# Work Plan to Update the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Plan

| Stakeholders | |
|---|---|
| California American Water | Marina Coast Water District |
| California Coastal Commission | Monterey Bay Citizen Watershed Monitoring Network |
| California Coastal Conservancy | Monterey County Service Area 50 |
| California Department of Fish and Game | Monterey Peninsula Regional Park District |
| California State University Monterey Bay | NOAA Fisheries |
| California State Water Resources Control Board | Pebble Beach Community Service District |
| Carmel Area Wastewater District | Pebble Beach Company |
| Carmel River Steelhead Association | Planning and Conservation League |
| Carmel River Watershed Conservancy | Regional Water Quality Control Board |
| Carmel Unified School District | Resources Conservation District of Monterey County |
| Carmel Valley Association | Seaside Basin Watermaster |
| City of Carmel-by-the-Sea | State Department of Parks & Recreation |
| City of Del Rey Oaks | Surfrider Foundation |
| City of Pacific Grove | The Nature Conservancy |
| City of Sand City | The Watershed Institute at CSUMB |
| City of Seaside | U.S. Army Corps of Engineers |
| Fort Ord Environmental Justice Network | U.S. Fish and Wildlife Serve |
| Monterey Bay National Marine Sanctuary | Ventana Wilderness Society |

## Regional Water Management Group

BIG SUR LAND TRUST

City of Monterey California

Monterey Peninsula Water Management District

Monterey County Water Resources Agency 1947

MRWPCA Monterey Regional Water Pollution Control Agency

**Proposition 84 Planning Grant Proposal**
**September 24, 2010**

**Attachment 3 – Work Plan to Update the**
**Monterey Peninsula, Carmel Bay, and South Monterey Bay**
**Integrated Regional Water Management Plan**

Table of Contents

**Description** **Page No.**


Table of Contents ..... 2
Acronyms ..... 3
Summary ..... 5
Background for 2007 IRWM Plan ..... 9
Task List Summary ..... 16
Chapter 1. Revise Executive Summary (ES) and Chapter 1 Introduction ..... 23
Chapter 2. Geographic and Political boundaries ..... 23
Chapter 3. Region Description (Tasks 3.1 through 3.3) ..... 24
Chapter 4. Objectives ..... 25
Chapter 5. Water Management Strategies and Integration ..... 26
Chapter 6. Regional Priorities and Project Review ..... 28
Chapter 7. Implementation ..... 30
Chapter 8. Impacts and Benefits ..... 31
Chapter 9. Technical Analysis and Plan Performance ..... 31
Chapter 10. Data Management ..... 32
Chapter 11. Plan Funding and Financing (Tasks 11.1 through 11.3) ..... 33
Chapter 12. Statewide Priorities and Program Preferences (Tasks 12.1.1 and 12.1.2) ..... 34
Chapter 14. Stakeholder Involvement and Coordination ..... 38
Chapter 15. Climate Change ..... 41


**Additional Work Plan Elements**


**Exhibit A-1** – An update to the Canyon Del Rey watershed portion of the Monterey County Master Drainage Plan
**Exhibit A-2** – Development of a salt and nutrient management plan for the Seaside Groundwater Basin
**Exhibit A-3** – Assessment of steelhead passage barriers in portions of four tributaries to the Carmel River main stem.
**Exhibit A-4** – Geographic Information Systems Internet Mapping Site Development.
**Exhibit A-5** – Inter-Regional Coordination Between the Greater Monterey County IRWM Plan and the Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM Plan
**Exhibit A-6** – An assessment for San Jose Creek watershed.
**Exhibit A-7** – ASBS alternatives analysis.
**Exhibit A-8** – Hydrologic Modeling for the Carmel Valley Alluvial Aquifer

**Acronyms**

AF – acre-feet
AFA – acre-feet per annum
AFY – acre feet per year
AMBAG – Association of Monterey Bay Area Governments
ASBS – Areas of Special Biological Significance
ASR – Aquifer Storage and Recovery
AWT – advanced wastewater treatment
BIRP – Begonia Iron Treatment Plant
BMP – best management practice
BSLT – Big Sur Land Trust
CDPR – California Department of Parks and Recreation (see also CSP)
CSIP – Castroville Seawater Intrusion Project
CALTRANS – California Department of Transportation
CAW – California American Water
CAWD – Carmel Area Wastewater District
CCA – Critical Coastal Area
CCC – California Coastal Commission
CCR – Central Coast Region
CDFG – California Department of Fish and Game
CDP – Coastal Development Plan
CEQA – California Environmental Quality Act
CDO – cease and desist order
CRB – Carmel River Basin
CRLF – California red-legged frog
CRMP – Carmel River Management Plan
CRWC – Carmel River Watershed Conservancy
CSA – County Service Area
CSP – California State Parks
CSU – California State University
CSUMB – California State University Monterey Bay
CVSIM – Carmel Valley Simulation Program
CWA – Clean Water Act
CZARA – Coastal Zone Act Reauthorization Amendment
DSOD – California Division of Safety of Dams
DWR – California Department of Water Resources
EIR – Environmental Impact Report
EIS – Environmental Impact Statement
GHP – greenhouse gas
GRP – Groundwater Recharge Project
GWR – groundwater replenishment
ICWM – Integrated Coastal Watershed Management
ICWMP – Integrated Coastal Watershed Management Plan
IRWM – Integrated Regional Water Management

IRWMP – Integrated Regional Water Management Plan
LCP – Local Coastal Plan
LUP – Land Use Plan
MBNMS – Monterey Bay National Marine Sanctuary
MCWD – Marina Coast Water District
MCWRA – Monterey County Water Resources Agency
MCWRP – Monterey County Water Recycling Project
MGD – million gallons per day
MM – Management Measures
MOU – memorandum of understanding
MPRPD – Monterey Peninsula Regional Parks District
MPWRS - Monterey Peninsula Water Resource System
MPWMD – Monterey Peninsula Water Management District
MRSWMP – Monterey Regional Storm Water Management Program
MRWPCA – Monterey Regional Water Pollution Control Agency
MURP – Model Urban Runoff Program
NOAA – National Oceanic and Atmospheric Administration
NOP – Notice of Preparation
NPDES – National Pollutant Discharge Elimination System
NPS – non-point source
NTU – nephelometric turbidity units
PBCSD – Pebble Beach Community Services District
PSP – Proposal Solicitation Package
RURWP – Regional Urban Recycled Water Project (superseded by RUWAP)
RUWAP – Regional Urban Water Augmentation Project
RAP – Region Acceptance Process
RM – river mile (measured from the Pacific Ocean)
RWMG – Regional Water Management Group
RWQCB – Regional Water Quality Control Board
SVRP – Salinas Valley Reclamation Project
SBGMP – Seaside Basin Groundwater Management Plan
SGB – Seaside Groundwater Basin
SNMP – salt and nutrient management plan
SSAMP – Sewer System Asset Management Plan
SWQPA – State water quality protection area
SWRCB – State Water Resources Control Board
TAC – technical advisory committee
TMDL – Total Maximum Daily Load
USACE – United States Army Corps of Engineers
USFWS – United States Fish and Wildlife Service
USGS – United States Geological Service
WDR – Waste Discharge Requirement
WQPP – Water Quality Protection Program
WMI – Watershed Management Initiative

## SUMMARY

This work plan describes tasks to update the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management (IRWM) Plan to the standards described in the IRWM Program Guidelines (Guidelines) and includes tasks to improve planning to address regional priorities described within the existing IRWM Plan. During meetings in 2009 and 2010 to discuss grant application to the IRWM program, stakeholders were informed of the new Guidelines and were asked to identify planning tasks that could improve the adopted IRWM Plan or address issues that had not been included in the IRWM Plan. Suggested additional tasks cover nearly every geographic area within the region and improve the region's ability to meet four of the five priorities described in the 2007 plan. These tasks are described in the following attachments:

**Exhibit A-1** – An update to the Canyon Del Rey watershed portion of the Monterey County Master Drainage Plan

**Exhibit A-2** – Development of a salt and nutrient management plan for the Seaside Groundwater Basin

**Exhibit A-3** – Assessment of steelhead passage barriers in portions of four tributaries to the Carmel River main stem

**Exhibit A-4** – Geographic Information Systems Internet Mapping Site Development

**Exhibit A-5** – Inter-Regional Coordination Between the Greater Monterey County IRWM Plan and the Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM Plan

**Exhibit A-6** – An assessment for San Jose Creek watershed

**Exhibit A-7** – City of Monterey and Pacific Grove ASBS refined 2006 feasibility study of alternatives Management Plan

**Exhibit A-8** – Hydrologic Modeling for the Carmel Valley Alluvial Aquifer.

## NEED FOR IRWM PLAN UPDATE

The Integrated Regional Water Management Plan (IRWMP or IRWM Plan) for the region was adopted in 2007 and can be downloaded or viewed at the following web site:

http://www.mpwmd.dst.ca.us/Mbay_IRWM/Mbay_IRWM.htm (note that the two blanks in the URL are actually underscores)

The 2007 plan complied with Proposition 50 IRWM standards and was adopted by MPWMD (representing the region) in November 2007; thus, DWR determined that the IRWM Plan met the

current requirement that an IRWM Plan be adopted before September 30, 2008. However, since adoption of the plan, there have been several events at the State and local level that affect water resources planning including:

- The publication of the Final Guidelines for the Integrated Regional Water Management (IRWM) Grant Program funded by Proposition 84.
- The California Public Utilities Commission is scheduled to rule on a regional water supply project in November 2010 that will affect most of the Monterey Peninsula IRWM region and may affect planning in the Greater Monterey County planning region.
- In 2009, the State Water Resources Control Board (SWRCB) adopted a recycled water policy to encourage local agencies to develop salt and nutrient management plans for basins listed in the California Water Plan. There are two recognized basins in the planning region – the Seaside Groundwater Basin (3-4.08) and the Carmel River Alluvial Aquifer (3-7).
- In October 2009, SWRCB issued Order WR 2009-0060, which is a Cease-and-Desist order against Cal-Am, which serves 95% of the water customers on the Monterey Peninsula. The CDO prescribes a series of significant permanent cutbacks to Cal-Am's pumping from the Carmel River beginning in 2010 and continuing through December 2016. Cal-Am customers may be subject to water rationing, a moratorium on water permits for new construction and remodels, and heavy fines if pumping limits are exceeded.
- In February 2008, Governor Schwarzenegger directed state agencies to develop a plan to reduce statewide per capita urban water use by 20 percent by the year 2020.

## ORGANIZATION OF THE WORK PLAN

This work plan includes tasks to update Chapters 1 to 15 in the IRWM Plan and tasks described in Exhibits A-4a and A4b (development of GIS and Data Management tools) and A-5 (Inter-regional Coordination), which also will assist in meeting minimum IRWM Plan standards. Task descriptions to update specific chapters in the existing IRWM Plan are generally organized to reflect the numbering of the chapters and sections in the existing IRWM plan. This work plan includes development of a separate chapter to be added to the IRWM Plan to address Global Climate Change and Greenhouse Gas Emissions.

In addition to tasks to meet current IRWM Plan standards, several tasks are proposed to improve or extend the existing IRWM Plan and are attached as exhibits to this work plan including:

- **Exhibit A-1** An update to the Canyon Del Rey watershed portion of the Monterey County Master Drainage Plan, which was completed in 1977. Flooding and bank erosion along the Highway 68/Highway 218 corridor and sedimentation of the two lakes at the terminus of the watershed (Roberts Lake and Laguna Grande) are the primary issues to focus on in an update. The potential to combine resource strategies and project alternatives to meet multiple IRWM plan objectives will be evaluated. Resource strategies that could be combined with flood and erosion control planning include water quality improvement, groundwater recharge, water conservation, and habitat restoration.

- **Exhibit A-2** Development of a salt and nutrient management plan for the Seaside Groundwater Basin. This basin falls under the SWRCB Recycled Water Policy, which was adopted in 2009, and requires a plan to recognize salt and nutrient loading and to implement a program to reduce the effects on groundwater quality. Several water supply projects involving extraction of a variety of input sources are being considered for implementation in the basin, including injection of winter surface runoff from the Carmel River basin, injection and percolation of recycled wastewater, injection of desalinated water, and capture and re-use of stormwater.

- **Exhibit A-3** Assessment of steelhead passage barriers in portions of three tributaries to the Carmel River main stem totaling about 20 miles of stream. After rebounding from a record low of one adult fish counted at the San Clemente Dam fish ladder in 1991 to nearly 900 adults in 1999, the adult run of steelhead has trended downward and is currently at a level of between just over 100 to 400 adults annually. This downward trend has occurred during a relatively wet period in which 12 of the last 15 years have seen above-average rainfall in the watershed and during a period that the streamside riparian corridor has increased more than 46% (between 1986 and 2001). Restoration of steelhead habitat in the Carmel River watershed was designated as one of five regional priorities in the IRWM Plan. Goals of the assessment include private property owner outreach, field assessment, prioritization of barriers to be removed, and recommendations about methods to remove or modify the barriers.

- **Exhibit A-4a** Development of a GIS, project proposal and monitoring database, and communication tools for stakeholders and other interested groups to use. Integrating project proposals and stakeholder information into the IRWM Plan and providing tools for meaningful feedback are primary goals for this task.

- **Exhibit A-4b** Development of a Document Management System (IRWM-DMS) portal for use with a GIS based Mapping & Collaboration Infrastructure. Work associated with this task will develop IRWM Document Management Software (IRWM-DMS) to be used in updating the IRWM Plan and in providing stakeholders with web-based tools to improve data and water resources management in the region.

- **Exhibit A-5** Inter-regional Coordination Between the Greater Monterey County IRWM Plan and the Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM Plan. This task updates neighboring IRWM efforts and the way cooperation or coordination with these other efforts will be accomplished. It should be noted that the results of inter-regional coordination tasks may be incorporated into several different sections of the IRWM Plan update. This may not be specifically called out with the tasks to update individual chapters in the IRWM Plan, but is a task to complete with the IRWM Plan update.

- **Exhibit A-6** – San Jose Creek Watershed Plan. A complete, steelhead-centric, physical watershed assessment is proposed that will lead to a prioritized list of watershed management actions. The assessment will integrate information from sediment source analysis, hydrologic data, barrier evaluations, and lagoon monitoring.

- **Exhibit A-7** – The Cities of Monterey and Pacific Grove Area of Special Biological Significance alternatives analysis. Dry and wet weather discharges to the Pacific Grove ASBS are prohibited under the State Ocean Plan. The Cities of Monterey and Pacific Grove are working with the SWRCB to meet discharge requirements and propose to refine an alternatives analysis completed in 2006 with the help of a Prop. 50 planning grant from DWR.

- **Exhibit A-8** – Hydrologic Modeling of the Carmel River Alluvial Aquifer. The Carmel Valley Alluvial Aquifer and the Carmel River have been modeled with various techniques in the past. However, many of these models are not current, and should be evaluated with respect to the ability of the models to answer questions necessary to best manage the coupled resource of the river flow and groundwater storage. Developing a new model will provide the ability to simulate and better manage the interaction between stream flow and groundwater movement in the portions of the Carmel River that flow over and through the Alluvial Aquifer. It should be noted that the lower 15.5 miles of the aquifer underlying and closely paralleling the surface water course of the Carmel River is water flowing in a subterranean stream and subject to the jurisdiction of the SWRCB (WRO 95-10).

## BACKGROUND AND CONTEXT

To provide background and context for each task, a brief excerpt or description maybe included from the existing IRWM Plan. Detailed background information is contained in the existing IRWM Plan and in the submittal materials for the Regional Acceptance Process. In addition, a summary of the planning process is provided in the next section of this work plan.

## BUDGET

Many of the individual tasks are inter-connected – meaning that efforts to complete one task may affect the amount of effort and, therefore, costs associated with completing one or more related tasks. For this reason, several tasks may be grouped together as a single budget item. More detailed estimates are available upon request.

## GRANT ADMINISTRATION PARTNERS FOR COMPLETING AN UPDATE

MPWMD will facilitate the completion of an update of the IRWM Plan with assistance from region stakeholders, the RWMG, the Greater Monterey County RWMG, and consultant services. The update will include periodic input and review by the RWMG and stakeholders. Additional tasks described may be completed through a combination of MPWMD staff, sub-grantee agreements, and consultant agreements.

## IRWM PLAN ADOPTION

This work plan is intended to result in a revised IRWM Plan that meets proposition 84 requirements and that meets the needs of the region's stakeholders; however, it is recognized that stakeholders and RWMG will need to work with IRWM program staff during the update process to assure that a revised IRWM Plan meets DWR standards. Upon completion of an

update, each stakeholder in the Region will be encouraged to adopt the IRWM Plan. At a minimum, project sponsors will be required to formally adopt the updated plan in order to be included in any project proposal described in future grant applications.

**BACKGROUND FOR 2007 IRWM PLAN**

From the Planning Grant Proposal Solicitation Package:

The background section will consist of a history of the IRWM planning process that the IRWM planning effort has taken to date. The background section should be used to set the context of the work plan. It can include a discussion of previous efforts or activities that relate to the development of the IRWM Plan, but are not part of specific work items. The following descriptions must be included either in the background section or, if appropriate, as tasks in the work plan (as applicable to existing or partially completed IRWM Plans). These descriptions may be extracted, where feasible, from the existing IRWM Plan or relevant sections of the RAP submittal materials.

## Regional Water Management Group (RWMG)

The RWMG is comprised of representatives from the Big Sur Land Trust (BSLT), the City of Monterey, the Monterey County Water Resources Agency (MCWRA), the Monterey Regional Water Pollution Control Agency (MRWPCA), and the Monterey Peninsula Water Management District (MPWMD). This group, which represents the diverse interests of the Region, was formed between 2005 and 2006 in conformance with State IRWM guidelines to guide the development and implementation of the IRWM plan.

Both MCWRA and MPWMD have responsibility for integrated water resource management within the Region. It should be noted that MCWRA was the lead agency for the Salinas Valley IRWM Plan and is currently part of the RWMG for the Greater Monterey County IRWM Plan. However, to ensure that resource management efforts are not duplicated, MPWMD and MCWRA entered into a Memorandum of Understanding in 1993 that addressed water supply, flood control, water conservation, water recycling, and taxation and assessments in Monterey County. The Pajaro Valley Water Management Agency also signed the MOU. All three of these agencies are currently participating in cooperative efforts with other Central Coast IRWM planning agencies concerning Central Coast priorities and moving forward under the IRWM grant program with projects within each respective planning region.

The City of Monterey provides storm water collection, maintains the sanitary sewer system, and manages park and open space areas for a population of approximately 30,000 within its jurisdiction. For the purposes of IRWM, Monterey represents many of the interests of the six Monterey Peninsula cities of Carmel-by-the Sea, Del Rey Oaks, Pacific Grove, Monterey, Sand City, and Seaside that are within the IRWM planning region.

The Big Sur Land Trust, which has been conserving coastal resources along the California central coast for more than a quarter of a century, serves as a bridge between private and public

sectors and has recently increased its participation in resource planning in both the Carmel Valley and Salinas Valley and more recently has expanded its role throughout Monterey County.

MRWPCA has multi-regional responsibility for wastewater treatment in both the Monterey Peninsula and Greater Monterey County regions.

In 2010, the RWMG approved a request by the Marina Coast Water District (MCWD) to be added to the RWMG. MCWD is a key agency in the proposed Regional Water Supply Project, which may permanently affect water resources planning and management in both the Monterey Peninsula and Greater Monterey County regions.

## Planning Region

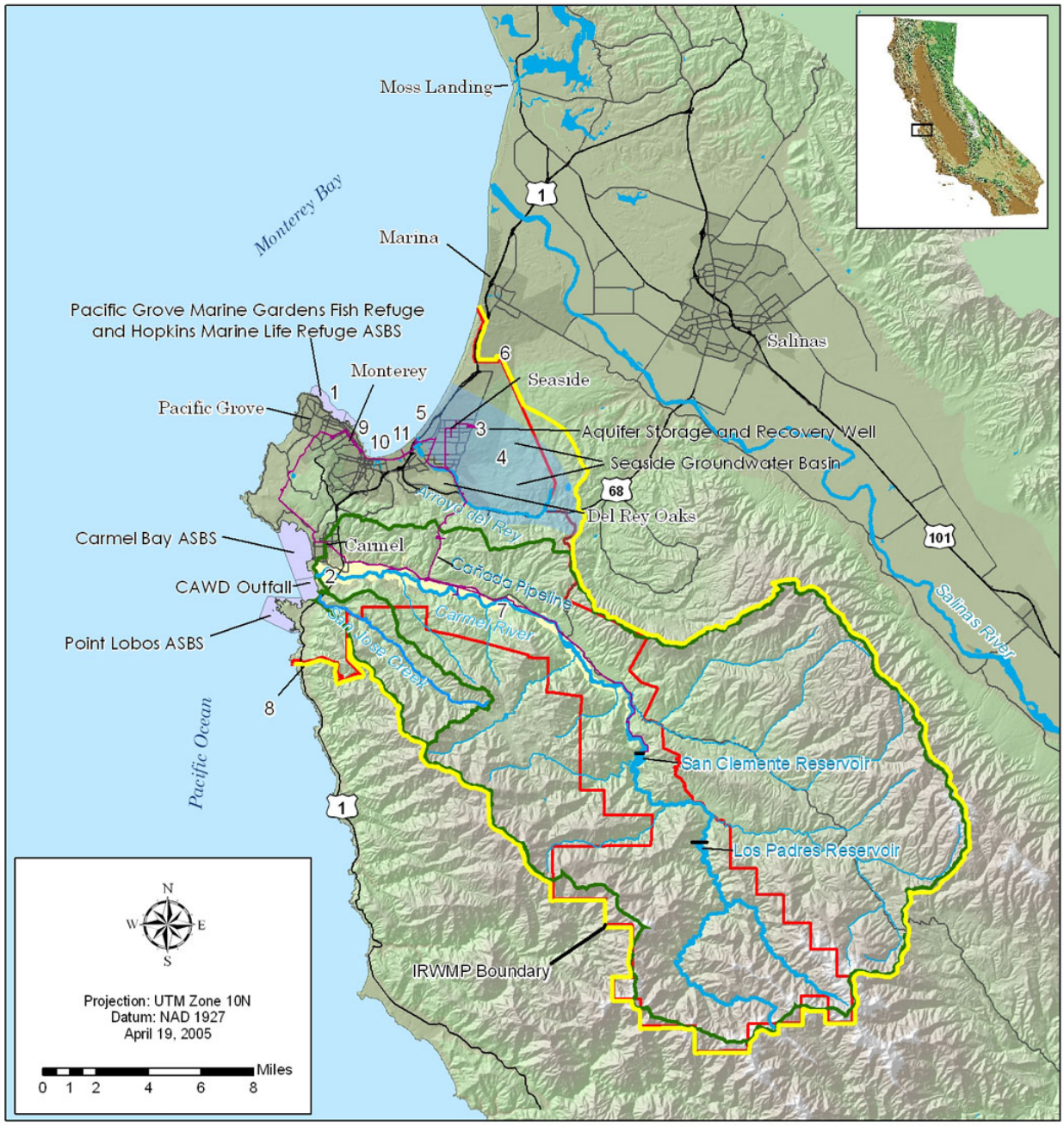
The planning area was established based on geographic, hydrologic, and existing legal responsibilities for water resource management. A map is presented in **Figure 1: Map of Monterey Peninsula Integrated Regional Water Management Planning Region**. The planning region is approximately 347 square miles and consists 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 coast that includes three Areas of Special Biological Significance (Pt. Lobos, Carmel Bay, and Pacific Grove). The area encompasses the six Monterey Peninsula Cities of Carmel-by-the Sea, Del Rey Oaks, Pacific Grove, Monterey, 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.

The planning area is adjacent to the Monterey Bay National Marine Sanctuary (MBNMS). The MBNMS was designated in 1992 as a federally-protected marine area offshore of California's central coast. Stretching from Marin to Cambria, the MBNMS encompasses a shoreline length of 276 miles and 5,322 square miles of ocean, extending an average distance of 30 miles from shore. At its deepest point, the MBNMS reaches down 10,663 feet (more than two miles). It is our nation's eleventh Marine Sanctuary and its largest – larger than Yosemite or Yellowstone National Parks. The MBNMS was established for the purpose of resource protection, research, education and public use. Its natural resources include our nation's largest kelp forest, one of North America's largest underwater canyons and the closest-to-shore deep ocean environment in the continental United States. It is home to one of the most diverse marine ecosystems in the world, including 33 species of marine mammals, 94 species of seabirds, 345 species of fishes, and numerous invertebrates and plants. This remarkably productive marine environment is fringed by spectacular coastal scenery, including sandy beaches, rocky cliffs, rolling hills and steep mountains. The southeastern portion of the Region includes a part of the Ventana Wilderness, which is in the Los Padres National Forest.

The population of the Region, which was estimated to be about 115,000 in 2006, is entirely dependent on local rainfall and runoff for its potable water supply, with no connections to water sources outside of the Region. Climate in the Region is considered Mediterranean, with wide annual swings in precipitation and surface runoff that can result in near desert-like, arid conditions or in periodic downpours resulting in large floods. The average annual runoff of the Carmel River, the largest stream in the Region, was 78,190 acre-feet (AF) for the period of

record 1962-2006 (U.S. Geological Survey, measured at U.S.G.S Near Carmel gage, 3.56 River Miles upstream of the Pacific Ocean). No flow reached this station for a 16-month period during the drought of 1976-77 – a condition that was a factor in the destabilization of streamside areas along the Carmel River during subsequent high flows in the years following this drought. The greatest amount of runoff recorded was estimated by the U.S.G.S. at nearly 368,000 AF during the 1982-83 el Niño event. Total water production from all sources within the Monterey Peninsula Water Management District boundary averaged a little more than 19,000 acre-feet annually (AFA) during Water Years 1996 through 2006 (October 1 to September 30).

**Figure 1: Map of Monterey Peninsula Integrated Regional Water Management Planning Region**




| | | |
|---|---|---|
| Refine ASBS Alternatives | Monterey/PG | 1 |
| Lower Carmel River Restoration and Floodplain Enhancement | MCWRA/BSLT/MPWMD | 2 |
| Seaside Groundwater Basin Aquifer Storage and Recovery | MPWMD/CAW | 3 |
| Seaside Basin Groundwater Replenishment | MRWPCA | 4 |
| Seaside 90" Outfall Infiltration Component | City of Seaside | 5 |
| CSUMB Stormwater Percolation and Education | CSUMB | 6 |
| Carmel River Watershed Volunteer Monitoring Program | CRWC | 7 |
| Water Conservation Retrofit Program | MPWMD | 8 |
| Sanitary Sewer System Repair and Replacement | Monterey/PG | 9 |
| Microbial Source Tracking | Monterey/PG | 10 |
| Implementation of Solid Waste Removal Technology | Monterey/PG | 11 |

IRWMP Area
MPWMD Boundary
Rivers
Cal-Am Pipelines
Roads
Watershed Boundaries
Seaside Groundwater Basin
Carmel Valley Alluvial Aquifer
Areas of Special Biological Significance
City Limits

Monterey Peninsula Water Management District

## Stakeholder Identification and Involvement

Stakeholders initiated IRWM Plan development in 2005 and were fully integrated throughout the development of the IRWM Plan. Initially (in 2005), the Carmel River Watershed Conservancy (CRWC) urged staff at the Monterey Peninsula Water Management District (MPWMD) to consider facilitating the development of an IRWM Plan for the region. Staff at the Monterey County Water Resources Agency supported this effort and eventually MPWMD obtained a Prop. 50 Planning Grant from DWR to develop an IRWM Plan.

During development of the IRWM Plan, more than 40 stakeholder groups were identified and representatives were invited to be involved in the planning process. Several workshops and sub-committee meetings were held to refine the plan and prioritize a project proposal. In addition, this same group was sent periodic summaries after actions were taken concerning the IRWM Plan.

A web site has been established http://www.mpwmd.dst.ca.us/Mbay_IRWM/Mbay_IRWM.htm to provide information to stakeholders about IRWM in the region and to maintain a record of plan development.

## Process used to identify the region's DACs and how the Applicant engaged them in the IRWM Planning process

Please see Task 14.2 in this work plan.

## Process used to identify the regions' water related objectives and conflicts

As is the case throughout much of California, the region has a rich history concerning water related objectives and conflicts. It appears that after the mid-1960s, conflicts over water resource management increased and became exceedingly complex while solutions moved at a glacial pace. Unfortunately, conflicts have been elevated to institutional structures outside of the region such as the SWRCB, RWQCB, NMFS, USFWS, California Superior Court, and the CPUC.

In 1995, SWRCB issued its first order to cut back diversions in the Carmel River Basin. In 1996, steelhead and red-legged frogs were listed as threatened species. In 2006, SWRCB issued a draft CDO to four entities in the region to cease discharges into two ASBS. In 2007, the California Superior Court adjudicated the Seaside Groundwater Basin, which supplies about 25% of the region's freshwater domestic supply, and set a schedule to reduce production limits by nearly 50%. In 2009, the SWRCB issued a second order concerning the Carmel River Basin and set a schedule that orders the region to reduce diversions from the Carmel River Basin by 70% (this is the remaining source of supply for the region). In 2010, the CPUC set a tight timeline for a decision on a regional water supply project that could solve the region's water supply problems.

Against this backdrop, stakeholders initially opted (in 2006) for goals and objectives in the IRWM Plan that would satisfy some of the legal requirements being imposed. RMC Water and Environment, the Consultant retained to assist with development of the IRWM Plan, recommended that the stakeholder group consider setting goals that would eventually exceed legal orders.

Over several meetings, stakeholders developed and refined the objectives and priorities for the region. These included meeting short-term needs, such as finding replacement water supplies, but set long-term goals for the region.

## Process used to determine criteria for developing regional priorities

As described above, stakeholders held several meetings to discuss issues and concerns. By stakeholder consensus, five priorities were established including:

- meet current replacement supply and future demand targets for water supply and support the Seaside Groundwater Basin Watermaster to implement the physical solution in the Basin
- reduce the potential for flooding in Carmel Valley and at the Carmel River Lagoon
- mitigate effects of storm water runoff throughout the planning Region
- address storm water discharges into Areas of Special Biological Significance
- promote the steelhead run

## Data and technical analysis collected/performed and how that data is managed

There a number of data sources available to the region's stakeholders concerning management of water resources, including near and real-time monitoring data, relevant reports, GIS products, and project web sites. However, there is no readily accessible database or website in the region where this information is collected. This work plan proposes to identify data sources, to give stakeholders better access to regional and state databases and to assist agencies and groups that collect data with managing data in a format that is accessible to stakeholders.

## How integrated resource management strategies will be employed

The objective project prioritization process in the adopted IRWM Plan results in higher rankings for projects that include multiple strategies. This encourages project sponsors to consider multiple strategies and, where feasible, to include tem in a project scope. However, if an individual project does not include multiple strategies, but does address a regional priority, such a project could be considered for inclusion in a project proposal.

## How the IRWM Plan will be implemented and what impacts and benefits are expected

Projects will be implemented by individual sponsors as funding becomes available. Reviews and updates to the plan are anticipated to occur as needed and agreed to by the stakeholders and RWMG. An initial impact and benefit assessment was carried out for the 2007 IRWM Plan. However, it is likely that this assessment needs to be updated (please see Task 8.2).

## For an existing IRWM Plan, describe how that plan meets the current IRWM Plan standards

The 2007 IRWM Plan was developed under Prop. 50 standards, adopted in November 2007, and accepted by DWR during the Regional Acceptance Process.

## Task List Summary

| Chapter 1. Executive Summary/Introduction | | |
|---|---|---|
| **Task** | **Description** | **Deliverables** |
| 1.1. | In addition to public meetings for the purpose of IRWM Plan adoption, hold two stakeholder meetings/workshops to solicit input and review plan revisions. | • Agenda, meeting notes. |
| 1.2 | Revise Executive Summary and Chapter 1 Introduction | • Revised Executive Summary and Chapter 1, Introduction |
| **Chapter 2. Regional Water Management** | | |
| **Task** | **Description** | **Deliverables** |
| 2.1.a | MPWMD will revise the GIS and Region map as necessary to show project locations, critical infrastructure, and other information provided by stakeholders. The IRWM library will be updated with documents provided by stakeholders. | • Updated web site and CD-ROM or DVD with GIS layers, if requested |
| 2.1.b | Update description of governance structure | • Revised Chapter 2, MOU to form Regional Water Management Group |
| **Chapter 3. Region Description** | | |
| **Task** | **Description** | **Deliverables** |
| 3.1. | Characterize the Ord Community area served by Marina Coast Water District, including water supplies and demand for a 20-year period. | • Update of Chapter 3, sections 3.1 to 3.5. |
| 3.8 | Review most recent data on the economic makeup of the community. Determine if additional DAC or environmental justice concerns can be identified. This task may be combined with Task 1.1 (outreach and stakeholder meetings) | • Update of Chapter 3, sections 3.6 to 3.8. If appropriate, include description of meetings, outreach efforts. |
| **Chapter 4. Objectives** | | |
| **Task** | **Description** | **Deliverables** |
| 4.1. | Review and prioritize the list of region objectives. This task will include review of requirements under Final Prop. 84 guidelines (e.g., global climate change, greenhouse gas emissions) and legislation affecting IRWM requirements (e.g., requirement for salt and nutrient management plans). | • Chapter update. Stakeholder meeting notes. |
| **Chapter 5. Water Management Strategies and Integration** | | |
| **Task** | **Description** | **Deliverables** |
| 5.1. | Consider Resource Management Strategies (RMS) described in the 2009 California Water Plan update. Determine appropriate strategies for the region and which strategies best meet regional priorities. Obtain input from stakeholders and IRWM Technical Advisory Committee. | • Chapter update. Meeting notes and/or input. Updated tables matching strategies with regional priorities. |
| 5.2 | Review the process for determining if there are opportunities within the region to combine projects, staff resources, or elements of projects within the region to better achieve plan objectives and priorities. Make recommendations as appropriate for consideration by the stakeholder group and RWMG. | • Chapter update. Meeting notes and/or input. Updated tables matching strategies with proposed projects. |

| Chapter 6. Regional Priorities and Project Review | | |
|---|---|---|
| **Task** | **Description** | **Deliverables** |
| 6.1 | Review regional priorities and compare with any changes noted in previous chapters. Determine if regional priorities should be changed, expanded, or reduced. Review relationship between regional priorities and prioritization of plan objectives. Conduct at least one meeting of the TAC and/or stakeholder group to discuss regional priorities. | • Chapter update. TAC meeting notes and/or input. |
| 6.2 | Compare Monterey Peninsula scoring criteria for projects with DWR criteria. Determine if criteria should be changed, added, or deleted. Develop a process to evaluate how projects address Statewide priorities. Develop criteria for including projects and programs in the IRWM Plan. | • Chapter update. Update of Appendix E (prioritization spreadsheets) |
| 6.3 | Complete an objective review of each proposed project using the process described in Chapter 6 as amended to include changes in Chapters 2 through 5. Compile a prioritized list of projects with input solicited from all stakeholders. Develop guidelines and tools for project proposal submittal and review. | • Chapter update. TAC meeting notes and/or input. Update of Appendix E (prioritization spreadsheets)<br>• Web tools described in **Exhibit A-4** |
| **Chapter 7. Implementation** | | |
| **Task** | **Description** | **Deliverables** |
| 7.1. | Revise proposal description based on information provided by project sponsors. Summarize information provided by project sponsors and provide an impacts table, budget, preliminary schedule, economic benefits, flood damage reduction, water quality benefits, and other benefits. | • Chapter update. |
| **Task** | **Description** | **Deliverables** |
| 7.2. | Consider alternatives to improve the institutional structure for implementing the IRWM Plan. Solicit input from stakeholders and project sponsors about the composition of the RWMG. Update or revise the MOU to form the RWMG as appropriate. | • Memo or proposal concerning alternatives, Chapter update, meeting agenda and notes. |
| **Task** | **Description** | **Deliverables** |
| 7.3. | Revise section to conform with Global Climate Change chapter. | Chapter update. |
| **Chapter 8. Impacts and Benefits** | | |
| **Task** | **Description** | **Deliverables** |
| 8.2. | Revise the Impacts and Benefits analysis to include new and/or changed projects. Develop table-based summary of impacts and benefits. | • Chapter update. |
| **Chapter 9. Technical Analysis and Plan Performance** | | |
| **Task** | **Description** | **Deliverable** |
| 9.1 | Update Section 9.1 to reflect information (or sources for information) used to assess the feasibility of proposed projects. | • Chapter update. |
| **Task** | **Description** | **Deliverable** |
| 9.2 | Update Section 9.2 to reflect development of web-based tools for plan performance. | • Chapter update. |
| | | |
| | | |

