

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 coordinating the development of an Integrated Regional Water Management Plan (IRWM Plan) for the purposes of coordinating water resource management projects in a planning region defined as the Monterey Peninsula, Carmel Bay, and the Southern Monterey Bay. The District received a grant of approximately \$497,000 from the Department of Water Resources to develop the plan. Many of the activities and projects proposed in this plan will benefit the Carmel River streamside corridor. 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 of the Carmel Valley Alluvial Aquifer (Scarlett Narrows to Carmel Valley Village). Activities in the 2005-2006 period to further this goal 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 CAW 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 reporting year 2005-2006 (RY 2006), MPWMD accomplished the following:

- Carried out a second phase of emergency streambank repairs at the Lower Carmel River Restoration Project.
- 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 (CDFG) and a Regional General Permit with the U.S. Army Corps of Engineers (USCE) 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 Bridge, Sutherland Property, Ronnoco Road, and Hacienda Carmel Community Association).

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

- **Carmel River Erosion Protection and Restoration**

Emergency Streambank Repairs at the Lower Carmel River Restoration Project: High river flows in early April 2006 caused erosion of the north streambank along a portion of Carmel River between Rancho San Carlos Road and Via Mallorca. The erosion occurred along the north streambank in an area that MPWMD had conducted temporary streambank repairs in March 2005. In mid-April 2006, additional rip-rap was placed on streambank areas subject to erosion that had not been stabilized the previous winter. Due to staff workload constraints, MPWMD has been unable to move forward with a comprehensive river restoration project to address the degradation and instability present in the reach. However, the District had identified this area as the highest priority for restoration work and had expressed a desire to work with riverfront property owners to restore this area.

In early April 2006, the condition of the most critical streambank area in this reach deteriorated rapidly as a result of heavy rains and high flows and emergency action became necessary to stabilize

the bank. Due to the estimated cost of repairs (\$36,000), the property owners requested that MPWMD share in the cost of the repairs. The District General Manager agreed that the work would be consistent with planned restoration activities and authorized reimbursement of property owners for up to \$20,000 in emergency repairs, with the property owners contributing the remainder of the costs. The District Engineer declared an emergency status for the Carmel River.

It was determined that installation of rock rip-rap would be the most effective method for stabilizing the bank for the remainder of the spring. Carmel Valley Construction, the contractor for this work, hauled and placed approximately 400 tons of rock on the streambank to halt the bank erosion and prevent further damage to the river and surrounding properties. The emergency work stabilized the bank and District staff worked with the contractor to install 100 native riparian plantings during repair work. District staff monitored this situation closely throughout the spring of 2006 and installed additional cuttings when river flows dropped (**Table X-1**). MPWMD will work with affected property owners to complete comprehensive repairs and restoration in the future.

Riparian Ordinance Enforcement Action - A serious violation of the District's riparian ordinances occurred in late December 2003 on two residential properties on the north bank of the river just upstream of the Rancho Cañada Golf Club. One of the property owners, Roy Woods, 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 the high flows in 1998. Approximately one-half of the work was carried out on an adjacent property, owned by Nick and Gerda Marotta.

District staff took enforcement action against both property owners and recorded Notices of Non-Compliance on the titles of both properties. During RY 2006, staff met with representatives of the property owners on several occasions in an effort to resolve the violation, but a satisfactory plan for bank restoration has not been approved.

Subsequently, 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 Mr. Woods to remove the work and obtain a permit from the District.

- **Vegetation Restoration** -- Various techniques for vegetation installation were employed at District restoration projects in RY 2006. 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 549 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 RY 2006. 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 RY 2006. Please note that these figures include irrigation during two separate irrigation seasons. For the reporting year, 6.43 acre-feet (AF) of water were applied. The 2005 irrigation season began in May and continued through the end of November 2005. Total water use for the season was 6.30 AF. This compares to 9.46 AF during the 2004 irrigation season, and is considerably less than the 1994 irrigation total of 51.1 AF, when critically-dry 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 2005 four areas with virtually 100% vegetation encroachment in the channel bottom were selected for vegetation removal: (1) beginning at Robles Del Rio Bridge at RM 14.5 and extending approximately 95 feet downstream; (2) beginning at approximately RM 11.8 near the east end of Garland Park and extending approximately 80 feet downstream along the Sutherland property; (3) beginning approximately two miles upstream of the Robinson Canyon Road Bridge by Ronnoco Road (RM 10.1), and extending 345 feet downstream; and (4) beginning about 0.25 mile upstream of Via Mallorca Bridge (RM 3.5) and extending 70 feet downstream. A width of up to 40 feet of clear area was desired. A total of approximately 590 lineal feet of stream encompassing approximately 0.48 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 RY 2006, trash such as 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 2007. 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**

