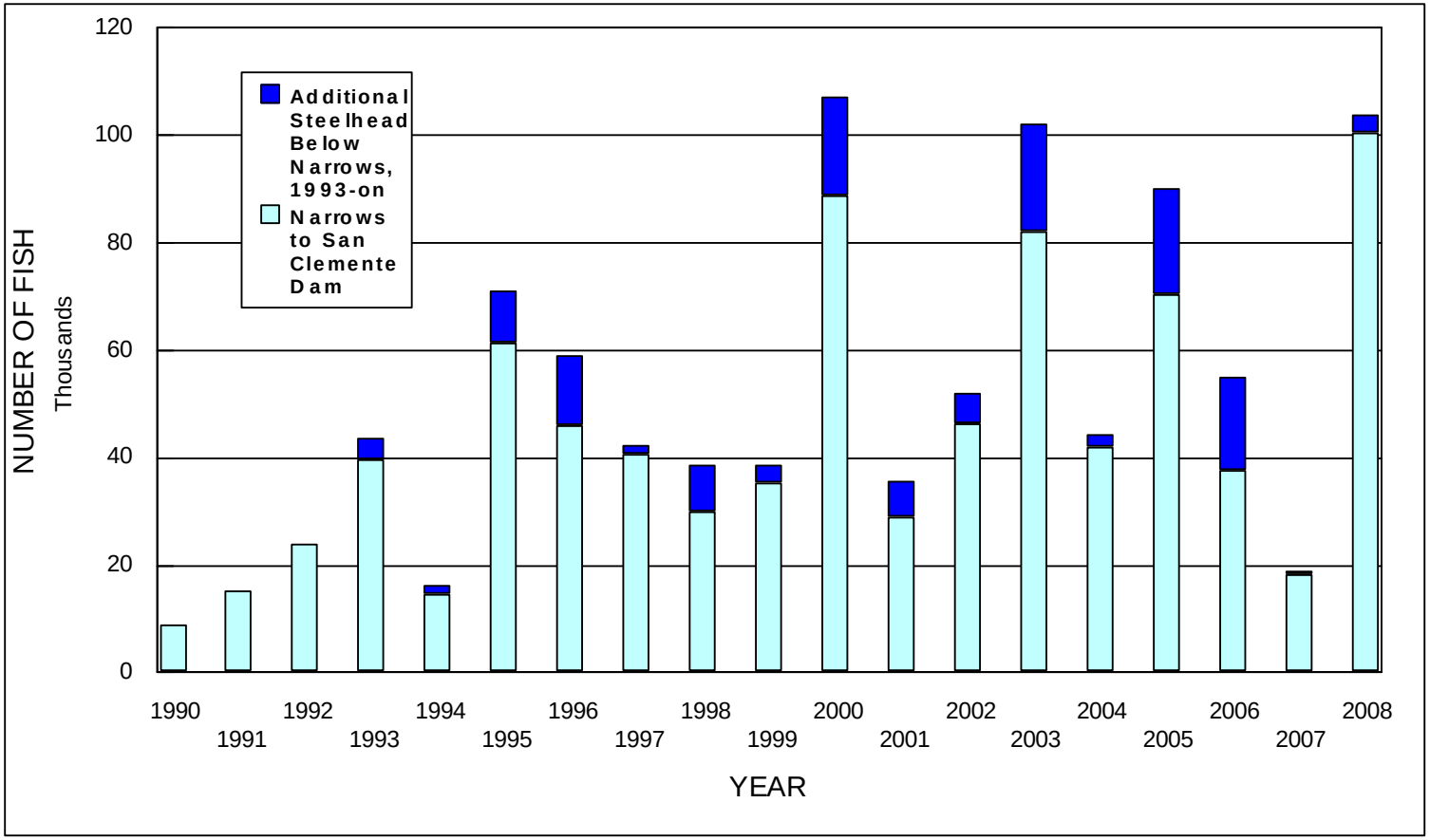


Source: CDFG files (1973-1987) and MPWMD files (1989-present)

u\beverly\excel\steelheadpopdensity bar graph 1973_08

Figure IX-9

Estimated Number of Juvenile Steelhead Reared Below San Clemente Dam
1990 - 2008



u/beverly/excel/numberfishrearedbelowscd

Table IX-1a

Number of Juvenile Steelhead Rescued in the Mainstem Carmel River, by Age Group and General Location, Rescue Year 2008.

Age Group	General Location	MPWMD May-Sept. 2008	CRSA May-July 2008
Young-of-the-Year	Mainstem	83,836	14,663
Age 1+	Mainstem	83	76
Smolts	Lagoon and Lower River	1	0
Adults	Mainstem and Lagoon	1	5
Mortalities	Mainstem	401	63
Totals		84,322	14,744
Percentage Mortality		0.47	0.43

TABLE IX-1b

MPWMD Release Locations of Juvenile Steelhead Rescued in the Mainstem Carmel River - Rescue Year 2008.

RELEASE LOCATION	RIVERMILE	# OF FISH TRANSPLANTED
Stewarts Cove	0	2
Lagoon	0.1	9,612
Don Juan Bridge	10.8	845
Upper Garland Park	11.5	5,601
West Garza's Well	12.1	4,572
Hitchcock Canyon	14.5	1,597
Ski's Pond	15	2,542
Carmel River @ Sleepy Hollow	16.9	6,288
SHRF	17.1	48,024
Sleepy Hollow Ford	17.3	1,994
Old Carmel Dam	18.3	2,844
TOTAL		**83,921**

NOTE: Rivermiles are approximations

SLEEPY HOLLOW STEELHEAD REARING FACILITY

Fish Rearing Summary: May 14, 2008 - January 2009

Holding Location	# Fish Stocked [1]	# Morts (Disease)[2]	# Morts (Unaccounted for) [3]	Total # Released	% Survival	Ave Condition Factor (K)	# by Release Location [4]	Notes
Rearing Channel 11 Pools (smaller YOY)	43,106	8,156	21,472	13,478	31.0	1.17	2,946 -- Tank 3 10,532 -- River	Smaller YOY fish were placed into the RC pools, to fill, from downstream to upstream as they were brought into the Facility. Size at release varied greatly from ~ 3 - 8 inches FL. Most fish were in the 5 - 7 inch range (130 - 180 mm FL).
Rearing Channel 2 Pools (larger YOY)	3,502	1,078	1,208	1,216	35.0	1.14	647 -- Tank 3 569 -- River	Larger YOY fish were graded out after quarantining and placed in one of two separate pools. Size range at release was 3 - 9 inches (FL).
Rearing Channel 1 Pool (Lrg 1+ Juvs)	27	0	0	27	100.0	1.13	27 -- Tank 3 0 -- River	Fish were ~ 2 yrs old at release. Sizes ranged from approx. 8 - 11 inches (FL).
Totals	**46,635**	**9,234**	**22,680**	**14,721**	**32%**	**1.16**	**3,620 - Tank 3 (25%)** **11,101 - River (75%)**	
		20%	**49%**	**32%**				

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.
4. Fish that were moved from the RC to Tank 3 (held there until the river flow is up) were greater than 150 mm (FL). T3 fish will be released into the lower river or the lagoon once it reconnects with the river. Fish released into the Carmel River downstream of Scarlett Well (RM 9.1) were <150 mm FL.