| Chapter 10. Data Management | | |
|---|---|---|
| **Task** | **Description** | **Deliverable** |
| 10.1 | Update Section 10.1 to reflect development of web-based tools for data management. | • Chapter update. |
| **Task** | **Description** | **Deliverable** |
| 10.2 | Update Section 10.2 to reflect development of web-based tools for plan performance. | • Chapter update. |
| **Chapter 11. Plan Funding and Financing** | | |
| **Task** | **Description** | **Deliverables** |
| 11.1 | Update table of beneficiaries | • Chapter update |
| 11.2 | Conduct stakeholder meeting and follow-up to identify additional long-term funding/staff resources for IRWM Plan implementation and administration | • Chapter update, meeting notes |
| 11.3 | Identify/update individual project financing | • Chapter update |
| **Chapter 12. Statewide Priorities and Program Preferences** | | |
| **Task** | **Description** | **Deliverables** |
| 12.1.1 | Review Statewide Priorities, Program Preferences, the Basin Plan and other state plans as appropriate. Compare project scoring criteria with state plans. Make recommendations as appropriate to update scoring criteria. Present to stakeholders for feedback. | • Chapter update, meeting notes (or other form of communication among stakeholders) |
| 12.1.2 | Compile tables showing which Statewide Priorities and Program Preferences each project satisfies | • Chapter update |
| **Chapter 13. Relation to Local Planning and Land Use Planning** | | |
| **Task** | **Description** | **Deliverables** |
| 13.1 | Revise list of local planning documents pertaining to water resource management. Provide links or information concerning availability to stakeholders. | • Chapter update, web portal |
| 13.2 | Contact local, regional, state, and federal agencies to request information or links to documents affecting water resource management. Provide information to stakeholders | • Chapter update, web portal |
| 13.3 | Contact local boards, commissions, committees and groups | • Updated list of agencies, boards, commission, and groups focused on water resource management |
| **Chapter 14 Stakeholder Involvement and Coordination** | | |
| **Task** | **Description** | **Deliverables** |
| 14.1 | Outreach for IRWMP | • Included in Chapter updates throughout IRWM Plan and in additional IRWM Plan tasks A-1 through A-7<br>• Updated list of stakeholders, including contact information |
| 14.2 | Outreach to DACs | • Contact list, identification of issues, Chapter update |
| | | |
| **Chapter 15. Climate Change** | | |
| **Task** | **Description** | **Deliverable** |
| 15.1 | Describe regional impacts | • New IRWM Plan Chapter |
| 15.2 | Describe GHG | • New IRWM Plan Chapter |
| 15.3 | IRWM Plan updates | • New IRWM Plan Chapter |
| | | |
| **Task** | **Description** | **Deliverable** |
| 16 | Grant Administration | • Quarterly reports, Final report |

| Exhibit A-1 – An update to the Canyon Del Rey drainage plan | | |
|---|---|---|
| **Task** | **Description** | **Deliverable** |
| 1.1 | Watershed characterization | • Updated drainage plan |
| 1.2 | Watershed evaluation | • Updated drainage plan |
| 1.3 | Update precipitation estimates | • Updated drainage plan |
| 2.1 | Evaluate Appropriate Runoff Estimation Methods | • Updated drainage plan |
| 2.2 | Estimate Existing and Future Flows | • Updated drainage plan |
| 3.1 | Determine the existing condition of primary facilities | • Updated drainage plan |
| 3.2 | Bathymetric study of Laguna Grande and Roberts Lake | • Updated drainage plan |
| 3.3 | Feasibility Study for Ocean Outfall Maintenance | • Updated drainage plan |
| 3.4 | Determine whether existing facilities are adequate | • Updated drainage plan |
| 4 | Project Management | • Updated drainage plan |
| OPTIONAL TASK | | |
| 5.1 | Evaluate erosion and sedimentation data | • May be included in an update |
| 5.2 | Estimate the future sediment load | • May be included in an update |
| | | |
| **Exhibit A-2 – Development of a salt and nutrient management plan for the Seaside Groundwater Basin** | | |
| **Task** | **Description** | **Deliverable** |
| 1 | Stakeholder Outreach | • Salt and Nutrient Management Plan, website |
| 2 | Establish Basin Characteristics | • Salt and Nutrient Management Plan, GIS project |
| 3 | Identify Existing and Foreseeable Salt and Nutrient Sources | • Salt and Nutrient Management Plan |
| 4 | Salt and Nutrient Evaluation | • Salt and Nutrient Management Plan |
| 5 | Monitoring Programs and Database | • Salt and Nutrient Management Plan |
| 6 | Prepare Salt and Nutrient Management Plan | • Salt and Nutrient Management Plan |
| | | |
| **Exhibit A-3 – Assessment of steelhead passage barriers in four tributaries in the Carmel River Basin** | | |
| **Task** | **Description** | **Deliverable** |
| 1 | Obtain access & permission for work | • Upon request, proof of access |
| 2 | Conduct reconnaissance surveys and update existing information | • Barrier assessment report |
| 3 | Detailed barrier assessments (field work), data analysis, site ranking, and report | • Barrier assessment report |
| | | |
| **Exhibit A-4a – Geographic Information Systems Internet Mapping Site Development** | | |
| **Task** | **Description** | **Deliverable** |
| 1 | Initial Meetings and Project Initiation | • |
| 2 | Detailed Scope Development | • |
| 3 | Systems Requirements Specification and Detailed Design | • |
| 4 | QA/QC Process Development | • |
| 5 | System hardware, database, communication and network specification document with line item costs | • |
| 6 | Development, Implementation, Testing, Deployment, training and documentation on the new custom GIS System | • |
| 7 | Acceptance and Fine Tuning of GIS System | • |

| **Exhibit A-4b – Development of a Document Management System (IRWM-DMS) portal for use with a GIS based Mapping & Collaboration Infrastructure** | | |
|---|---|---|
| **Task** | **Description** | **Deliverable** |
| 1 | Perform IT infrastructure inventory for the IRWM-DMS Portal | • Portal IT infrastructure and Software Inventory Report |
| 2 | Gather the Software, Hardware, Database, Communications and Networking Requirements | • Systems Requirements Specification (SRS) Document |
| 3 | Create a detailed design for the recommended Software, Hardware, Database, Communications and Networking Requirements | • Detailed Design Specification (DDS) Document |
| 4 | A proof of concept (POC) after acquiring the hardware specified in the DDS | • On-site pilot demonstration and functionality sign-off |
| 5 | Implementation, Deployment, Testing, Training and Documentation | • Functioning and tested IRWM-DMS System<br>• Integration test results<br>• Four-hour training sessions for 10 people for using the new system and another 4 hour training session for troubleshooting and fixing hardware and system problems.<br>• System documentation in electronic format. |
| 6 | Project Management | • Monthly status reports |
| | | |
| **Exhibit A-5 – Inter-regional Coordination** | | |
| **Task** | **Description** | **Deliverable** |
| A | Describe Relationship between IRWM Regions | • Sub-section in IRWM Plan |
| B | Describe Boundary Region | • Sub-section in IRWM Plan |
| C | Describe the Regional Water Project and Anticipated Benefits | • Sub-section in IRWM Plan |
| D | Inter-Regional Prioritization Processes | • Sub-section in IRWM Plan |
| | | |
| **Exhibit A-6 – Assessment for San Jose Creek Watershed** | | |
| **Task** | **Description** | **Deliverable** |
| A | Develop sediment transport curves | • Final Watershed Plan (written report in pdf format)<br>• GIS project with database and several layers<br>• Electronic files with data-section in IRWM Plan |
| B | Develop rating curves | • Final Watershed Plan (written report in pdf format)<br>• GIS project with database and several layers<br>• Electronic files with data-section in IRWM Plan |
| C | Assess barriers | • Final Watershed Plan (written report in pdf format)<br>• GIS project with database and several layers<br>• Electronic files with data-section in IRWM Plan |
| D | Analyze lagoon processes | • Final Watershed Plan (written report in |

| | | |
|---|---|---|
| | | pdf format)<br>• GIS project with database and several layers<br>• Electronic files with data-section in IRWM Plan |
| | | |
| **Exhibit A-7 – City of Monterey and Pacific Grove ASBS Alternatives Analysis** | | |
| **Task** | **Description** | **Deliverable** |
| 1 | Identify surface areas and groundwater locations of potential reserve capacity | • Final Report |
| 2 | Define the most cost effective and environmentally superior options. | • Final Report |
| 3 | Provide a current and thorough cost analysis for the alternatives or a new superior defined project. | • Final Report |
| 4 | Present the most cost-effective and environmentally superior options | • Final Report |
| | | |
| **Exhibit A-8 – Development of a Surface and Groundwater Model for the Carmel Valley Alluvial Aquifer** | | |
| **Task** | **Description** | **Deliverable** |
| 1 | Assess previous models used for simulating flows | • Report |
| 2 | Inventory data available | • Report |
| 3 | Construct a conceptual model | • Report/conceptual model |

# Lead Groups by Task

| Task | Description | Groups expected to lead task |
|---|---|---|
| **Exhibit A** | **Update IRWM Plan Chapters 1 - 15** | |
| 1 | Revise Executive Summary (ES) and Chapter 1 Introduction | MPWMD/Consultant |
| 2 | Geographic and Political boundaries | Stakeholders/RWMG/MCWD/Greater Monterey County RWMG |
| 3 | Region Description | Stakeholders/RWMG/DACs |
| 4 | Objectives | Stakeholders/RWMG/DACs |
| 5 | Water Management Strategies and Integration | Stakeholders/RWMG/DACs |
| 6 | Regional Priorities and Project Review | Stakeholders/RWMG/DACs/Project sponsors |
| 7 | Implementation | RWMG/Project Sponsors |
| 8 | Impacts and Benefits | MPWMD/Consultant |
| 9 | Technical Analysis and Plan Performance | MPWMD/Consultant |
| 10 | Data Management | Stakeholders/RWMG/DACs/Project sponsors |
| 11 | Plan Funding and Financing | Stakeholders/RWMG/DACs/Project sponsors |
| 12 | Statewide Priorities | Stakeholders/RWMG/DACs |
| 13 | Relation to Local Planning and Land Use Planning | Stakeholders/RWMG/DACs/Local agency representatives |
| 14 | Stakeholder Involvement and Coordination | Stakeholders/RWMG/DACs |
| 15 | Climate Change | MPWMD/Consultant |
| | | |
| | | |
| Exhibit A-1 | Update to the Canyon Del Rey Drainage Plan | MPWMD/MCWRA/Seaside/MPRPD/Monterey/Consultant |
| | | |
| Exhibit A-2 | Development of a salt and nutrient management plan for the Seaside Groundwater Basin | MPWMD/Seaside Basin Watermaster/Basin stakeholders/MRWPCA/MCWI |
| | | |
| Exhibit A-3 | Assessment of steelhead passage barriers in the Carmel River watershed. | MPWMD/Consultant |
| | | |
| Exhibit A-4a | Geographic Information Systems Internet Mapping Site Development. | MPWMD/Consultant/Stakeholders |
| | | |
| Exhibit A-4b | Data Management System | MPWMD/Consultant/Stakeholders |
| | | |
| Exhibit A-5 | Inter-Regional Coordination | Ord Community/RWMG/MCWD/Greater Monterey County RWMG |
| | | |
| Exhibit A-6 | An assessment for San Jose Creek watershed. | MPRPD/CSUMB |
| | | |
| Exhibit A-7 | ASBS alternatives analysis. | Monterey/Pacific Grove |
| | | |
| Exhibit A-8 | Hydrologic Modeling for the Carmel Valley Alluvial Aquifer. | MPWMD/Consultant |

MPWMD, various consultants, and other stakeholder representatives are expected to facilitate the IRWM Plan update. However, to the maximum extent feasible, stakeholder groups will be encouraged to lead or have significant participation in completing several of the proposed tasks. The table above shows which groups are expected to be involved by task. Please see the next two pages for a list of acronyms.

## Chapter 1. Revise Executive Summary (ES) and Chapter 1 Introduction

This section will be re-written to reflect proposed changes to Chapters 2 through 14 and the addition of a chapter on Climate Change. This task will include facilitation of a minimum of two stakeholder meetings to solicit input and review plan revisions and updates.

| **Chapter 1. Executive Summary/Introduction** | | |
|---|---|---|
| **Task** | **Description** | **Deliverables** |
| 1.1. | In addition to public meetings for the purpose of IRWM Plan adoption, hold two stakeholder meetings/workshops to solicit input and review plan revisions. | • Agenda, meeting notes. |
| 1.2 | Revise Executive Summary and Chapter 1 Introduction | • Revised Executive Summary and Chapter 1, Introduction |

## Chapter 2. Geographic and Political boundaries

During the development of the 2007 IRWM Plan, the region boundary was established after discussions with representatives of agencies with statutory authority over water resources within and outside of the established region. The following is an excerpt from the Regional Acceptance Process Summary posted on the DWR IRWM web site:

> **[RAP] Interview Conclusions- Approved**
> The RWMG representative described the historical, hydrological, and political perspectives to justify the continuation of the Monterey Peninsula IRWM Region boundary as a distinct region from the Greater Monterey County and the Pajaro River Watershed IRWM Regions. No changes to this IRWM Region's boundaries are suggested by DWR.

### 2.1. Regional Entities

The Regional Water Management Group (RWMG) is comprised of representatives from the Big Sur Land Trust (BSLT), the City of Monterey, the Monterey County Water Resources Agency (MCWRA), the Monterey Regional Water Pollution Control Agency (MRWPCA), and the Monterey Peninsula Water Management District (MPWMD). This group, which represents the diverse interests of the Region, was formed in conformance with State IRWM guidelines to guide the development and implementation of the IRWM plan. A MOU was approved in June 2008 by the Regional Water Management Group to acknowledge cooperative efforts in the planning Region and to form an institutional structure to develop and implement the IRWM Plan. The MOU formalizes the collaborative planning effort that these agencies have been involved in for several years, describes the processes for completing the IRWM Plan and making amendments in the future, and also describes the role of stakeholders in carrying out the Plan.

In 2010, staff for the RWMG recommended approval of the Marina Coast Water District request to be represented in the RWMG. MCWD is one of the key regional agencies involved in the

proposed Regional Water Supply Project. An amended MOU to include MCWD in the RWMG will be circulated for approval by the respective governing boards.

MPWMD conducted community outreach and conducted several meetings and workshops from 2005 to 2007 as part of the development of the IRWM Plan. Several stakeholders were identified that have or will contribute to or be affected by the suite of projects described in the IRWM Plan. More than 40 stakeholder groups were identified and contacted, although only a subset chose to actively participate in the development of the 2007 IRWM Plan. With a renewal of interest in the IRWM program after passage of Prop. 84 and as a result of follow-up stakeholder meetings and a call for project updates, the list of projects submitted for inclusion in the IRWM Plan increased from 10 to 18 in 2009.

Additional efforts to reach out to stakeholders are described throughout this work plan.

| **Chapter 2. Regional Water Management** | | |
|---|---|---|
| **Task** | **Description** | **Deliverables** |
| 2.1.a | MPWMD will revise the GIS and Region map as necessary to show project locations, critical infrastructure, and other information provided by stakeholders. The IRWM library will be updated with documents provided by stakeholders. | • Updated web site and CD-ROM or DVD with GIS layers, if requested |
| 2.1.b | Update description of governance structure | • Revised Chapter 2, MOU to form Regional Water Management Group |

## Chapter 3. Region Description (Tasks 3.1 through 3.3)

The following needs to be reflected in an update of the IRWM Plan:

- The California Public Utilities Commission is scheduled to rule on a regional water supply project in November 2010 that will affect most of the Monterey Peninsula IRWM region and may affect planning in the Greater Monterey County planning region.
- The 2010 Census was completed.
- In 2009, the State Water Resources Control Board (SWRCB) adopted a recycled water policy to encourage local agencies to develop salt and nutrient management plans for basins listed in the California Water Plan. There are two recognized basins in the planning region – the Seaside Groundwater Basin (3-4.08) and the Carmel River Alluvial Aquifer (3-7).
- In October 2009, SWRCB issued Order WR 2009-0060, which is a Cease-and-Desist order against Cal-Am, which serves 95% of the water customers on the Monterey Peninsula. The CDO prescribes a series of significant permanent cutbacks to Cal-Am's pumping from the Carmel River beginning in 2010 and continuing through December 2016. Cal-Am customers may be subject to water rationing, a moratorium on Water Permits for new construction and remodels, and heavy fines if pumping limits are exceeded.

### 3.1. General Description

Note: see related task in **Exhibit A-5** "Inter-regional Coordination."

The role of the Marina Coast Water District and the needs of the Ord Community (located on the former Fort Ord lands) concerning water resources planning for the Monterey Peninsula are more clear than at the time the IRWM Plan was adopted in 2007. However, the shared responsibility between the Monterey Peninsula and Greater Monterey County IRWM regions for this area needs to be more fully described.

If the CPUC makes a decision on the Regional Water Supply Program in November 2010, this chapter will also be updated to reflect that decision. The relationship between the Regional Water Supply Program, the Greater Monterey County IRWM Plan and the Monterey Peninsula plan will be clarified and a method for coordinating planning efforts and project implementation between regions will be established. Opportunities for inter-regional cooperation will be evaluated.

### 3.8. Update of Disadvantaged Communities (DACs)

The 2010 Census data will be used to identify and update areas that are considered DACs. and an investigation of environmental justice concerns in the Ord Community and surrounding area. See also Task 14.2 Disadvantaged Community (DAC) Outreach for background and related tasks.

| **Chapter 3. Region Description** | | |
|---|---|---|
| **Task** | **Description** | **Deliverables** |
| 3.1. | Characterize the Ord Community area served by Marina Coast Water District, including water supplies and demand for a 20-year period. | • Update of Chapter 3, sections 3.1 to 3.5. |
| 3.8 | Review most recent data on the economic makeup of the community. Determine if additional DAC or environmental justice concerns can be identified. This task may be combined with Task 1.1 (outreach and stakeholder meetings) | • Update of Chapter 3, sections 3.6 to 3.8. If appropriate, include description of meetings, outreach efforts. |

## Chapter 4. Objectives

Comprehensive sets of quantitative and qualitative objectives were developed for the 2007 IRWM Plan. Objectives were grouped into five categories, but no priority was assigned to categories or within categories. In addition, some of the objectives were described with open-ended or undefined goals. This Chapter will be reviewed and revised with the intention of prioritizing these objectives and, where needed, quantitative or qualitative targets will be established to be met through project implementation. If feasible, objectives will be prioritized spatially or temporally.

Several projects proposed in the 2007 IRWM Plan completed phases or have advanced toward implementation. These include Aquifer Storage and Recovery, ASBS alternatives analysis, Lower Carmel River Restoration and Floodplain Enhancement, and the Water Conservation Retrofit Program. Project review will provide additional insight into whether and how projects meet plan objectives and will help the region in prioritizing its objectives and in setting future targets for objectives.

It is anticipated that a process similar to that used for the 2007 IRWM Plan will be followed to accomplish this task. It is likely that two to three stakeholder and/or TAC meetings will be held to gather input and approve a set of objectives.

| **Chapter 4. Objectives** | | |
|---|---|---|
| **Task** | **Description** | **Deliverables** |
| 4.1. | Review and prioritize the list of region objectives. This task will include review of requirements under Final Prop. 84 guidelines (e.g., global climate change, greenhouse gas emissions) and legislation affecting IRWM requirements (e.g., requirement for salt and nutrient management plans). | • Chapter update. Stakeholder meeting notes. |

## Chapter 5. Water Management Strategies and Integration

This chapter will be revised to consider Resource Management Strategies (RMS) described in the 2009 California Water Plan update (RMS reproduced below from the Draft IRWM Grant Program Guidelines).

| Table 3 – Resource Management Strategies | |
|---|---|
| Reduce Water Demand | Agricultural Water Use Efficiency<br>Urban Water Use Efficiency |
| Improve Operational Efficiency and Transfers | Conveyance – Delta<br>Conveyance – Regional/local<br>System Reoperation<br>Water Transfers |
| Increase Water Supply | Conjunctive Management & Groundwater<br>Desalination<br>Precipitation Enhancement<br>Recycled Municipal Water<br>Surface Storage – CALFED<br>Surface Storage – Regional/local |

| | |
|---|---|
| Improve Water Quality | Drinking Water Treatment and Distribution<br>Groundwater Remediation/Aquifer Remediation<br>Matching Quality to Use<br>Pollution Prevention<br>Salt and Salinity Management<br>Urban Runoff Management |
| Improve Flood Management | Flood Risk Management |
| Practice Resources Stewardship | Agricultural Lands Stewardship<br>Economic Incentives (Loans, Grants and Water Pricing)<br>Ecosystem Restoration<br>Forest Management<br>Recharge Area Protection<br>Water-Dependent Recreation<br>Watershed Management |
| Other Strategies | Crop Idling for Water Transfers<br>Dewvaporation or Atmospheric Pressure Desalination<br>Fog Collection<br>Irrigated Land Retirement<br>Rainfed Agriculture<br>Waterbag Transport/Storage Technology |

Many, but not all, of the RMS described in Table 3 were considered during development of the 2007 IRWM Plan. Because of changed conditions in the region, all of the RMS will be re-considered for the IRWM Plan update. The process for consideration will be similar to that used for the 2007 IRWM Plan development (i.e., determine the applicability of individual RMS to the Region and their ability to achieve regional objectives and priorities). However, the level of effort may be reduced for strategies that were previously considered.

| **Chapter 5. Water Management Strategies and Integration** | | |
|---|---|---|
| **Task** | **Description** | **Deliverables** |
| 5.1. | Consider Resource Management Strategies (RMS) described in the 2009 California Water Plan update. Determine appropriate strategies for the region and which strategies best meet regional priorities. Obtain input from stakeholders and IRWM Technical Advisory Committee. | • Chapter update. Meeting notes and/or input. Updated tables matching strategies with regional priorities. |
| 5.2 | Review the process for determining if there are opportunities within the region to combine projects, staff resources, or elements of projects within the region to better achieve plan objectives and priorities. Make recommendations as appropriate for consideration by the stakeholder group and RWMG. | • Chapter update. Meeting notes and/or input. Updated tables matching strategies with proposed projects. |

## Chapter 6. Regional Priorities and Project Review

### 6.1 Procedure for Developing Regional Priorities

Five regional priorities were established through an extensive stakeholder process in 2006-07 that included the formation of a Technical Advisory Committee (TAC) to investigate complex issues and advise the general stakeholder group. These priorities will be reviewed and updated or amended as appropriate through a similar process (i.e., stakeholder and TAC meetings). Measurable targets for meeting regional priorities will be reviewed and new targets established, if appropriate (it should be note that several measurable targets were previously established). For regional priorities without clearly measureable targets, a method will be proposed to evaluate progress toward meeting the priority.

Similar to the regional priority review and update, the existing project selection process and prioritized set of projects was developed over the course of several stakeholder and TAC meetings. For this update, particular attention will be paid to the procedure for evaluating technical and economic feasibility as well as the benefits and costs of projects. The existing review, selection, and prioritization procedure will be evaluated and revised as necessary to include Review Factors A through L contained in the "Project Review Process" section of the Final Guidelines, pp 48-51. It should be noted that several of these factors do not appear in the project prioritization process presently contained in the IRWM Plan. This sub-task will be coordinated with tasks to update management of the Ord Community area overlying the Seaside Groundwater Basin (see **Exhibit A-5** – Inter-Regional Coordination).

Economic analysis of individual projects and of an overall suite of projects (the proposal) is a key aspect in assessing project effectiveness and in considering how to meet regional priorities. This task will include work to provide recommendations to project sponsors, the stakeholder group, and the TAC concerning application of economic analysis principles to the types of projects considered for the inclusion in IRWM Plan. Projects currently under consideration in the region range in cost from a few hundred thousand dollars to hundreds of millions of dollars. These projects may have a variety of costs and benefits to the people and environment that are both qualitative and quantitative.

Using materials and relevant links provided on the DWR web site, a standardized method (or methods) to assess and compare the costs and benefits of both large and small projects across the region will be developed. This may include the development and use of standardized forms that could be made available for use by stakeholders through the proposed GIS and data management portal. An advantage of standardizing an economic analysis is the reduced cost for such analyses – especially for DACs and some non-profit groups that may not have the economic resources that large projects would normally have.

### 6.2 Compilation of Projects

Few of the project descriptions contained in the adopted IRWM Plan contain the information necessary for review and prioritization under the Guidelines or for inclusion in a proposal for grant funding. A project application package needs to be developed for the region that

incorporates information requirements shown in Exhibits A through G in the *Integrated Regional Water Management (IRWM) Program Proposal Solicitation Package (PSP) for IRWM Implementation grants funded by Proposition 84.* As described in the Guidelines, information provided for these Exhibits can be used to determine the suitability for inclusion of a project in the IRWM Plan proposal. Using the criteria for evaluation developed for the IRWM Plan, a subset of the Exhibits contained in the Guidelines can also be used for initial consideration of a project (e.g., during a call for projects).

The process described in Section 6.2 of the IRWM Plan will be used to solicit projects; however, additional tools will be provided to stakeholders as described in the next task and as described in **Exhibit A-4a** – Geographic Information Systems Internet Mapping Site Development and **Exhibit A-4b** - Development of a Document Management System (IRWM-DMS) portal for use with a GIS based Mapping & Collaboration Infrastructure.

### 6.3 Prioritization of Projects

Revised guidelines from Task 6.1 will be used by stakeholders to determine what stage of development a project is at, whether a project should be considered for inclusion, and what steps project proponents might take to insure that a project will be included in the IRWM Plan or project proposal. Potential screening criteria could include how well projects help meet the objectives and priorities in the IRWM Plan, how they are scored in a project package, and other criteria such as meeting DAC needs, addressing EJ concerns, addressing a strategic need within the region, and addressing Statewide priorities. A new suite of projects will be reviewed by stakeholders and prioritized for inclusion in an IRWM Plan update.

As described in **Exhibits A-4a and A-4b**, it is proposed that individual stakeholders be given web tools and the procedures used to upload project information to a web server that is accessible to all stakeholders. Web forms that reflect Exhibits A through G and criteria set out in the IRWM Plan will be made available. These web forms will be linked to a master database and displayed in a summary form. Essentially, the tables and spreadsheets currently used in Chapters 4, 5, and 6 to review and establish links between projects and to prioritize projects within a proposal will be made available over the web.

| **Chapter 6. Regional Priorities and Project Review** | | |
|---|---|---|
| **Task** | **Description** | **Deliverables** |
| 6.1 | Review regional priorities and compare with any changes noted in previous chapters. Determine if regional priorities should be changed, expanded, or reduced. Review relationship between regional priorities and prioritization of plan objectives. Conduct at least one meeting of the TAC and/or stakeholder group to discuss regional priorities. | • Chapter update. TAC meeting notes and/or input. Updated tables. |
| 6.2 | Compare Monterey Peninsula scoring criteria for projects with DWR criteria. Determine if any Monterey Peninsula criteria should be changed, added, or deleted. Develop a process to evaluate how projects address Statewide priorities. Consider how addressing Statewide | • Chapter update. Update of Appendix E (prioritization spreadsheets) |

| | | |
|---|---|---|
| | priorities can be used in the project prioritization process. Develop criteria for including new projects and programs in the IRWM Plan. | |
| 6.3 | Complete an objective review of each proposed project using the process described in Chapter 6 as amended to include changes in Chapters 2 through 5. Compile a prioritized list of projects with input solicited from all stakeholders. Develop guidelines and tools for project proposal submittal and review. | • Chapter update. TAC meeting notes and/or input. Update of Appendix E (prioritization spreadsheets)<br>• Web tools described in **Exhibit A-4** |

## Chapter 7. Implementation

### 7.1 Projects and Programs for IRWMP Implementation

Projects and programs for the IRWM Plan will be updated using the tools and processes described in Chapter 6. It should be noted that between the adoption of the IRWM Plan in 2007 and a call for an update of the plan in 2009, the project proposal list increased from 10 to 18. The total amount of funds (total project cost) estimated to complete all projects proposed in the IRWM Plan has gone from approximately $75 million in 2007 to more than $300 million in May 2009 (this figure has increased in 2010 with more accurate estimates of the cost for the Regional Water Supply Project). The new list of projects currently under consideration includes a large regional desalination facility, an expanded water conservation program, and an expansion in the use of recycled water from the Salinas Valley Treatment Plan.

This task will reflect the new call for projects and re-prioritization of the projects using new criteria developed as described above.

### 7.2 Institutional Structures to Ensure Implementation

By MOU, the RWMG is currently responsible for ensuring implementation of the IRWM Plan. This is accomplished through stakeholder input and actions, review of those actions by the RWMG, decisions of the RWMG, and monitoring of regional projects and priorities. However, no formal structure exists to change the composition or duties of the RWMG or establish a funding mechanism for maintaining this effort. These latter deficiencies will be addressed in a plan update by investigating and proposing alternatives for improving the institutional structure. It is expected that formal processes will be developed to encourage participation by a variety of stakeholders in the structure of the RWMG and duties of each member will be clearly defined. Funding mechanisms or institutional changes to maintain a formal structure to implement the IRWM Plan will be evaluated.

### 7.3 Adaptive Management Process

This section will be reviewed for its relation to Global Climate Change and strategies related to adaptation to changes that could result from a climate change.

| Chapter 7. Implementation | | |
|---|---|---|
| **Task** | **Description** | **Deliverables** |
| 7.1. | Revise proposal description based on information provided by project sponsors. Summarize information provided by project sponsors and provide an impacts table, budget, preliminary schedule, economic benefits, flood damage reduction, water quality benefits, and other benefits. | • Chapter update. |
| **Task** | **Description** | **Deliverables** |
| 7.2. | Consider alternatives to improve the institutional structure for implementing the IRWM Plan. Solicit input from stakeholders and project sponsors about the composition of the RWMG. Update or revise the MOU to form the RWMG as appropriate. | • Memo or proposal concerning alternatives, Chapter update, meeting agenda and notes. |

## Chapter 8. Impacts and Benefits

### 8.2 Impacts and Benefits

The IRWM suite of projects, the standards for describing impacts and benefits, and the type of inter-regional projects have changed since the IRWM plan was adopted in 2007. To meet new guidelines, a method to group impacts and benefits needs to be devised. This task will consider the recommendations made in the Guidelines, Appendix C, pages 51 to 54 and develop tables similar to the examples given in the Guidelines to describe impacts and benefits and that are related to the region's objectives and priorities in the updated plan.

### 8.3 Disadvantaged Communities

See Task descriptions under Task 3.2 and Task 14.2.

| Chapter 8. Impacts and Benefits | | |
|---|---|---|
| **Task** | **Description** | **Deliverables** |
| 8.2. | Revise the Impacts and Benefits analysis to include new and/or changed projects. Develop table-based summaries of impacts and benefits. | • Chapter update. |

## Chapter 9. Technical Analysis and Plan Performance

### 9.1 Technical Feasibility

The data sets available about the planning region to project sponsors and stakeholders continue to mushroom at an increasing rate as new information and updates to old information become available over the internet. A key aspect of this information explosion is to be able to focus on what information is appropriate to use in developing, analyzing, and prioritizing projects.

Using the web-based tools described in **Exhibit A-4a** and **Exhibit A-4b** and a revised prioritization process, stakeholders and project sponsors will have both appropriate and adequate resources to analyze projects. This section of the IRWM Plan will be updated to reflect the results of those efforts.

### 9.2 Plan Performance

It is expected that project review, performance and monitoring elements, and data management elements will be improved with the development of the tools described in **Exhibit A-4a** and **Exhibit A-4b**. In addition, the quantitative and qualitative measures established with the revision of regional priorities (see Section 6.1) will be used as one of the criteria in evaluating plan performance. Additional criteria may be developed based on stakeholder input during the revision process.

| **Chapter 9. Technical Analysis and Plan Performance** | | |
|---|---|---|
| **Task** | **Description** | **Deliverable** |
| 9.1 | Update Section 9.1 to reflect information (or sources for information) used to assess the feasibility of proposed projects. | • Chapter update. |
| **Task** | **Description** | **Deliverable** |
| 9.2 | Update Section 9.2 to reflect development of web-based tools for plan performance. | • Chapter update. |

## Chapter 10. Data Management

### 10.1 Data Management

An improved data management element is described in **Exhibit A-4a** and **Exhibit A-4b**. With these tools, virtually any stakeholder with a computer and internet access should be able to access and/or add to a regional database in a timely fashion. Key aspects of this development will include communication and cooperation between such regional partners as MBNMS, MRSWMP, and agencies such as AMBAG and MCWRA that are part of both the Greater Monterey County and Monterey Peninsula region.

### 10.2 Future Data Dissemination

The development of web-based tools for data management is described in **Exhibit A-4a** and **Exhibit A-4b**. These tools can be expanded in the future as necessary to meet stakeholder needs. However, current formats for gathering, reporting, and analyzing data vary widely. A first step that is proposed with this task will be to carry out a survey of the quality, quantity, and format of the available data. Agencies and groups will be contacted and a catalogue of this data will be developed and presented as part of this update. If feasible, data gaps will be identified and recommendations will be made to standardize data formats.

In addition, DWR is expected to release guidelines in September 2010 for future compliance with California Statewide Groundwater Elevation Monitoring (CASGEM) requirements. If those guidelines are available, a plan will be developed to meet the requirements for the SGB and CRB.

| **Chapter 10. Data Management** | | |
|---|---|---|
| **Task** | **Description** | **Deliverable** |
| 10.1 | Update Section 10.1 to reflect development of web-based tools for data management. | • Chapter update. |
| **Task** | **Description** | **Deliverable** |
| 10.2 | Update Section 10.2 to reflect development of web-based tools for plan performance. | • Chapter update. |

## Chapter 11. Plan Funding and Financing (Tasks 11.1 through 11.3)

This Chapter will be updated to reflect changes in the Project Proposal, including the project list, beneficiaries, estimated costs and funding sources. Known as well as possible funding sources, programs, and grant opportunities for the development and ongoing funding of the IRWM Plan will be identified (see also related task 7.2 "Institutional Structures to Ensure Implementation").

The existing list of project funding sources will be reviewed and updated. Each project sponsor in the plan will be asked to identify the amount and certainty of funding sources for both capital and O & M costs (see also the related task description of project application forms in **Exhibit A-4a** and **Exhibit A-4b**).

Since approximately 2005, the RWMG has facilitated the development of the IRWM Plan, stakeholder communications and meetings, and provided most of the effort to develop and administer grant applications and agreements. As a result of this effort, many of the region's stakeholders have become knowledgeable about IRWM, the associated grant programs, and the potential for cooperation on projects within the region. Part of this chapter update will be to explore long-term options to fund and/or identify additional staff resources within the planning region to implement the IRWM Plan and to provide assistance with administration of the IRWM effort within the region. This may include services to update web information, facilitate meetings, provide grant application coordination, grant administration and answer questions.

| **Chapter 11. Plan Funding and Financing** | | |
|---|---|---|
| **Task** | **Description** | **Deliverables** |
| 11.1 | Update table of beneficiaries | • Chapter update |
| 11.2 | Conduct stakeholder meeting and follow-up to identify additional long-term funding/staff resources for IRWM Plan implementation and administration | • Chapter update, meeting notes |
| 11.3 | Identify/update individual project financing | • Chapter update |

## Chapter 12. Statewide Priorities and Program Preferences (Tasks 12.1.1 and 12.1.2)

Note: see also work described in Task 6 to review and amend the project prioritization process.

During development of the IRWM Plan adopted in 2007, the region's stakeholders included a consideration of Statewide Priorities in the initial project prioritization process developed for the region. However, the stakeholder group found it difficult to assign a quantitative benefit to a project for addressing Statewide priorities. In addition, many of the region's priorities and objectives that were included in the scoring criteria reflected Statewide Priorities. To avoid confusion and redundancy in the scoring system, the Statewide Priorities scoring section was dropped from the objective process, but remained an option to review projects on a qualitative basis.

This Chapter update will include an expanded description of how proposed individual projects and the overall project proposal address both Statewide Priorities and Program Preferences. The most recent version of the Basin Plan for RWQCB Region 3 will be reviewed and recommendations made in that plan will be compared with the goals, objectives, and priorities in the region. Information and recommendations will be presented to stakeholders for their consideration and action. If appropriate, project and proposal scoring criteria may be revised to reflect this review.