Prioritization of Carmel River Watershed Conservancy (CRWC) Action Plan – MPWMD participated in the prioritization of the Carmel River Watershed Conservancy’s Action Plan. A series of approximately eight meetings with representatives of CRWC, Planning and Conservation League Foundation (PCLF), Coastal Conservancy, Big Sur Land Trust, CDFG, and the Regional Water Quality Control Board (RWQCB) yielded refined text and actions from the original 57 item 2005 Action Plan. The *Carmel River Watershed Action Plan Matrix (2006)* consists of 41 actions organized into 9 issue categories (cross-cutting, flow, groundwater, habitat, public safety, public outreach, sediment, steelhead, and monitoring). The *2006 Action Plan* builds upon the previous action plan with information that provides a framework for implementation. In addition to characterizing each key problem, the *Action Plan Matrix* presents benefits to be gained, and identifies potential lead organization(s) for project implementation, potential partner organizations, estimated cost, permits, and potential funding sources. Actions are ranked within each category, with “1” indicating the top priority. These actions were then prioritized based on the number of benefits they could provide.

Planning and Conservation League Tour of Carmel Valley: On September 26, 2005, District staff provided information on District restoration activities on the Carmel River for the PCLF tour of the San Clemente Dam, Carmel River Lagoon, and Valley Hills Restoration Project. Also participating in the tour were representatives of CAW, National Marine Fisheries Service (NMFS), the Big Sur Land Trust, and two consulting firms. Several consultants and the PCLF are working on a plan evaluating solutions for the San Clemente Dam seismic retrofit project.

Participation in Coastal Training Program: District staff participated in a training program focusing on the Carmel River watershed held by the Elkhorn Slough Coastal Training Program on November 3 and 4, 2005. District staff spoke on the District’s environmental protection and habitat restoration programs on the Carmel River.

On January 17 and 18, 2006, District staff gave field presentations to Carmel Valley Middle School (CVMS) students on the District’s environmental protection program. Students participated by planting native vegetation at the Carmel River Lagoon. CVMS faculty coordinator brought black

cottonwood seedlings, and the District brought 180 willow cuttings. Over the two morning planting sessions, District staff presented restoration techniques and lagoon dynamics to about 200 students.

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 resource conditions over time.

In RY 2006, staff collected semi-monthly pressure chamber measurements of leaf water potential at four study sites in mid and lower Carmel Valley. Soil moisture was evaluated bi-monthly with tensiometers at the Schulte project, in the vicinity of the San Carlos Well, and at the Valley Hills Project. Photo documentation and measurements of foliage volume and tree dimensions occurred at several study site locations along the river. Staff continued willow planting mortality and growth surveys to determine the success of plantings at the Red Rock and All Saints Restoration Projects.

- **CAW Conservation Agreement** -- In September 2001, CAW entered into a Conservation Agreement with NMFS to protect steelhead habitat by increasing pumping downstream of Rancho San Carlos Road by 3 to 5 cubic feet per second. This action, in combination with cessation of diversions at San Clemente Dam, is designed to maximize river flow as far downstream as possible. However, the new pumping regime may increase impacts to riparian vegetation in the vicinity of CAW's four wells (Rancho Cañada, San Carlos, Cypress, and Pearce), especially in the Rancho Cañada well area. For this reason, District staff participated in developing the Conservation Agreement Monitoring Plan and shifted monitoring efforts from the Scarlett Project to CAW's Rancho Cañada well site. Some of the monitoring includes pre-dawn moisture potential testing (vegetative stress), and the installation of data loggers that record depth to groundwater every 15 minutes. The increased extraction from the lower wells is being performed on a trial basis. If monitoring results show a trend towards significant impacts, changes in CAW's operation will occur.