"**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). ($\times 10^{-5}$)

u\beverly\excel\shsrf\2008\2008summary Jan. 7, 2009 updated

Table IX-3

SHSRF - 2008 REARING SEASON
Ave fish lengths, weights, and Condition Factors

Pool #	Ave FL (mm)	Ave Wt (g)	Ave K factor	Fish Size	Date Sampled
RC 1	158	54.2	1.18	Med YOY	12/20/2008
RC 2	174	65.5	1.13	1+ Juvs	12/20/2008
RC 3	N/A	N/A	N/A	Med YOY	N/A
RC 4	168	58.8	1.17	Lg YOY	12/18/2008
RC 5-7	145	43.8	1.20	Med YOY	12/17/2008
RC 8	150	41.6	1.20	Med YOY	12/15/2008
RC 9	159	49.9	1.15	Med YOY	12/12/2008
RC 10	172	61.0	1.11	Lg YOY	12/11/2008
RC 11	139	31.7	1.11	Med YOY	12/11/2008
RC 12	141	34.3	1.13	Med YOY	12/19/2008
RC 13	149	42.0	1.18	Med YOY	12/8/2008
RC 14	139	36.5	1.17	Med YOY	12/5/2008
RC 15	124	31.3	1.18	Med YOY	12/3/2008
RC 16	139	38.5	1.20	Med YOY	12/3/2008
OVERALL (at release - Dec)	**151**	**45.3**	**1.16**		
Lg. YOY (RC 4 & 10)	170	59.9	1.14		
Med. YOY (11 pools)	131	36.7	1.17		
Mid Season (Oct)	110	23.0	1.22		
At Stocking (June)	97	13.5	1.03		

u/beverly/excel/shrf/2008/2008length_wt data_end_seasonsummary0109

Table IX-4

Sleepy Hollow Steelhead Rearing Facility
Fish Release Location Summary: 2008 - 2009

Location	# Released	Percent of Total
Lower River: Garland Park (RM 10.8) to CAW's Manor Well (RM 7.1)	11,101	75%
Lagoon (south arm)	3,620	25%
Total	**14,721**	

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**
Station Ave (#/ft)	**0.62**	**0.61**	**0.94**	**1.12**	**1.27**	**0.99**	**0.64**	**0.50**	**0.61**	**0.84**	**1.45**	**0.88**	**4626**
Station Ave (#/mile)	**3,252**	**3,225**	**4,945**	**5,890**	**6,683**	**5,219**	**3,390**	**2,648**	**3,221**	**4,457**	**7,678**		
Overall Station Averages:												**0.87**	**4,601**

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

[2] RM; indicates miles from rivermouth

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

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

Table IX-6

Biological Metric Values for Benthic Macroinvertebrate (BMI) Assemblages (metrics descriptions on next page)
Carmel River, Monterey County, CA. November 2007 and 2008.

	2007					2008					
Metrics	**CRLP**	**CRCA**	**CRSH**	**CRSP**	**CRSW**	**CRLP**	**CRCA**	**CRSH**	**SHRC**	**CRSP**	**CRSW**
Taxonomic Richness	32	21	19	23	25	42	26	16	22	27	24
EPT Taxa	8	5	5	8	7	16	7	4	7	11	9
Ephemeroptera Taxa	1	1	1	2	2	6	1	1	1	1	3
Plecoptera Taxa	3	0	1	1	1	5	0	1	1	2	1
Trichoptera Taxa	4	4	3	5	4	5	6	2	5	8	5
EPT Index (%)	18	18	28	31	34	42	22	7	32	31	56
Sensitive EPT Index (%)	3.1	0.8	0.6	2.6	10	22	0.6	0.2	5.5	5.7	26
Shannon Diversity	1.7	1.7	1.9	1.6	2.3	2.6	1.7	1.4	2.1	1.5	2.2
Dominant Taxon (%)	58	50	33	53	25	25	56	62	32	57	25
Tolerance Value	5.5	5.8	5.9	5.6	5.4	4.4	5.9	6.3	5.3	5.5	4.5
Intolerant Organisms (%)	3.5	1.0	0.6	2.6	9.6	22	1.0	0.2	5.7	5.7	26
Tolerant Organisms (%)	4.5	5.9	15	4.0	23	4.7	9.9	18	2.8	3.1	17
Collector-Gatherers (%)	27	32	54	34	37	40	25	33	60	25	24
Collector-Filterers (%)	58	51	35	56	35	26	58	62	27	61	32
Scrapers (%)	4.7	1.2	2.4	0.8	9.2	17	5.5	0.2	1.8	0.2	1.1
Predators (%)	6.7	15	8.0	7.2	8.4	16	12	5.0	5.9	8.1	17
Shredders (%)	1.6	0.0	1.0	0.8	0.2	0.6	0.0	0.2	5.5	2.2	1.1
Other (%)	1.4	1.0	0.0	1.4	9.0	0.4	0.4	0.0	0.0	3.1	25
Estimated Abundance											
Composite sample (18 ft^2)	4100	6960	8040	7030	14200	4100	7000	7400	7000	8000	11000
Site (BMIs/ft^2)	228	387	447	391	789	228	389	411	389	444	611
Site (BMIs/m^2)	2452	4163	4809	4205	8494	2452	4187	4426	4187	4785	6580
Estimated Biovolume											
ml/ft^2	0.40	0.47	0.38	0.37	1.45	0.35	0.50	0.39	0.65	0.52	1.07
ml/m^2	4.3	5.1	4.1	4.0	16	3.7	5.4	4.1	7.0	5.6	11.5
Central Coast IBI Metrics											
Intolerant Individuals (%)	3.5	1.0	0.6	2.6	9.6	22	1.0	0.2	5.7	5.7	26
Collector Taxa (%)	44	43	47	43	44	33	46	63	45	48	46
Non-Insect Taxa (%)	16	24	21	22	32	14	31	31	23	26	38
Tolerant Taxa (%)	22	29	16	22	20	17	27	31	18	30	33
Coleoptera Richness	4	0	1	1	1	5	1	1	1	1	1
Predator Richness	11	8	6	8	7	16	8	4	7	9	7
EPT Richness	8	5	5	8	7	16	7	4	7	11	9

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)

Table IX-6 continued

Metrics used to describe characteristics of the benthic macroinvertebrate assemblage as described in the California Stream Bioassessment Procedures.