A table will be developed that lists each project and which Statewide Priorities and Program Preferences each project meets. In addition, it should be noted that this scope of work includes the following updates that involve Statewide Priorities and Program Preferences.

| **Chapter 12. Statewide Priorities and Program Preferences** | | |
|---|---|---|
| **Task** | **Description** | **Deliverables** |
| 12.1.1 | Review Statewide Priorities, Program Preferences, the Basin Plan and other state plans as appropriate. Compare project scoring criteria with state plans. Make recommendations as appropriate to update scoring criteria. Present to stakeholders for feedback. | • Chapter update, meeting notes (or other form of communication among stakeholders) |
| 12.1.2 | Compile tables showing which Statewide Priorities and Program Preferences each project satisfies | • Chapter update |

**Statewide Priorities**

| | |
|---|---|
| Drought Preparedness | IRWM Plan update is likely to consider: inclusion of elements of a Regional Water Supply Project (Exhibit A-5), expanded Water Conservation Project, and a volunteer program that includes a water conservation component |
| Use and Reuse Water More Efficiently | IRWM Plan update will include: additional analysis to address ASBS stormwater runoff (Exhibit A-7), a description of recycled water use (Exhibit A-2), and alternatives for managing stormwater in Canyon Del Rey Creek (Exhibit A-1) |
| Climate Change Response Actions(refer to Appendix C, for further guidance) | See proposed work on Climate Change, Chapter 15 |
| Expand Environmental Stewardship | IRWM Plan update will include: web-based tools for better communications and understanding of region priorities and proposed projects(Exhibit A-4), a watershed assessment for San Jose Creek (Exhibit A-6) |
| Practice Integrated Flood Management | IRWM Plan update will include: alternatives for managing stormwater in Canyon Del Rey Creek (Exhibit A-1) |
| Protect Surface Water and Groundwater Quality | IRWM Plan update will include: salt and nutrient management plan for Seaside Groundwater Basin (Exhibit A-2), alternatives for ASBS discharges (Exhibit A-7), assessment and recommendations for San Jose Creek watershed (Exhibit A-6) |
| Improve Tribal Water and Natural Resources | N/A |
| Ensure Equitable Distribution of Benefits | See proposed work for stakeholder outreach (Task 14.1), DAC involvement (Task 14.2), and project prioritization process (Task 6.2 and 6.3) |

## Program Preferences

| Program Preference | Applicable Chapter or Task |
|---|---|
| Include regional projects or programs (CWC §10544) | Geographic Information Systems Internet Mapping Site Development (Exhibit A-4) |
| Effectively integrate water management programs and projects within a hydrologic region identified in the California Water Plan; the Regional Water Quality Control Board (RWQCB) region or subdivision; or other region or sub-region specifically ident | Inter-Regional Coordination (Exhibit A-5) |
| Effectively resolve significant water-related conflicts within or between regions | Inter-Regional Coordination (Exhibit A-5), IRWM Plan update to include several projects to reduce conflicts between water supply needs and damage to public trust resources (see Tasks in Section 6 and 7) |
| Contribute to attainment of one or more of the objectives of the CALFED Bay-Delta Program | N/A |
| Address critical water supply or water quality needs of disadvantaged communities within the region | Task 15.2 and Tasks in Chapter 6 and 7 |
| Effectively integrate water management with land use planning | Geographic Information Systems Internet Mapping Site Development (Exhibit A-4), Tasks 13.1 to 13.3 |
| For eligible SWFM funding, projects which: a) are not receiving State funding for flood control or flood prevention projects pursuant to PRC §5096.824 or §75034 or b) provide multiple benefits, including, but not limited to, water quality improvemen | Canyon Del Rey Dranage Plan Update (Exhibit A-1) |
| Address statewide priorities (Table 1 establishes the specific Statewide Priorities for the IRWM Grant Program.) | See separate table |

## Chapter 13. Relation to Local Planning and Land Use Planning (Tasks 13.1 to 13.3)

Since the 2007 adoption of the IRWM Plan, several documents affecting water resource management have been revised or introduced including:

- Monterey County General Plan Update (Monterey County)
- 2003 Monterey County Floodplain Management Plan (MCWRA)
- California American Water Urban Water Management Plan (CAW)
- Carmel Valley Master Plan (Monterey County)
- Monterey Regional Storm Water Prevention Program (MRSWMP)
- Local agency strategic plans (various)
- Monterey Bay National Marine Sanctuary Regulations (NOAA)
- San Clemente Dam Emergency Action Plan

As described in **Exhibit A-4a** and **Exhibit A-**4b, web tools will be provided to stakeholders to enable a search for documents related to proposed projects. An updated table will be developed showing local planning documents that affect water resource management and project proposals. Where feasible, links to the documents or information about where these are available will be provided.

Agencies with authority over land use will be contacted and requested to provide the most recent documents (or links) to information that would affect water resource management. These agencies will also be provided access to the web site portal and asked to post notices of document updates and/or information about proposed revisions.

Over the past several years, many groups and agencies have focused or formed to consider water resources management and projects that could affect the region. These include groups centered on a specific aspect, project, or program including:

- San Clemente Dam Removal and Reroute (many local, state, and federal groups)
- Regional Water Supply Program (many agencies and interest groups)
- Monterey Regional Stormwater Management Program (several cities and Monterey County)
- Carmel Bay, Monterey Peninsula, and Southern Monterey Bay Integrated Regional Water Management
- Carmel River Lagoon groups (TAC, CPLPA, HELM)
- Carmel River Parkway Vision (Big Sur Land Trust)
- Carmel River Watershed Conservancy
- Greater Monterey County IRWM RWMG
- Seaside Basin Watermaster (several agencies and overlying pumpers)
- Carmel Valley Association (residents)
- Sustainable Carmel Valley (residents)

- Carmel Residents Association (residents)

Many of the people involved participate in more than one of these groups and are involved in both land use and water resource management decisions at the agency staff level. However, there is no formal forum or single agency responsible for coordinating the efforts of these groups.

Local governing boards have also formed or appointed a number of committees and sub-committees that can affect water resource planning, public enjoyment of resources, and/or the outcome of proposed projects. For example, MPWMD has appointed at least 10 such committees to help understand and promote water resource management. Most cities have at least one public committee with oversight or input into resource management. There are also web blogs that occasionally focus on water resource management issues.

Chapter 3 in the IRWM Plan describes many of the agencies involved in water resource management. This list will be updated and a comprehensive list of agencies, boards, commissions, and community interest groups that have responsibility or input into water resource management will be developed.

Outreach to all of these identified groups will include contacting a representative and providing a link to information about IRWM within the region, the stakeholders involved and proposed projects. Interest in establishing a forum to discuss specific issues will be gauged. However, given the active involvement of many across the region in water resources planning, management, and project review, it is uncertain what the most appropriate process would be to coordinate efforts.

| **Chapter 13. Relation to Local Planning and Land Use Planning** | | |
|---|---|---|
| **Task** | **Description** | **Deliverables** |
| 13.1 | Revise list of local planning documents pertaining to water resource management. Provide links or information concerning availability to stakeholders. | • Chapter update, web portal |
| 13.2 | Contact local, regional, state, and federal agencies to request information or links to documents affecting water resource management. Provide information to stakeholders | • Chapter update, web portal |
| 13.3 | Contact local boards, commissions, committees and groups | • Updated list of agencies, boards, commission, and groups focused on water resource management |

## Chapter 14. Stakeholder Involvement and Coordination

### 14.1 Outreach for IRWM Plan

As described in many of the tasks to update the IRWM Plan, stakeholder outreach and involvement will be a significant part of the update. Results of this effort will be summarized in this section. In addition, several web-based tools are proposed for development to encourage stakeholder participation in the IRWM Plan process. These are briefly described below.

Beginning about 2002, MPWMD established a Geographic Information System (GIS) using ARCVIEW 9.1 that now incorporates several sets of data into layers that can be mapped and analyzed. As part of the development of the IRWM Plan adopted in 2007, MPWMD established a web site and document library for IRWM stakeholders. Currently, a limited amount of data, documents, and maps from GIS projects are made available as they are developed, but there is no public access to the GIS platform and no method to search for relevant data and documents.

This IRWM Plan update includes tasks to provide GIS tools to approved stakeholders and a public web portal for viewing information on MPWMD servers as well as a new server for the web portal. In addition, a pilot project to manage monitoring data will be completed. Separate task descriptions for this work are attached as **Exhibit A-4a** and **Exhibit A-4b**.

During development of GIS tools and data management tools, MPWMD will continue to update existing maps and documents provided on the web. All stakeholders have the ability to request copies of the projects and/or associated layers once they are completed.

### 14.2 Disadvantaged Community (DAC) Outreach

The 2000 population census showed four census tracts that qualified as DACs, which represented about 17% of the region's population. The 2010 census may change both the number and area of DACs in the region (see related Task 3.2). In 2010, Monterey County had one of the highest unemployment rates in California (14%) and there has been a steady stream of home foreclosures since 2008. It is generally recognized that the planning region is relatively affluent. But, it is clear that there are some areas within the region that struggle economically. The largest sector of the region's economy (tourism and related services) relies heavily on unskilled, relatively low-paid workers, some of whom may live in the region and may be considered disadvantaged. Currently, most households in DACs appear to be geographically and politically represented in either the RWMG or the stakeholder group, but there are no recognized representatives of DACs within the stakeholder group.

During the development of the IRWM plan adopted in 2007, DWR encouraged outreach to communities that had not participated in the IRWM Plan development. The response to a targeted outreach within one of the areas with what appeared to be a DAC and that has known water supply and quality problems was not particularly successful – possibly due to unfamiliarity or a mistrust of a relatively new government aid program and the lack of an organization within the community that was capable of working with government agencies.

It appears that this planning region has three challenges in addressing issues within DACs – identifying where DACs are, explaining the benefits of the IRWM grant program, and connecting leaders or representatives in DACs with the IRWM Plan. The general stakeholder outreach conducted with the update of this plan will be augmented and additional efforts will be undertaken to address DACs. These tasks include:

- Using information generated from the 2010 Census, DAC information will be updated.

- A consultant or agency staff person(s) familiar with identifying and contacting community groups or individuals in underprivileged communities will be retained to work with people who may have knowledge of issues or problems within DACs. Contact could be through web postings, contact of agency officials, and contacts with groups involved with underprivileged portions of the community.
- If appropriate, technical assistance will be provided to identify needs, problems, issues and potential solutions or projects to address those needs.
- Individual representatives from DACs will be encouraged to become involved in the IRWM stakeholder group.
- For DACs that do not have designated community representatives in the stakeholder group, other stakeholder members will be encouraged to advocate and represent the interests of those DACs which may lie within a stakeholder's jurisdiction or area of special interest.

It should be noted that consideration and prioritization of DAC needs will be evaluated under Task 6.2 "Project Prioritization." If it is determined that there are unmet DAC needs within the region, the objectives, priorities, and project selection process should be amended to address those needs.

No areas or issues of Environmental Justice (EJ) concerns were identified in the 2007 IRWM Plan. However, during development of this work plan, the Executive Director of the Fort Ord Environmental Justice Network (FOEJN), Levonne Stone, was contacted concerning potential DAC and EJ concerns in the Monterey Peninsula region and, in particular, the Ord Community area. This group was overlooked during development of the Monterey Peninsula IRWM Plan. Since its inception, FOEJN has advocated for the participation of disenfranchised communities in the activities and decisions made regarding the cleanup of toxins, contaminated groundwater, 8,000 acres of military munitions and other contaminants that cause adverse health affects to impacted residents.

This former Army base is shared between the Monterey Peninsula and Greater Monterey County planning regions and, like many military installations across the country, houses environmentally contaminated sites, due to past environmental practices of the Department of Defense (DOD). The U.S. Environmental Protection Agency (US EPA) has listed Fort Ord on the National Priorities List (NPL), as one of the most contaminated Superfund sites.

Representatives of the FOEJN will be asked to participate in the IRWM Plan update and with identifying under served portions of the community and EJ concerns.

| **Chapter 14 Stakeholder Involvement and Coordination** | |
|---|---|
| **Description** | **Deliverables** |
| Outreach for IRWMP | • Included in Chapter updates throughout IRWM Plan and in additional IRWM Plan tasks A-1 through A-7<br>• Updated list of stakeholders, including contact information |
| Outreach to DACs | • Contact list, identification of issues, Chapter update |

## Chapter 15. Climate Change

There are two related areas of concern about climate change in the region – a potential rise in ocean levels and changes in rainfall patterns that could affect watersheds draining to the ocean.

The Association of Monterey Bay Area Governments (AMBAG), NOAA's Monterey Bay National Marine Sanctuary (MBNMS) and local municipalities are working toward the development of a shoreline management plan to manage and mitigate coastal erosion and adapt to future conditions based on projections for anticipated accelerated levels of sea level rise. Recent meetings of the City of Monterey and the Southern Monterey Bay Coastal Erosion Workgroup (SMBCEW) have identified coastal hazards related to sea level rise and climate change as an important component to the shoreline management plan. Work to update the IRWM Plan will be coordinated with the AMBAG and MBNMS work.

At present, the potential effects to the region from changes in temperatures and rainfall patterns have not been considered. Given the Mediterranean climate of the area, it is well adapted to extremes in temperatures and rainfall patterns. However, if there is a potential for floods and droughts to become more frequent, or for temperatures to diverge significantly from the average, the long-term effects should be considered.

### 15.1 Regional Impacts

The following should be reviewed prior describing the potential effects of climate change on the region:

- Proposition 84 and Proposition 1E Integrated Regional Water Management Guidelines (August 2010) for Climate Change Standard Requirements
- California Department of Water Resources Integrated Regional Water Management Climate Change Document Clearinghouse
- Coastal Water Project Environmental Impact Report and its suggested mitigations for Green House Gas emissions associated with the Regional Project

Using the description of general climate change impacts, identify potential areas, types of impacts, and risks from climate change within the planning region. The IRWM Plan climate change discussion should address adapting to changes in the amount, intensity, timing, quality, and variability of runoff and recharge in the local watersheds.

In addition, contact agencies and cities within the region and develop a list of facilities and infrastructure (present and near future) that may be impacted by the following potential impacts: rises in sea level (e.g., sanitary sewer facilities, storm drain outfalls, and intake facilities for desalination plants), salt water intrusion, changes in hydrology, flooding, drought, and other potential impacts described in the clearing house documents. Incorporate these findings in the region description, project review process, and other relevant sections of the IRWM Plan. Make region specific recommendations on how the area would mitigate or adapt to the potential impacts. See table 8 in Guidelines for Climate Change Standard Requirements.

### 15.2 Green House Gases (GHG)

Evaluate ways that the planning region could reduce emissions of Green House Gases (GHG) and energy consumption. Develop a process that discloses and considers GHG emissions when choosing between project alternatives. A possible resource for this task is the recently released report "Quantifying Greenhouse Gas Mitigation Measures" by the California Air Pollution Control Officers Association.

### 15.3 IRWM Plan Updates

Amend the IRWM Plan update process to include an evaluation and use (as appropriate) of predictive tools for climate change in assessing impacts and benefits of projects and project proposals.

| **Chapter 15. Climate Change** | |
|---|---|
| **Description** | **Deliverable** |
| Describe regional impacts | • New IRWM Plan Chapter |
| Describe GHG | • New IRWM Plan Chapter |
| IRWM Plan updates | • New IRWM Plan Chapter |

## Task 16 – Grant Administration

This task consists of grant oversight and administration, including preparation and administration of sub-grantee agreements, quarterly reports, and a final report.

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# Exhibit A-1 - Canyon Del Rey Master Drainage Plan Update

## SUMMARY

Canyon Del Rey Creek is an ephemeral stream that drains to the Pacific Ocean from an area of 16.8 square miles (approximately 10,750 acres) along Highways 68 and 218, beginning near the Laguna Seca raceway at the eastern end of the watershed and flowing west into the Monterey Bay (see Figure 1). The watershed includes portions of Seaside, Del Rey Oaks, Monterey, and unincorporated Monterey County. The Monterey County Flood Control and Water Conservation District (since renamed the Monterey County Water Resources Agency or MCWRA) completed a Master Drainage Plan for the watershed in June 1977. The plan included a hydrologic analysis of existing data, predictions of future flows, a hydraulic analysis of existing facilities, and made recommendations for future improvements. One recommendation in that plan was "A periodic updating of the Master Plan to reflect actual conditions, as development occurs, is strongly recommended as the basis on which to provide for future conditions." No update of the plan has occurred since completion of the study.

Since that time, a significant amount of development has occurred and many of the recommended improvements have been implemented. General Plans for development in the cities and unincorporated areas have changed, water quality standards for stormwater runoff have increased, and tools to understand and predict water and sediment flows have improved.

High flows during the extremely wet years of 1995 and 1998 exposed several drainage problems and confirmed some of the predictions made in the 1977 study, especially concerning headcutting in Canyon Del Rey Creek (the creek) and culvert sedimentation of road drainage facilities. Laguna Grande and Roberts Lakes, located at the terminus of the watershed, continue to experience sedimentation and have a reduced flood control capacity.

It should be noted that Monterey County implemented regulations to prevent or reduce sediment and runoff from new development beginning in the 1960's. In addition, since completion of the 1977 drainage plan, the City of Monterey has implemented all recommendations from that plan for new development within the city limits of Monterey. It is unknown which improvements have been implemented within the city of Del Rey Oaks.

Along the Central California Coast, which contains a significant number of watersheds underlain with sandy soils, it has been noted recently that the hydrologic effects of development may be much greater in deep sandy soils than in loamy, clay and/or shallow soils. At the time of the 1977 drainage study, little or no information was available about this effect and no data on lake sedimentation, or bedload and suspended load in the creek were available.

Four areas of focus are proposed for an update to the Master Drainage Plan:

1.) An update of the hydrologic model contained in the 1977 Drainage Study. That study included rainfall data from the mid-1930's to the mid-1970's. An additional 35 years of rainfall data are now available.

2.) An update of the hydraulic model including existing and future peak flows. The 1977 study estimated both existing flows and future flows based on general plan build-out and estimated future population density. An update of these flows would be completed for use in meeting various flow modeling requirements (e.g., for HEC-RAS, SWMM, or for use in establishing BMPs such as those required by the SWRCB).

3.) An update of expected erosion and sedimentation rates in the tributaries, main stem and in the lakes at the terminus of the watershed. The 1977 drainage study postulated that the creek was in a "juvenile" stage of development with a new floodplain as a result of "5 to 10" feet of incision and that, despite transportation of silt from the headwaters, the amount of sediment carried by the creek was limited, due to the limited transport power. The stability of tributaries and the main stem creek will be evaluated. If possible, the historic, existing, and future rate of sediment transport to the lakes will be evaluated.

4.) A survey of the primary drainage facilities in the watershed will be conducted (i.e., size, capacity, does the facility meet the requirements of the 1977 study). In addition, a feasibility study considering alternatives to minimize flooding and maintain stormwater flows to the ocean will be completed.

This update is a cooperative effort between MCWRA, the City of Seaside, and the Monterey Peninsula Water Management District (MPWMD). These agencies will take the lead in the development of a final scope of work and review of work products and will provide in-kind services and funds. Other contributing agencies include the City of Monterey and the Monterey Peninsula Regional Park District.

It is expected that one or more consultants will be retained to complete the work. If required, Consultants will have the responsibility for developing QAPPs meeting SWRCB/DWR standards, and for modifying them in response to comments. A high level of consultant qualifications may be required to carry out the drainage plan update. [1]

## INTRODUCTION

Canyon Del Rey Creek is an ephemeral stream that drains to the Pacific Ocean from an area of 16.8 square miles (approximately 10,750 acres) along Highways 68 and 218 beginning near the Laguna Seca raceway at the eastern end of the watershed and flowing west into the Monterey Bay (see Figure 1). The watershed includes portions of Seaside, Del Rey Oaks, Monterey, and unincorporated Monterey County. Significant portions of the watershed to the south of Highway 68 are sparsely developed and contain steep slopes (>25%) rising up to 1,300 feet in elevation with a mix of coastal scrub, pine, and oak woodlands. Most of the runoff to the creek is from this area, which is rated as a fire hazard and thus can undergo episodes with high rates of erosion. Areas to the north of Highway 68, are generally low rolling grassy hills covered with sandy soils that provide little runoff to the creek, except during the wettest periods. The

[1] These may include, where appropriate, (a) conformance with State of California professional registration requirements as professional engineers, geologists, and (optionally) advanced certifications such as geotechnical engineer, engineering geologist, or certified hydrogeologist, (b) prior experience with the hydrologic models proposed, (c) evidence of experience with stream gaging or suspended-sediment and bedload-sediment sampling, and (d) submittal of prior sediment-quality sampling and testing-protocol development.

west end of the basin, in the Cities of Monterey, Seaside, and Del Rey Oaks has a high degree of urbanization with a mix of single- and multi-family units and commercial development. The peak 100-year flow in the creek (from the 1977 drainage study) ranged from 800 cfs (existing) to 1,000 cfs (future conditions). Many of the primary facilities surveyed in 1977 could pass less than one-half of the 100-year peak. The most recent update of the FEMA Flood Insurance Rate Map (April 2, 2009) shows zones of shallow flooding in the 100-year event that would affect residences and businesses adjacent to the creek between Roberts Lake and the intersection of Highway 68/Highway 218. Portions of both highways would be inundated during a 100-year flood.

Improvements recommended in the 1977 drainage study were proposed to reduce flooding damage to structures as a result of the expected 100-year return period flood. Additional analyses and recommendations were made in the 1977 study to pass the expected 10-year storm flows at road and highway drainage facilities. To fund needed improvements, the 1977 study recommended both property tax assessments and fees for new developments. However, with the passage of Prop. 13 in June 1978, property taxes were capped and only the development fee was initiated. In the interim, some improvements and erosion prevention measures on individual parcels developed since that time have been completed. By late 2006, the fund had accumulated approximately $66,000 and a portion of this fund is now proposed to be used to update the 1977 drainage plan and to identify improvements still needed in the watershed.

Geologic evidence and soil moisture budget analyses both indicate the presence of a shallow alluvial aquifer system that sustains wetlands and phreatophytic vegetation and also supports baseflow in Canyon Del Rey in wet years[2]. Hydrogeologic conditions along Canyon Del Rey suggest that infiltration into the aquifer system from the channel is not a significant source of groundwater recharge and runoff in the creek normally represents a small fraction of the annual rainfall. Groundwater level data collected between 1989 and 2001 showed a widespread declining trend in groundwater levels. In 2006, groundwater in the basin was adjudicated and the Court ordered that the supply and demand be brought into balance[3].

**Other information available**:

Since preparation of 1977 plan, Monterey County has developed a comprehensive GIS database of soils, topography, resource values, assessor parcel data, and the distribution of population and facilities. The County may provide the lead agencies and supporting consultants with available coverages.

Information is available to characterize land-cover changes in the watershed since 1977. Some information is found within the 1977 report. The 1980 census portrays population within the basin at the time. Virtually the entire watershed is shown on the Seaside 7.5-minute topographic quadrangle, photorevised using 1981 aerial photography, with all individual structures beyond the incorporated boundaries of Monterey and Seaside indicated.

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[2] See "Laguna Seca Subarea Phase III Hydrogeologic Update," prepared for the Monterey Peninsula Water Management District, prepared by Eugene B. Yates, Martin B. Feeney, and Lewis L. Rosenberg, November 2003.

[3] See California-American Water Company v. City of Seaside et. al., Monterey County Superior Court Case No. M66343, Final Decision.

Daily flows and limited other data are available from the (former) USGS gaging station 11143300, near the Del Rey Oaks City Hall and immediately upstream of Laguna Grande, which was operated for 13 years (from WY1967 to WY1978). MPWMD has maintained a recording gage at this station beginning with WY2003. Daily records are presently published by MPWMD through WY2008. No sediment data and only scattered water-quality data have been collected. MPWMD will make the daily data and hydrographs from selected large storms available for analysis.

**Summary of field situation:**

The area of initial concern in the creek bottom begins near the north end of Silver Cloud Court near the intersection of Highway 68 and York Road in Monterey County. The stream channel suffers from bank instability, headcutting, and erosion problems during high flows along adjacent private properties due to a variety of factors such as increased stream flows during rain events, changes in sediment supply in the watershed, and creekside development. Recent conditions in the watershed include:

1. The construction of a larger culvert at Boot Road. The previous smaller culvert detained water and reduced peak flows downstream. With the larger culvert, high flow rates have been observed, which may exacerbate erosion downstream.
2. Several residential structures along the creek have been threatened by streambank loss. Local property owners want a solution to this problem and believe that increased development within the watershed has contributed to bank erosion and has also contributed to a decline in the water level of the aquifer supporting the Bishop unit of the California American Water Company. There are several detention, tertiary, and retention ponds currently operated within the watershed that may affect runoff quantity and aquifer recharge characteristics.
3. The failure of a major spillway on a detention pond near the entrance of the Pasadera development that has not been corrected.

## SCOPE OF WORK

### Task 1 – Update of the hydrologic model

In this task, the consultant will assess existing conditions in the Canyon Del Rey watershed (e.g., land use, drainage condition) and compare existing conditions with those assumed in the 1977 Canyon Del Rey Creek Master Drainage Study for future conditions.

<u>Subtask 1.1 – Watershed Characterization</u>[4]
Under this subtask, changes in land use and drainage facilities/structures that have occurred in the watershed between 1977 (when the original drainage master plan was prepared) and the

[4] A watershed assessment or enhancement plan has not been done for the Canyon del Rey watershed, and may be conducted separately, at a later date, and building on this scope. Work for this project is limited to information needed to manage runoff and sediment.

present will be identified and documented. The primary focus would be to use aerial photographs to determine the percent of impervious area and, if feasible, identify significant detention and/or retention facilities that might affect runoff. In addition, local land use jurisdictions will be contacted and asked to provide copies of any updated land use maps, facilities maps, or other information that would contribute to an understand of changes in land use and/or drainage patterns.

Subtask 1.2 – Watershed Evaluation
This subtask will consist of two actions, both designed to identify problem areas within the canyon drainage.

*Field Evaluation* – using information from Subtask 1.1, a field survey of selected facilities would be conducted to assess and document areas of potential problems. If possible, problem facilities would be observed during rain events.

*Report Evaluation* – where annual reports or other documents about drainage facilities are available, information about the effectiveness of a facility would be used. The Consultant will also review the 1977 breakdown of the watershed into sub-watersheds. If appropriate, a new set of sub-watersheds may be developed for additional analysis in Task 2.

A map of the identified areas will be prepared, and the results of this subtask will be used in other tasks described below.

Subtask 1.3 – Update Precipitation Estimates
Using acceptable data from local rainfall reporting stations, an updated estimate of rainfall rates would be prepared. This would include the development of updated isohyetal maps and actual or correlated annual rainfall totals for the period of record. Where appropriate, rainfall data and analyses from nearby watersheds may be used for comparison. Product: Correlating daily records for about 8 stations over 60 to 70 years, plus depth/duration/frequency tables for 3 stations with most-complete records.

**Task 2 – Update Runoff Estimates**

Subtask 2.1 – Evaluate Appropriate Runoff Estimation Methods
The 1977 plan used the synthetic unit hydrograph. There are several alternate methods currently available for evaluating runoff. The Consultant will evaluate existing methods and in consultation with agency staff, recommend a method to estimate flows in the basin and sub-watersheds.

Subtask 2.2 – Estimate Existing and Future Flows
The Consultant will develop an estimate of present and future flows at critical locations along the creek and in sub-watersheds. Flow predictions would be on intervals for use in standardized models to evaluate flooding (e.g., HEC-RAS) and stormwater runoff (e.g., SWMM). Basin characteristics for a future developed condition will be based on approved General Plans in the cities and unincorporated Monterey County areas.

It should be noted that information from Tasks 3 and 4 may be required in order to make flow determinations.

**Task 3 – Evaluate the effectiveness of the primary drainage facilities in the watershed**

Subtask 3.1 – Determine the existing condition of primary facilities

The 1977 study recommended improvements to 19 primary drainage facilities (see listing of "Canyon Del Rey Primary Drainage Facilities). Using City and County records and field visits, the size and condition of each facility will be verified. In addition, drainage facility no. 46, which is a quadruple 6 ft. by 6 ft. by 750 feet long reinforced concrete box (RCB) outfall from Roberts Lake that goes under Highway 1, will be inspected.

Subtask 3.2 Bathymetric study

A bathymetric study of the lakes will be conducted and sediment samples will be taken. A report from the sediment analysis would be provided to local agencies interested in the potential for beneficial use of any material dredged from the lakes to replenish sands that are being lost from local beaches.

Subtask 3.3 – Feasibility Study for Ocean Outfall Maintenance

Consultants will investigate potential structural solutions that could reduce the manual breaching of the beach at the outfall from Roberts Lake. The feasibility of the potential solutions will be ranked by economic, environmental, technologic and other factors. The preferred alternative could be presented to the California Coastal Commission for permit approval.

Subtask 3.4 – Determine whether existing facilities are adequate

Using information provided from previous tasks, the effectiveness of each facility to pass flows will be evaluated. Where facilities are found to be inadequate, the Consultant will make recommendations to improve the facilities or make recommendations for additional work.

**Task 4 - Project Management**

This task consists of standard project management tasks, including scheduling, budget tracking, invoicing, and general project communications. Also included in this task are regular communications with agency staff , conference calls as required, and quarterly progress reporting.

**Optional Tasks if Funding is Available**

**Task 5 – Update of erosion and sedimentation rates in the tributaries, main stem and in Laguna Grand and Roberts Lake**

Subtask 5.1 – Evaluate erosion and sedimentation data

Questions to answer with this task, if possible, are: 1) What are the past, present, and expected future sediment loads from the watershed? 2) Where are the sources of sediment? 3) Are the drainage facilities for new developments that have been required since the 1977 drainage plan was completed functioning as intended?

Task 5.1.1 Historical analysis

The Consultant will review historical data concerning erosion rates in the watershed and sedimentation at Laguna Grande and Roberts Lake. This includes a review of the effect of dredging projects at the lakes and any other information that may provide a history of the sediment loading and changes in the rate of loading from the watershed. The original capacities of Laguna Grande and Roberts Lake are not known at this time, although the lakes were reportedly last dredged in the late 1980's. As part of this review, past City of Seaside officials and others who may have been involved with managing the lakes will be interviewed and documentation sought about past management efforts.

Task 5.1.2 Sedimentological study

Sediment samples at the lakes will be taken. A report from the sediment analysis would be provided to local agencies interested in the potential for beneficial use of any material dredged from the lakes to replenish sands that are being lost from local beaches.

Task 5.1.3 Sediment sources and transport sampling

In addition, sediment samples from various parts of the watershed may be obtained and analyzed in an effort to establish their original source based on mineralogical or lithological evidence. If rainfall and runoff are sufficient during the course of the investigation, bedload and suspended load measurements may be taken in the main channel and analyzed for particle size. Two years of sediment sampling will be conducted. Stations will be located at the existing Canyon Del Rey gage, plus one north-side tributary and one south-side tributary to be selected during Task 1.1. Federal Interagency Sedimentation Program methods will be used for sample collection, analysis and daily-load computation, with minor variance allowed for site-specific considerations.[5]

Subtask 5.2 – Estimate the future sediment load

Estimate future sediment loads to the lagoon system by projecting future flows and future sediment-rating curves or other loadings analysis.

[5] Suspended sediment samples to be collected with DH-48, DH-81 or similar samplers; bedload to be collected with Helley-Smith samplers for conformance with prior regional data.

Subtask 5.3 Sediment Management of Laguna Grande and Roberts Lake

The City of Seaside performs maintenance on the outfalls from Laguna Grande and Roberts Lake. The maintenance activities typically involve clearing the outfalls of sediment, sand and debris so the systems can freely discharge to the ocean. This maintenance program is permitted by a permit waiver granted by California Coastal Commission, which is due to expire on January 7, 2014 (see Coastal Development Permit Waiver 3-08-026-W).

Sedimentation of Laguna Grande and Roberts Lake has reduced the ability of Seaside to manage flows through the barrier beach at the coast. In addition, mechanical and manual breaching of the barrier beach at the outfall from Roberts Lake is sometimes required during the spring and winter. The barrier beach is breached both mechanically and manually in order to prevent flooding of low-lying areas. To minimize the frequency of this activity, the breaching of the barrier beach is postponed until a sufficient volume of water accumulates in the lake system and the outflow from the lakes can be maintained at a rate that is sufficient to prevent the sand barrier from re-forming on the beach.

The City needs to evaluate alternatives to breaching of the barrier beach and is considering several projects including the dredging of Laguna Grande and Roberts Lake, which is estimated to cost up to $15 million. An important consideration for determining the benefits from dredging is the number of years for which this would be effective. Using information from previous tasks, the Consultant will prepare an estimated range for the future sediment load into Laguna Grande and Roberts Lake.

***Canyon delRey Drainage Plan Update Estimated Costs***

| Task Number and Description | | Labor Costs For Task | Direct Costs | **Total costs For Task** | Comments |
|---|---|---|---|---|---|
| *Hourly Rate* | | | | | |
| Task 1.1. Preliminary watershed characterization | | $19,350 | $500 | *$19,850* | |
| | | $0 | | *$0* | |
| Task 1.2.1. Facilities evaluation | | $19,220 | $1,000 | *$20,220* | Assumes 15 staff days to see and tabulate facilities, prepare task memo and 3 staff days of |
| | | $0 | | | Includes purchase of aerial photos for early |
| Task 1.2.2. Evaluation of existing plan. | | $8,860 | $0 | *$8,860* | |
| | | $0 | | | |
| Subtask 1.3. Update precipitation estimates | | $15,760 | $400 | *$16,160* | Opinion of Balance's meteorologist, who knows |
| | | $0 | | *$0* | |
| Subtask 2.1 Evaluate Runoff Estimation Methods | | $23,400 | $0 | *$23,400* | |
| Subtask 2.2. Estimate Existing and Future Flows | | $14,220 | $1,000 | *$15,220* | |
| | | $0 | | *$0* | |
| Subtask 3.1 Determine the existing condition of primary facilities | | $26,110 | $500 | *$26,610* | |
| Subtask 3.2 Batymetric Study | | | 30000 | | |
| Subtask 3.3 Feasibility Study for Ocean Outfall Maintenance | | $54,200 | $0 | *$54,200* | Focuses on lagoon, and includes minimal qualitative discussion of beach nourishment and disposal issues. Add nother $150,000 for |
| Subtask 3.4 – Determine whether existing facilities are adequate | | $61,590 | $5,000 | *$66,590* | |
| Task 5 Project management | | $11,465 | $0 | *$11,465* | Assumes 27-month study duration |
| Subtotal | | $254,175 | $38,400 | $262,575 | |
| OPTIONAL TASKS IF FUNDS BECOME AVAILABLE | | | | | |
| Subtask 5.1.1 – Evaluate erosion and sedimentation data | | $16,260 | $1,000 | *$17,260* | |
| Subtask 5.1..2 sedimentology | | $51,510 | | *$51,510* | Straight bathymetry is generally best |
| (.5.1.2, continued) | | $11,320 | $100,000 | *$111,320* | Direct costs are lab fees, mainly for toxics and |
| Subtask 3.1.3. Sediment transport and sed souces | | $92,360 | $12,000 | *$104,360* | Gaging and sediment-transport sampling |
| | | $2,470 | $11,000 | *$13,470* | Lab fees for particle size analysis, plus data |
| | | $9,450 | $3,000 | *$12,450* | Mineralogical evaluation of sediment sources |
| Subtask 5.2 Estimate future sediment loads to lagoon system | | $14,310 | $1,000 | *$15,310* | Based on buildout projection of existing measured sediment loads and size distributions |
| | | $0 | | | |
| Subtasks 5.3 Sediment management of lagoon system | | $61,590 | $5,000 | *$66,590* | |
| | | $0 | | *$0* | |
| Subtotal optional tasks | | $259,270 | $133,000 | $392,270 | |
| **Total Hours** | 0 | **$513,445** | **$171,400** | **$654,845** | |

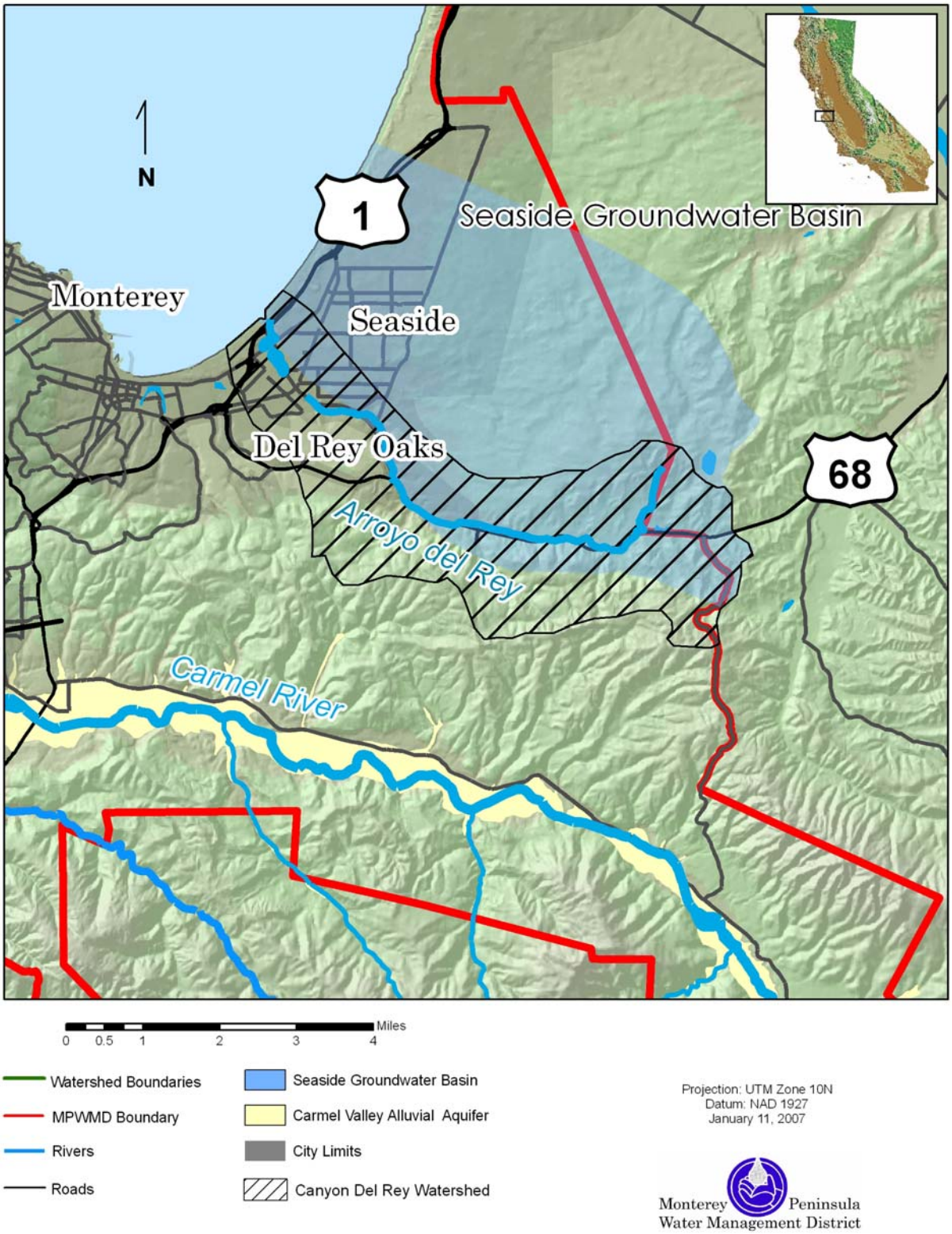
## Schedule

| | | 2011 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Task No.** | **Description** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| **Exhibit A-1 – An update to the Canyon Del Rey drainage plan** | | | | | | | | | | | | | |
| 1.1 | Watershed characterization | | | | | | | | | | | | |
| 1.2 | Watershed evaluation | | | | | | | | | | | | |
| 1.3 | Update precipitation estimates | | | | | | | | | | | | |
| 2.1 | Evaluate Appropriate Runoff Estimation Methods | | | | | | | | | | | | |
| 2.2 | Estimate Existing and Future Flows | | | | | | | | | | | | |
| 3.1 | Determine the existing condition of primary facilities | | | | | | | | | | | | |
| 3.2 | Bathymetric study of Laguna Grande and Roberts Lake | | | | | | | | | | | | |
| 3.3 | Feasibility Study for Ocean Outfall Maintenance | | | | | | | | | | | | |
| 3.4 | Determine whether existing facilities are adequate | | | | | | | | | | | | |
| 4 | Project Management | | | | | | | | | | | | |
| OPTIONAL TASK | | | | | | | | | | | | | |
| 5.1 | Evaluate erosion and sedimentation data | | | | | **If funded, concurrent with Task 3** | | | | | | | |
| 5.2 | Estimate the future sediment load | | | | | **If funded, concurrent with Task 3** | | | | | | | |