A significant development since the Conservation Agreement was signed includes the suspension of pumping at CAW's San Carlos well. The California Department of Health Services (CDHS) deemed the well under the influence of surface water. Therefore, in order to use water extracted from this well, it must be treated to surface water standards. Currently, CAW does not have the ability to treat water from this part of the system to surface water standards. The loss of use of this well has limited CAW's ability to increase pumping in the lower valley. However, CAW's newly retrofitted Cañada well is now operating with the capacity to pump up to 2,500 gallons per minute. To offset impacts to riparian vegetation associated with an increase in pumping at the Cañada well, CAW and the District installed 1,000 linear feet of sprinkler irrigation to maintain tree health. In Spring 2004, the District expanded this system to water riparian vegetation near the base of the river bank.

In addition to vegetation and soil moisture monitoring, avian (bird) species diversity monitoring was continued during Summer 2005 and Spring 2006 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 demonstrated a steady increase in 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 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 RM 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 streamside area between Rancho Cañada and Quail Lodge has been impacted by increased groundwater extraction. In this reach, only irrigated areas are able to sustain a diversity of plant species. Plant stress in the late summer and fall is evident in non-irrigated portions of the river. In these areas, streambanks exhibit unstable characteristics during high flows, such as sudden bank collapse, because of the lack of healthy vegetation that would ordinarily provide stability.

Restoration project areas sponsored by MPWMD since 1984 continue to mature and exhibit more features of relatively undisturbed reaches, such as plant diversity and vigor, complex floodplain topography, and a variety of in-channel features such as large wood, extensive vegetative cover, pools, riffles, and cut banks. Areas that were repaired after the 1995 and 1998 floods are still developing these natural features. In part, the location and geometry of the projects constrain the rate of progress toward a fully restored stream channel (i.e., several are located in highly developed, narrow sections of the river impacted by groundwater extraction). Also, many of these projects relied heavily on the use of bank hardening (e.g., rip-rap) to stabilize banks, which can discourage

plant vigor and diversity.

The most significant trends include the following:

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

Carmel River Erosion Protection and Restoration

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

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

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

A noticeable change to the channel bottom is the obvious continued degradation (i.e., the river channel is incising into floodplain deposits). This has both a positive and negative aspect. On the plus side, it is clear that sand and fine material has been winnowed out in the past few years, exposing gravel and cobble layers that provide spawning habitat for steelhead and suitable substrate for the food web that steelhead depend on. However, a lack of a natural supply of sediment from the upper watershed (due to the presence of main stem dams) means that the river must remove material from the channel bottom and streambanks to make up for this deficit. The river system downstream of Los Padres Dam is considered “sediment starved.”

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

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

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

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

Vegetation Restoration and Irrigation

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

The Conservation Agreement between CAW and NMFS has changed the lower Carmel Valley

pumping regime. Depending on the total rainfall for the year, increased pumping at the Cañada Well may cause significant stress to the riparian corridor and create the need for supplemental irrigation. The severity of these impacts was monitored in RY 2006 through the Conservation Agreement Monitoring Plan. Based on observation of stress to riparian trees in the area, the irrigation system at the Cañada Well has been sufficient to offset impacts to established trees from groundwater extraction.

Channel Vegetation Management

Another notable trend relating to the District's vegetation management program was the widening of the channel after the floods in 1995 and 1998. With relatively normal years following these floods the channel has narrowed as vegetation recruits on the streambanks and gravel bars. Current Federal regulations such as the Endangered Species Act (ESA) "Section 4(d)" rules promulgated by 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 USCE and the California RWQCB. In January 2001, the District applied to the CDFG to renew a long term Routine Maintenance Agreement (RMA) to conduct regular maintenance and restoration activities. The District continued to pursue this RMA during RY 2006 and finally received a signed RMA in October 2005. The District may also seek long-term permits or agreements with other regulatory agencies including the Monterey County Water Resources Agency and Monterey County Planning and Building Inspection Department.

Monitoring Program

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

monitoring and irrigation during the dry season.