BMI Metric	Description	Response to Impairment [1]
Richness Measures		
1. Taxonomic Richness	Total number of distinct taxa based on a standard taxonomic effort.	Decrease
2. EPT Taxa	Number of taxa in the insect orders Ephemeroptera (mayfly), Plecoptera (stonefly) and Trichoptera (caddisfly).	Decrease
3. Ephemeroptera Taxa	Number of mayfly taxa.	Decrease
4. Plecoptera Taxa	Number of stonefly taxa.	Decrease
5. Trichoptera Taxa	Number of caddisfly taxa.	Decrease
Composition Measures		
6. EPT Index	Percent composition of mayfly, stonefly and caddisfly individuals.	Decrease
7. Sensitive EPT Index	Percent composition of mayfly, stonefly and caddisfly individuals with tolerance values less than 3.	Decrease
8. Shannon Diversity Index	General measure of sample diversity that incorporates richness and evenness (Shannon and Weaver 1963).	Decrease
9. Percent Dominant Taxon	The highest percentage of organisms represented by one taxon.	Increase
Tolerance/Intolerance Measures		
10. California Tolerance Value (CTV)	CTVs between 0 and 10 weighted for abundance of individuals designated as pollution tolerant (higher values) and intolerant (lower values).	Increase
11. Percent Intolerant Organisms	Percentage of organisms that are highly intolerant to water and/ or habitat quality impairment as indicated by CTVs of 0, 1 or 2.	Decrease
12. Percent Tolerant Organisms	Percentage of organisms that are highly tolerant to water and/ or habitat quality impairment as indicated by CTVs of 8, 9 or 10.	Increase
Functional Feeding Groups (FFG)		
13. % Collector-gatherers (cg)	Percentage of macroinvertebrates that collect or gather material.	Increase
14. % Collector-filterers (cf)	Percentage of macroinvertebrates that filter suspended material from the water column.	Increase
15. % Scrapers (sc)	Percentage of macroinvertebrates that graze upon periphyton.	Variable
16. % Predators (p)	Percentage of macroinvertebrates that prey on living organisms.	Decrease
17. % Shredders (sh)	Percentage of macroinvertebrates that shred leaf litter.	Decrease
18. % Others (ot)	Percentage of macroinvertebrates that occupy an FFG not described above.	Variable
Other		
19. Abundance	Estimate of the number of BMIs in a sample based on the proportion of BMIs subsampled.	Variable
20. Biovolume	Volumetric displacement of BMIs subsampled. Total sample biovolume estimated by extrapolation from portion subsampled.	Variable

[1] Responses represent generalized trends and should be considered within the context of assessment objectives and reference conditions.

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 2008-09, MPWMD facilitated the formation of a Regional Water Management Group and responded to new Proposition 84 IRWM guidelines that require acceptance of a region into the IRWM grant 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 2008-2009 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 2008-2009 (FY 08-09), 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 the maintenance activities associated with vegetation encroachment and restoration projects;
- Made public presentations showing MPWMD-sponsored restoration work over the past 20 years;
- 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;
- Continued an enforcement action against two property owners for a serious violation of the District's riparian ordinances in late December 2003 on two residential properties on the north bank of the river just upstream of the Rancho Cañada Golf Club;
- Carried out vegetation management activities at four sites (Robles Del Rio, Boronda Bridge, West Garzas, and Randazzo's Bridge).
- Graham Matthews & Associates (GMA) was retained to complete a 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.

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 in the last few years, and there is evidence that previous stabilization efforts are beginning to destabilize as the lowest course of riprap is being undercut. GMA focused on two alternatives to improve the long-term stability of the reach and provided a set of documents for MPWMD to review. A final report and design work carried over into FY 2009-2010.

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. During FY 2007-08, staff met with representatives of the property owners and a mediator on several occasions in an effort to resolve the violation. By June 2008, it appeared that most issues were resolved and the District was awaiting a final design plan and River Work Permit application.

In July 2008, MPWMD received a River Work Permit application and subsequently assisted the property owners in obtaining authorization from the Corps under RGP 24460S to complete rehabilitation work. Construction work in the river was scheduled to be completed in FY 2009-10.

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. Presently, 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 1 (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 2008-09, MPWMD cooperated with a consultant for the Coastal Conservancy that was charged with identifying potential risks from the Carmel River Reroute and Dam Removal alternative. In February 2009, CAW announced that it was withdrawing its support of this alternative. Subsequently, the Coastal Conservancy announced that work by the Conservancy would be closed out and grant funds for the project would be redirected.

In March 2009, in response to a request from the Carmel River Watershed Conservancy, the MPWMD Board of Directors voted to support the Carmel River Reroute and San Clemente Dam Removal Project and authorized staff to contact organizations involved in the project to offer the District's assistance in facilitating a discussion on the San Clemente Dam Removal Project. CAW subsequently re-engaged in discussions of the Reroute and Dam Removal and work progressed toward organizing a group of agencies to carry the project forward.

- **Vegetation Restoration --** Various techniques for vegetation installation were employed at District restoration projects in FY 08-09. 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 258 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 08-09. 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 08-09. Please note that these figures include irrigation during two separate irrigation seasons. For the fiscal year, 9.33 acre-feet (AF) of water were applied. The 2008 irrigation season began in April and continued through the end of November 2008. Total water use for the season was 10.46 AF. This compares to 11.66 AF during the 2007 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 2008, four areas with virtually 100% vegetation encroachment in the channel bottom were selected for vegetation removal:

1. Robles Del Rio Bridge Area: beginning at Robles Del Rio Bridge at River Mile (RM) 14.5 and extending approximately 200 feet downstream; trees were removed growing on a mid-channel bar. Work was also done on the upstream side of the bridge extending approximately 150 feet upstream.

In addition to the vegetation management activities at this site, MPWMD with the help of the California Conservation Corps removed a large concrete slab/abutment (14 feet long, 6.5 feet wide, and 1.3 feet thick) that was located in the low flow channel.

2. Upstream of Boronda Road Bridge Area: two reaches beginning approximately 300 feet and 800 feet upstream of the Boronda Road Bridge, which is located at RM 12.7, trees blocking the channel on a gravel bar (150 feet in length for each reach) were removed.

3. West Garzas Area: beginning at approximately RM 12.3, upstream of California American Water's West Garzas Well a large downed white alder tree lying across the active channel was cut to remove the hazard and provide instream large wood habitat.

4. Randazzo's Bridge Area: beginning at a private bridge known as Randazzo's Bridge at RM 10.1 and extending approximately 200 feet upstream and downstream; tree branches were trimmed to allow for high flow measurements off of Randazzo's Bridge.

A total of approximately 1,050 lineal feet of stream encompassing approximately 0.36 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 08-09, 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 2010. 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**

Presentations to Carmel Valley Association and Carmel Residents Association – MPWMD presented a history of the Carmel River and MPWMD's programs to restore the river to these local organizations.

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 08-09, 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 2008 and Spring 2009 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 and the health and vigor of invasive weeds.

OBSERVED TRENDS, CONCLUSIONS AND/OR RECOMMENDATIONS:

The Carmel River is showing many signs of recovery after the extreme drought and flood events during the 1990s that impacted property owners, threatened species, and riparian habitat. Fine material (silt and sand) that entered the main stem during floods in 1995 and 1998 has 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 may be due both to 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 streampower (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.

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, at present streambanks in the main stem appear to be relatively stable during average water years.

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 as 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 2009. 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. 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 near the river may 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. The supply of sediment to the lower portion of the river is likely to increase when a project to make San Clemente Dam safe is completed. However, the effect of an increased sediment supply may not reach the lowest portion of the river for many years.