J:\IRWM\2010PlanGrant\Canyon Del Rey\ExA-1Scope of Work_Canyon del Rey Study 10Sep10.doc

**Figure 1**

Canyon Del Rey Watershed



# CANYON DEL REY WATERSHED
# PRIMARY DRAINAGE FACILITIES

| STRUCTURE NO. | SUB-WATERSHED | DESCRIPTION OF EXISTING STRUCTURE | PRESENT CAPACITY EXISTING STRUCUTE | PEAK DISCHARGE 100 YR. STORM FUT. cfs | PEAK DISCHARGE 100 YR. STORM PRES. cfs | PRIMARY FACILITY REQUIRED FUTURE | ESTIMATED COST FUTURE | PRIMARY FACILITY REQUIRED PRESENT | ESTIMATED COST PRESENT |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 2 | 28"x18" CMARCH UNDER HIGHWAY 68 | 30 cfs | 182 | 135 | REPLACE WITH 6'x2.5' RCB | $8,300 | REPLACE WITH 5'x2.5' RCB | $7200 |
| 4 | 15 | 12" CMP UNDER LAGUNA SECA RD., EAST FORK | 10 | 286 | 270 | REPLACE WITH DBL. 42"CMP & RAISE ROAD 2' CLEAN OUTLET CHANNEL DOWN TO STRUC. 7 | 6,700 | SAME AS FUTURE | 6700 |
| 7 | 16 | 48"CMP UNDER LAGUNA SECA RD, WEST FORK | 180 | 257 | 235 | PROVIDE PARALLEL 48"CMP w/ ROUNDED ENTRANCE HEADWALL | 3,800 | PROVIDE PARALLEL 36" CMP w/ ROUNDED ENTRANCE HEADWALL | 2900 |
| 10 | 16 | 36"CMP UNDER LAGUNA SECA RANGER STA. RD. IT HAS A DROP INLET & ROAD ACTS AS DAM. | 90 | 170 | 170 | PROVIDE PARALLEL 36" CMP w/ DROP INLET & RAISE ROAD 2' | 10,400 | SAME AS FUTURE | 10,400 |
| 14 | 17 | 36" CMP UNDER HWY 68 | 100 | 190 | 135 | PROVIDE PARALLEL 36"CMP w/ ROUNDED COMMON HEADWALL ENTRANCE | 5,000 | PROVIDE PARALLEL 24" CMP w/ ROUNDED COMMON HEADWALL ENTRANCE | 3,400 |
| 16 | 6 | 48"CMP UNDER HWY 68 | 240 | 260 | 194 | PROVIDE PARALLEL 36"CMP ABOVE EXISTING CULVERT | 7,900 | NO CHANGE | 0 |
| 25 | 22 | 48"CMP UNDER LARKSPUR DR. | 260 | 391 | 230 | PROVIDE PARALLEL 42"CMP w/ DROP INLET. KEEP INLETS & APPROACHING DITCH CLEAR. | 8,800 | NO CHANGE | 0 |
| 26 | 22 | 12'x6' RCB UNDER YORK SCHOOL RD. | 500 | 391 | 391 | REMOVE EXISTING TREES AT ENTRANCE OF STRUCTURE | 1,000 | SAME AS FUTURE | 1,000 |
| 27 | 10 | 6'x3' RCB UNDER HWY. 68 | 200 | 344 | 265 | PROVIDE PARALLEL 4'x3' RCB w/ LONGITUDINAL SLOPE OVER 1% TO REDUCE SILTING, CONSTRUCT COMMON ROUNDED HEADWALL ENTRANCE | 8,200 | PROVIDE PARALLEL 3'x3' RCB w/ LONGITUDINAL SLOPE OVER 1% TO REDUCE SILTING, CONSTRUCT COMMON ROUNDED HEADWALL ENTRANCE | 6,900 |
| 29 | 23 | TRIPLE 30" CMP UNDER HWY. 68 | 200 | 757 | 583 | REPLACE WITH TRIPLE 6'x3' RCB w/ COMMON ROUNDED HEADWALL ENTRANCE | 21,000 | REPLACE WITH TRIPLE 5'x3' RCB w/ COMMON ROUNDED HEADWALL ENTRANCE | 19,100 |
| 30 | 11 | 8.5'x3.5' BRIDGE AT PRIVATE DRIVEWAY | 450 | 834 | 668 | ENLARGE STRUCTURE TO MIN. 72 sq.ft. OPENING RAISE ROAD 2'. | 3,900 | ENLARGE STRUCTURE TO MIN. 60 sq.ft. OPENING RAISE ROAD 2' | 3,200 |
| 31 | 14 | DBL. 48" RCP w/ ROUNDED ENTRANCE HEADWALL UNDER HWY 68 | 300 | 1088 | 853 | REPLACE WITH TRIPLE 7'x4.5' RCB w/ COMMON ROUNDED HEADWALL ENTRANCE | 35,800 | REPLACE WITH TRIPLE 6'x4.5' RCB w/ COMMON ROUNDED HEADWALL ENTRANCE | 32,900 |
| 37 | 14 | 90" CMP UNDER CANYON DEL REY GARDENS ROAD | 500 | 1120 | 898 | REPLACE WITH 12'x7.5' RCB w/ ROUNDED ENTRANCE OR EQUIVALENT STRUCTURE w/ CLEAR OPENING OF 90 sq.ft. MIN. | 16,400 | REPLACE WITH 10'x7.5' RCB w/ ROUNDED ENTRANCE OR EQUIVALENT STRUCTURE w/ CLEAR OPENING OF 75 sq.ft. MIN. | 10,200 |
| 38 | 27 | 6'x8' RCB UNDER HWY 218 | 600 | 1129 | 906 | PROVIDE PARALLEL 6'x8' RCB w/ ROUNDED ENTRANCE | 16,300 | PROVIDE PARALLEL 3'x8' RCB w/ ROUNDED ENTRANCE | 12,800 |
| 40 | 27 | 6'x7' RCB AT FROG POND OUTLET UNDER HWY 218 | 420 | 960 | 794 | PROVIDE PARALLEL 6'x8' RCB w/ COMMON ROUNDED HEADWALL ENTRANCE. SET INVERT 1' BELOW EXIST. CULVERT INVERT | 19,100 | PROVIDE PARALLEL 4'x8' RCB w/ COMMON ROUNDED HEADWALL ENTRANCE. SET INVERT 1' BELOW EXIST. CULVERT INVERT | 16,200 |
| 41 | 27 | 6'x6' RCB UNDER ROSITA RD. | 400 | 960 | 794 | REPLACE WITH DBL. 6'x7' RCB w/ ROUNDED ENTRANCE MAINTAIN U/S CHANNEL w/ 30 sq.ft. MIN AREA & 5' MIN. VERT. CLEARANCE TO PRIVATE BRIDGES | 26,900 | REPLACE WITH DBL. 6'x6' RCB w/ ROUNDED ENTRANCE. MAINTAIN U/S CHANNEL w/ 75 sq. ft. MIN. AREA & 5' MIN. VERT. CLEARANCE TO PRIVATE BRIDGES | 16,600 |
| 42 | 27 | 8'x8' RCB AT FREMONT AVE. & UNDER MONTE MART & FREMONT BLVD. | 1800 | 870 | 720 | PROVIDE MAINTENANCE CLEANING AT INLET & NO FILLING OR ENCROACHMENTS OF U/S PONDING AREA | ——— | SAME AS FUTURE | 0 |
| 43 | 28 | 6'x6' RCB AT END OF KOLB AVE. | 780 | 870 | 720 | REMOVE EXIST. STRUCTURE 43 & EXTEND EXIST. STRUC. 42 TO LAGUNA GRANDE IF FILLED AREA IS TO BE USED | 107,200 | NO CHANGE | 0 |
| 45 | 28 | COLLAPSED 48" CMP. LAKE ROBERTS OUTLET | 0 | 200 | | REPLACE WITH DBL. 8'x6' RCB ENTRANCE TO ALLOW FOR DESIRED OPERATING ELEV. OF LAKE | 24,300 | SAME AS FUTURE | 24,300 |

FUTURE TOTAL ESTIMATED COST $331,000

PRESENT TOTAL ESTIMATED COST $173,800

NOTES

1. PRIMARY FACILITIES NOT INCLUDED IN THE ABOVE LIST ARE ADEQUATE IN SIZE OR ARE LOCATED ON PRIVATE PROPERTY.

2. ALL PRIMARY FACILITIES, SUCH AS CULVERTS, BRIDGES, PONDING AREAS & CHANNEL IMPROVEMENTS ARE SUBJECT TO MODIFICATION DURING DESIGN.

3. ESTIMATED CONSTRUCTION COSTS ARE AT SPRING OF 1977 LEVELS & EXCLUDE COSTS OF ENGINEERING, ADMINISTRATION, RIGHTS OF WAY & EASEMENTS.

MONTEREY COUNTY SURVEYORS, INC.
KORETSKY KING ASSOCIATES, INC.
*A Joint Venture*
235 SALINAS STREET SALINAS

MONTEREY COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

MONTEREY COUNTY MASTER DRAINAGE PLAN

REVISIONS

TITLE: CANYON DEL REY WATER SHED

DATE: JUNE, 1977

DRAWN: KEM CHECKED: LML

APPROVED

SCALE

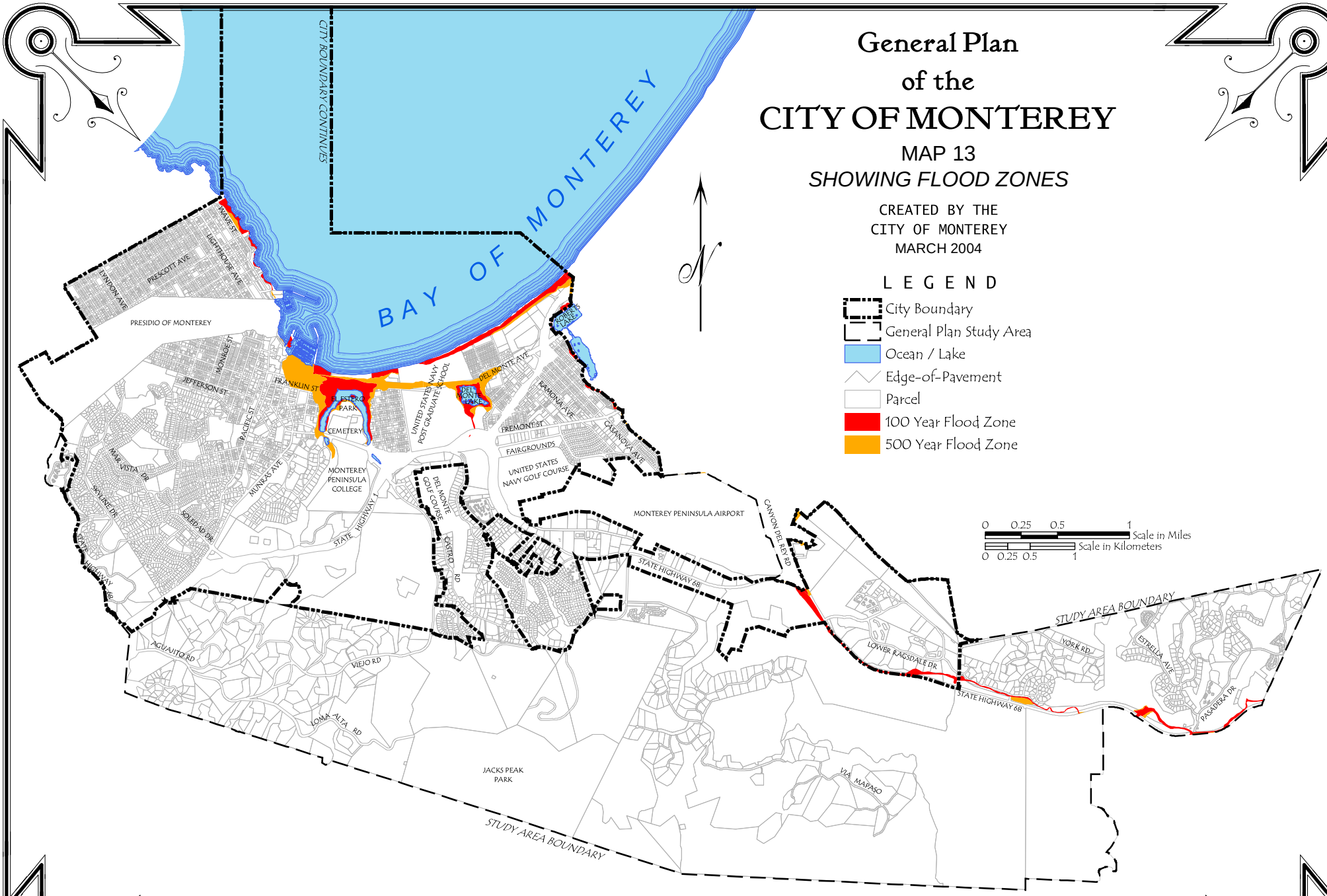
DRAWING NO. 12

# General Plan of the CITY OF MONTEREY

## MAP 13

*SHOWING FLOOD ZONES*

CREATED BY THE
CITY OF MONTEREY
MARCH 2004



# EXHIBIT A-2

# SEASIDE GROUNDWATER BASIN

# SALT AND NUTRIENT MANAGEMENT PLAN

On February 3, 2009, the California State Water Resources Control Board adopted a Recycled Water Policy as part of Resolution No. 2009-0011. The goals of the Recycled Water Policy are to promote and increase the use of recycled water, to streamline water recycling project permitting, and to provide direction to the Regional Boards regarding recycled water project permitting. This resolution included the requirement for all groundwater basins to prepare and adopt a Salt and Nutrient Management Plan (S&NMP). All basins are required to adopt such a plan by May 14, 2014.

Salt and nutrient management plans promote integrated water resource planning by:

- Integrating all stakeholders, including water purveyors and users;
- Analyzing all existing and potential water sources;
- Improving groundwater monitoring; and
- Collaborating with the local Regional Board to assure existing and future water management plans are consistent with the Basin Plan.

The Proposed Solicitation Package (PSP) for IRWMP Planning Grants specifically identified salt and nutrient management planning as an eligible project type for the 2010 grant cycle.

This scope of work for developing a S&NMP is based on guidance received by the Central Coast Regional Water Quality Control Board (Regional Board) at workshops held on March 3, 2010 in Santa Maria; and on March 10, 2010 in Marina. This approach specifically addresses all aspects in the legislation, as well as the general S&NMP outline developed by the Central Coast RWQCB.

## Task 1. Stakeholder Outreach

The recycled water policy adopted by Resolution No. 2009-0011 states in part that the plans should be a, "…locally driven and controlled, collaborative processes open to all stakeholders…" Stakeholder outreach ensures integration between all regional water users and water producers. To ensure broad stakeholder involvement, all agencies and private individuals who use or

influence groundwater, or have the potential to, will be identified. Each of these stakeholders will be contacted and invited to participate in the process of developing the S&NMP. The Seaside Groundwater Basin Watermaster (Watermaster) will be a starting point for this outreach, as all the main stakeholders are already represented on the Watermaster's Board. The Regional Water Quality Control Board (RWQCB) will be an important and necessary stakeholder in this process who will help guide the project's direction. In addition, property owners or agencies that are engaged in using significant quantities of water for irrigation or that produce water for such uses may be contacted to determine salt and nutrients in the water. This outreach could include the Monterey Regional Water Pollution Control Agency (MRWPCA) and the owners of golf courses or other intensely irrigated areas.

Once the stakeholders have been identified and have made a commitment to participating in the process, specific roles and responsibilities will be assigned. These will be based on their salt and nutrient impacts, availability of staff, and monetary resources. All stakeholders will be invited to contribute financially to the development of the S&NMP.

**Task 1: Stakeholder Outreach**

| Task | Description | Deliverables |
|---|---|---|
| 1.1 | Identify stakeholders | • Chapter 1, subsection 1.1 of the S&NMP |
| 1.2 | Identify stakeholder roles and responsibilities | • Chapter 1, subsection 1.2 of the S&NMP |
| 1.3 | Stakeholder meetings | • Website, copies of printed material, meeting notes |

## Task 2. Establish Basin Characteristics

The recycled water policy adopted by SWRCB Resolution No. 2009-0011 states in part that, "The degree of specificity within these plans and the length of these plans will be dependent on a variety of site-specific factors [including] size and complexity of a basin… hydrogeology, and aquifer water quality" This task establishes basin characteristics that will guide the plan's length and specificity. This is consistent with the list of recommended S&NMP elements developed by the Central Coast Regional Board, which includes elements on Groundwater Basin Description.

The basin characteristics will be derived from a number of existing reports, some of which are listed in Appendix A to this scope of work. The basin description will include basin physiography, basin boundaries, watersheds and hydrology (including areas that are tributary to the groundwater basin), climate, beneficial water uses, land uses, and land cover.

When describing beneficial water uses, those uses will be identified that have the potential to be impacted by salts, nutrients, and constituents of emerging concern (CEC) now or in the future. MPWMD or its consultants and basin stakeholders will document how these beneficial uses are currently protected from CECs, where beneficial uses do not currently exist in protected areas, and identify areas which are especially challenged by CECs.

Of particular interest will be any indication of historically increasing salt or nutrient levels. This will be achieved by evaluating the historical and current surface and groundwater water quality over time. The existing MPWMD water quality database will be used to source the data.

A GIS project will be developed that includes watershed and basin boundaries, impervious areas, open space, parks, recreational areas, and other irrigated areas, parcel information, recycled water/stormwater use project locations, and monitoring and production well locations.

**Task 2: Establish Basin Characteristics**

| Task | Description | Deliverables |
|---|---|---|
| 2.1 | Establish basin characteristics, including hydrogeology and water quality. These will help guide the level of detail needed in the S&NMP | • Chapter 2, subsection 2.1 through 2.8 of the S&NMP |
| 2.2 | Develop a GIS to assist with tracking sources and fate of salts and nutrients | • GIS project with layers to be maintained on MWPMD servers |

## Task 3. Identify Existing and Foreseeable Salt and Nutrient Sources

The recycled water policy adopted by SWRCB Resolution No. 2009-0011 states in part that, "…plans shall address and implement provisions, as appropriate, for all sources of salt and/or nutrients to groundwater basins, including recycled

water irrigation projects and groundwater recharge reuse projects." All organizations with property interests in the study area will be contacted to determine salt, nutrient, irrigation practice, and chemical loading characteristics of maintenance or management activities. In particular owners of the four golf courses in the Seaside Basin will be contacted and asked to provide information on fertilizer loading rates and concentrations.

The S&NMP will serve as an important document for guiding integrated water resource management by assessing all existing and potential water sources. Existing and proposed water recycling and stormwater recharge/reuse projects, along with their documented goals and objectives will be described as potential salt and nutrient sources. The projects described for the basin will include, but will not be limited to:

1. MPWMD/CAW Aquifer Storage and Recovery Project;
2. Pasadera Country Club irrigation with recycled water.
3. proposed Regional Desalination Facility;
4. proposed Regional Urban Water Augmentation Project;
5. proposed Groundwater Replenishment Project;
6. proposed CSUMB Stormwater Percolation and Education Project;
7. proposed stormwater capture and recycling by the City of Seaside;
8. proposed recycling of stormwater from the City of Monterey to the Seaside Basin.

**Task 3: Identify Existing and Foreseeable Salt and Nutrient Sources**

| Task | Description | Deliverables |
|---|---|---|
| 3.1 | Identify potential existing sources of salt, nutrients, and other CECs. Estimate loading/concentrations from these sources. | • Chapter 3, subsection 3.1 in the S&NMP. |
| 3.2 | Identify possible future projects that may add salt, nutrients, or CECs to the groundwater basin. Estimate loading/concentrations from these sources. | • Chapter 3, subsection 3.2 in the S&NMP. |

## Task 4. Salt and Nutrient Evaluation

The recycled water policy adopted by SWRCB Resolution No. 2009-0011 states in part that the plan shall include a component that evaluates, "… assimilative capacity and loading estimates, together with fate and transport of salt and

nutrients". This promotes integrated water management by analyzing all existing and future projects to a common water quality and groundwater impact standard. This task establishes the quantity of salt and nutrient loading in the basin, taking into account hydrologic, hydrogeologic, and man-made processes. If salts and nutrients are being introduced into the basin, a determination will be made about how much can be assimilated by the basin without impacting basin objectives and beneficial uses.

The first step in the salt and nutrient evaluation will be to develop a conceptual model of the study area, focusing on interaction between the different aquifers, areas of surface and groundwater recharge and discharge, and groundwater flow directions. In 2009, a conceptual model was developed as part of the process of constructing a groundwater flow model for the Watermaster. The conceptual model was considered representative, as demonstrated by the good calibration of the model to measured groundwater levels. Tools such as the Seaside groundwater flow model and existing reports, such as the Seaside Basin Management Action Plan will be used extensively during this task. The groundwater model can also be used to determine water balance components that will be used together with the sources identified and quantified in Task 3 for estimating the salt and nutrient balances. The salt and nutrient balances will also include estimates due to planned changes in:

- land use, including low impact development proposals in the watershed;
- existing uses of recycled water in the basin;
- irrigation water quality and irrigation patterns, and;
- artificial recharge including rainwater/stormwater recharge.

The Seaside Basin is likely to be considered a low risk basin for salt and nutrients because of limited recycled water use and agricultural irrigation. Because it is low risk, the RWQCB may waive fate and transport, and assimilative capacity analyses until such time as recycled water use is increased. Therefore, the costs for these analyses have not been included in the cost estimate for this study.

If fate and transport analysis and assimilative capacity analysis are required, they can be provided under both existing and planned patterns of land and water use A fate and transport analysis may initially be limited to using existing tools, such as the Seaside groundwater flow model to evaluate potential pathways salts and nutrients could take if introduced into the groundwater. Please note that a fate and transport analysis is not part of this scope of work, but may be recommended as a follow-up task after a S&NMP is completed. If fate and

transport modeling is not found to not be required for existing sources, triggers that would initiate future analyses will be provided.

If there are projects described in Task 3 that have the potential to degrade the water quality of the groundwater basin, an antidegradation analysis will be conducted to satisfy the requirements of Resolution 68-16.

**Task 4: Salt and Nutrient Evaluation**

| Task | Description | Deliverables |
|---|---|---|
| 4.1 | Describe the hydrologic and hydrogeologic conceptual model of the basin | • Chapter 6, subsection 6.1 of the S&NMP |
| 4.2 | The water balance of the basin will be estimated using existing tools | • Chapter 6, subsection 6.2 of the S&NMP<br>• Summary table of water balance components |
| 4.3 | Using sources with loading/ concentrations from Task 3, and the water balance from Task 4.2, salt and nutrient balances will be estimated for existing and planned land and water use | • Chapter 6, subsection 6.3 of the S&NMP<br>• Summary tables of input and output components for salts and nutrients |
| 4.4 | If required, salt and nutrient, and CEC fate and transport, and assimilative capacity analyses may be recommended as a future task | • Chapter 6, subsections 6.4 and 6.5 of the S&NMP. Included will be triggers to initiate future analyses, as new recycled water/ stormwater projects are implemented |
| 4.5 | If required, an antidegradation analysis will be conducted to ensure high quality waters in the basin are maintained | • Chapter 6, subsection 6.6 of the S&NMP |

## Task 5. Monitoring Programs and Database

The recycled water policy adopted by SWRCB Resolution No. 2009-0011 states in part that the plan shall include, "a basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations. The scale of the basin/sub-basin wide monitoring plan is dependent upon the site-specific conditions and shall be adequate to provide cost-effective means of determining whether the concentrations of salt, nutrients, and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water quality objectives". Existing monitoring programs will be evaluated first, before recommending a monitoring program specific to the S&NMP.

Existing surface and groundwater monitoring programs will be described (constituents being monitored, frequency, responsible party, how data is disseminated). The description of existing programs will include whether CECs are being monitored where recycled water is being used. The recommendations provided by the science advisory panel convened by the State Water Resources Control Board pursuant to the State's approved Recycled Water Policy (June 2010) will be used in evaluating CECs related to recycled water.

MPWMD already maintains a groundwater level monitoring program in the Seaside Groundwater Basin. Additionally, MPWMD began a coastal groundwater quality monitoring program in the basin in April 1991 which is focused on monitoring and early detection of potential sea water intrusion. The program includes a network of dedicated monitoring wells, which has been expanded over time. The most recent expansion of the program was after the 2006 adjudication of the basin. The data collected as part of this program are used to support a variety of programs, including groundwater storage monitoring, compilation of annual and long-term well hydrographs, groundwater level contour mapping, Seaside Basin Watermaster's annual Seawater Intrusion Analysis reporting, and other special projects. The groundwater level and water quality data are stored in a database developed by MPWMD to facilitate data entry, access and manipulation of the groundwater level data. In addition, groundwater level measurements are collected on a regular basis by California American Water (CAW) from each of their production wells, and these measurements are also utilized in MPWMD monitoring program.

The salt and nutrient monitoring program will be designed to allow for a reasonable, cost-effective means for regular assessment of the water quality in the basin. The program will be developed to focus on basin water quality near water supply wells, areas proximate to existing salt and nutrient sources, and areas where groundwater has connectivity with adjacent surface waters. The program will be designed to be easily expanded as new sources of salt or nutrients are introduced into the Seaside Basin.

If existing monitoring programs are not adequate for determining whether salts, nutrients, and CEC concentrations are consistent with applicable water quality objectives, additional features, constituents, and frequencies will be identified. The preferred approach for developing the monitoring program will be to use existing wells for data collection, where the existing wells provide the spatial

coverage necessary to determine water quality throughout the most critical areas of the basin. If needed, additional monitoring locations will be recommended. Other than recycled, stormwater, surface and groundwater quality, water balance components such as groundwater levels, production, climate, surface flows will also be included in the monitoring program. It is expected that salts, nutrients, and CECs will be monitored on an annual basis, unless site specific analysis determines that a different frequency results in effective plan implementation.

The monitoring program will identify stakeholders responsible for conducting, compiling and reporting monitoring data under the S&NMP. Those responsible for updating the database and the frequency of the updates will also be specified. The monitoring program will include a requirement that data will be complied and reported to the Regional Water Board every three years.

The existing MPWMD database will be reviewed and its contents summarized. The summary will include which wells and data are contained in the database, and the frequency at which the database is updated. Responsible parties for providing data and updating data will be identified.

It is likely that the existing MPWMD database will be used for storing monitoring data related to the S&NMP. Necessary adjustments and/or additions will be made to the database to ensure it meets the needs of the S&NMP.

**Task 5: Monitoring Programs and Database**

| Task | Description | Deliverables |
|---|---|---|
| 4.1 | Describe existing groundwater and surface water monitoring programs | • Chapter 4 of the S&NMP |
| 4.2 | Recommend a groundwater and surface water monitoring program specific to the S&NMP | • Chapter 8 of the S&NMP |
| 4.3 | Describe existing databases, and recommend a database to be used in the implementation of the S&NMP | • Chapter 5 of the S&NMP |

## Task 6. Prepare Salt and Nutrient Management Plan

An outline of the proposed S&NMP for the Seaside Basin is presented below. This outline is based on both the requirements of the legislation, as well as the general S&NMP outline developed by the Central Coast RWQCB. The outline is expected to change based on direction provided by basin stakeholders.

Chapter1: Stakeholder Involvement

- Subsection 1.1: Stakeholder identification
- Subsection 1.2: Stakeholder roles and responsibilities

Chapter 2: Basin Characteristics

- Subsection 2.1: Basin boundaries
- Subsection 2.2: Basin physiography
- Subsection 2.3: Watersheds and hydrology
- Subsection 2.4: Climate
- Subsection 2.5: Beneficial water uses
- Subsection 2.6: Land uses, and land cover
- Subsection 2.7: Surface water quality
- Subsection 2.8: Groundwater quality

Chapter 3: Salt and Nutrient Sources

- Subsection 3.1: Existing salt and nutrient sources
- Subsection 3.2: Proposed salt and nutrient sources

Chapter 4: Existing Groundwater Monitoring Programs

Chapter 5: Existing Databases

- Subsection 5.1: Existing database identification and description
- Subsection 5.2: Data gaps
- Subsection 5.3: Recommended database

Chapter 6: Salt and Nutrient Evaluation

- Subsection 6.1: Conceptual model
- Subsection 6.2: Water balance
- Subsection 6.3: Salt and nutrient balances
- Subsection 6.4: Fate and transport of salts, nutrients and CECs
- Subsection 6.5: Assimilative capacity (if required)
- Subsection 6.6: Antidegradation analysis (if required)

Chapter 7: Salt and Nutrient Management Strategies

Subsection 7.1: Actions to manage salt and nutrient loading
Subsection 7.2: Management triggers

Chapter 8: Salt and Nutrient Monitoring Program

Subsection 8.1: Goals and objectives
Subsection 8.2: Location of monitoring features
Subsection 8.3: Constituents to be monitored, including CECs
Subsection 8.4: Sampling methodology
Subsection 8.5: Sampling frequency
Subsection 8.6: Stakeholder roles and responsibilities
Subsection 8.7: Reporting (including trend analysis)

Chapter 9: Salt and Nutrient Management Plan Implementation

Subsection 9.1: Performance measures
Subsection 9.2: Implementation schedule
Subsection 9.3: Adaptive management
Subsection 9.4: Public outreach and education
Subsection 9.5: Cost analysis
Subsection 9.6: Funding opportunities
Subsection 9.7: Institutional arrangements
Subsection 9.8: Organizational structure

The S&NMP will be prepared primarily from work completed in Tasks 1 through 5. Additional items that will also be part of the management plan but were not included in previous tasks are:

- Salt and Nutrient Management Strategies
- Salt and Nutrient Management Plan Implementation

Salt and nutrient management strategies will involve developing a list of potential management strategies or actions that are considered cost effective and readily implementable should salt and nutrient concentrations become elevated. Strategies will consider Best Management Practices (BMP). Examples of BMPs include: salt and nutrient source control, improved irrigation practices, irrigation source water changes, and enhanced recharge of rainwater and/or stormwater. Triggers or threshold concentrations of selected salts and nutrients will be proposed that would invoke specific management strategies.

Elements that are required for successful implementation of salt and nutrient management will be outlined in the plan. These will include: performance measures, implementation schedule, adaptive management, public outreach and education, cost analysis, funding opportunities, institutional arrangements, and organizational structure.

**Task 6: Prepare Salt and Nutrient Management Plan**

| Task | Description | Deliverables |
|---|---|---|
| 6.1 | Include deliverables from Tasks 1 through 5 in S&NMP | • Chapters 1 through 6, and 8 of the S&NMP |
| 6.2 | Develop salt and nutrient management strategies | • Chapter 7 of the S&NMP |
| 6.3 | Outline S&NMP implementation | • Chapter 9 of the S&NMP |

## Budget and Schedule

The schedule below shows the actual time to prepare the information described in the tasks. The schedule does not reflect review periods by agencies or stakeholders. It is anticipated that additional periods will be added to the schedule to allow for this after initial stakeholder outreach. The goal will be to complete the SNMP within two years after initiating work on the plan.

| Task and Name | | Schedule |
|---|---|---|
| 1 | Stakeholder Outreach | 4 weeks and throughout project |
| | | |
| 2 | Establish Basin Characteristics | 4 weeks |
| 3 | Identify Existing and Foreseeable Salt and Nutrient Sources | 3 weeks |
| 4 | Salt and Nutrient Evaluation | 6 weeks |
| 5 | Monitoring Programs and Database | 3 weeks |
| 6 | Prepare Salt and Nutrient Management Plan | 4 weeks |

Total 24 weeks

**Preliminary Cost Estimate to Prepare a Salt & Nutrient Management Plan**
**Seaside Groundwater Basin**

| Tasks | HydroMetrics WRI Labor | | | | Labor Total | Other Direct Costs | TOTALS |
|---|---|---|---|---|---|---|---|
| | Derrik Williams | Cameron Tana | Georgina King | Admin | | | |
| | President | Vice-President | Project Manager | Office Support | | | |
| | $180 | $160 | $160 | $55 | $ | $ | $ |
| **Task 1. Stakeholder Outreach** | | | | | | | |
| 1.1 - Identify Stakeholders | 2 | 0 | 8 | 0 | 1,640 | 0 | 1,640 |
| 1.2 - Stakeholder Roles and Responsibilities | 8 | 0 | 16 | 0 | 4,000 | 0 | 4,000 |
| 1.3 - Stakeholder Meetings (Assume 3 meetings) | 24 | | 24 | 0 | 8,160 | 500 | 8,660 |
| *Subtotal Task 1* | *34* | *0* | *56* | *0* | *13,800* | *500* | *14,300* |
| **Task 2. Establish Basin Characteristics** | | | | | | | |
| 2.1 - Basin Characteristics and Water Quality | 4 | 6 | 32 | 0 | 6,800 | 0 | 6,800 |
| 2.2 - Develop GIS | 4 | 0 | 30 | 0 | 5,520 | 0 | 5,520 |
| *Subtotal Task 2* | *8* | *6* | *62* | *0* | *12,320* | *0* | *12,320* |
| **Task 3. Identify Existing and Foreseeable Salt and Nutrient Sources** | | | | | | | |
| 3.1 - Identifiy Existing Sources of Salt and Nutrients | 2 | 0 | 16 | 0 | 2,920 | 0 | 2,920 |
| 3.2 - Identifiy Future Sources of Salt and Nutrients | 6 | 0 | 24 | 0 | 4,920 | 50 | 4,970 |
| *Subtotal Task 3* | *8* | *0* | *40* | *0* | *7,840* | *50* | *7,890* |
| **Task 4. Salt and Nutrient Evaluation** | | | | | | | |
| 4.1 - Develop Conceptual Model | 2 | 0 | 8 | 0 | 1,640 | 0 | 1,640 |
| 4.2 - Develop Water Balance (Current and Future) | 8 | 16 | 16 | 0 | 6,560 | 50 | 6,610 |
| 4.3 - Develop Salt and Nutrient Balance (Current and Future) | 8 | 8 | 24 | 0 | 6,560 | 0 | 6,560 |
| 4.4 - Fate and Transport, and Assimilative Capacity Analysis | | | | | 0 | 0 | 0 |
| 4.5 - Anitdegradation Analysis | | | | | 0 | 0 | 0 |
| *Subtotal Task 4* | *18* | *24* | *48* | *0* | *14,760* | *50* | *14,810* |
| **Task 5. Monitoring Programs and Database** | | | | | | | |
| 5.1 - Evaluate Existing Monitoring Programs | 4 | 0 | 16 | 0 | 3,280 | 0 | 3,280 |
| 5.2 - Recommended Monitoring Plan | 8 | 0 | 32 | 0 | 6,560 | 50 | 6,610 |
| 5.3 - Recommended Database | 2 | 0 | 8 | 0 | 1,640 | 0 | 1,640 |
| *Subtotal Task 5* | *14* | *0* | *56* | *0* | *11,480* | *50* | *11,530* |
| **Task 6. Prepare Salt and Nutrient Management Plan** | | | | | | | |
| 6.1 - Report (Tasks 1 - 5) | 8 | 8 | 16 | 10 | 5,830 | 600 | 6,430 |
| 6.2 - Salt and Nutrient Management Strategies | 4 | 8 | 10 | 0 | 3,600 | 50 | 3,650 |
| 6.3 - Plan Implementation | 8 | 0 | 20 | 0 | 4,640 | 50 | 4,690 |
| *Subtotal Task 6* | *20* | *16* | *46* | *10* | *14,070* | *700* | *14,770* |
| *Total* | *102* | *46* | *308* | *10* | *74,270* | *1,350* | *75,620* |

Note: Fate and transport, assimaltive capacity and antidegradation analyses are not included in the cost estimate

# Appendix A

## Existing Reports for Seaside Basin Salt and Nutrient Management Plan


Feeney, M.B., 2007. *Seaside Groundwater Basin Watermaster seawater sentinel wells project - summary of operations*, prepared for Seaside Groundwater Basin Watermaster.