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

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

The District entered into an agreement with the Department of Water Resources to prepare an Integrated Regional Water Management Plan (IRWM Plan) for a planning region encompassing Monterey Peninsula areas within the District boundary, the area in the Carmel River watershed outside of the MPWMD boundary, Carmel Bay and the Southern Monterey Bay. MPWMD will be reimbursed for up to \$496,957 to prepare the Plan, which is estimated to cost a total of about

\$1,258,000. Funds for reimbursement will come from the IRWM grant program funded by Proposition 50, which was approved by voters statewide in November 2002. The plan will combine strategies to improve and manage potable water supply, water conservation, stormwater runoff, floodwaters, wastewater, water recycling, habitat for wildlife, and public recreation.

MPWMD's local match contribution toward development of the plan was estimated to be \$516,000, with other stakeholders contributing approximately an additional \$243,000. MPWMD executed sub-grantee agreements with the City of Monterey, the Big Sur Land Trust, and the Carmel River Watershed Conservancy to prepare portions of the IRWM Plan. A draft IRWM Plan was completed in November 2006.

When finalized, the IRWM Plan will also aid in applying to State grant programs for implementing projects such as those funded by Proposition 50, 84, and 1E and in applying to Federal grant programs such as those funded through the USCE and NMFS.

In an effort to broaden the integration of water resource management around the Monterey Bay, the District signed a Memorandum of Understanding with the Monterey County Water Resources Agency and the Pajaro Valley Water Management Agency to further joint efforts on IRWM Planning for watersheds draining into the Monterey Bay. A primary goal of this effort is to coordinate the detailed IRWM Plans being developed for areas draining into the Monterey Bay.

Table X-1

Riparian Species Planted July 1, 2005 through June 30, 2006

| Plant Species | Number | Location |
|--|---------------|---|
| <i>Acer negundo</i> , box elder | 1 | Kenny (1) |
| <i>Aesculus californica</i> , buckeye | 8 | Kenny (4) Rancho San Carlos (4) |
| <i>Populus balsamifera ssp. trichocarpa</i> , black cottonwood | 171 | Lagoon (30) Kenny (98) Rancho San Carlos (13) Hacienda Carmel (15) Dow (15) |
| <i>Ribes divaricatum</i> , Scraggly gooseberry | 4 | Kenny (4) |
| <i>Salix ssp.</i> , willow | 365 | Dow (20) Lagoon (180) Kenny (105) Hacienda Carmel (60) |
| TOTAL | 549 | |

Table X-2

**MONTHLY IRRIGATION WATER USE DURING 2005-2006
(VALUES IN ACRE-FEET)**

| Project Site | Jul-05 | Aug-05 | Sep-05 | Oct-05 | Nov-05 | Dec-05 | Jan-06 | Feb-06 | Mar-06 | Apr-06 | May-06 | Jun-06 | Total |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------|
| DeDampierre | 0.142 | 0.151 | 0.083 | 0.037 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.413 |
| Trail and Saddle | 0.012 | 0.024 | 0.020 | 0.018 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.013 | 0.017 | 0.109 |
| Scarlett | 0.015 | 0.016 | 0.010 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.017 | 0.058 |
| Schulte South | 0.045 | 0.023 | 0.010 | 0.005 | 0.000 | 0.000 | 0.000 | 0.066 | 0.000 | 0.000 | 0.041 | 0.062 | 0.252 |
| Reimers | 0.672 | 0.655 | 0.312 | 0.616 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.679 | 2.934 |
| Cypress | 0.298 | 0.413 | 0.539 | 0.184 | 0.048 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.344 | 1.826 |
| San Carlos | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| All Saints | 0.029 | 0.043 | 0.017 | 0.028 | 0.015 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.012 | 0.030 | 0.174 |
| Schulte Bridge | 0.070 | 0.130 | 0.056 | 0.063 | 0.057 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.036 | 0.058 | 0.470 |
| Begonia | 0.032 | 0.034 | 0.031 | 0.024 | 0.015 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.023 | 0.039 | 0.198 |
| TOTAL WATER USE IN ACRE-FEET FOR DISTRICT RESTORATION PROJECTS IN 2005-2006 = | | | | | | | | | | | | | 6.434 |

Figure X-1