In January 2008, the California Department of Water Resources (DWR) and the U.S. Army Corps of Engineers completed a combined Environmental Impact Report and Environmental Impact Statement (EIR/EIS) concerning alternatives to remediate the safety deficiencies that have been identified at San Clemente Dam. Of the two alternatives being considered for approval (buttressing and dam removal and re-route), MPWMD supported the dam removal and re-route project that the California Coastal Conservancy proposed. 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).

Over the long term, an increase in sediment supply could help reduce streambank instability and erosion threats to public and private infrastructure. However, reestablishing a natural supply of sediment and meander pattern presents significant political, environmental, and fiscal challenges,

and is not currently being considered as part of the Mitigation Program.

Vegetation Restoration and Irrigation

To the maximum extent possible, MPWMD-sponsored river restoration projects incorporate a functional floodplain that would be inundated in relatively frequent storm events (those expected every 1-2 years). For example, low benches at the Red Rock and All Saints Projects have served as natural recruitment areas and are currently being colonized by black cottonwoods, sycamores and willows. In addition, willow and cottonwood pole plantings in these areas were installed with a backhoe, which allows them to tap into the water table. These techniques have been successful and have reduced the need for supplemental irrigation. However, as pumping has increased in the lower Carmel Valley (pursuant to direction by the SWRCB and a Conservation Agreement between 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. However, they have rebounded in the last few years and have shown some of the highest diversity since monitoring began in 1992, indicating that the District mitigation program is preserving and improving riparian habitat.

INTEGRATED REGIONAL WATER MANAGEMENT PLAN (IRWM Plan)

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. In August 2008, all members of the RMWG signed a Memorandum of Understanding that formalized the RWMG and described their responsibilities.

Effective March 1, 2009, acceptance and approval of the composition of an IRWM region into the IRWM grant program was made a requirement before any region can submit an application for IRWM grant funds. In April 2009, MPWMD submitted a package to the Department of Water Resources (DWR) in response to this requirement.

In May 2009, representatives of the RWMG (include District representatives) met with DWR representatives in Fresno for an interview. DWR had questions concerning the governance structure for the planning region and what effects the expansion of the Salinas Valley IRWM planning region to the greater Monterey County area would have.

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

U/MPWMD/Allocation/RY09/X_riparianhabitat2009.doc
Finalized November 2010
Water Resources Division

Table X-1
Riparian Species Planted July 1, 2008 through June 30, 2009

Plant Species	Number	Location
Acer negundo **, box elder**	1	Tancredi (1)
Eriogonum, **buckwheat**	25	Tancredi (5) Moo Land (20)
Populus balsamifera ssp. trichocarpa **, black cottonwood**	64	Tancredi (17) Pasten (3) Quinn (16) Red Rock (9) Pryor (19)
Rosa californica, **California Rose**	46	Quinn (10) Tancredi (9) Moo Land (27)
Salix ssp **., willow**	93	Tancredi (18) Pasten (10) Quinn (65)
Symphoricarpos albus **, snowberry**	29	Quinn (9) Tancredi (5) Moo Land (15)
Total Number of Plants	**258**	

Table X-2
Monthly Irrigation Water Use During 2008-2009
(Values in Acre-Feet)

Project Site	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
DeDampierre	0.029	0.041	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.070**
Trail and Saddle	0.215	0.257	0.207	0.177	0.094	0.000	0.000	0.000	0.000	0.092	0.133	0.135	**1.310**
Scarlett	0.025	0.023	0.012	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025	**0.109**
Begonia	0.028	0.028	0.017	0.019	0.008	0.000	0.000	0.000	0.000	0.035	0.018	0.018	**0.171**
Schulte South	0.022	0.044	0.003	0.028	0.028	0.000	0.000	0.000	0.000	0.029	0.048	0.016	**0.218**
Reimers	0.447	0.442	0.456	0.189	0.218	0.000	0.000	0.000	0.000	0.000	0.239	0.493	**2.484**
Schulte Bridge	0.093	0.180	0.110	0.135	0.047	0.000	0.000	0.000	0.000	0.027	0.028	0.033	**0.653**
All Saints	0.026	0.027	0.022	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.011	**0.123**
Cypress	0.401	0.313	0.411	0.391	0.068	0.000	0.000	0.000	0.000	0.000	0.035	0.233	**1.852**
San Carlos	0.000	0.513	0.685	0.375	0.357	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**1.930**
San Carlos (Dow)	0.096	0.088	0.053	0.052	0.024	0.000	0.000	0.000	0.000	0.029	0.021	0.042	**0.405**
TOTAL WATER USE IN ACRE-FEET FOR DISTRICT RESTORATION PROJECTS IN 2008-2009 =													**9.325**