HydroMetrics LLC, 2008. *Seawater intrusion analysis report*, prepared for the Seaside Groundwater Basin Watermaster, October 2008.

———, 2009a. *Water year 2009 seawater intrusion analysis report*, prepared for the Seaside Groundwater Basin Watermaster, October 2009.

———, 2009b. *Seaside groundwater basin modeling and protective groundwater elevations*, prepared for the Seaside Groundwater Basin Watermaster, October 2009.

Koretsky King Associates, Inc. 1977. *Monterey County master drainage plan, Canyon Del Rey watershed drainage and erosion*, June.

Mills, W.R. 2004. *Feasibility of using recycled water to recharge the seaside groundwater basin in Monterey county*, September.

Schaaf & Wheeler. 2006. *California State University Monterey Bay stormwater master plan*, February.

Watershed Institute, Earth Systems Science and Policy California State University Monterey Bay. 2002. W*atershed and riparian assessment report (wrar): bureau of land management lands former Fort Ord, Monterey County*, Report No. WI-2002-01, central coast watershed studies, February 20th.

Yates, E.B., M.B. Feeney, and L.I. Rosenberg. 2005. *Seaside groundwater basin: update on water resource conditions*; prepared for: Monterey Peninsula Water Management District, April 14.

**Exhibit A-3** - Assessment of steelhead passage barriers in portions of four tributaries to the Carmel River main stem

## SUMMARY

The decline of steelhead in the Carmel River Basin between the 1960s and 1990s prompted its listing as a threatened species under the protection of the federal Endangered Species Act (ESA). Despite significant habitat improvements in the Carmel River main stem and some improved practices concerning diversions in the basin over the past several decades, the run count at San Clemente Dam (18.6 miles upstream of the ocean), has continued to exhibit a downward trend.

In normal and above water years, adult steelhead can spawn in a total of 60.5 miles of stream, including 24.5 miles of the Carmel River main stem, 30 miles of primary tributaries, and 6 miles of secondary tributaries. Considering that winter and spring surface flows in the lower river have not been fully mitigated or restored, it is important to ensure that steelhead adults and juveniles have unimpeded access, in a timely manner without delays, to spawning and rearing habitats in tributary streams and the main stem below tributaries. A thorough, detailed survey needs to be completed of all potential barriers to steelhead migration.

This scope of work includes an analysis of barriers in tributary streams that are judged to be the most important in terms of potential steelhead habitat. The priorities for this assessment will be to document and confirm the amount of stream channel accessible to steelhead in selected tributaries under natural conditions, provide a description of existing passage barriers and develop a prioritized list of actions/modifications at each barrier that will ultimately maximize production of juvenile steelhead from each tributary.

A detailed **budget** and **schedule** are shown on page 22.

## BACKGROUND INFORMATION ON BARRIER ASSESSMENTS

Steelhead trout (*Oncorhynchus mykiss*) are distributed in their native range along the west coast of North America from the Kuskokwim River (just south of the Bering Straits) south to northwest Mexico and west to the Rocky Mountains. (Scott and Crossman 1973) Though populations of steelhead are robust throughout most of Alaska, Canada and some near coastal portions of Washington and Oregon, the population segments throughout much of California and in interior Oregon and Washington are now listed as either endangered or threatened in their native range. Exceptions to this trend occur in far northwest California, where the populations in streams draining the Klamath River Province are not listed.[1]

The Carmel River steelhead population is included within the South-Central California Coast distinct population segment (DPS), which is listed as "threatened" under the federal ESA, meaning that if no actions are taken to restore populations, fish in this DPS

[1] A description of the listing status for steelhead under the federal Endangered Species Act is provided at: http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Steelhead/Index.cfm

will likely become "endangered" with a high risk of extinction.[2] The counts of steelhead in the Carmel River document their status as threatened with numbers declining from highs of 1,000–1,400 fish in the 1960's and early 1970's period to a range of 100–500 fish during the last decade. Of most concern is the most recent trend during the last eight years, as the run has declined from 483 to less than 200 fish. (Figure 1)

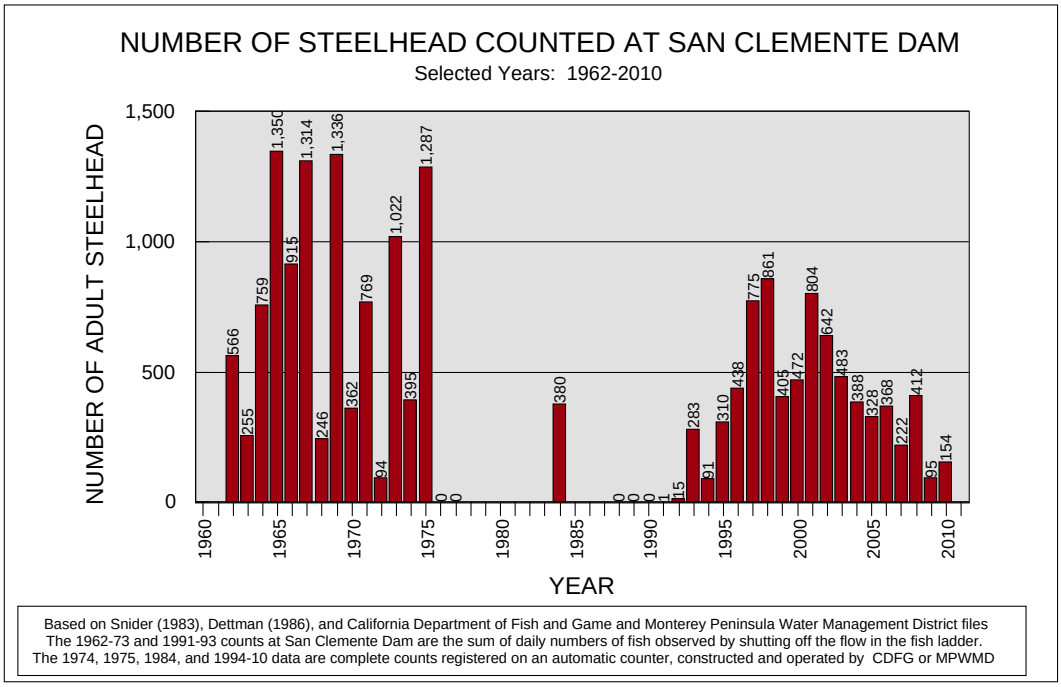



**Figure 1: The number of steelhead returning to San Clemente Dam, selected years 1962 to 2010**

The Carmel River Watershed Assessment (CRWA) (MPWMD 2004)[3] listed several factors responsible for the general decline of steelhead in the Carmel including:

- Inadequate passage facilities for adults and juveniles at Los Padres Dam.
- Dry season surface diversions at San Clemente Dam.
- Subsurface diversion of percolating streamflow and groundwater.
- Reductions in the extent and diversity of streamside vegetation, number of trees and canopy of the riparian forest, and occurrence of large wood in the active channel downstream of Robles del Rio.
- Retention in main stem reservoirs of sediment beneficial to steelhead and benthic macroinvertebrates (insects in the river bottom).

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[2] From NOAA Fisheries Service website: *"The ESA defines a "species" to include any distinct population segment of any species of vertebrate fish or wildlife. For Pacific salmon, NOAA Fisheries Service considers an evolutionarily significant unit, or "ESU," a "species" under the ESA. For Pacific steelhead, NOAA has delineated distinct population segments (DPSs) for consideration as "species" under the ESA."*

[3] An Executive Summary of Environmental and Biological Assessment of Portions of the Carmel River Watershed, Monterey County, California is available at the CDFG document website: http://nrm.dfg.ca.gov/documents/docviewer.aspx
A complete version of the Assessment is available at the MPWMD website: http://www.mpwmd.dst.ca.us/programs/river/watershed_assessment/watershed_assessment.htm

- Chronic and episodic tributary and main stem bank erosion that introduces fine sediments into spawning and rearing habitats.
- Prior to 1997, the temporary or seasonal blockage of smolt emigration at San Clemente Dam in some years when flashboards were raised in the spring.
- Sand deposition in the Lagoon that reduces habitats for adults during the winter, for smolts during the spring, and for juveniles during the summer and fall months.
- Changes in dry season water quality (water temperature).
- Loss of surface storage in Los Padres Reservoir due to sedimentation.

Barriers sometimes keep adult steelhead from migrating upstream and ultimately limit the amount of spawning habitat utilized annually in the Carmel River Basin. The CRWA listed the known upper barriers to adult steelhead migration and the location and the extent of spawning habitat. (Table 1) In normal and above water years, when no temporary barriers limit upstream migration, adult steelhead spawn in a total of 60.5 miles of stream, including 24.5 miles of the Carmel River main stem, 30 miles of primary tributaries, and 6 miles of secondary tributaries. In dry and some below normal water years, adults probably do not ascend to the uppermost permanent barriers on the primary and secondary tributaries, but utilize the entire 24.5 of the main stem. Those unable to migrate past barriers are forced to spawn below smaller falls and chutes or in the main stem.

Though specific migration barriers in tributaries have not been called out as primary constraints, in some years the first three primary factors can interact with temporal and partial barriers in tributaries to delay spawning, temporally block access to tributary streams, or partially block access. In extreme cases, as occurred during the 1987-1991 drought, subsurface and surface diversions in the lower Carmel River can totally block access to upstream tributaries, even though adequate flows occurred in the tributaries for adult migration, spawning, juvenile rearing and emigration (MPWMD 2004).[4] Considering that winter and spring surface flows in the lower river have not been fully mitigated or restored, it is important to ensure that steelhead adults and juveniles have unimpeded access, in a timely manner without delays, to spawning and rearing habitats in tributary streams and the main stem below tributaries. With this objective in mind, the CRWA (MPWMD 2004) recommended a list of projects and modifications including the following:

> "*Barrier Modification and Habitat Expansion* – ***A thorough, detailed survey needs to be completed of all potential barriers to steelhead migration.*** *Nonetheless, there are several known locations were modification of barriers would result in expansion of spawning and rearing habitats for steelhead, including Danish and Black Rock Creeks, where natural barriers limit the passage of adult steelhead.* ***In addition, man-made partial barriers, many road***

[4] The impacts of historical water withdrawals are documented in the Carmel River Watershed Assessment MPWMD 2004, in Section 5.5.1.6 on Pages 4-7 and in Figures 5.5.1.6C to 5.5.1.6I on pages 19-24.

> ***culverts, and some stream crossings in many tributaries could be modified to improve passage and expand spawning habitats. Specific locations are known on Tularcitos, Potrero, Garzas, San Clemente, and Cachagua Creeks, and Hitchcock Canyon."****[emphasis added]*

Following this recommendation, the purpose of this barrier assessment is to locate, delineate, survey and rank manmade barriers and recommend modifications to eliminate temporal migration delays and any partial blockages in selected tributaries.

Local, Regional and State Assessments – A process of conducting barrier assessments, ranking the barriers based on priority for removal, and making recommendations concerning the type of modifications has been used in other local, regional and state watersheds to guide important management decisions. For example, the California Coastal Conservancy (2004) conducted an inventory of fish passage barrier assessments in coastal California and identified:

> *"… a total of 13,016 coastal fish passage assessment sites, a term used for the purposes of this report to define any location researched in the course of conducting this assessment. Of these sites, 3,323 are known to be passage barriers, 636 are known not to be barriers, and 9,057 require further examination or analysis to determine their passage status.* ***Of all known barriers, 175 are high-priority and 120 are moderate-priority for modification or removal."*** *[emphasis added]*

Locally, barrier assessments have been completed in Garrapata Creek in Monterey County and in Soquel Creek, Aptos Creek, Arana Gulch, the San Lorenzo River and tributaries and other selected stream sites in Santa Cruz County. In Garrapata Creek, assessments led to recommended modifications to improve passage conditions at structures in Wildcat Canyon and in the main stem Garrapata Creek, below large permanent debris structures. (Casagrande and Smith 2005). In Soquel Creek, 56 potential barriers were documented including several seasonal dams, culverts and concrete aprons that temporally, partially or totally blocked spawning and rearing habitats. (D.W. Alley and Associates 2003) In Aptos Creek, five key barriers or road crossings were identified and ranked in priority for modification. (Conrad and Dvorsky 2003) In Arana Gulch, 12 potential migration barrier sites were identified and recommended eight of them for remediation and treatment (In the San Lorenzo River, 24 manmade barriers were identified in the main stem, including 21 seasonal summer dams. (Alley, et. al. 2004) In Zayante Creek, Dettman (1981) delineated seven natural or manmade barriers and recommended modifications to ease passage of adult silver salmon and steelhead. In the ensuing years, two of the natural/manmade barriers (Quail Hollow Road Falls and Mount Hermon Summer Dam) were modified with installation of fish ladders. Ross Taylor and Associates (2004) completed a culvert/barrier assessment at 80 road crossings for Santa Cruz County Department of Public Works and ranked 13 as high priority, 13 as medium priority, and 27 as low priority for remediation.

**Table 1: Estimates of the length of stream habitats accessible to adult steelhead, permanent barriers and types of temporal and partial barriers to adult migration in the Carmel River Basin. Source: MPWMD 2004.**

Table 5.5.1.1-A

Estimates of the linear extent of stream accessible to adult steelhead in the Carmel River Basin[2]

| PORTION OF BASIN, Stream | Length Accessible (ft) | (miles) | Type of Permanent Barrier | Permanent Barrier Field Checked | Type of Temporary Barriers |
|---|---|---|---|---|---|
| DOWNSTREAM OF SAN CLEMENTE DAM | | | | | |
| - Carmel River mainstem | 64,750 | 12.26 | none | yes | shallow riffles, flow barrier at Old Carmel Dam, reservoir drawdown at San Clemente Dam |
| -- Robinson Canyon Cr. [1] | 5,850 | 1.11 | unknown | no | boulder piles |
| -- Las Gazas Creek [1] | 13,150 | 2.49 | unknown | no | unknown |
| -- Tularcitos Cr. [2] | 22,750 | 4.31 | concrete ford | yes | Bedrock chutes, culverts |
| FROM SAN CLEMENTE RESERVOIR TO LOSPADRES DAM | | | | | |
| - Carmel River mainstem | 28,550 | 5.41 | none | yes | Shallow riffles,bedrock chutes, concrete fords, & summer dams |
| -- San Clemente Creek | 22,200 | 4.20 | unknown | no | boulder piles, recreation dams |
| --- Black Rock Cr. | 15,800 | 2.99 | recreation dam & waterfall | no | recreation dams, boulder piles, & bedrock chutes |
| -- Pine Creek [1] | 29,050<br>7,750 | 5.50<br>1.47 | unknown | no | boulder piles, bedrock chutes |
| -- Cachagua Creek | 25,250 | 4.78 | none | yes | shallow riffles |
| --- Finch Cr. [2] | 10,900 | 2.06 | unknown | no | shallow riffles, bedrock chutes, boulder piles |
| --- James Cr. [2] | 5,600 | 1.06 | unknown | no | boulder piles |
| UPSTREAM OF LOS PADRES RESERVOIR | | | | | |
| - Carmel River mainstem | 35,800 | 6.78 | waterfall | yes | shallow riffles, boulder piles |
| -- Miller Fork [1] | 31,000 | 5.87 | unknown | no | shallow riffles, bedrock chutes |
| -- Danish Creek | 9,000 | 1.70 | bedrock chute & waterfall | yes | bedrock chute |
| Subtotals: | | | | | |
| - Carmel River mainstem | 129,100 | 24.45 | | | |
| -- Primary Tributaries | 158,250 | 29.97 | | | |
| --- Secondary Tribs. | 32,300 | 6.12 | | | |
| TOTAL IN CARMEL RIVER BASIN: | 319,650 | 60.54 | | | |

[1] Limit of spawning habitat assumed at elevation where average slope of stream exceeds 13 percent

[2] Limit of spawning habitat assumed at elevation where streamflows were judged inadequate for successful spawning.

## DESCRIPTION OF THE PROPOSED GEOGRAPHIC LIMITS, INFORMATION ON KNOWN BARRIER LOCATIONS, AND PRIORITIES FOR AN ASSESSMENT

Eleven principle tributaries drain into the Carmel River including Potrero Canyon, Robinson Canyon, Garzas Creek, San Clemente Creek Pine Creek, Danish Creek, Ventana Mesa Creek, Blue Canyon, Bear Trap Canyon, Bruce Creek, Cachagua Creek, Tularcitos Creek (Figure 2) For a variety of reasons, including costs, probable access to private property, and public policy it is unlikely or unnecessary to carry out barrier assessment on all major tributaries within the watershed. For example, natural barriers currently block or impede access to under utilized habitats in the watershed, including the uppermost main stem of the Carmel River, the South Fork of Black Rock Creek, Pine Creek, Danish Creek and Ventana Mesa Creek. Current policies, guidelines and administrative rules for CDFG and NOAA – Fisheries limit modifications of natural barriers to improve fish passage, so there is little reason or impetus to conduct detailed assessments at these locations, other than to determine the natural extent of accessible habitats.[5]

The District selected four major tributaries for this assessment including Potrero Creek, Cachagua Creek, Pine Creek and San Clemente Creek, and added one potential barrier known as Flavin's Ford, due to its importance in potentially delaying or blocking access to streams above Los Padre Dam and Cachagua Creek. The following sections summarize information on passage issues and known potential barriers in each tributary and at Flavin's Ford.[6]

Potrero Creek – This tributary enters the main stem at River Mile 3.88 (RM 3.88). (Figure 2) It is the first tributary above the lagoon that supports steelhead habitats, but most of the stream is constrained by lack of perennial flows, especially in its lower reaches.[7] Due to the seasonal nature of flows in this creek, it is important to provide unimpeded access for spawning adults, young fry, and other juveniles. Currently, there are at least seven road crossings or culverts and an artificially steep riffle that could potential impair upstream and downstream migration of steelhead. (Figure 3) Importantly, two structures are located within a quarter mile of the confluence and could temporally block access to the entire basin.

San Clemente Creek – Prior to 1921, this tributary entered the main stem at RM 18.7, but now drains directly into the western arm of San Clemente Reservoir ~ 700 feet upstream of San Clemente Dam. (Figure 2) It flows through a steep, narrow, well-shaded canyon.

[5] Exceptions to these guidelines are made in cases where human modifications to partial or temporal natural barriers reduce the ability of fish to migrate upstream. This situation occurs in the Carmel River below San Clemente and Los Padres Dams, where the impacts from historical scour of bedload and down-cutting in the main channel have dropped the elevation of riverbed more rapidly compared to the tributary and resulted in partial or temporal barriers.

[6] Known barriers were determined by examining and reviewing Google imagery, USGS 7.5-min topographic maps, field notes from MPWMD sponsored surveys and conducting a search of the Passage Assessment Database, maintained by the State Coastal Conservancy and the California Department of Fish and Game (Search dated September 20, 2010).

[7] MPWMD maintains a network of stream thirteen gaging stations in the Carmel River Basin, including a station on Potrero Creek at Valley Greens Road. The continuous 18-year record began on November 30, 1993.

Its relatively small watershed of 15.6 sq. mi. contributes 13% of the average annual runoff in the Carmel River at Robles del Rio (James 2010) – making it a major water bearing tributary in the watershed. Previous estimates of spawning habitat in the basin by Snider (1983) and MPWMD (2004) indicate that the 6.8 miles of available spawning habitat can support about 200 nests, while measurements of rearing habitat and juvenile steelhead populations indicate the rearing habitat can support a returning run of 200 to 350 adults. Considering the current steelhead run at San Clemente Dam averages 307 fish, it is reasonable to conclude that the current returning population to San Clemente Creek is well under its potential. Possible causes for a reduced population in San Clemente Creek are total blockage of a portion of the watershed to spawning adults, or a temporal blockage of upstream and downstream migration. Currently, there are at least four road crossings, one small summer dam, two larger dams and reservoirs (one laddered and one not), and an alluvial delta that could potential impair upstream and downstream migration of steelhead. (Figure 4) Importantly, the creek outlet and delta at San Clemente Reservoir could temporally block access to the entire basin and passage problems at San Clemente Trout Pond Dam could impair access to about three-quarters of the habitat in the basin.

Pine Creek – This tributary enters the main stem at ˜RM 22.2. It drains 7.8 square miles and accounts for 7.5% of the mean annual runoff at the USGS gage at Robles del Rio. (James 2010) Snider (1983) estimated the potential production in 5.5 miles of Pine Creek equaled 28,000 juvenile fish, exceeding the total potential in the entire main stem between San Clemente Reservoir and Los Padres Dam. Importantly, the population included relatively large numbers of yearling fish, which as a group yield more returning adults because of their size. The upstream limit of spawning and rearing habitat has not been surveyed since 1974 and since that time a bedrock/boulder chute developed at the confluence. (Figure 5) A thorough survey of potential natural barriers and the bedrock chute is warranted because of the stream's historical importance in contributing to runs upstream of San Clemente Dam and the possibility that the current configuration of the bedrock chute temporally blocks upstream migration.

Flavin's Ford – This ford crosses the main stem approximately 2,200 feet downstream of the confluence with Cachagua Creek. (Figure 6) The property owner built the structure in the mid 1900's to reach property on the southwest side of the stream. The structure was built from reinforced, free-form concrete laid in the channel. With construction of Los Padres Dam in 1948 the river cut and scoured material from below the structure, which continues to function as a grade control at the upstream edge, forming a 300-foot long quiescent pool/glide upstream of the ford. The apron below the control slopes downward, sheeting flow across the entire channel width and drops approximately two feet into a steep riffle. (Figure 7) Although no detailed measurements have been taken at this location, the configuration of the ford indicates that adults can pass it at an unknown high flow threshold, but it may be a temporal barrier at lower flows.

Cachagua Creek – This tributary enters the main stem at ˜RM 24.5. (Figure 2) Cachagua Creek drains a relatively large portion of the Carmel River Basin at 46 square miles, but rainfall is lower because the basin is in the rain shadow of higher ridges and mountains to the west. Consequently, total annual runoff from the stream accounts for only 5.9% of the Carmel River Basin at Robles del Rio. (James 2010) Nonetheless, the Cachagua

Creek supports a small persistent run of adult steelhead, which must migrate quickly upstream due to the lack of high flows throughout the normal migration season. Summer flows are correspondingly low, with annual minimums frequently declining to zero by early summer in the lowermost reach of the creek. Along the lower portions of the creek, the canyon and riparian corridor are relatively open; but there are patches of alder, live oak, and sycamore that shade the habitat especially below and above Tassajara Road where the canyon is narrow. Streamflow in these reaches can persist in some years, providing limited amounts of rearing habitat, especially where the stream flows through steep bedrock canyons in portions of the tributaries including Finch, James and Martin Creeks. While this restricts perennial rearing habitats to approximately four stream miles, steelhead fry from Cachagua Creek disperse downstream each spring and this production seeds habitat in the main stem. In addition, the stream performs the important function of replenishing spawning sized gravels to the main stem between the confluence and San Clemente Reservoir.

Historically, settlers in this area constructed trails and roads immediately adjacent to the creek, eventually resulting in many crossings, some of which were converted to bridges, some to culverts and some left as rough low-water crossings. A review of imagery, topography and historical observations shows a total of 23 crossings, including 12 crossings maintained by Monterey County Department of Public Works and 11 private road crossings. (Figure 8 and Figure) The crossings are distributed evenly along the stream length; bridge structures predominate in the lower reaches, where historical flood flows washed away previous crossing structures. Due to the preponderance of crossings and the lack of sustained high flows during the winter migration season, it is important to ensure that all crossings in Cachagua Creek and its tributaries are passable, even at low flows.

Overall Priorities for Barrier Assessment – The priorities for this assessment will be to document and confirm the amount of stream channel accessible to steelhead in selected tributaries under natural conditions, provide a description of existing passage barriers and develop a prioritized list of actions/modifications at each barrier that will ultimately maximize production of juvenile steelhead from each tributary.

Figure 1

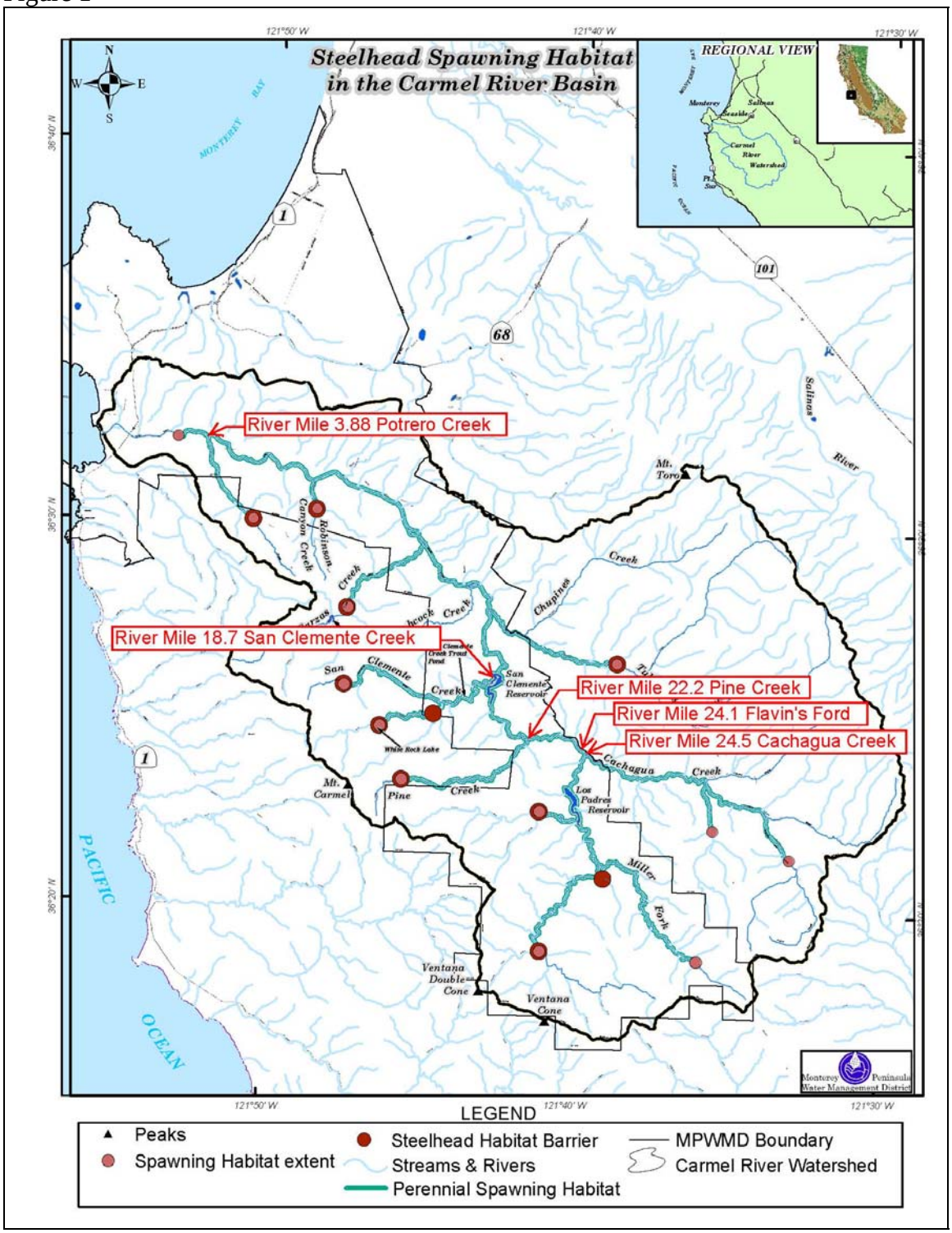


**Figure 2 Carmel River Basin showing principle tributaries and extent of stream habitat accessible to adult steelhead. Location of uppermost barriers in tributaries based on historical surveys by CDFG (Snider 1983) and MPWMD (Dettman and Kelley 1986; MPWMD files) or on examination of topographic features on 7.5-minute USGS maps. Source of Map (MPWMD 2005)**

**Figure 3: Potrero Canyon Basin showing extent of stream habitat, potential barriers and road crossings. Locations of crossings and potential barriers are based on an examination of Google imagery, a review of 7.5-minute USGS topographic maps, historical observations by CDFG and MPWMD biologists and database maintained by State Coastal Conservancy and the California Department of Fish and Game.**

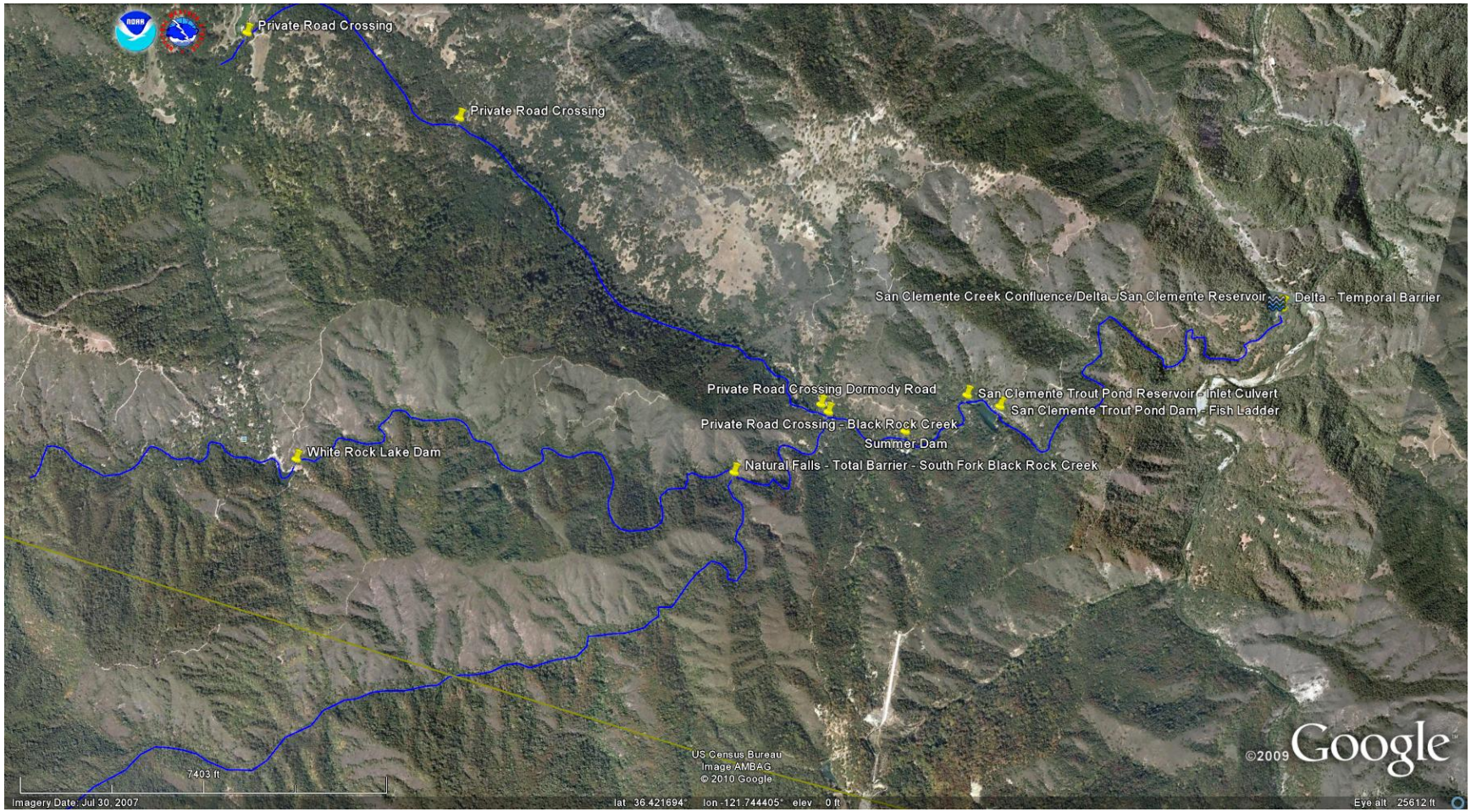


**Figure 4: San Clemente Creek Basin showing extent of stream habitat, potential barriers and road crossings. Locations of crossings and potential barriers are based on an examination of Google imagery, a review of 7.5-minute USGS topographic maps, historical observations by CDFG and MPWMD biologists and database maintained by State Coastal Conservancy and the California Department of Fish and Game.**

Figure 4

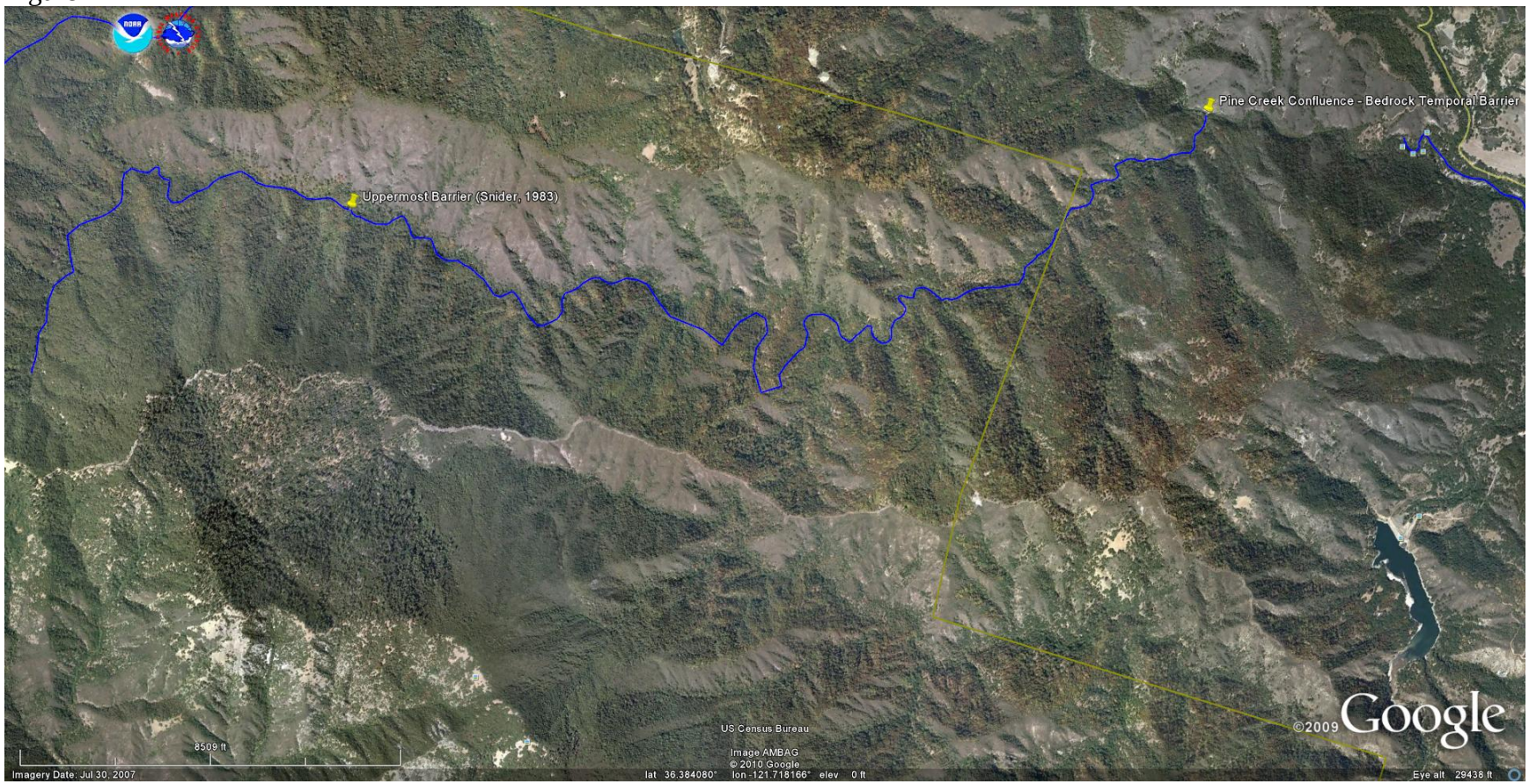


**Figure 5: Pine Creek Basin showing extent of stream habitat, potential barriers and road crossings. Locations of crossings and potential barriers are based on an examination of Google imagery, a review of 7.5-minute USGS topographic maps, historical observations by CDFG and MPWMD biologists and database maintained by State Coastal Conservancy and the California Department of Fish and Game.**

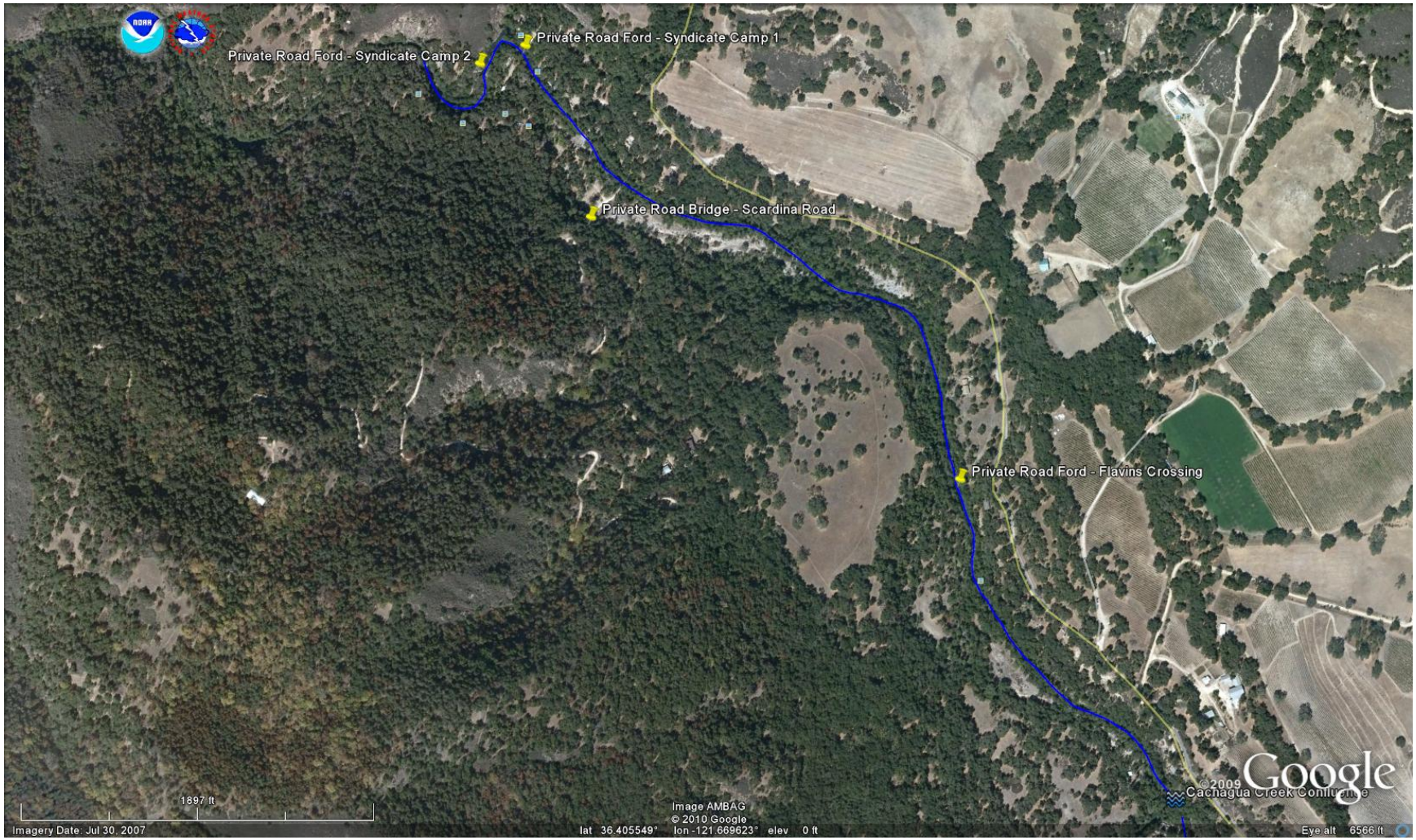


**Figure 6: Reach of the Carmel River between Syndicate Camp and Cachagua Creek showing location of Private Road Crossing at Flavin's Ford, located at River Mile 24.1 Location of crossings and potential barriers in this reach are based on an examination of Google imagery, historical observations by CDFG and MPWMD biologists and database maintained by State Coastal Conservancy and the California Department of Fish and Game.**

**Figure 7: Private road crossing at Flavin's Ford, photograph taken April 17, 1989.**

**Figure 7**

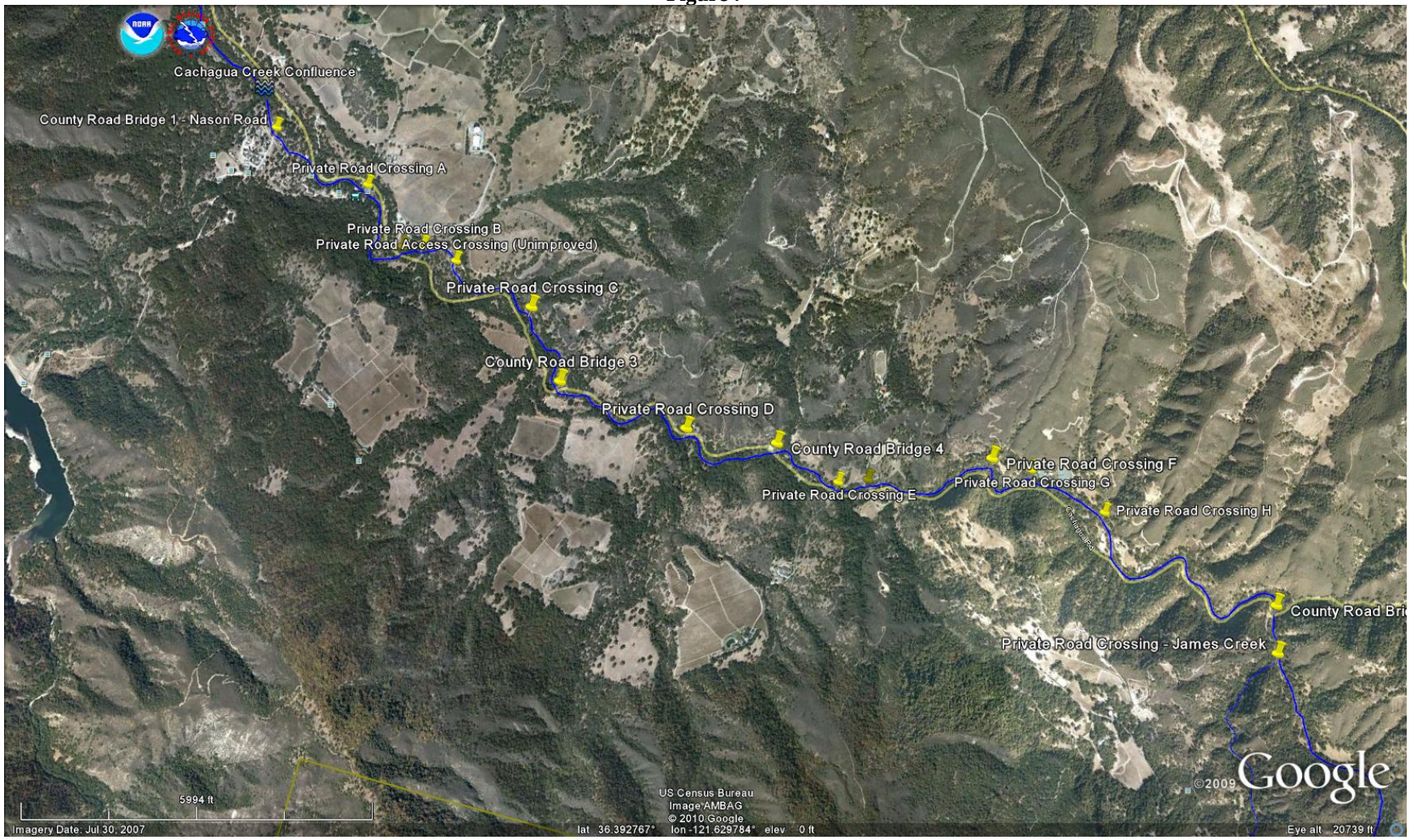


**Figure 8: Lower reach of the Cachagua Creek Basin between the Carmel River and Finch x James Creek confluence. Location of crossings and potential barriers in this reach are based on an examination of Google imagery, a review of 7.5-minute USGS topographic maps, historical observations by CDFG and MPWMD biologists and database maintained by State Coastal Conservancy and the California Department of Fish and Game.**

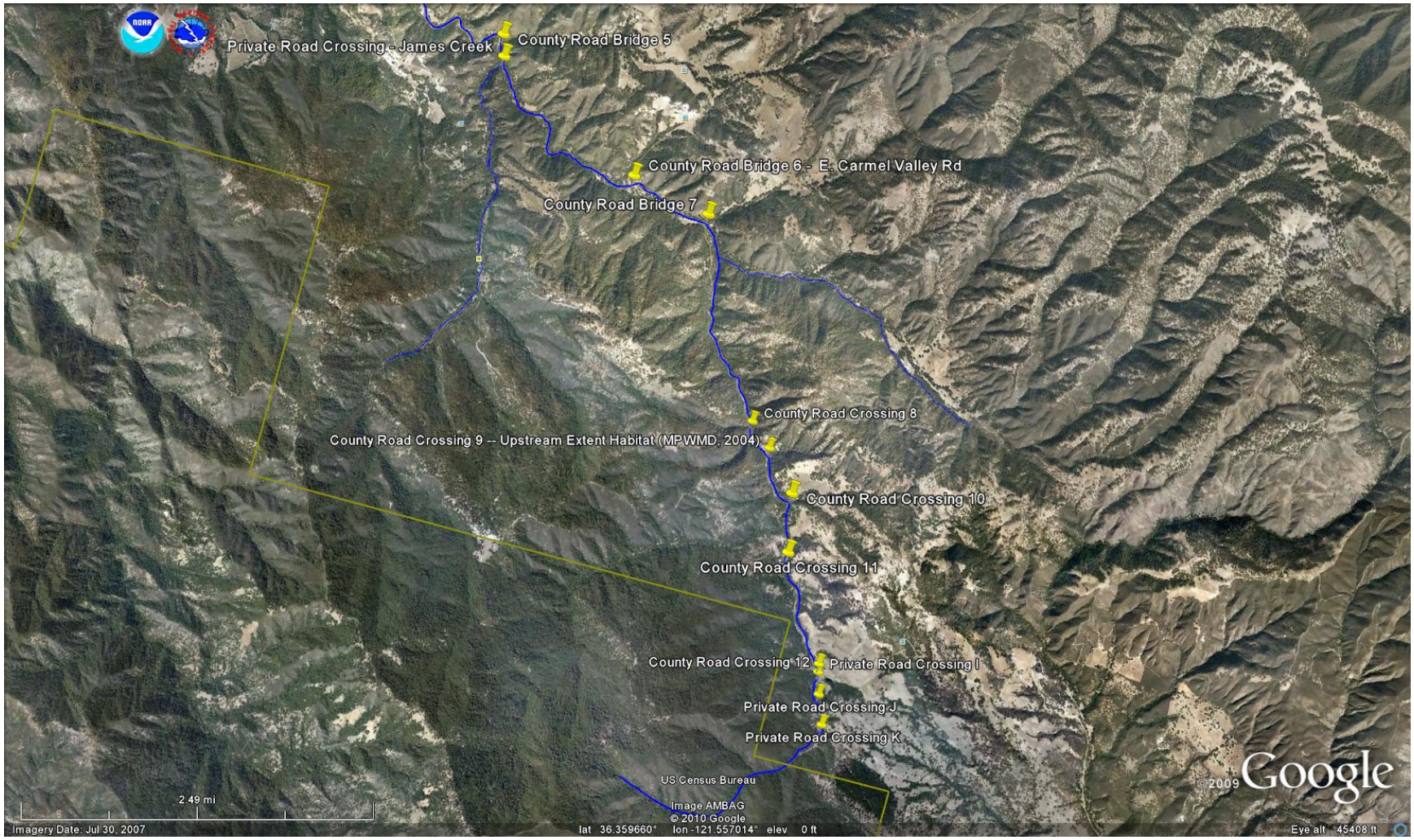


**Figure 9: Upper reach of the Cachagua Creek Basin between the Finch x James Creek confluence and upper end of Finch Creek. Location of crossings and potential barriers in this reach are based on an examination of Google imagery, a review of 7.5-minute USGS topographic maps, historical observations by CDFG and MPWMD biologists and database maintained by State Coastal Conservancy and the California Department of Fish and Game.**

## OUTREACH PROGRAM FOR OBTAINING ACCESS AGREEMENTS ON PRIVATE PROPERTY

Many of the areas to be assessed are on private property and require the permission of the owner to enter. The District plans on obtaining access permission by first assembling a complete list of property owners along each tributary and the main stem between San Clemente Reservoir and Los Padres Dam, contacting each landowner for permission to conduct the assessments, holding a workshop/meeting with prospective grantors, and if necessary, negotiating terms of an agreement that would cover the study period from April 2011 to May 2012.

In 1993 and 1996, the District obtained permission from most of the landowners in the reach between Tularcitos Creek and Los Padres Dam to conduct spawning habitat surveys and implement a 10-year Spawning Habitat Restoration Project in this reach. Given the cooperative experience with implementing restoration projects on private property over the past 32 years, the District anticipates a similar level of cooperation on the proposed barrier assessments.

## DESCRIPTION OF METHODS FOR BARRIER ASSESSMENT

Reconnaissance Surveys – Barrier assessment will be initiated by conducting a reconnaissance survey of each study stream to verify previously described barriers and identify new potential barriers. During the reconnaissance survey, basic information will be collected to characterize each site including: barrier type (road crossing, steep riffle, seasonal dam, bedrock chute, waterfall, log jam, etc.), location by Latitude/Longitude coordinates, overall gradient upstream and downstream of barrier, initial determination as to migration is constrained by water velocity, jump height or both, and representative photos above and below the potential barrier. To supplement previous work on the selected tributaries, the uppermost natural barrier to fish migration will be located and described.

Detailed Barrier Surveys and Screening Analysis – Following completion of reconnaissance surveys, potential migration barriers in the selected tributaries of the Carmel River and at one location in the main stem Carmel River will be assessed using a two-staged approach based on techniques developed by the United States Forest Service (2005 and 2008) and the California Department of Fish and Game (2010). This approach will incorporate a screening process, whereby site specific geomorphic and hydrologic data are first collected at all of the potential barriers in each stream. (**Figure 10**) These data are compared to a set of criteria to filter the barriers into green, grey and red rankings.[8] For the grey and red ranked sites additional analysis will be performed using the software known as FishXing, which was developed as a tool for evaluating and designing road/culvert crossings for fish passage under a range of streamflow and specific fish species x life history stages.[9]

The site specific geomorphic and hydrologic data collected at each site will follow recommendations by the USFS and CDFG; a form for recording these data is provided in Attachment 1. The protocol includes measurements of channel profile, x-sections, substrate composition, the size and shape of culverts or channel obstructions, flow characteristics, sketches, and photo documentation of potential barriers. Detailed protocols for collecting data and procedures for recording data are available at: http://www.fsl.orst.edu/geowater/PEP/inventory/prevs/flash/NIAP.pdf

The overall goal of this two-staged approach is to inventory, evaluate and rank the sites according to the general framework recommended by the CDFG, as shown in from CDFG's California Salmonid Stream Habitat Restoration Manual (page IX-6, CDFG, 2010). The results of the evaluation help to provide guidance on the priority for treating sites with the goal of eventually providing unimpeded fish access to the uppermost natural total barrier in each tributary.

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[8] As documented in CDFG (2010): Green ranking corresponds to conditions likely to provide passage for all aquatic species x life history stages; Gray ranking corresponds to physical conditions that may temporally delay passage for all species depending on streamflow or partially exclude passage for some aquatic species x life stages; and Red ranking corresponds to physical conditions likely to block passage for all aquatic species x life history stages.

[9] Detailed information on the software, FishXing, is available at: http://stream.fs.fed.us/fishxing/beta.html

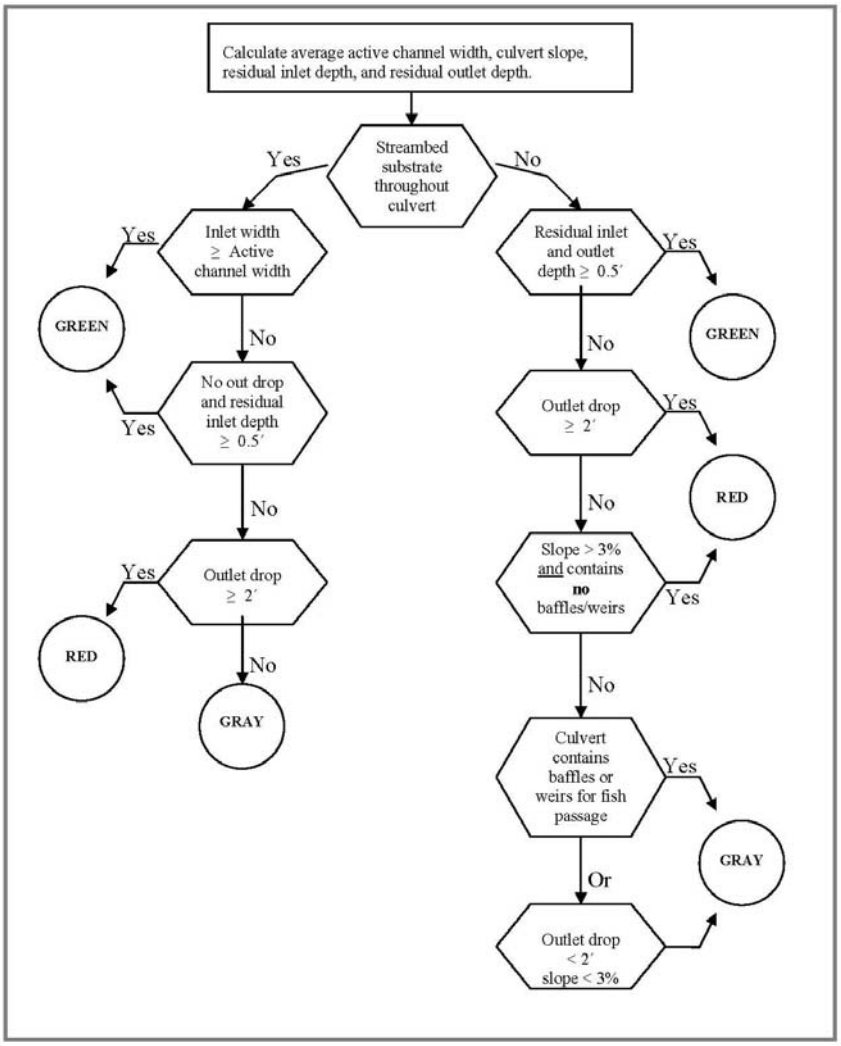


**Figure IX-17. GREEN-GRAY-RED first-phase passage evaluation filter.**



**Figure 10: Proposed primary screening criteria for evaluation of potential migration barriers in tributaries of the Carmel River Basin. Source: Criteria from CDFG (2010) California Salmonid Stream Restoration Manual**

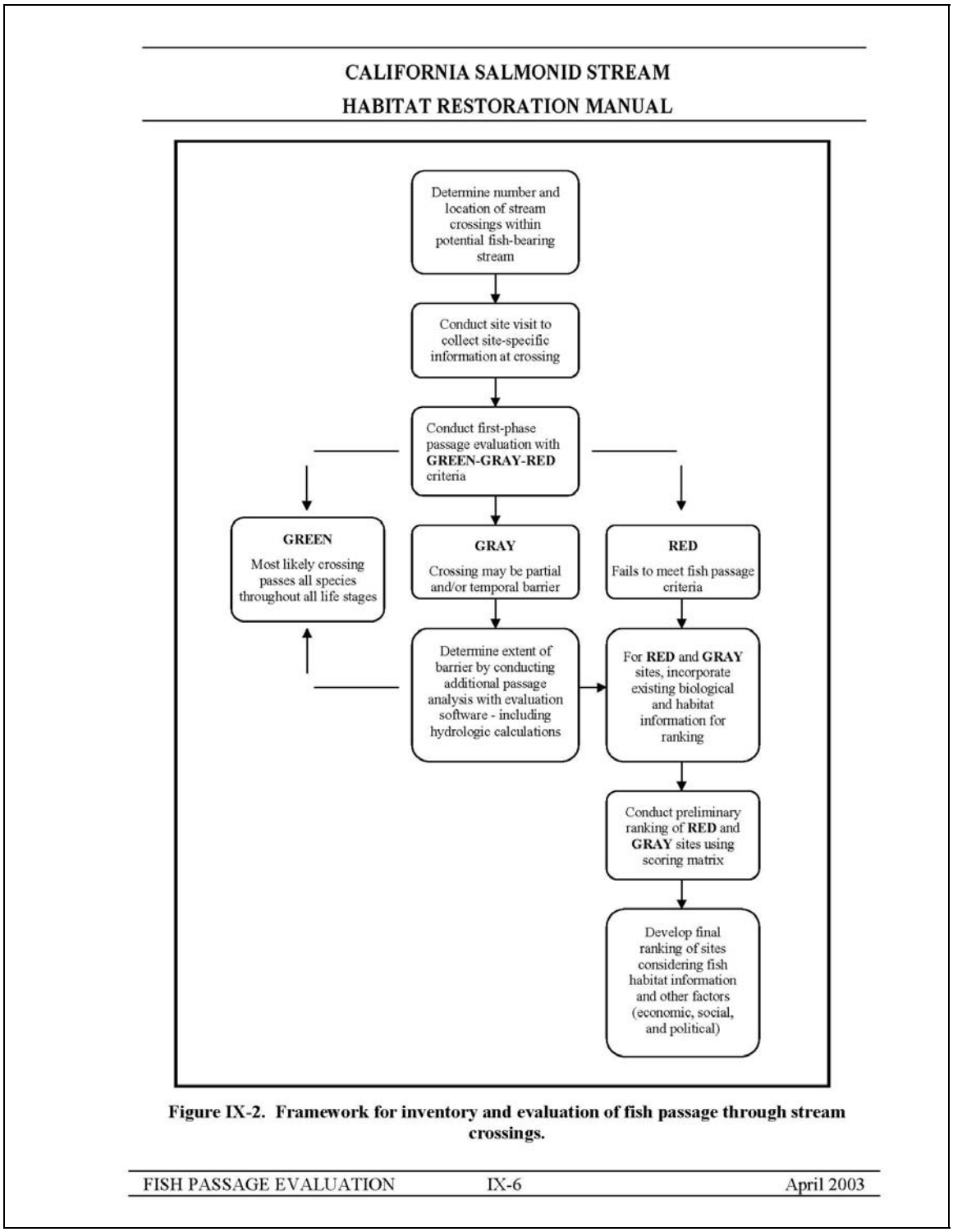


**Figure 11: The proposed system for ranking potential barriers in selected tributaries of the Carmel River Basin. Source: from DFG (2010) California Salmonid Stream Restoration Manual**

## PROJECT TASKS, BUDGETED COST ESTIMATE AND SCHEDULE

**Potential Passage Barriers in the Assessment –**

Table 2 lists the number of barrier assessments to be conducted in the selected tributaries and main stem between Pine Creek and Cachagua Creek. Forty-four reconnaissance sites and a maximum of 40 sites with detailed measurements are proposed for this barrier assessment. Of the total reconnaissance sites, 31 are on private property and 13 are on public property.

**Table 2: Number of reconnaissance sites and proposed detailed assessment sites in selected tributaries and main stem of the Carmel River, Monterey County, CA.**

| Stream Name | Number of Reconnaissance of Sites | Number of Detailed Assessment | Sites on Private Property | Sites on Public Property |
|---|---|---|---|---|
| Potrero Creek | 8 | 7 | 8 | 0 |
| San Clemente Creek | 8 | 7 | 8 | 0 |
| Pine Creek | 2 | 1 | 1 | 1 |
| Flavin's Ford | 1 | 1 | 1 | 0 |
| Cachagua Creek (lower reach) | 12 | 12 | 8 | 4 |
| Cachagua Creek (upper reach) | 13 | 12 | 5 | 8 |
| Totals: | 44 | 40 | 31 | 13 |

Work Tasks, Proposed Budget and Schedule for Barrier Assessment – The District anticipates scheduling the proposed survey work and report preparation during the period from April 2011 to June 30, 2012. This would provide time to conduct field reconnaissance work during the spring flow recession in 2011, collect detailed physical measurements during winter-spring 2012, analyze the data and prepare a draft report by June 30, 2012. In addition, this schedule is designed to accommodate submittal of a grant proposal to the California Department of Fish and Game during spring 2012 for making modifications to three of the highest ranked barrier sites.

**Table 3** lists detailed tasks, budgeted costs and anticipated milestone marks for completing the barrier assessment. Budgeted costs (rounded) for conducting the reconnaissance and detailed assessments total $65,000 including:

- Task 1 – $8,000 for obtaining access & permission for work
- Task 2 – $22,000 for conducting the reconnaissance and updating existing data at 44 sites
- Task 3 – $35000 for conducting detailed measurements of physical and hydrologic parameters, analyzing data and submitting a draft report on findings

**Table 3: Detailed Schedule of Project Tasks, Budgeted Costs and Milestone Dates for Conducting Barrier Assessments at selected sites in tributaries and main stem Carmel River, Monterey County, CA, April 2011 to June 2012**

## Assessment of Steelhead Passage Barriers in the Carmel River Watershed

| | | Project Costs by Task | | |
|---|---|---|---|---|
| Project Task Description: | | **Personnel Costs (reimbursement rates x days x hours)** | **Supplies** | **Milestone Date(s)** |
| 1) Obtain Access & Permission for Work: | | | | |
| 1.1 | Develop parcel list and contact information | $ 2,000 | | May 31, 2011 |
| 1.2 | Hold meeting/workshop for property owners | $ 2,000 | | June 30, 2011 |
| 1.3 | Negotiate agreements for access | $ 4,000 | | July 31, 2011 |
| | Task Subtotal | $ 8,000 | | |
| 2) Conduct Reconnaissance Surveys and Update Existing Information: | | | | |
| 2.1 | Potrero Creek: 3 miles, one day, two surveyors | $ 1,200 | | November 30, 2011 |
| 2.2 | San Clemente Creek Basin: 8 miles; 4 days, two surveyors | $ 4,800 | | October 31, 2011 |
| 2.3 | Pine Creek: 5.5 miles; 3 days, two surveyors | $ 3,600 | $ 200 | October 31, 2011 |
| 2.4 | Flavin's Ford: one site; 0.25 days, two surveyors | $ 300 | | October 31, 2011 |
| 2.5 | Cachagua Creek Basin: 16 miles; six days, two surveyors | $ 7,200 | | November 30, 2011 |
| 2.6 | Update Barrier Maps & Preliminary Report | $ 4,000 | | January 1, 2012 |
| 2.7 | Select Sites for Detailed Assessments | $ 1,000 | | January 1, 2012 |
| | Task Subtotal | $ 22,100 | $ 200 | |
| 3) Detailed Barrier Assessments: | | | | |
| 3.1 | Potrero Creek Surveys: (7 road crossings & one steep riffle; 4 hours each; 2 two surveyors per site) | $ 3,600 | | March 1, 2012 |
| 3.2 | San Clemente Creek Survey: (4 road crossings, one summer dam, two permanent dams, & one delta; 4 hours each for roads &summer dam, 8 hours each for permanent dams and delta; 2 two surveyors per site) | $ 6,000 | | February 1, 2012 |
| 3.3 | Pine Creek Survey: (bedrock chute at confluence; one day; two surveyors) | $ 1,200 | | February 1, 2012 |
| 3.4 | Flavin's Ford Survey: (one concrete road crossing; one day; two surveyors) | $ 1,200 | | February 1, 2012 |
| 3.5 | Cachagua Creek, Lower Reach Survey: (4 MoCo. Road Bridges & 8 private road crossing; 2 hours each for MoCo road bridges and 4 hours each for private road crossings | $ 6,000 | | March 1, 2012 |
| 3.6 | Cachagua Creek Basin, Upper Reach, Finch, James and Martin Creeks Upper Reach Survey: (4 MoCo. Road Crossings & 8 private road crossing; 4 hours per crossing | $ 6,000 | | March 1, 2012 |
| 3.7 | Data Entry: 37 sites x 1 hour per site | $ 1,000 | | April 1, 2012 |
| 3.8 | Data Analysis: 37 sites x 2 hours per site | $ 6,000 | | May 1, 2012 |
| 3.9 | Summary Report & Site Ranking | $ 4,000 | | May 1, 2012 |
| | Task Subtotal | $ 35,000 | | |
| | Overall Project Cost | **$ 65,300** | | |

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## Passage Through Crossings Assessment

**SITE**

Forest _____ District _____

**Route number:** _____ **INFRA milepost:** _____

Milepost: _____from junction of road no. _____

**Crossing ID number** _____
**Structure**_____**of** _____
**Structure milepost**_____

Watershed 6th HUC or name: _____Stream name: _____

7.5-minute quad name: _____ Land ownership: _____ **NF** _____ Other: _____

Legal description: T. _ _ S / N, R. _ _ E / W, Sec. _ _, _ _ ¼ of _ _ ¼ Principal meridian_____

**X/Y Coordinates** _____ **Coordinate system** _____**Datum**_____

Surveyor names: _____ **Field date:** ___ / ____ / ____

**CROSSING STRUCTURE**

**Shape**
- ☐ Circular
- ☐ Box
- ☐ Open-bottom arch
- ☐ Pipe-arch
- ☐ Ford
- ☐ Vented ford
- ☐ Bridge
- ☐ Other: _____

**Dimensions (inches)**
width: _____ height: _____

Rust line: _____ (feet)

Ford data: sag _____
$F_1$ _____
$F_2$ _____

**Multiple structures at site:**
___# other openings identical to main structure
Mileposts _____
___# different openings with forms completed
___ # overflow pipes----no forms completed
Mileposts_____
___ # overflow pipes with forms completed

Structure shape comments_____

**Structure material**
- ☐ Spiral CMP
- ☐ Annular CMP
- ☐ Structural plate
- ☐ Steel ☐ Aluminum
- ☐ Concrete
- ☐ PVC
- ☐ Wood or log
- ☐ Other: _____

**Corrugations**
- ☐ 2 2/3 x ½ inch
- ☐ 3 x 1 inch
- ☐ 5 x 1 inch
- ☐ 6 x 2 inch (SSP only)
- ☐ None
- ☐ Paved or smooth invert
- ☐ Other: _____

**Skew from road**
____degrees

**Inlet type**
- ☐ Projecting
- ☐ Mitered
- ☐ Wingwall 10-30°
- ☐ Wingwall 30-70°
- ☐ Headwall
- ☐ Apron
- ☐ Trashrack
- ☐ Other: _____

Describe: _____

**Outlet configuration**
- ☐ at stream grade
- ☐ cascade over riprap
- ☐ freefall into pool
- ☐ freefall onto riprap
- ☐ outlet apron
- ☐ Other: _____

Describe: _____

Fill Volume
$L_u$ (upstream fill slope length):_____
$L_d$ (downstream fill slope length):_____
$S_u$ (slope of upstream fill):_____%
$S_d$ (slope of downstream fill):_____%
$W_r$ (Road Width):_____
$W_f$ (length of road on fill): _____
$W_c$ (length of fill base):_____

**Baffles, weirs or other internal structures:** Yes No Material: _____

Describe (see sketch): _____

**Pipe condition:** ☐ Breaks inside culvert (Location_____)

☐ Fill eroding ☐ Debris plugging inlet (% blockage_____) ☐ Bent inlet ☐ Bottom worn through

☐ Poor alignment with stream ☐ Debris in culvert (rock or wood) ☐ Bottom rusted through ☐ Water flowing under culvert

☐ Other _____ Describe overall condition _____

Diversion Potential: Yes No Comments:

63

**Crossing ID Number** _____ **Structure** ___**of** ____

**SURVEY**

| Station[1] | BS (+) | HI | FS (-) | Elevation | Notes |
|---|---|---|---|---|---|
| | | | | 100.00 | |
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**Tailwater Cross Section**
Describe:

| Station[1] | BS (+) | HI | FS (-) | Elevation | Notes |
|---|---|---|---|---|---|
| | | | | | |
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**Long profile (required points)**

$P_1$ inlet gradient control point
$P_2$ inlet invert
$P_3$ roadway surface
$P_4$ outlet invert
$P_5$ pool bottom
$WS_5$ or $WS_6$ water surface at outlet pool taken at $P_5$ or $P_6$
$P_6$ tailwater control
$P_7$ downstream end of profile
$WS_7$ water surface at $P_7$

**Tailwater cross-section (minimum recommended points)**

Left bankfull
Left edge of water
Left toe of bank
Thalweg
Right toe of bank
Right edge of water
Right bankfull

[1] Station: The distance (ft) along the profile or transect from the starting point.

64

**Crossing ID number** _____ **Structure** ___ **of** ___

**STREAMBED SUBSTRATE RETENTION IN STRUCTURE**

☐ No substrate in structure
☐ Discontinuous layer of substrate in structure begins at _____ ft; ends at _____ft (measured from inlet)
☐ Substrate is continuous throughout structure

If present, substrate depth at inlet _____ft;substrate depth at outlet _____ ft

**SUBSTRATE PARTICLE SIZES** number 1up to 3 in order of sizes occupying most streambed area

| | Bedrock | Boulders | Cobbles | Gravel | Sand | Silt/Clay | Organics | Aquatic macrophytes |
|---|---|---|---|---|---|---|---|---|
| Culvert | | | | | | | | |
| Downstream near tailwater control | | | | | | | | |

**BANKFULL channel widths---outside of culvert influence** (ft): (1) _____ (2) _____

(3) _____ (4) _____ (5) _____ **Average** _____

**CALCULATIONS FROM SURVEY**

**Culvert slope:** _ _. _ % $\frac{\text{elev}(P_2 - P_4)}{\text{dist}(P_2 - P_4)}$ *100

**Outlet drop (F):** _ _. _ ($P_4$ minus $P_6$)

Channel gradient: ____ % upst; _____% downst

**Inlet gradient:** ___ % $\frac{\text{elev}(P_1 - P_2)}{\text{dist}(P_1 - P_2)}$ x (100)

**Ratio of inlet width to channel width :** _____

**Residual inlet depth**: _____ ($P_6 - P_2$)

**Substrate ratio:** _____(depth of substrate/structure height)

Residual pool depth: _____ ($P_6 - P_5$)

**FIELD PASSAGE EVALUATION**

__ **Resembles natural channel** __ **Passage adequate (species/lifestage)** _____

__ **Passage indeterminate** __ **Passage inadequate (species/lifestage)** _____

**Comments**:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

65

**Crossing ID number** _____ **Structure** ___ **of** ____

**Comments:** (See instructions for list of potential items needing comments)

_____

**PHOTOGRAPHS---identify and provide captions**

**Required photos:**
1. Inlet from upstream
2. Outlet from downstream
3. Tailwater control

| Photo caption | X/Y Coordinates | *Comments* |
|---|---|---|
| 1. Inlet from upstream | | |
| 2. Outlet from downstream | | |
| 3. Tailwater control | | |
| | | |
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66

**Crossing ID number _____ Structure ___ of ____**

**SITE SKETCH**

Include:
North Arrow
Direction of stream flow
Culvert/channel alignment
Lay of tape if needed
Photo point locations and numbers
Wingwalls and inlet / outlet aprons
Multiple structures
Baffle configurations
Weirs and other instream structures
Debris jams inside, upstream and downstream near site, depositional bars
Trash racks, screens, standpipes etc. that may affect passage
Damage to or obstacle inside structure
Location of Riprap for bank armoring or jump pool formation
Tailwater cross-section location

67

## Optional Channel Reference Data

**Crossing ID Number** _____ **Structure** ___**of** ____

CHANNEL SLOPE---- measured outside of culvert influence
Upstream (include upstream channel cross section in reach)

Slope = cumulative elevation change/cumulative distance

| Station | BS (+) | HI | FS (-) | Elevation | Cumulative |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Upstream slope _____

Downstream

| Station | BS (+) | HI | FS (-) | Elevation | Cumulative |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
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Downstream slope _____

**Note**: Slope measurements should be taken at the water surface and at the same stream feature (such as, pool and pool, or riffle and riffle).