Figure X-1

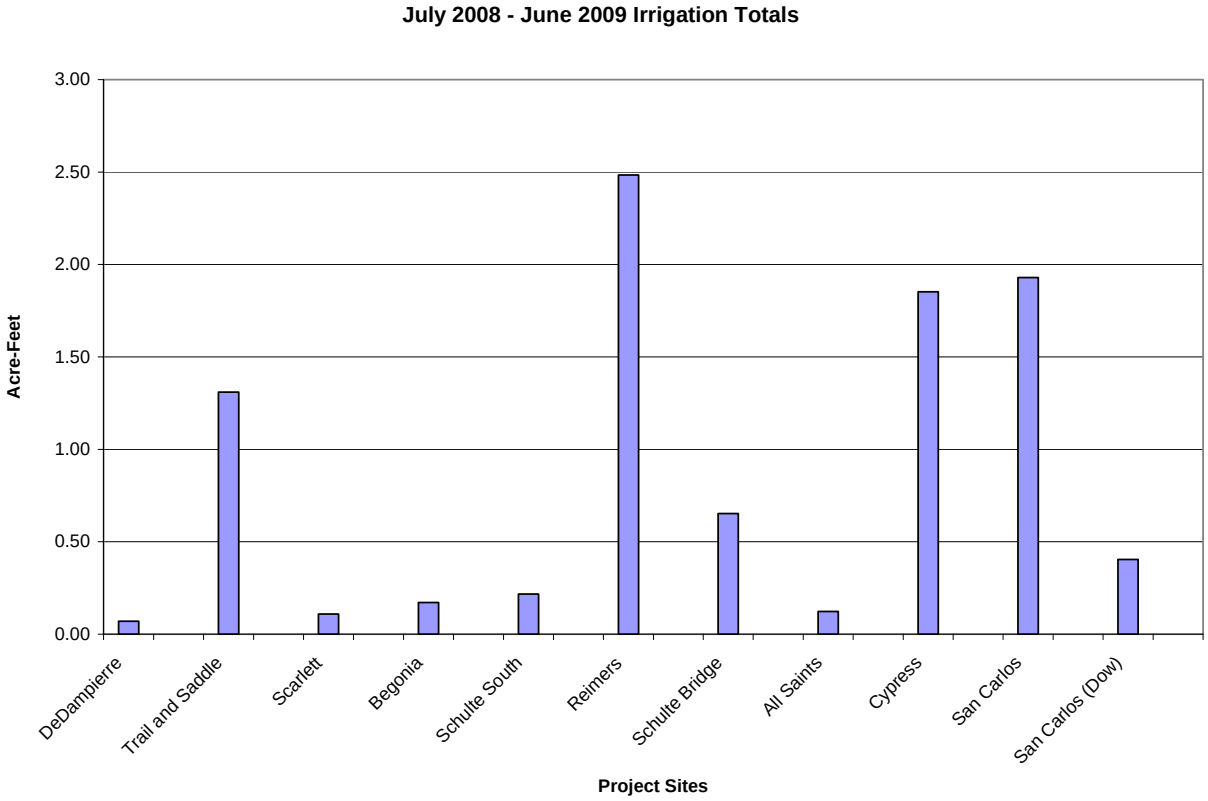
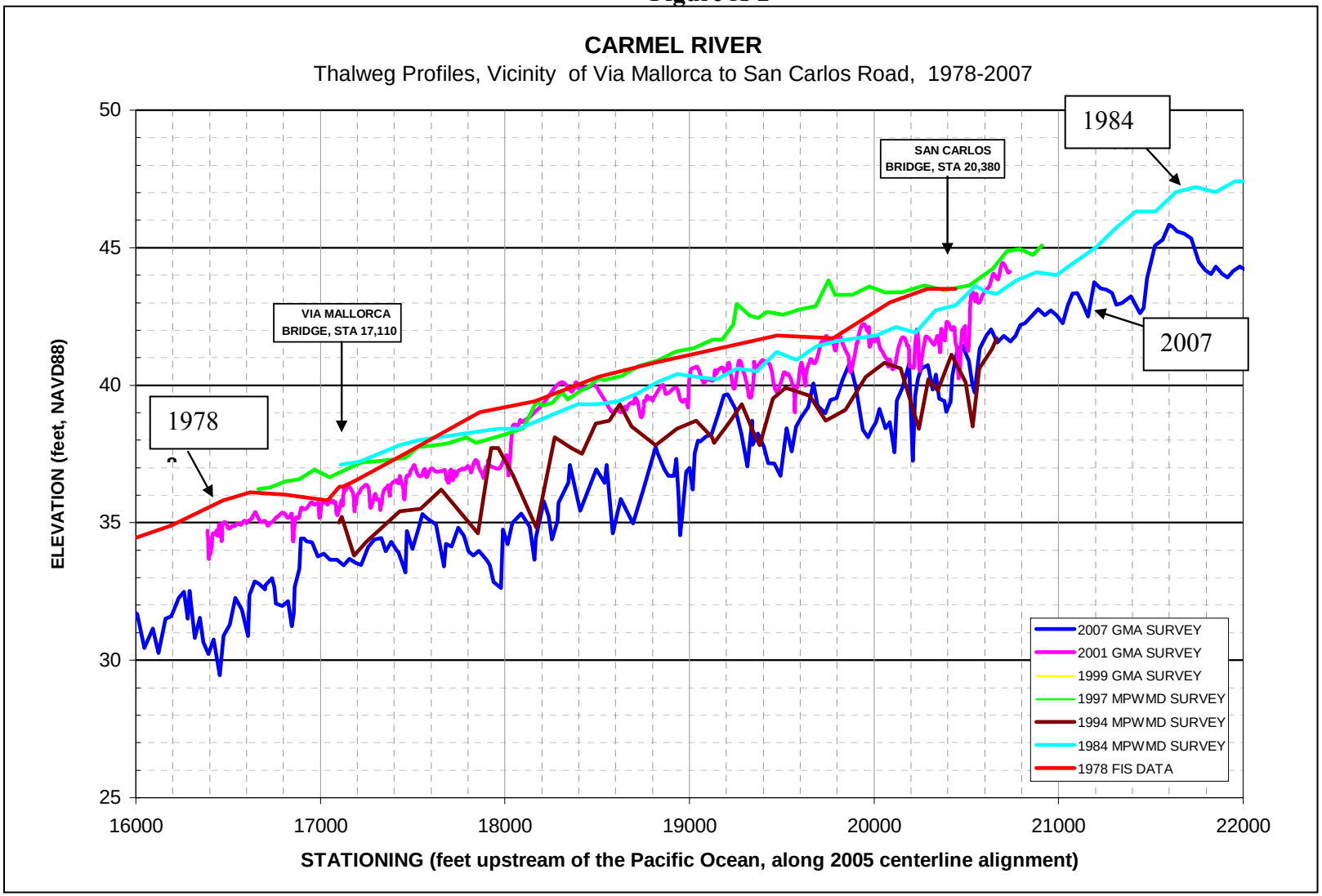

July 2008 - June 2009 Irrigation Totals
Acre-Feet
3.00
2.50
2.00
1.50
1.00
0.50
0.00
DeDampierre
Trail and Saddle
Scarlett
Begonia
Schulte South
Reimers
Schulte Bridge
All Saints
Cypress
San Carlos
San Carlos (Dow)
Project Sites

Figure X-2


CARMEL RIVER
Thalweg Profiles, Vicinity of Via Mallorca to San Carlos Road, 1978-2007
ELEVATION (feet, NAVD88)
STATIONING (feet upstream of the Pacific Ocean, along 2005 centerline alignment)
50
45
40
35
30
25
16000
17000
18000
19000
20000
21000
22000
1984
SAN CARLOS BRIDGE, STA 20,380
VIA MALLORCA BRIDGE, STA 17,110
2007
1978
2007 GMA SURVEY
2001 GMA SURVEY
1999 GMA SURVEY
1997 MPWMD SURVEY
1994 MPWMD SURVEY
1984 MPWMD SURVEY
1978 FIS DATA

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, 2008 through June 30, 2009.

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 2008-2009

During this period, 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 State Legislature appropriated $4 million in the year 2000 for the Conservancy to restore habitat in the lower Carmel River, and CDPR entered into an agreement with the Conservancy to implement and manage the project. The dredging and filling of the new south arm of the lagoon was completed in 2004, an extensive re-vegetation effort with native plants began following completion of the earthworks in 2004. The re-vegetation work and associated monitoring is ongoing. For a summary of the status of the lagoon restoration project in 2008, see CDPR's *2008 Carmel River Lagoon Enhancement Project Report* dated December 2008 (CDPR 2008). CSUMB researchers also began a fall lagoon monitoring effort that they hope to continue annually as part of a graduate seminar. The second year's results for fall 2008 are in the January 2009 report *Carmel Lagoon Water Quality and Sonar Soundings: Fall 2008* (Castorani et. al 2008).

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. A project to use treated water from the CAWD plant, primarily during the dry season, to increase the amount of water available at the

lagoon and increase steelhead habitat was continued for a fourth year in Fall 2008. 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, allowing 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 began this baseline monitoring for metals on February 13, 2008 and took one more sample during last reporting year on May 30, 2008. Efforts on this project continued in 2008-2009, with samples taken on September 2 and December 16, 2008, and on February 10 and April 28, 2009. The sampling will continue quarterly in 2009-2010. 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 still looking for funding to undertake these studies.

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 Fall 2008, CAWD released a total of 16.3 AF of tertiary treated wastewater from September through December for the sole purpose of percolating it into the soil adjacent to the lagoon in an attempt to improve lagoon water quantity and quality. The CDPR also utilized 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 118.43 AF of groundwater between July 2008 and June 2009 to serve the organic demonstration farm and irrigate the riparian restoration area. This was approximately twice the level of their use in the prior reporting year, but only about two-thirds their use in 2006-2007. CDPR also pumped water from their "Highway 1" well at CRSA's behest into the South arm of the Lagoon from August 28th through some time in late January or early February 2009 (operational records are incomplete), adding a total of 328.60 acre-feet of water over that period. There has been no quantitative analysis of the effect of these releases on lagoon water quality.