Reference cross-section
Describe location:

| **Station** | **BS (+)** | **HI** | **FS (-)** | **Elevation** | **Notes** |
|---|---|---|---|---|---|
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Reference cross section recommended points (minimum)

| | | |
|---|---|---|
| Left bankfull | Thalweg | Right toe of bank |
| Left edge of water | | Right edge of water |
| Left toe of bank | | Right bankfull |

Measured Discharge _____cfs

Manning's n _____

68

**Crossing ID number** _____

**Site Biological information** – (**Core data** and prioritization data)

**ANALYSIS SPECIES**

| Core data | | | Prioritization data | |
|---|---|---|---|---|
| **Species** | **Life Stage** | **Comments** | Upstream habitat blocked (mi) | Downstream habitat blocked (mi) |
| 1. | | | | |
| 2. | | | | |
| 3. | | | | |
| 4. | | | | |
| 5. | | | | |
| 6. | | | | |
| 7. | | | | |
| 8. | | | | |
| 9. | | | | |
| 10. | | | | |

Habitat Quality Notes:

Watershed Information – Prioritization data

**Exotic Species Crossing Barrier**

| | |
|---|---|
| Upstream crossings: No. of crossings_____<br>Distance to 1st crossing (ft): _____Barrier Y ☐ N ☐<br>Distance to 2nd crossing (ft): _____Barrier Y ☐ N ☐ | Downstream crossings: No. of crossings_____<br>Distance to 1st crossing _____ mi Barrier Y ☐ N☐<br>Distance to 2nd crossing _____mi Barrier Y ☐ N☐ |
| Other upstream barriers: No. of barriers: _____<br>Distance to 1st barrier: _____mi Height _____ft<br>Distance to 2nd barrier: _____ mi Height _____ft | Other downstream barriers: No. of barriers _____<br>Distance to 1st barrier: _____mi Height _____ft<br>Distance to 2nd barrier: _____ mi Height _____ft |

**Is a barrier necessary at this site to meet management objectives, that is---passage barrier okay?**

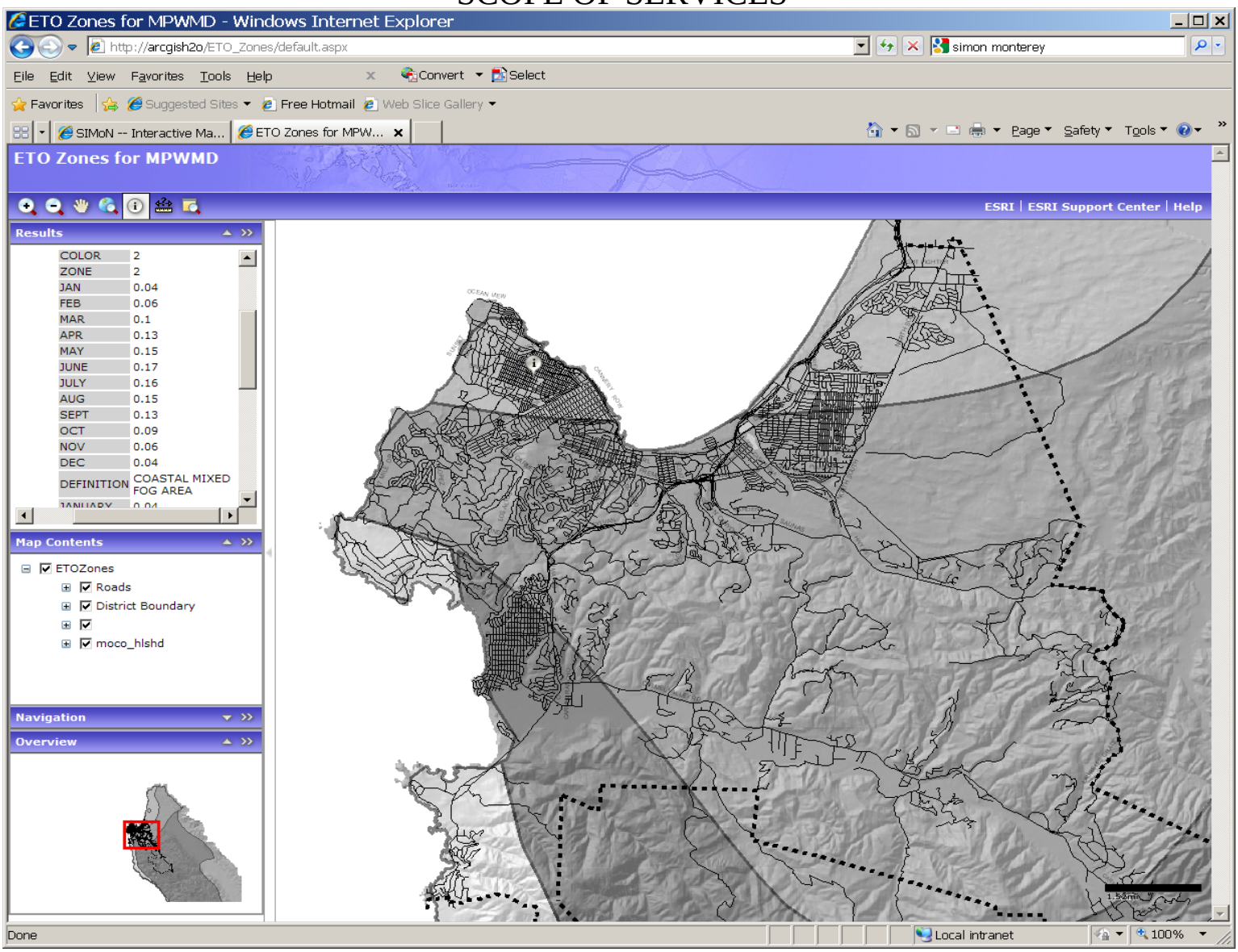
Yes No

69

# Exhibit A-4a

Geographic Information Systems
Internet Mapping Site Development

## SCOPE OF SERVICES

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Monterey Peninsula Water Management District

# Introduction

The purpose of developing a GIS Internet Mapping Site is to provide stakeholders in the IRWM planning region with web-based tools to access relevant data, interact with the IRWM Plan and with each other. The overall success of the IRWM Plan will be dependent upon each Project Sponsor focusing on the project completion and the dissemination of its data, reports and information. A GIS Internet Mapping Site can efficiently distribute project data, reports and information and is an effective tool for display and analysis of geospatial information. GIS is also a superior tool for achieving some of the main objectives of the IRWM Plan update, including project integration, project review and prioritization, performance and monitoring, data management, technical analysis, integration with local land use planning, and stakeholder involvement and coordination. The proposed GIS Internet Mapping Site can address these main objectives in the following way:

Initial Meetings and Project Initiation Local project sponsors, stakeholders, and other interested parties will be able to share maps, descriptions, photographs, and other project data, as well as region-wide information concerning water resource management. All stakeholders will be provided tools to access data and communicate with each other via Microsoft Sharepoint and the interactive Web Mapping Services. These datasets can include tables, reports, documents, databases, graphs, pictures and diagrams. There can be various sub-groups with associated levels of permissions for site viewing, moderating, editing and data download and upload. MPWMD and the Project Sponsors will identify how the site will be moderated dependent upon the project goals and needs.

Project Review Process As part of the GIS Web Mapping application, standardized forms will be available for submitting project information. This information will be used to update tables in the IRWM Plan that show how projects meet IRWM plan objectives and regional priorities and how these projects are ranked in the IRWM plan. Users will be able to download, review or comment on particular project datasets. This will increase and broaden the scope of review beyond the Project Sponsors and stakeholders. Additionally, the GIS Internet Mapping Site will have a link to the overall project monitoring application, so that users can view the geographic data and review the status of projects.

Performance & Monitoring As part of the project management section, the GIS Internet Mapping Site will dynamically link to the Project Tracking section so that users can determine the status of the data for a particular project. This information will also be tracked in the GIS "metadata" section that describes how current and/or complete the information is.

Data Management

*Water Data Library* – Water data in the region is collected in various formats and can likely be standardized for use in the DWR Water Data Library format using automation via customized coding. This would allow for more efficient dissemination of data and reduce the time needed to reformat data. Water related data can include but is not limited to: groundwater level wells, water quality stations, surface water stage and flow sites, rainfall/climate observers, and water well logs.

MPWMD maintains a significant quantity of regional water data. This task includes work to develop a standardized format for data required to be reported to DWR for recognized groundwater basins (i.e., in the Seaside and Carmel River Basins). In addition, project sponsors and other entities that collect data will be surveyed and the results tabulated (e.g., type, frequency, period of record, etc.). Depending on the information collected, recommendations may be made for future data collection, formatting, and methods for automatic conversion to regional, inter-regional, and state database formats.

*Surface Water Ambient Monitoring Program* – The Web Mapping Services will access SWAMP through their California Environmental Data Exchange Network (CEDEN). This system is designed to facilitate integration and sharing of data collected by many different participants involved in water and environmental resources of the State of California. Data exchange between the two systems will enhance the regional and inter-regional efforts.

*Groundwater Ambient Monitoring and Assessment program* – Outreach to the Monterey County Environmental Health Department has been done and a customized application will be developed to run within the GIS Internet Mapping Site to update water quality information within the region on a quarterly basis. MPWMD currently collects information from over 1,000 wells on the Monterey Peninsula and is responsible for maintaining the data for the Seaside Groundwater Management Water Master. All of this data will be made available via the GIS Internet Mapping Site.

*California Environmental Information Catalog* – MPWMD participates in the California Environmental Information Catalog (CEIC). GIS metadata is developed and will continue to be developed in this format so it can be loaded into this statewide metadata clearinghouse. The CEIC is accessible at: http://gis.ca.gov/catalog/. The online directory is used for reporting and discovery of information resources for California.

*Integrated Water Resources Information System* – As part of the Sharepoint and SQL database development, the GIS Web Mapping Site will link up with the Integrated Water Resources Information System (IWRIS), which is a data management tool for water resources data and not a database. IWRIS is a web based GIS application that allows entities to access, integrate, query, and visualize multiple sets of data simultaneously. Information on IWRIS is available at: http://www.water.ca.gov/iwris/.

*California Environmental Resources Evaluation System* – MPWMD participates in and has a copy of the California Environmental Resources Evaluation System (CERES). By linking to the GIS and tabular information in this geodatabase, environmental analysis and planning will be improved by integrating natural and cultural resource information.

Technical Analysis One of the most important aspects of this application development is the integration with existing state databases and the proposed regional Database and Document Library. Since the Web Mapping Service will be dynamically linked with the Document Library and Database Applications, users will be able to list, review and access documents, data and technical analyses, relevant to each project.

Local Land Use Planning Local land use planning agencies such as city and county planning departments, AMBAG, and special districts will have access to contact information for the IRWM stakeholder group and can receive regular updates of IRWM Plan changes. The MPWMD Project Team will maintain a database of these agencies and appropriate contact information. A GIS and web-based communication is one tool for exchanging information and may eventually be a primary communication method, but initially, an outreach program consisting of media advertisement, workshops, and other meetings will be done to "get the word out" to many of the regional planning staff members.

Stakeholder Involvement & Integration One of the more cost effective and efficient ways to engage with project stakeholders and interested parties is with a web-based platform. In addition to planned workshops and meetings, much of the information concerning IRWM Planning can be provided on the web. It is anticipated that webinar and pod casts may also be provided to explain "How To" utilize many of the Web Mapping Services.

Coordination  Representatives of the Monterey Peninsula RWMG hold regular meetings with their counterparts in neighboring IRWM regions (the coastal areas from Santa Cruz County to Santa Barbara County).  These and other inter-regional groups will be informed of the site and may be given login permissions to upload and download information.

# GIS Internet Mapping Site Summary

This phase of the scope of services is focused on the development of an Internet website to provide public and IRWM stakeholder group access to select GIS information including parcels, roads, imagery, and other data approved by the RWMG. The near term goal of the public site is to provide a resource and mapping information site that allows local Project Sponsors to share their project data.  The system architecture contains the web, GIS and data server within the MPWMD local area network (LAN).  The authoring and administrative functionality will also be done from within the MPWMD LAN.  GIS project data will be dynamically linked to associated reports, images, documents and other web services. An important aspect of this task is to build on and access the growing body of GIS-based data layers at local, inter-regional, state and federal agencies.

The longer term goals include improving communication, collaboration and data availability through on-line access to information and reducing the cost of providing and sharing this geographic information. The near term goals of the internet mapping site will be to provide stakeholders with the ability to upload tabular and geographic data that the IRWM Project Sponsors are currently using, convert to GIS format and to have a mapping site available. This will provide stakeholders and interested parties with geographic data at a centralized site (currently, MPWMD responds to requests individually).  As the data conversion and data mining efforts are completed, the GIS Internet Mapping Site will move closer to a full service geospatial mapping site that is fully tested and deployed .

The Project Team formed to complete these tasks will include the MPWMD Chief Technology Officer and the MPWMD GIS/Graphic Technician.  Consultants may also be retained for specific tasks. MPMWD is part of the ESRI and Microsoft developer networks and has purchased licenses from these organizations for software development.  However, additional license requirements are associated with providing stakeholders with these web tools are reflected in the budget for this task.

# Overall Approach

## *Phased Development and Deployment*

As part of the overall development, which includes the Document Library and Database development, the GIS Internet Mapping phase will be done in conjunction with these other applications.  Much of the application design and requirement gathering will occur simultaneously with the Database and Document Library development.  Since all three applications will interact with Sharepoint technology, some customized applications and functionality within the GIS Internet Mapping application will be dependent upon the completion and approval of certain tasks within the Database and Document Library development.  We will develop web applications using Microsoft .NET technologies and ASP for the Internet Explorer version 7.x and above web browser. We are members of the ESRI Development Network and track their development efforts and updates. ESRI has embraced the .NET framework for applications development and Enterprise integration.  The two major Enterprise-enabling technologies are Java (J2EE) and .NET. We choose to develop in .NET because it is highly integrated with Windows Operating System.  In our applications we include many other technologies that may include:  DHTML,

VML, JavaScript, ASP, XML, and HTML; however, at the core we prefer ASP and .NET-based applications at the presentation tier.

### *Software Development Lifecycle and Review Approach*

Lifecycle Steps: The Project Team will follow the classic software life cycle steps listed below to develop software in a more organized, cost-effective, and timely manner. This life cycle includes an opportunity for analysis and planning before any code is ever written, therefore saving the money and time in the long run because changes and adjustments are made before costly code has been written. Many of the early phase deliverables are documents, not software. Often the software life cycle is followed in an iterative process. For example, it is possible to have part of a project in the design phase while another part is in the coding phase. The Software Life Cycle Steps include: Assessment, Application Design, Application Development, Development Testing, User Acceptance Testing, Deployment, and Maintenance & Support. The steps are defined in more detail in Figure 1.

## Task Summary

| Task and Description | | Due Date | Deliverable |
|---|---|---|---|
| Task 1 | Initial Meetings and Project Initiation | Early February 2011 | NA |
| Task 2 | Detailed Scope Development | Mid February 2011 | Detailed Scope Document |
| Task 3 | Systems Requirements and Specifications | Mid March 2011 | System Requirements Specification Document |
| Task 4 | QA/QC Process Development | Early March 2011 | QA/QC Document |
| Task 5 | System hardware, database, communication and network specification document | Early April 2011 | Detailed Design Document |
| Task 6 | Development, Implementation, Testing, Deployment, training and documentation on the new custom GIS System | Early June 2011 | On-site Pilot Demonstration and Sign-off |
| Task 7 | Acceptance and Fine Tuning of GIS System | Early June 2011 | Functional System Document |

The information from the IRWM-DMS will be dynamically linked with the GIS Internet Mapping System for collaboration and sharing. Some of the aforementioned tasks will be dependent upon the completion of the IRWM-DMS, but the functionality of the GIS system is not dependent upon the IRWM-DMS completion.

# Detailed Scope Development

The remainder of this section provides details on the approach, tools, and work processes used in developing the website. A key component to development of the GIS Internet Mapping site will be the involvement of the Project Sponsors in providing feedback, testing, and site reviews. Local Project Sponsor participation in this part of the project is critical to the overall site success.

**TASK 1, Initial Meetings and Project Initiation**: As part of Task 1, the GIS design team will meet with all of the Stakeholders to discuss overall functionality of the Internet Mapping Site. This phase is heavily invested for internet project evaluation and needs assessment. Information provided by Stakeholders will be used for developing a Detailed Scope.

Deliverable: No deliverable is proposed for this task.

**TASK 2, Detailed Scope Development**: Information from the initial Stakeholder meetings will be used to create a detailed scope for the entire project. This Scope will outline all application functionality with links to the Stakeholders defined needs. The Scope will be used to generate System Requirements and Specifications.

Deliverable: A Detailed Scope Document will be created and delivered to all Stakeholders

**TASK 3, System Requirements and Specifications Analysis**: The Project Team will perform an initial Systems Analysis and Design related to the desired Web enabled GIS application. All design activities will be performed in such a way that they are expandable and scalable enough to support future applications development efforts. It is not expected that this task will be lengthy in duration but is crucial nonetheless. Analysis and Design efforts will include the gathering of Application and System Requirements.

Deliverable: A System Requirements and Specifications Document will be created and delivered to all Stakeholders

**TASK 4, QA/QC Process Development**: Since many of the Project Sponsors have solid definitions of their projects, these definitions will be translated to functional GIS internet mapping and application interface requirements. A list of these requirements can then be used to develop an internal, quality control/assessment process. It is important to understand the fine details and set expectations before moving to formal implementation. Implementation will be guided by the quality control process.

Deliverable: A Quality Control & Assessment Document will be created and delivered to all Stakeholders

**TASK 5, System Hardware, Database Communication and Network Specification Analysis**: Local Project Sponsors will work with MPWMD Project Team to refine site functionality and usability from what has been presented in this proposed scope. Existing Internet Application services that have been developed on MPWMD servers can be “consumed” in the IRWM Web Mapping Site. During the development phase, Project Sponsors will be able to review and comment on the application progress. After Stakeholder feedback has been received, a System hardware, database, communication and network specification document will be created.

Deliverable: A Detailed Design Document will be created and delivered to all Stakeholders

**TASK 6, Development, Implementation, Testing, and Deployment of the GIS System**: The results of the design efforts will include a style guide sheet detailing colors, fonts, and other stylistic components. Mocked screen interfaces will be developed to facilitate this effort. A Cascading Style Sheet will be developed based on the Style Guide and be available to the IRWM Monterey Planning Group for future development efforts. Any existing style guides and style sheets will be leveraged where appropriate. Every effort will be taken to create an aesthetically-pleasing interface that adheres to any existing Stakeholders formats. All functionality will be included in a pilot application for Stakeholder review.

Deliverable: An on-site Pilot Demonstration of the application will be made available to all Stakeholders

**TASK 7, Acceptance and Fine Tuning of the GIS System**: Upon acceptance of the Pilot GIS System, the application will be deployed to production servers and exposed to a broader audience via public and power user login privileges, so the functionality, interface options and output capabilities can be reviewed. After final acceptance, training and system documentation will be provided to all Stakeholders.

Deliverable: A Functional System Document will be created and delivered to all Stakeholders

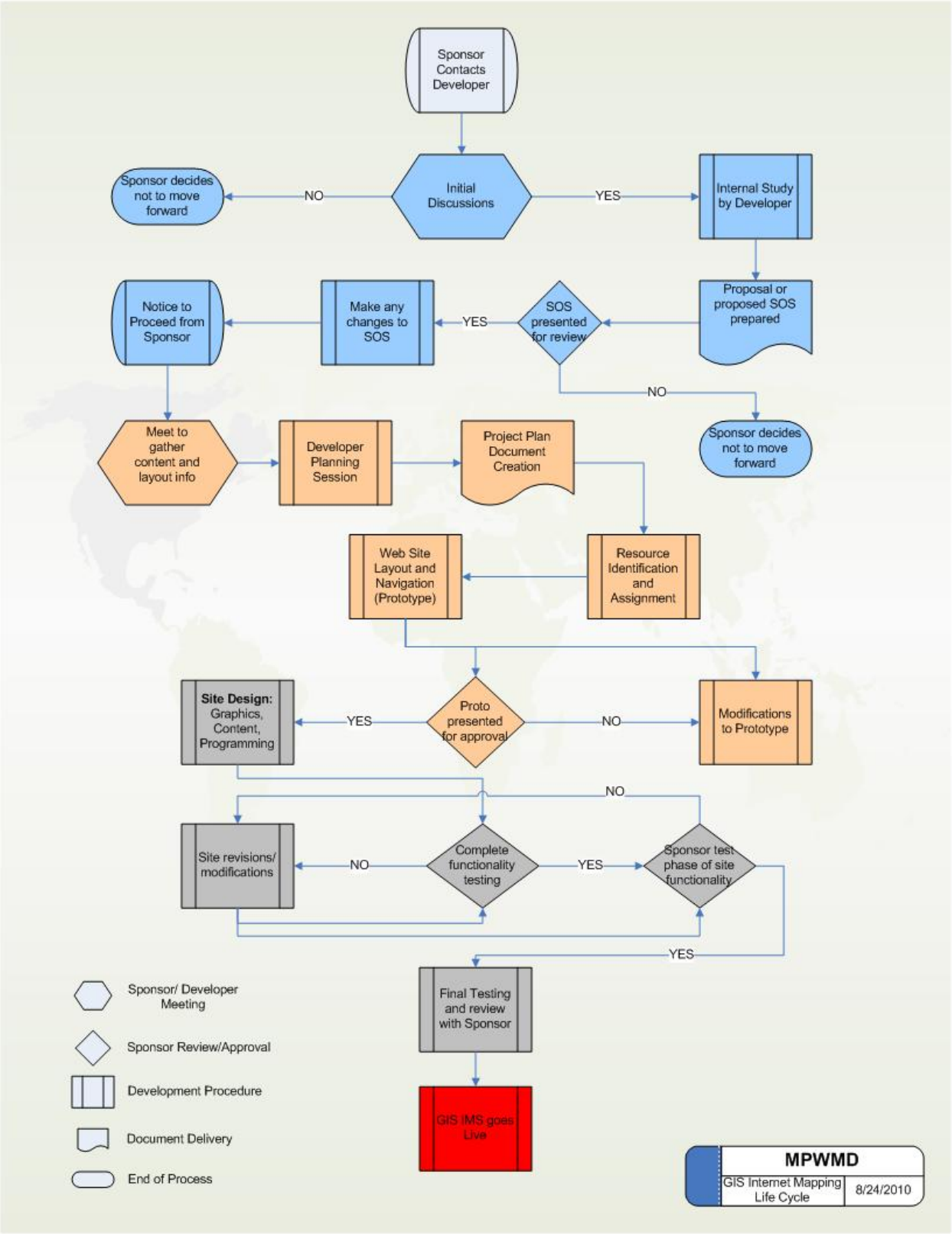



**Figure 1: GIS Internet Mapping Site Life Cycle**

# Functional Requirements

## *Core Mapping Requirements*

The application will perform all of the following:

| Requirement | Comment (if needed) |
|---|---|
| Map View Zoom “In”, “Out”, and “All”. | |
| Manual On-Screen Map View “Pan”. | |
| Display Cursor State Plane Coordinate Position | |
| Display “Spatially Adjacent” Data Layer upon Single Feature Identification | This is a buffer operation where users can choose to select features from another layer of interest (e.g., parcels) when selecting a feature. Sample workflow might be to select a stream segment, buffer it by 100 ft, have the parcels in the buffer area returned to the user. |
| Organize Logical Map Layers into On- Screen Data Layer Groupings. | |
| Email Link Function | Application would generate a PDF output of the map / report. This facilitates email the map in a consistent format. |
| Standard Predefined Database Search | |
| Identify, and “Zoom To” Tools | |
| Search for Parcel Owner, address, APN, street name, or Tax ID | |
| Measure On-Screen Defined Linear Distance in Feet and Miles with “Zoom To” Feature | The application will combine the measure distance and area into a single measure tool. Each segment and total line length would be interactively reported. The beginning and last point created would be dynamically connected to create an “area” that would also be reported back to the user. The IRWM Monterey Planning Group could define the units to report / display |
| Dynamic Graphic Scale on Main Map View Page. | |
| Open Query (ability to customize a database search) for all GIS Layers with Boolean Searches for all Available Database Fields | This would be handled through a query builder interface |
| Ability to Save Query Results and Selection Sets to Text File | |
| Single Click Search for Adjoining Features for Selected Map Layer Entity | |
| “Hyper-Link” to project reports, Plates, Deeds, Engineering Plans, images, etc | If a requirement, it is assumed that a document management system exists that can be accessed easily for this information. If not, hyperlink connections will need to be edited manually in the database by |

| | |
|---|---|
| | Stakeholders employees. All related records must be provided in a usable format. |
| Location Window with Regional View Showing Current Map Location | |
| Multi-Tab Function for Layer Control and Legend Display | |
| Ability to Save to PDF | |
| Single Button Launch of On-line Help Menu with Explanation of Map Tools. | |
| Automatic "Site Status Page" Display During Routine Site Maintenance. | |
| Direct Hyperlink to Stakeholders or Department Web Page and/or E-mail | |
| Application Development in Highly Customizable Programming Environment | |

## *Additional Requirements*

In addition to the general requirements defined above, we provide the following functionality at no additional cost. Implementing this functionality reduces the time and effort required to maintain the site over time and to make changes to what information get shown on the sites.

| Functionality | Comment |
|---|---|
| Database-driven control of GIS Layers | This allows certain users to flag in the database which layers of data are valid for identification, searching, etc. This avoids post-deployment development costs by building in this flexibility. |
| Database-driven control over fields of information | This gives the ability to control, by users, which fields of information come back to the interface. This also allows control of which fields are exposed for a "Short Report" and "Detailed Report." Field aliases can be defined to make the site more user friendly. This can be done dynamically without having to turn the site off. |
| No Pop-ups | Many browsers now come installed with popup blockers. This creates a great deal of overhead on many sites and renders many GIS sites useless. |
| No frames | Frames are strongly recommended against, and being discouraged, by the Worldwide Web Consortium (W3C). |

| | |
|---|---|
| Single trip to server for polygon, line etc digitization | A technique that allows direct digitization on the screen without multiple trips to the server. This greatly reduces server load and enhances the user's experience and overall usability. |
| Zoom to scale | The ability to zoom the user to a fixed scale (e.g., 1:24000) |
| No Session Variables | This increases performance and scalability as each user's maps and other info are stored on the client as opposed to the server. For 200 users, each storing 512Kb of information in Sessions (200 * 512 = 102400 Kb) this equates to = 102.4 MB of server memory. |

## *Data Layers*

It is anticipated that the GIS Internet Map Site will have approximately 20 base data layers. Examples of these layers are:

Parcels
Zoning
Roads
Contours
FEMA Floodplains
Streams
Water bodies
Other socio-economic data
Police / Fire / Rescue stations, etc
Hillshade
Aerial Imagery
Jurisdictional Boundaries
Landmark Labels
Rivers
Watershed
River Reaches
Aquifers
Wells
Gauging Stations
Sampling Stations

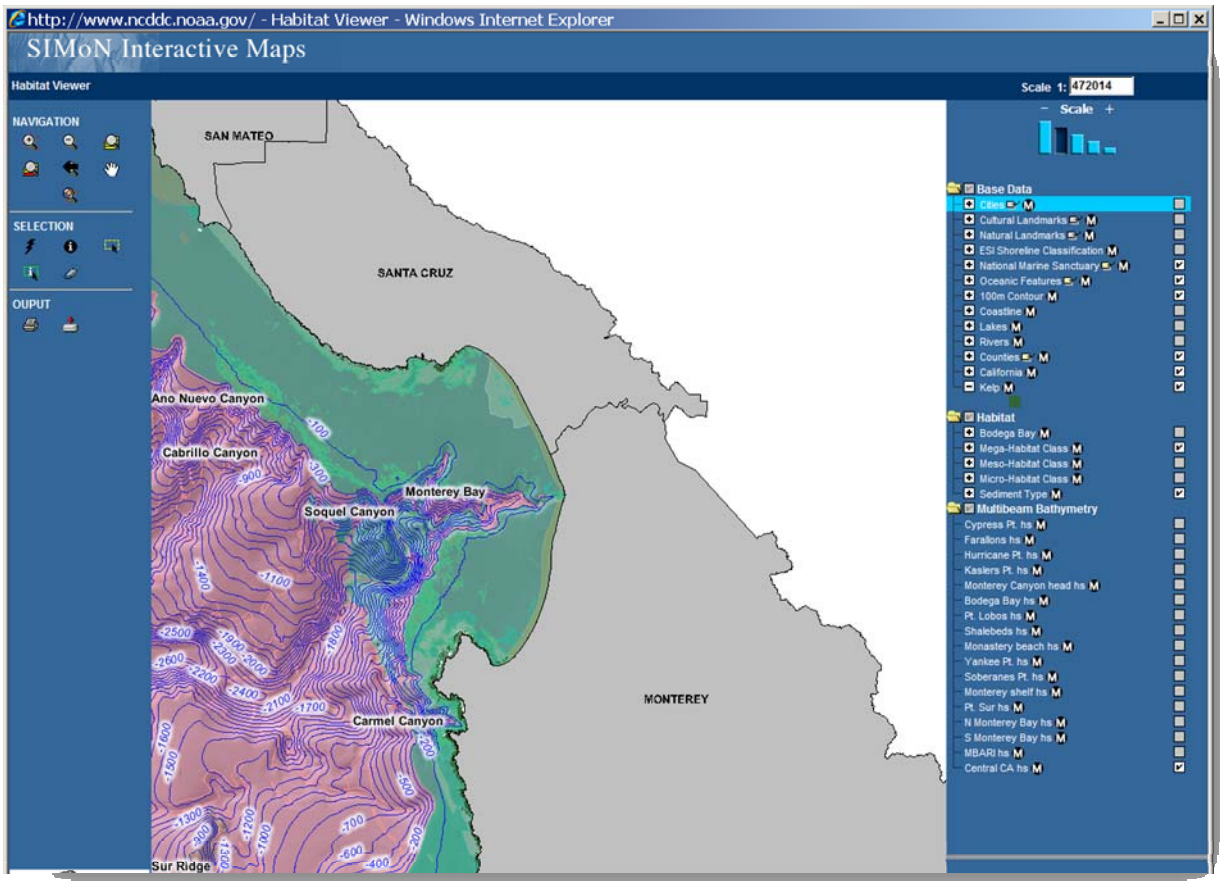



**Figure 2. Sample of SIMoN Interactive Mapping Site**

In addition to these base layers, additional layers pertaining to local projects will also be added. As stated previously, as data is made available by the local Project Sponsors, these datasets can be loaded to the GIS Internet Mapping Site. In addition, existing Web Mapping Services (Figure 2) will be integrated and web services will be consumed within the IRWM Web Mapping Service for a seamless display of geographic data. Some existing data sources are:

California Natural Diversity Database (CNDDB)
Central Coast Water Quality Synthesis, Assessment and Management (SAM)
Project Sanctuary Integrated Monitoring Network (SIMoN)
Natural Resources Project Inventory (NRPI)

## *Mapping Display*

A data list / priority matrix will be developed and reviewed with Project Sponsor's staff. The purpose of this data list is to identify what data the stakeholders and project sponsors would like to make available on the website and to what class of user (internal, public, etc.). This data matrix will include several key components necessary to meet core application requirements. These elements include:

- Data layer “Friendly” name (e.g., Commercial Airports)
- Symbology for layers to be included (how data will be shown on the site: labels, colors, scale dependencies, and any thematic organization for each layer)
- Scale threshold (i.e., when layers comes on / off in user-interface)
- Thematic category for placement in the user-interface (e.g., socioeconomic, environmental, planning, transportation, etc).

Much of the responsibility in the task will be that of the users.

MPWMD currently has an internal web mapping service (see Figure 3). These services have been deployed on the same software and development structure that is being proposed.

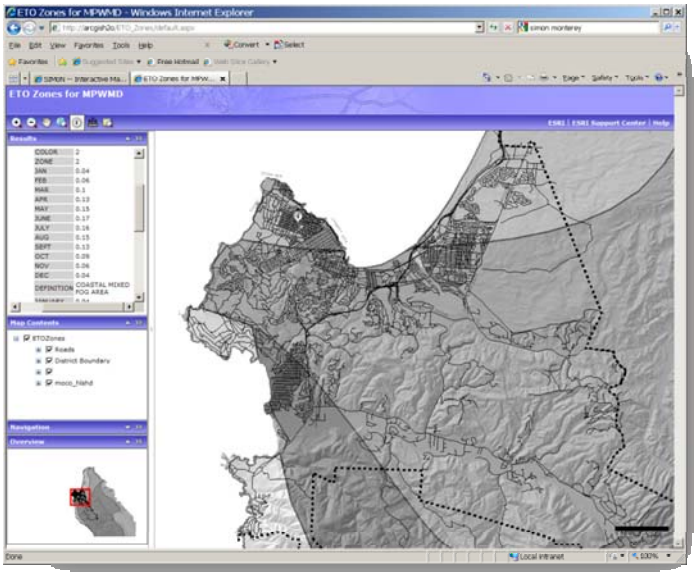



**Figure 3: Example of MPWMD Web Mapping Service**

## *Maintenance/Hosting*

MPWMD will install, test and configure the Internet Map Server applications developed, as defined above, on our secure Application Services Provider (ASP) infrastructure, which includes ArcIMS, ArcGIS Server, ArcSDE, dual redundant T-1 connections to the Internet, data backup and management and a Storage Area Network (SAN). Data hosting maintenance includes the posting of changes to the site on at least a regular basis. The Stakeholders will be responsible for sending data in the correct and consistent format.

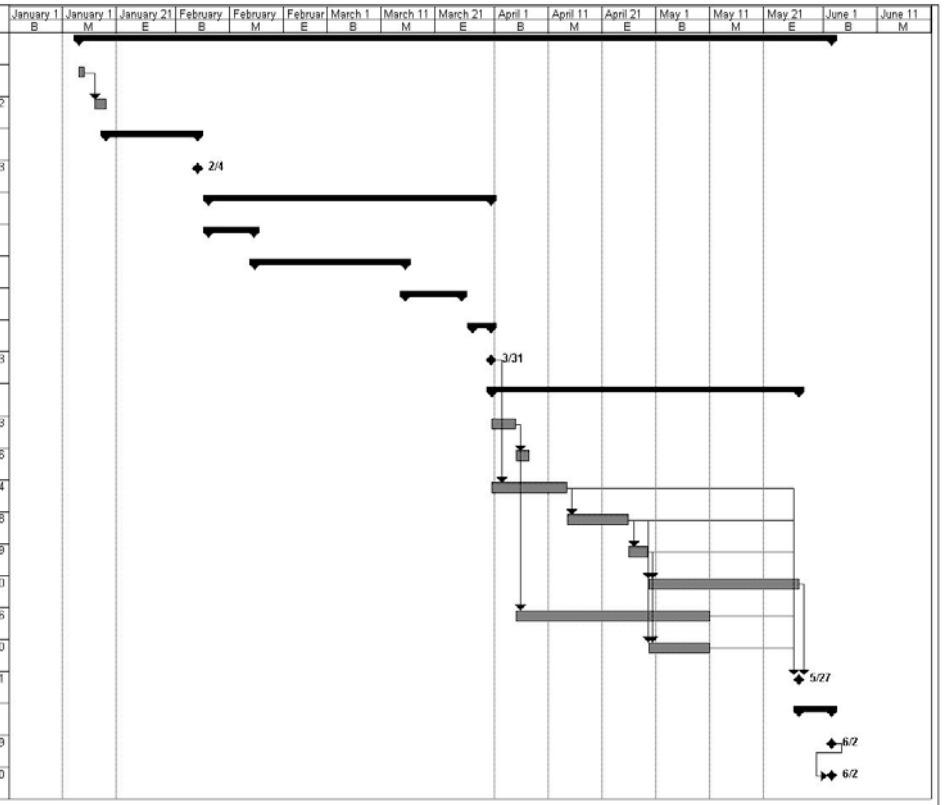
If stakeholders cannot interface with the Internet map site, an alternative could be to develop an FTP site to which Project Sponsors can post data updates.

## *Project Schedule*

Several tasks shown on the schedule require input from the RWMG, stakeholders, and other potential users. The timeline shown for these tasks presumes a relatively short response time (sometime just a few days). If responses are not received in the presumed time frame, there will be delays in completing some tasks.

# Project Schedule

| ID | Task Name | Duration | Start | Finish | Predecessors |
|---|---|---|---|---|---|
| 1 | **PMI Process** | **199 days** | **Fri 1/14/11** | **Thu 6/2/11** | |
| 2 | Initial Discussions with Sponsors | 2 days | Fri 1/14/11 | Fri 1/14/11 | |
| 3 | Internal Analysis | 4 days | Mon 1/17/11 | Tue 1/18/11 | 2 |
| 4 | **(TASK 1) Initiation Processes** | **26 days** | **Wed 1/19/11** | **Fri 2/4/11** | |
| 14 | Initiation Processes COMPLETE, Notice to Proceed | 0 days | Fri 2/4/11 | Fri 2/4/11 | 11,12,13 |
| 15 | **Planning Processes (3.2.2.1)** | **77 days** | **Mon 2/7/11** | **Thu 3/31/11** | |
| 16 | **(TASK 2) Scope Management Processes** | **13 days** | **Mon 2/7/11** | **Tue 2/15/11** | |
| 20 | **(TASK 3) Planning & Demo** | **40 days** | **Tue 2/15/11** | **Tue 3/15/11** | |
| 26 | **(TASK 4) Risk Management Processes** | **17 days** | **Tue 3/15/11** | **Fri 3/25/11** | |
| 31 | **(TASK 5) Procurement Management Processes** | **7 days** | **Mon 3/28/11** | **Thu 3/31/11** | |
| 34 | Planning Phase COMPLETE | 0 days | Thu 3/31/11 | Thu 3/31/11 | 33 |
| 35 | **(TASK 6) Development, Testing & Quality Control Processes** | **82 days** | **Thu 3/31/11** | **Fri 5/27/11** | |
| 36 | Install Hardware and Software | 5 days | Thu 3/31/11 | Mon 4/4/11 | 33 |
| 37 | Establish Internet Demo Site | 5 days | Tue 4/5/11 | Thu 4/7/11 | 36 |
| 38 | Prepare and standardize geodatbases | 20 days | Thu 3/31/11 | Thu 4/14/11 | 34 |
| 39 | Create MXD projects | 15 days | Thu 4/14/11 | Mon 4/25/11 | 38 |
| 40 | Review and Import State Datasets | 7 days | Tue 4/26/11 | Fri 4/29/11 | 39 |
| 41 | .NET and Silverlight Customization | 40 days | Fri 4/29/11 | Fri 5/27/11 | 39,40 |
| 42 | Direct and Manage Project Execution (3.2.3.1) | 52 days | Tue 4/5/11 | Tue 5/10/11 | 36 |
| 43 | Monitoring and Controlling Processes (3.2.4) | 15 days | Fri 4/29/11 | Tue 5/10/11 | 39,40 |
| 44 | Development, Testing & Quality Control COMPLETE | 0 days | Fri 5/27/11 | Fri 5/27/11 | 38,42,43,39,40,41 |
| 45 | **(TASK 7) Acceptance & Closing Processes** | **8 days** | **Fri 5/27/11** | **Thu 6/2/11** | |
| 50 | Closing Processes COMPLETE | 0 days | Thu 6/2/11 | Thu 6/2/11 | 48,49 |
| 51 | Project COMPLETE | 0 days | Thu 6/2/11 | Thu 6/2/11 | 50 |




Project: GIS Internet Mapping Schedule
Date: Wed 9/22/10

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

Page 1

# Project Cost

| TYPE | OVERALL COST | MATCHING | GRANT |
|---|---|---|---|
| SOFTWARE | - | - | - |
| ArcServer Enterprise upgrade license | 10,000 | 5,000 | 5,000 |
| Visual Studio 2010 | 2,000 | 2,000 | |
| Sharepoint 2010 * | 0 | 0 | |
| GeoCortex | 18,000 | 0 | 18,000 |
| | | | |
| SOFTWARE MAINTENANCE | - | - | - |
| MS Server 2008 license | 2,000 | 2,000 | |
| IIS 7.0 license | 0 | 0 | |
| ArcServer 9.3.1 license | 1,300 | 1,300 | |
| ArcSDE 9.3.1 license | 0.00 | 0.00 | |
| ArcEditor license | 1,800 | 1,800 | |
| Freeance license | 1,500 | 1,500 | |
| HARDWARE | - | - | - |
| ArcServer machine | 3,000 | 2,000 | |
| DataServer machine | 3,000 | 2,000 | |
| | | | |
| STAFF TIME | | | |
| GIS Specialist | 38,500 | 38,500 | |
| IT Manager | 5,000 | 5,000 | |
| | | | |
| CONTRACT PROGRAMMING | | | |
| .NET, Silverlight, REST Programmer | 10,000 | 10,000 | |
| | | | |
| TOTAL MATERIALS COST | 40,600 | 17,600 | 23,000 |
| TOTALWAGES | 53,500 | 53,500 | 0 |
| OVERALL COST | 94,100 | 71,100 | 23,000 |
| PERCENTAGE OF OVERALL | | **76%** | **24%** |

* The Sharepoint software is being purchased as part of the IRWM-DMS (Document Library) project and being shared with the GIS Internet Mapping Project.