District staff were also 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. 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 steeleehad, 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 Reporting Year on April 28, 2008. On May 5, 2008, the CDPR took their last beach management action and pushed additional sand from the northern beach across the narrowest part of the sandbar at the mouth of the lagoon, to prevent evacuation of the lagoon from a breach at this low point, and to maintain lagoon elevations that had reached approximately 8.3 feet. Lagoon levels then gradually declined as inflow dropped. Inflow to the lagoon ceased on approximately June 21, 2008, and the lagoon's water level dropped to a little over 4.5 feet by June 31, 2008.

During the current Reporting Year, the lagoon's water volume mostly stabilized at low levels throughout the summer and fall of 2008, fluctuating between approximately 3.5 – 4.6 feet through September 2008. Water levels rose in October and November and stabilized between approximately 4.0 – 5.0 feet. In December 2008 and January 2009 they rose slightly again, stabilizing between approximately 5.0 - 5.5 feet. Very small amounts of surface flow were recorded at the MPWMD Highway 1 Gage for two days on February 11 and 13, 2009. Continuous Carmel River main-stem flow reached the lagoon on February 15, 2009, rising to a daily mean of 1,000 cubic feet per second (cfs) at the MPWMD Highway 1 stream flow gage on February 17, 2009. River inflow raised the lagoon water elevation to approximately 10.5 feet on February 16, 2009 when the beach was mechanically breached by the County Department of Public Works. The CRL-TAC agreed with the County that there was insufficient width of beach sand southwards along the bluffs to cut a channel in that direction, so the County followed the advice of the CRL-TAC and cut an approximately 300-foot channel to the northwest. Unfortunately this channel was not stable and shifted due west cutting down enough that it remained open even as the lagoon drained. Subsequently, the lagoon elevation dropped to approximately 2.4 feet over the next seven days following the initial breach. During most of the lagoon's daily cycles thereafter through May 18, 2009, minimum lagoon levels declined from a daily minimum of 2 to less than 1.5 feet.

Flows increased with the second major winter storm to the mean daily high flow for the water year of 1,970 cfs by March 4, 2009, then steadily declined to 23 cfs on May 18, 2009, when CDPR closed the lagoon. As a result of declining river flows and winter ocean wave action that built up the beach, the lagoon was closed for more than 24 hours on five occasions in April and May 2009, totaling approximately 10 days or 16% of the time during those two months. The lagoon was open 89% of the time for the 92 days between February 15 and May 18, 2009. After the final closure on May 18, 2009, the lagoon surface reached a peak elevation of approximately 8.6 feet on June 15, 2009. Flow to the lagoon ceased after the end of the reporting year on July 16, 2009, and lagoon elevations were at approximately 7.9 feet at the end of this reporting period on June 30, 2009, which was over three feet higher than at the same time in the prior year.

The CDPR was initially prepared to stage their bulldozers to close the lagoon the week of May 4, 2009, but MPWMD recommended they delay their efforts until flows were lower, and they did so until May 18, 2009. CDPR closed the mouth with sand brought from both the north and south beach fronts and sculpted a high elevation channel to the south to provide a controlled outlet for

excess inflow that might occur above what was predicted. The outlet channel provided a measure of insurance against a natural or mechanical breach reoccurring due to a high water level in the lagoon. This work was completed on May 20, 2009. As a result of a drop in inflow this outlet channel went unused. On advice of the CRL-TAC, CDPR requested assistance from a CRSA volunteer who used heavy equipment loaned by Monterey Peninsula Engineering to raise the beach front an additional three feet to successfully preclude unauthorized beach re-breaching by visitors to the beach. These 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.

District staff continue 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 twice between July 2008 and June 2009 [10/01/08, and 11/19/08].

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 reporting period.

In April 2008 of the previous reporting year, 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 by the Carmel River Steelhead Association and the Sierra Club 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 permit application and review. However, during this reporting year CDPR finalized its *Mitigated Negative Declaration for the Carmel River Lagoon Water Elevation Adaptive Management*, and acquired 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 2008-2009

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 or 2008. A combination of factors went into the decision not to monitor the vegetation in 2006 and 2008, which are discussed in the annual reports covering those years. 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 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 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. Current results for spring of 2009, show that Species Diversity near the lagoon, is slightly below the 16 year average.

Special Studies During 2008-2009

- **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. No pre-breaching population census was conducted this year in December, as Fisheries Program staff were occupied with releasing steelhead reared at the SHSRF ahead of the threat of impending turbid winter flows expected as a result of the Basin Complex Fire. The June post-lagoon closure study was also not conducted due to staff commitments to the ASR Water Rights process and developing testimony for the CAW's Coastal Water Project hearings before the State Public Utilities Commission.

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 vlaues (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.

Implementation and Activities During 2008-2009

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 sediment load of the Carmel River increased after main-stem bank erosion and sand from Tularcitos Creek and other drainages entered the active channel 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 2009, staff completed the annual surveys of cross sections (XS) 1-4. Close inspection of the September 2009 XS surveys indicated very little change in lagoon substrate elevation at the four XS from the previous year's surveys (August 2008) **(Figure XI-3)**. The unchanged substrate conditions from 2008 to 2009 may be related to the fact that peak streamflow into the lagoon only reached about 2,500 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 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 lagoon substrate elevations in September 2009 are well within the range of previous surveys indicating no clear trend of either sand depletion or accumulation at the cross sections.

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 restoration of the Odello West property and 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 use of an existing agricultural well and treated water from the Carmel Area Wastewater District to augment the lagoon during periods of low water.

The District expanded its long-term monitoring around the lagoon in 1995 in an attempt to determine if the reduction in freshwater flows due to ground water pumping upstream might 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 this period, for example, there have been two extremely wet years (1995 and 1998), and two above normal years (1996 and 1997), in terms of runoff. Other natural factors that affect the wetlands include introduction of salt water into the system as waves overtop the sandbar in autumn and winter, tidal fluctuations, and long-term global climatic change. When the District initiated the long-term lagoon monitoring component of the Mitigation Program, it was with the understanding that it would be necessary to gather data for an extended period in order to draw conclusions about well draw-down effects on wetland dynamics. It is recommended that the annual vegetation, conductivity, topographical and wildlife monitoring be continued in order to provide a robust data set for continued analysis of potential changes around the lagoon.

Lagoon bathymetric cross sectional surveys, initially conducted in 1988, have been completed

annually during the dry season since 1994. These data are useful in assessing changes in the sand supply within the main body of the lagoon 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.

U/MPWMD/Allocation/RY09/xi_lagoon.doc
Prepared by Water Resources Division
Finalized: July 29, 2010

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

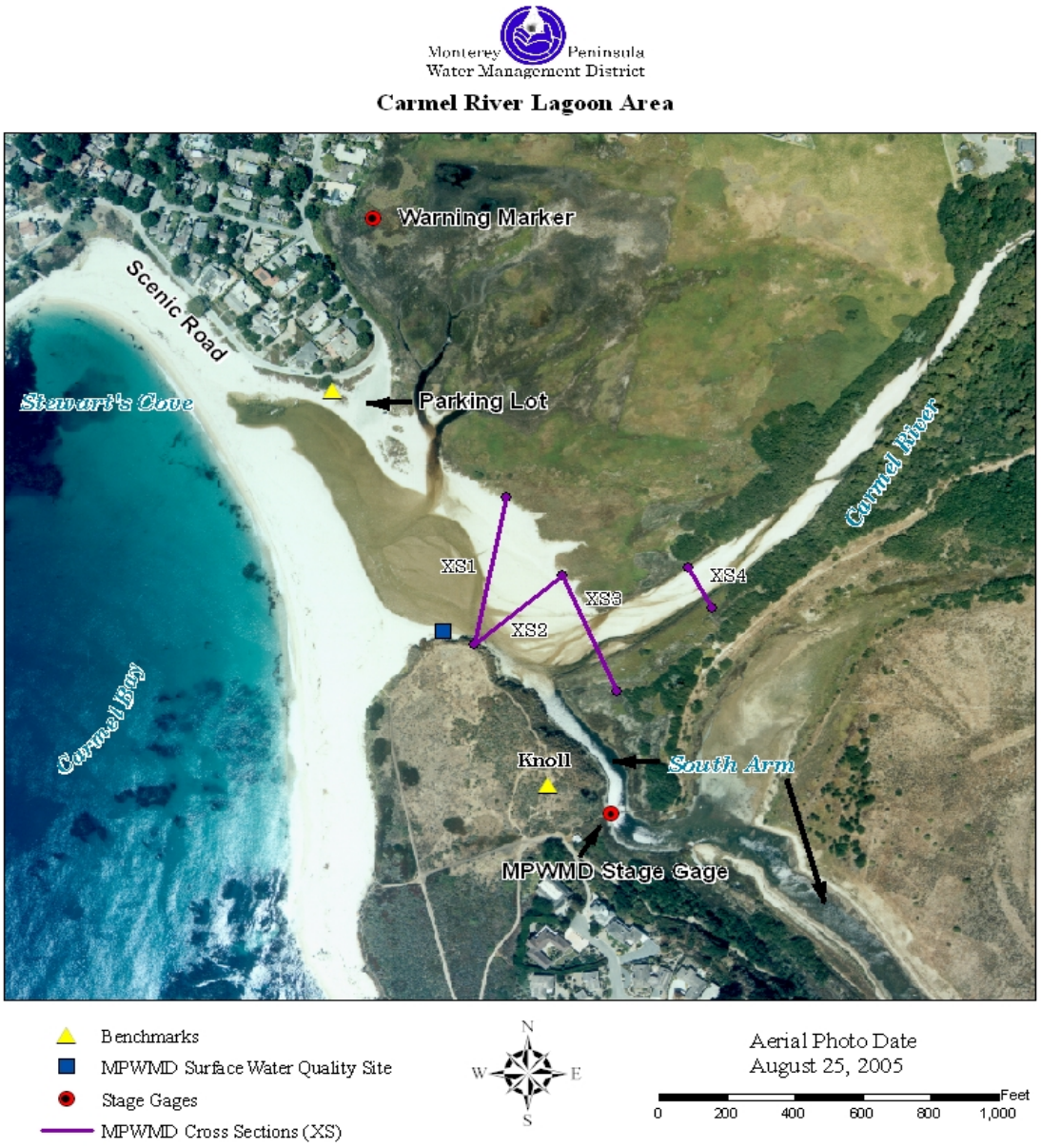
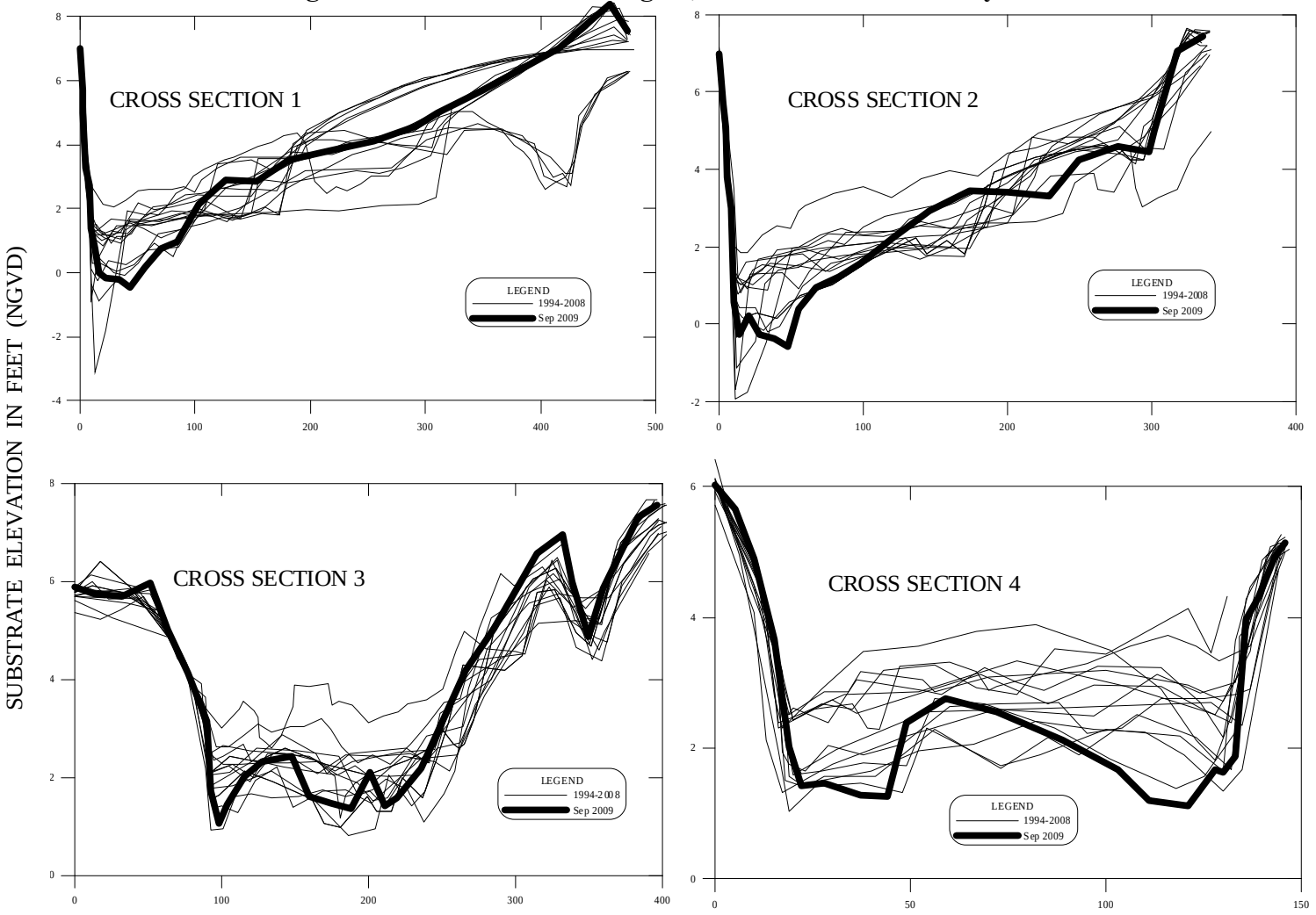


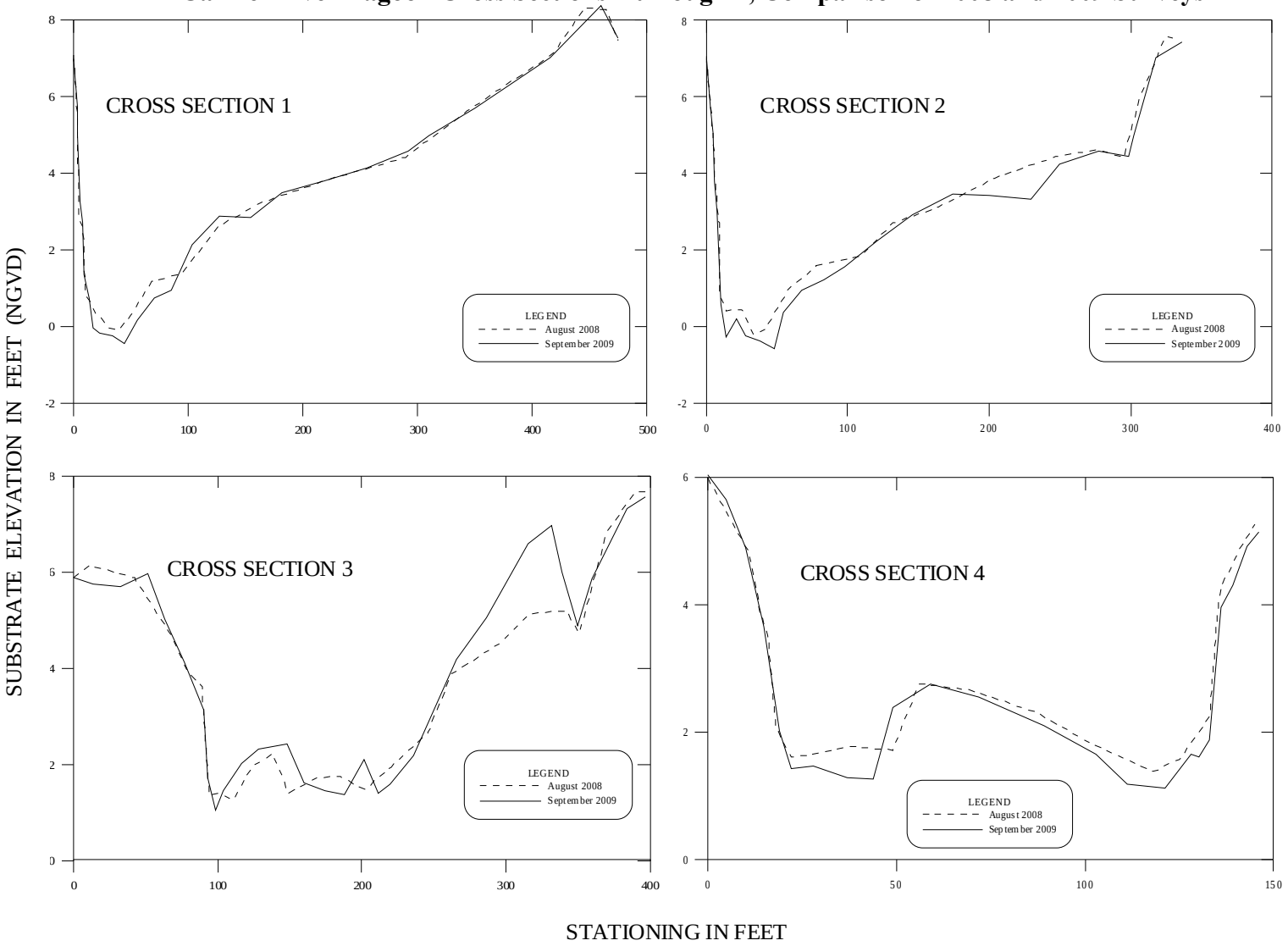
Figure XI-2

Carmel River Lagoon Cross Sections 1 through 4, based on Annual Surveys over the 1994-2009 Period.



U:\james\mitrep0809\lagxs.doc

Figure XI-3:
Carmel River Lagoon Cross Sections 1 through 4, Comparison of 2008 and 2009 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 2008 through June 2009.

U/MPWMD/Allocation/RY09/xii_asthetic.doc
Prepared by Planning and Engineering Division
Finalized: October 1, 2009

XIII. SUMMARY OF COSTS FOR MITIGATION PROGRAM, JULY 2008 THROUGH JUNE 2009

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, 2008 through June 30, 2009. 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.

Total expenditures for the 12-month period were $2,850,509 including direct personnel expenses of $1,671,314, operating costs totaling $411,884, project expenditures in the amount of $658,870 and $108,441 in capital equipment and fixed asset purchases.

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 (SMWS) 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 SMWS customers. During fiscal year 2008-09, revenues totaled $3,293,035, including user fee revenues of $2,299,055. Other revenue sources for the Mitigation Program included $935,124 in tax revenues, $36,951 in reimbursements, interest earnings of $20,143 on the Mitigation Program Fund Balance and $1,762 of miscellaneous revenues. The reimbursements totaling $36,951 were received from California American Water and consisted of $17,831 for Aquifer Storage and Recovery (ASR) operation and maintenance costs and $19,120 for orthoimagery data cost sharing. The Mitigation Program Fund Balance as of June 30, 2009 was $1,284,554.

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 2008-09 were $821,487 less than the prior fiscal year largely due to reduced capital expenditures for ASR and reduced project expenditures related to the Integrated Regional Water Management Plan.

Table XIII-1

Mitigation Program Cost Breakdown for the Period July 2008 through June 2009

EXPENDITURES	Data Collection	Riparian	Fish	Lagoon	Water Supply	IRWMP	Admin	Total
Personnel Costs	$224,577	$252,266	$331,184	$131,514	$197,158	$18,272	$516,343	$1,671,314
Operating Expenses	55,345	62,169	81,618	32,411	48,588	4,503	127,250	411,884
Project Expenses	52,854	53,458	114,996	0	437,483	0	79	658,870
Fixed Asset Acquisitions	11,351	30,458	27,443	5,970	8,950	829	23,440	108,441
TOTAL EXPENDITURES	**$344,127**	**$398,351**	**$555,241**	**$169,895**	**$692,179**	**$23,604**	**$667,112**	**$2,850,509**
REVENUES								
User Fees								$2,299,055
Reimbursements								36,951
Tax Revenues								935,124
Interest Revenues								20,143
Miscellaneous								1,762
TOTAL REVENUE								**$3,293,035**
REVENUE OVER EXPENDITURES								**$442,526**

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

The following selected references provide additional information about the subjects described in this Annual Report. References are organized by section.

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Section XIII. Summary of Costs

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