J:\IRWM\2010PlanGrant\GIS\Geographic Information Systems3.doc

# Exhibit A-4b

# Development of a Document Management System (IRWM-DMS) portal for use with a GIS based Mapping & Collaboration Infrastructure

## 1.0. GENERAL

The Monterey Peninsula Water Management District (MPWMD) or its consultants proposes to provide the IRWM Document Management Software (IRWM-DMS) project to be used in updating the IRWM Plan and in providing stakeholders with web-based tools to improve water resources management in the region

## 2.0 INTRODUCTION

The IRWM Plan adopted in 2007 included a component to create a publically available web site to access the IRWM Plan and documents associated with water resources planning and management in the region. This scope of work is to develop additional tools to allow stakeholders to upload their planning and monitoring documents to the IRWM-DMS and to interact with the IRWM Plan and other stakeholders. Data that are uploaded and saved should be widely available and compatible with the State of California databases such as SWAMP, CERES, GAMA, CEIC and CEDEN. In addition there needs to be a collaboration tool that allows the stakeholders to share information with other agencies such as CNDDB, SAM, SIMoN, and NRPI. It should be noted that GIS layers that are available through local agencies, such as AMBAG and MRWPCA, will be incorporated into this system.
To foster stakeholder outreach and interaction between stakeholders, including land use planning bodies within the region, a publically available GIS mapping and collaboration tool will be provided for grant applications, project planning, project monitoring, and coordination with local, state and federal agencies.

An IRWM-DMS portal software solution would help manage, facilitate and share all data collected by different stakeholders involved in water and environmental resources of the State of California. This portal will be open to all federal, state, county and local organizations. The IRWM-DMS portal would allow the exchange and integration between the stakeholders and make it accessible to the public.

## 3.0 OBJECTIVES

- Perform a needs analysis and gather information from stakeholders on what type of projects they have undertaken or are planning in the near future, project timelines, funding needs, and what, if any, existing tools are being used to manage projects.

- Develop a scalable system architecture and design to meet the needs for IRWM planning using the IRWM-DMS portal with GIS mapping and collaboration tools and specify hardware, software, communication, networking tools (see Figure 1).

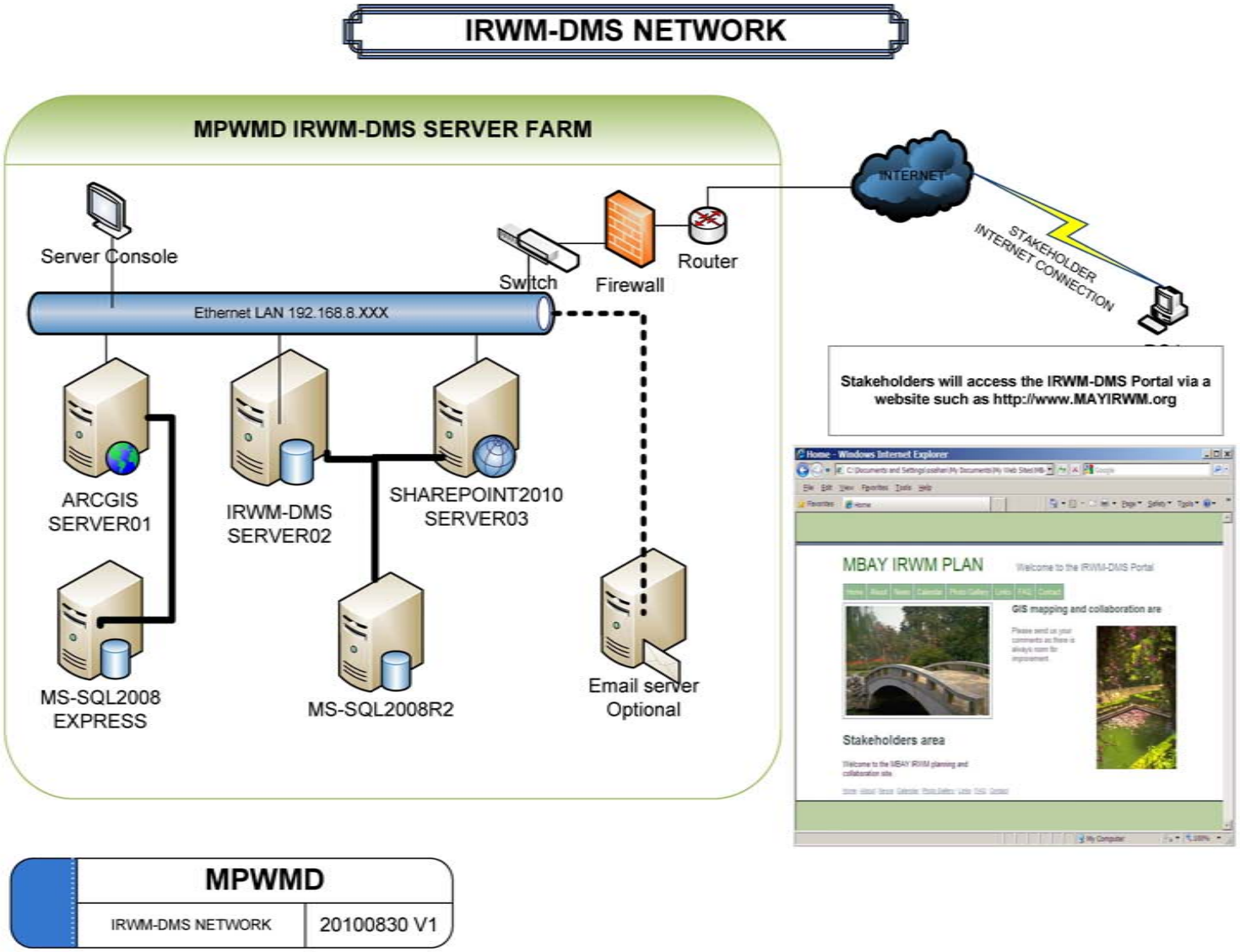



*Figure 1: Document Library Architecture*

## 4.0 SCOPE OF WORK

- Perform a needs analysis for the current stakeholders and develop a scalable system design and software for the IRWM-DMS portal. The system design shall include line item costs for the acquisition, implementation, integration, testing, and stakeholder training modules for all aspects of the IRWM-DMS portal, including the custom software development as needed.
- Develop a user interface for uploading and downloading information from all the stakeholders
- Develop project mapping capabilities that maps user defined information into a full GIS system with search capabilities
- If appropriate, provide a discussion forum that can be segmented by topic
- Link the GIS geo-databases to the State of California databases for information sharing
- Link user defined information to the IRWM Plan that can be implemented by each stakeholder having a MY HOME PAGE that links to the master plan

## 5.0. DELIVERABLES and SCHEDULE

5.1. Stakeholders will have the opportunity to review each deliverable product and provide oral and written comments. MPWMD will review and incorporate comments or implement directed changes, after discussion or clarification with the stakeholders and designated project lead, if necessary, and submit a final version of the product. The table of deliverables indicates when MPWMD shall begin the reporting and the frequency of reporting. MPWMD shall provide copies of the reports in electronic format.

| Deliverable | | PWS Reference | Due Date | Frequency | Distribution |
|---|---|---|---|---|---|
| D01 | IRWM-DMS Portal project IT infrastructure systems inventory report | Task 1 | Not later than 50 days after receipt of task order | One Time | stakeholders |
| D02 | Systems Requirements Specification (SRS) Document | Task 2 | Not later than 100 days of receipt of task order | One Time | stakeholders |
| D03 | Detailed Design Specification (DDS) Document | Task 3 | Not later than 150 days of receipt of task order. | One Time | stakeholders |
| D04 | System hardware, database, communication and network specification document with line item costs | Task 4 | Not later than 180 days of receipt of task order | One Time | stakeholders |
| D05 | Development, Implementation, Testing, Deployment, limited training sessions and documentation on the new custom IRWM-DMS portal system | Task 5 | Not later than 730 days of receipt of task order | One Time | stakeholders |

| | | | | | |
|---|---|---|---|---|---|
| D06 | Project Management | Task 6 | Quarterly progress meetings and updates | Quarterly | stakeholders |

## 6.0 PERFORMANCE REQUIREMENTS

**Task 1** – MPWMD shall perform IT infrastructure inventory for the IRWM-DMS Portal no later than 50 days from the date of receipt of task order.

Description of work – Identify requirements of the stakeholders IRWM plans for the IRWM-DMS Portal project

Deliverable: **IRWM-DMS Portal IT infrastructure and Software Inventory Report**

**Task 2 –** Gather the Software, Hardware, Database, Communications and Networking Requirements for the IRWM-DMS Portal project no later than 100 days from the date of receipt of task order after creating the needs from the stakeholders.

Description of work – Identify requirements and develop the preliminary IRWM-DMS needs for Hardware, Software, GIS needs, System Network and IRWM Pla(s) management requirements.

Deliverable: **Systems Requirements Specification (SRS) Document**

**Task 3 –** Create a detailed design for the recommended Software, Hardware, Database, Communications and Networking Requirements for the IRWM-DMS portal project no later than 180 days from the date of receipt of task order after the preliminary SRS has been approved and accepted.

Description of work – Based on requirements gathered to develop the final IRWM-DMS portal design for the overall system architecture and hardware setup, network architecture, custom software and GIS needs for analysis and IRWM plan reporting.

Deliverable: **Detailed Design Specification (DDS) Document**

**Task 4 –** Create a proof of concept (POC) after acquiring the hardware specified in the DDS to meet the needs of the IRWM-DMS portal no later than 730 days from the date of receipt of task order.

Description of work – Based on the DDS, acquire hardware for the defined system architecture, network the equipment, develop the custom software to include the GIS needs for analysis and IRWM plan reporting. Test for functionality in lab with stakeholders and then deploy on-site as a pilot project with a few test workstations for proper functionality.

Deliverables: **On-site pilot demonstration and functionality sign-off**

**Task 5 –** Implementation, Deployment, Testing, Training and Documentation of the custom IRWM-DMS portal project

Description of work – MPWMD shall install and test hardware for connectivity and functionality of the IRWM-DMS. Once the test is successful, the entire system will be deployed at MPWMD. The operators of the new IRWM-DMS system shall be trained to use the new system as designed. The system administrators will be trained to trouble shoot and fix applicable hardware and software problems related to the IRWM-DMS infrastructure and design as-built. For the training, it is estimated that training sessions will be needed --- 4 hour sessions for up to 10 users and 4 hour sessions for system administrators will be needed. More training can be provided if needed and will need to be approved prior to conducting the training. MPWMD shall provide all the relevant documentation and deliverables in English under this task.

Deliverables

- **Functioning and tested IRWM-DMS System**
- **Integration test results**

- **Four-hour training sessions for 10 people for using the new system and another 4 hour training session for troubleshooting and fixing hardware and system problems.**
- **System documentation in electronic format.**

**Task 6 - Project Management**

Description of work - MPWMD shall provide the project management support to successfully carry out the tasks within schedule. MPWMD shall provide monthly management and progress reports on activities completed, pending action items, and activities planned for the following period electronically at the end of each month. MPWMD shall construct and maintain a directory of task order participants that shall be included with each monthly report.

Deliverable: **Monthly status reports**

**7.0 IRWM-DMS Portal Project Reference Material and examples for IRWM-DMS design.**

MPWMD has developed a database system for water demand requirements for conservation, permitting, rebates, water use credits, water credit transfers etc. Figure 2 through Figure 4 show examples from the current system at MPWMD. These are examples of what stakeholders could expect to see at a new IRWM-DMS portal, but with more functionality. The information will be shared between the GIS mapping and IRWM-DMS for collaboration and sharing of ALL information. A customized "My Home Page" can be made available for the stakeholders as needed.

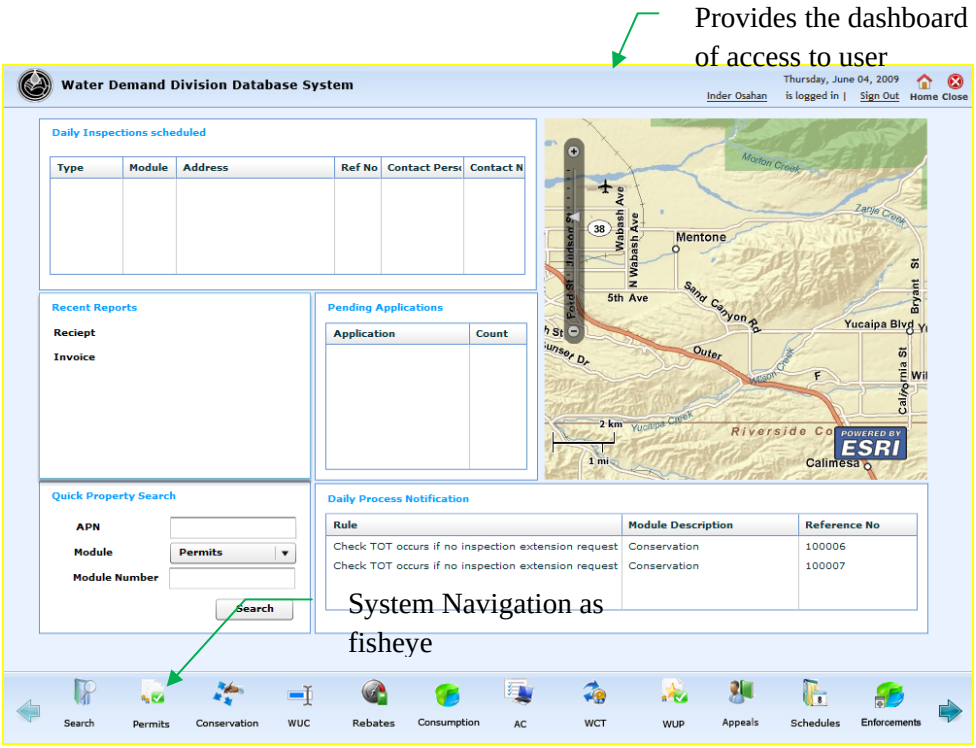



*Figure 2: DMS Portal Homepage Example*

**8.0 DOCUMENT LIBRARY**

Each project that is in the IRWM plan can have many documents of different types associated with it. All of these documents can be uploaded into the IRWM-DMS with an easy to use interface. Any document type can be added to the system by navigating to the Document Library link for each project type. Users will be able to select document names from a drop down list. Fields for ID's, Module Names and Reference IDs will been automatically generated. A user will be able to update their remarks in this section prior to selecting and uploading the document into the system (See Figure 3).

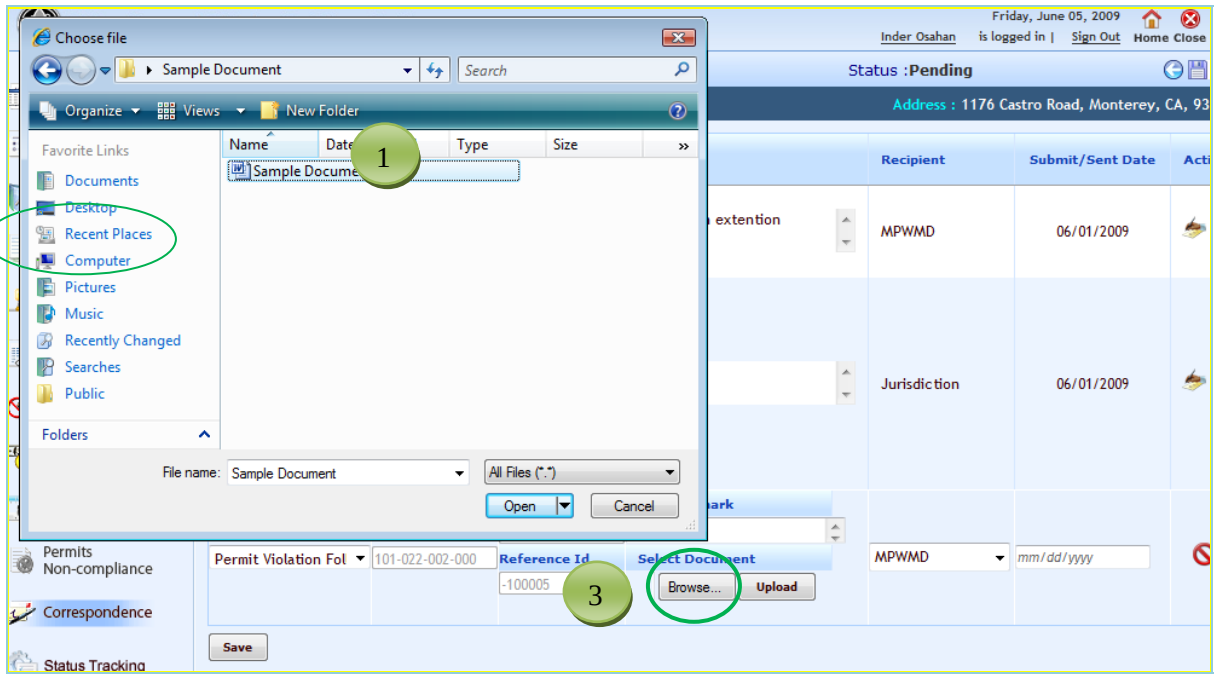



*Figure 3 – Document Upload*

A user will also be able to browse documents within a local machine, to update, view and eventually load into the system. Once the document is selected and loaded into the system, a confirmation message will be sent to the user to verify the upload.

### 9.0 Searching for a document or other information

Any available information can be searched through this particular module. Below is an example if one was looking for a particular property and knew the APN in advance.

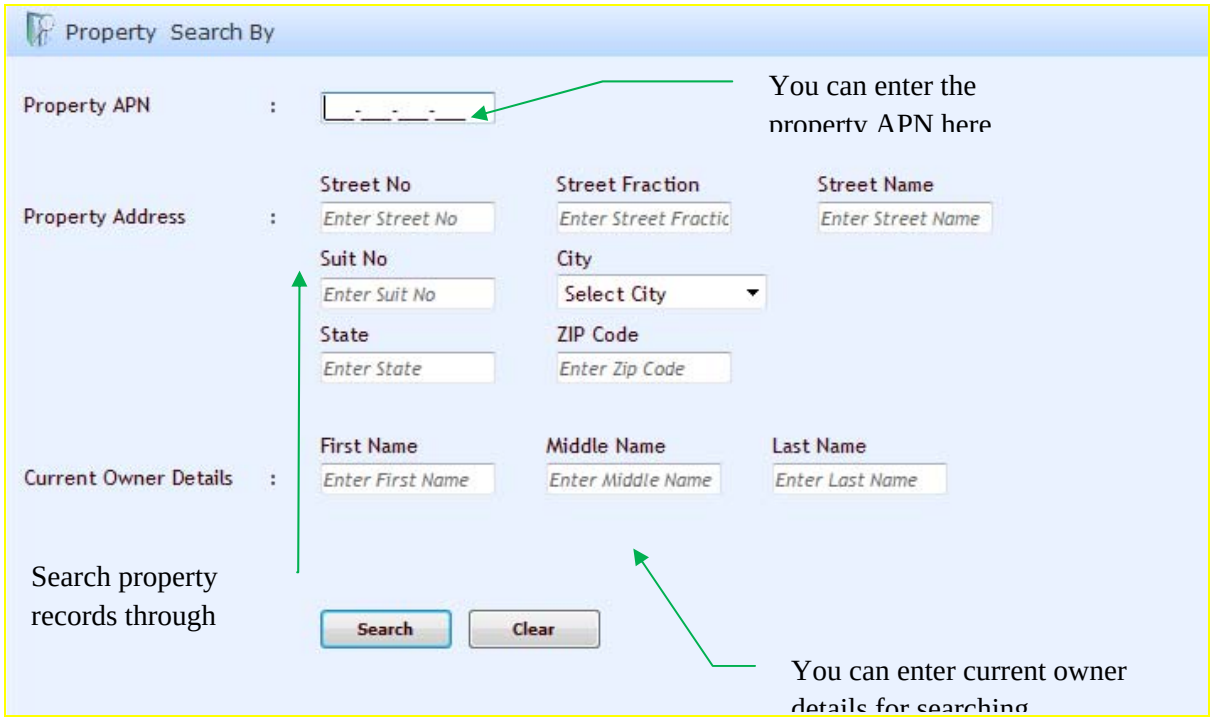



*Figure 4 – Example Search Screen*

## 10.0 Viewing Search Results

SharePoint 2010 is the business collaboration platform of choice for the enterprise deployment and the Internet. For every business scenario in which people need to interact with other people, with content and information, or with line-of-business data, the SharePoint 2010 platform includes a rich set of integrated capabilities that are ready to be used out-of-the-box, but can also be customized to address specific business needs and integrated with other products and solutions (Figures 5 & 6). The SharePoint 2010 platform can be deployed both inside the enterprise (intranets) and outside of the firewall (extranets, Internet) to enable interaction with employees, customers and business partners by using the same set of capabilities and tools.

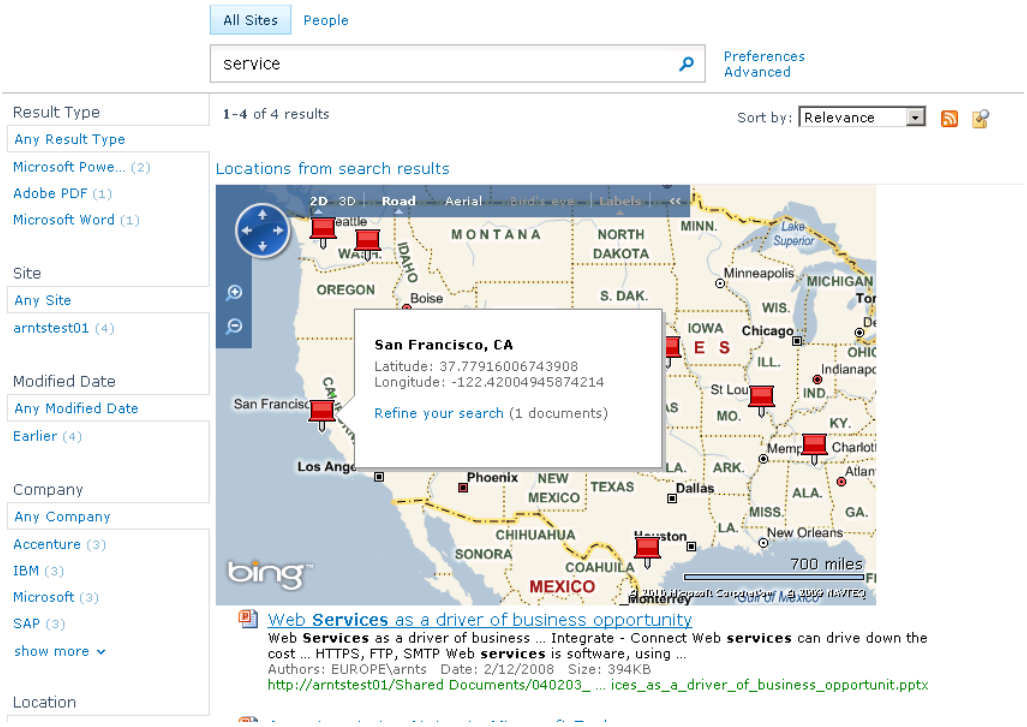



*Figure 5: Example Search Results*

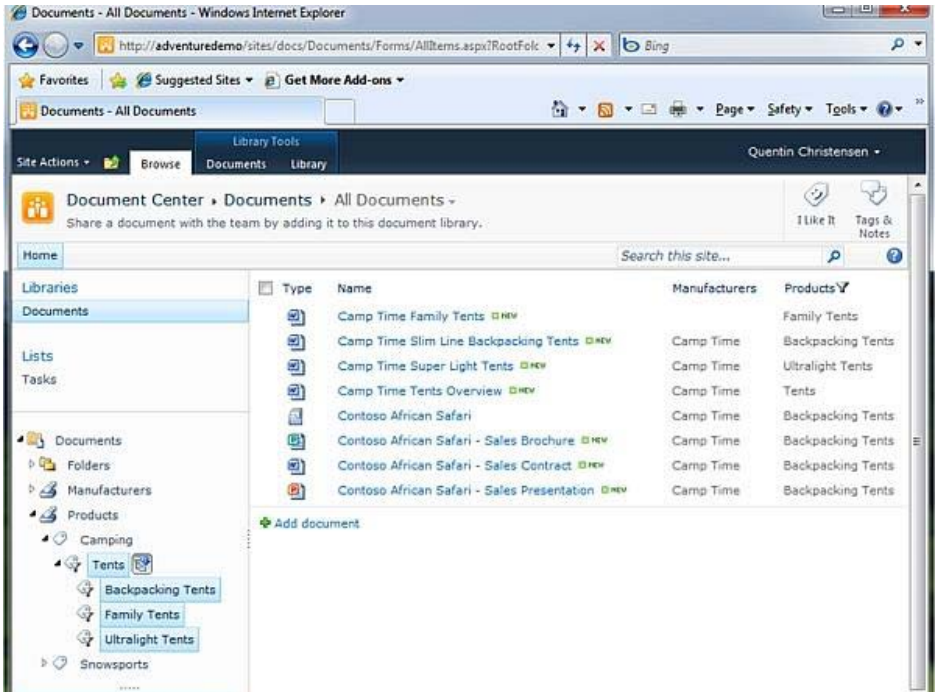



*Figure 6: Example of Document Search Result-List*

## 11.0 PROJECT COST

| TYPE | OVERALL COST | MATCHING | GRANT |
|---|---|---|---|
| SOFTWARE | | | |
| Sharepoint | 5,000 | | 5,000 |
| MS SQL Server | 1,300 | | 1,300 |
| Windows 2008 | 2,000 | | 2,000 |
| Backup Exec | 2,000 | 2,000 | |
| Antivirus Windows | 1,000 | 1,000 | |
| Windows 7 Pro Ultimate | 300 | 300 | |
| MS Exchange | 1,200 | 1,200 | |
| Backup Exec, Exchange | 900 | 900 | |
| Antivirus, Exchange | 900 | 900 | |
| HARDWARE | | | |
| HP Dl 380 Server | 10,000 | 5,000 | 5,000 |
| Tape Backup | 2,300 | 2,300 | |
| Console | 1,100 | 1,100 | |
| Network Switch | 500 | 500 | |
| Firewall | 600 | 600 | |
| VPN Appliance | 600 | | 600 |
| Laptop | 1,700 | 1,700 | |
| Misc Cables, Tools, etc | 700 | 700 | |
| Exchange Server | 3,100 | 3,100 | |
| HP 500 Gb Sata 1 Yr | 2,000 | | 2,000 |
| STAFF TIME | | | |
| CTO | 18,000 | 18,000 | |
| GIS Specialist | 1,600 | 1,600 | |
| CONTRACT PROGRAMMING | | | |
| .NET ASP Programmer | 20,000 | | 20,000 |
| TOTAL MATERIALS COST | 37,200 | 21,300 | 15,900 |
| TOTAL WAGES | 39,600 | 19,600 | 20,000 |
| OVERALL COST | 76,800 | 40,900 | 35,900 |
| PERCENTAGE OF OVERALL | | **53.3%** | **46.7%** |

# Exhibit A-5

## Inter-Regional Coordination Between the Greater Monterey County IRWM Plan and the Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM Plan

The Greater Monterey County region shares a border with the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management (IRWM) Plan region. This "inter-regional coordination" task focuses specifically on the coordination of projects between the Greater Monterey County region and the Monterey Peninsula region. The outcome of this task will be information that can be included in both regions' IRWM Plans, describing coordination efforts between the two regions.

*Note: Both regions are submitting this task in full (including the full budget) for Planning Grant funds, in order to avoid the possibility of one region not receiving a Planning Grant award and part or all of this task not getting accomplished. In the event that both regions should be awarded Planning Grant funds, the regions have tentatively agreed to evenly split budgeted costs and match, and evenly divide the remaining award funds to be allocated, in consultation with the Department of Water Resources (DWR), to other Planning Grant tasks.*

## Background

The Greater Monterey County IRWM planning region and the Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM planning region (Monterey Peninsula region) are currently updating their respective IRWM Plans to meet Proposition 84 standards and the IRWM program Final Guidelines published by DWR. A key aspect of this update is to identify neighboring IRWM efforts and the way cooperation or coordination with these other efforts will be accomplished. In addition, each plan should discuss ongoing water management conflicts with adjacent IRWM efforts.

The primary area where water resource management is shared between the Greater Monterey County IRWM Plan and the Monterey Peninsula IRWM Plan is in the vicinity of the Seaside/Salinas River Groundwater Basin divide. The Seaside Groundwater Basin (SGB) is a place of water supply storage and extraction for the Monterey Peninsula and the Salinas River Groundwater Basin is a source of water supply for the Ord Community, portions of which are in each IRWM Planning region (see Figure 2: Jurisdictional Boundaries in the Ft. Ord Area – note that the geographic planning region boundary coincides with the Monterey Peninsula Water Management District [MPWMD] boundary). The SGB and other portions of the former Fort Ord area can provide a significant opportunity for stakeholders in both IRWM planning regions to collaborate and coordinate on projects of interest to both regions. Of particular note, and prompting the preparation of this joint subchapter, is a major water supply and recycled water distribution project—the Monterey Bay Regional Water Project (or Regional Project)—being proposed for funding under the IRWM Grant Program, with potential long-term effects for both regions.

Physically, a regional analysis of groundwater levels found that the boundary between the Seaside and Salinas River Groundwater Basins appears to be a groundwater flow divide, which is simply the high point in the regional water-level surface between pumping depressions in Seaside, the Salinas Valley, and the El Toro Creek area. It is beyond the scope of either IRWM Plan to describe these interactions, but

extensive information may be found in the Laguna Seca Subarea Phase III Hydrogeologic Update, Prepared for the Monterey Peninsula Water Management District by Eugene B. Yates, Martin Feeney, and Lewis I. Rosenberg, November 2002 and in Seaside Groundwater Basin: Update on Water Resource Conditions, prepared for the Monterey Peninsula Water Management District by Eugene B. Yates, Martin Feeney, and Lewis I. Rosenberg, April 14, 2005 .

Within the area shared by the two IRWM regions, responsibility for and management of groundwater, potable water, wastewater, recycled water, stormwater, desalinated water, and resources dependent on all of these waters, are divided among dozens of stakeholders. These stakeholders range from private water distribution systems to federal agencies involved in the reuse of the former Fort Ord. However, most management responsibilities lie with the Cities of Seaside and Marina, California American Water (CAW), Marina Coast Water District (MCWD), MPWMD, County of Monterey, Monterey County Water Resources Agency (MCWRA), Monterey Regional Water Pollution Control Agency (MRWPCA), Fort Ord Reuse Authority (FORA), and the Department of Defense.

It is critical for both IRWM regions to have an understanding of the physical and jurisdictional interactions between the planning regions and for each region to understand each other's objectives and priorities. The following outline of work is intended to provide both regions with the basic information necessary to understand proposals within the regional and inter-regional context and to prioritize future management actions. Bulleted items indicate information to be developed or updated for the joint chapter.

## Task A Relationship between IRWM Regions

- Describe the background for forming the two regions. This section should summarize the information presented in the Regional Acceptance Process and other communications to DWR about the formation of the regions.
- Update information from the existing IRWM Plans and RAP submittal and briefly describe each Region and their current relationship to each other
- Define the purpose of the joint chapter, for example:
    - to "…help identify inter-regional opportunities and projects"
    - to "…promote the cooperative development of projects that benefit both regions"
    - to "…ensure consistency in project evaluation"
    - to "… promote cooperation and coordination between regions in the development and sustainable management of water resources." (see pages 20, 24 and 41 of Final Guidelines)
    - Note that the Monterey Bay Regional Water Project includes is comprised of multiple water supply project components that benefit both IRWM regions, prompting the preparation of this joint chapter.
- Note that the proposal to create the Monterey Bay Regional Water Project would have long-term effects in both IRWM regions. The proposal would link water resources in the Salinas Valley with supplies to the Seaside Groundwater Basin. There are ongoing discussions among agencies with responsibilities over these supplies, which include desalinated water, brackish groundwater near the coast, and recycled water. The current status of the Regional Project should be described (i.e., outcome of a decision by the California Public Utilities Commission [CPUC], status of project agreements, proposed schedule, etc.).

- Summarize components of the Regional Project and briefly describe the goals and objectives of the components for each planning region. This should include information about the Monterey Regional Desalination Project, the Regional Urban Water Augmentation Project (RUWAP), the Groundwater Replenishment Project, and Aquifer Storage and Recovery (ASR).
    - Describe the benefits from each project in each Region. These may include:
        - Improved/increased water supply and reliability
        - Conjunctive use; decreased dependence on surface water
        - Decreased treatment and operational costs
        - Decreased/prevention/mitigation of groundwater overdraft
        - Increased water use efficiency
        - Matching water source to its best use
        - Improvement/management of groundwater quantity and quality
        - Reuse of recycled water

## Task B Boundary Region

Fort Ord was established as a U.S. Army post by the Department of Defense in 1917 and proposed for closure in 1991 by the Base Realignment Commission. In 1994, the State legislature created the Fort Ord Reuse Authority (FORA) to oversee the reuse and redevelopment of the former military base, which includes more than 45 square miles of the former Fort Ord (also referred to as the Ord Community). A small portion of the former Ft. Ord remains under Army control and is now called the Presidio of Monterey Annex. Other property within the former Fort Ord falls under the following jurisdictions: the Bureau of Land Management, the cities of Seaside, Marina, Monterey, and Del Rey Oaks, the County of Monterey, the University of California, California State University at Monterey Bay, and the Presidio of Monterey Annex. The California Department of Parks and Recreation administers the Fort Ord Dunes State Park area that stretches along the western portion of the former Fort Ord between Highway 1 and the ocean.

Task B includes describing current and anticipated water supply needs as they relate to the two IRWM planning regions and how the various jurisdictions propose to meet those needs.

- Provide additional details about
    - Geography
    - Jurisdictional boundaries including political boundaries, special districts, and agency boundaries
    - Service areas for water and wastewater providers
    - Hydrogeology
    - Hydrology
    - Economics/Industry
    - Population and population trends (including MHI)

Potable water is provided to customers overlying the SGB by MCWD, CAW, and one other water distribution system. Over 90% of the water within the CAW service area is delivered by CAW, which

operates its main and three satellite water distribution systems in the area. MCWD provides municipal supply water to existing and future developed areas on the former Fort Ord military base. Within the SGB, this includes the residential areas and schools surrounding the Bayonet and Blackhorse golf courses. The water is obtained from wells near Marina, in the Salinas River Groundwater Basin. The City of Seaside operates a single municipal supply system in the SGB to serve residential customers in a part of the city. MCWD provides water for residents in the City of Marina and former Fort Ord. MCWD provides water solely from groundwater wells extracting from the Salinas Valley Groundwater Basin.

The principal nonpotable use of water in the SGB is irrigation of golf courses. The Laguna Seca and Pasadera golf courses are in the Laguna Seca Subarea of the SGB, and the Bayonet and Blackhorse golf courses are located on the former Fort Ord military base north of Seaside, in the Northern Coastal Subarea of the SGB. These irrigation uses are all supplied by nearby wells. Recycled water is also used at the Pasadera golf course.

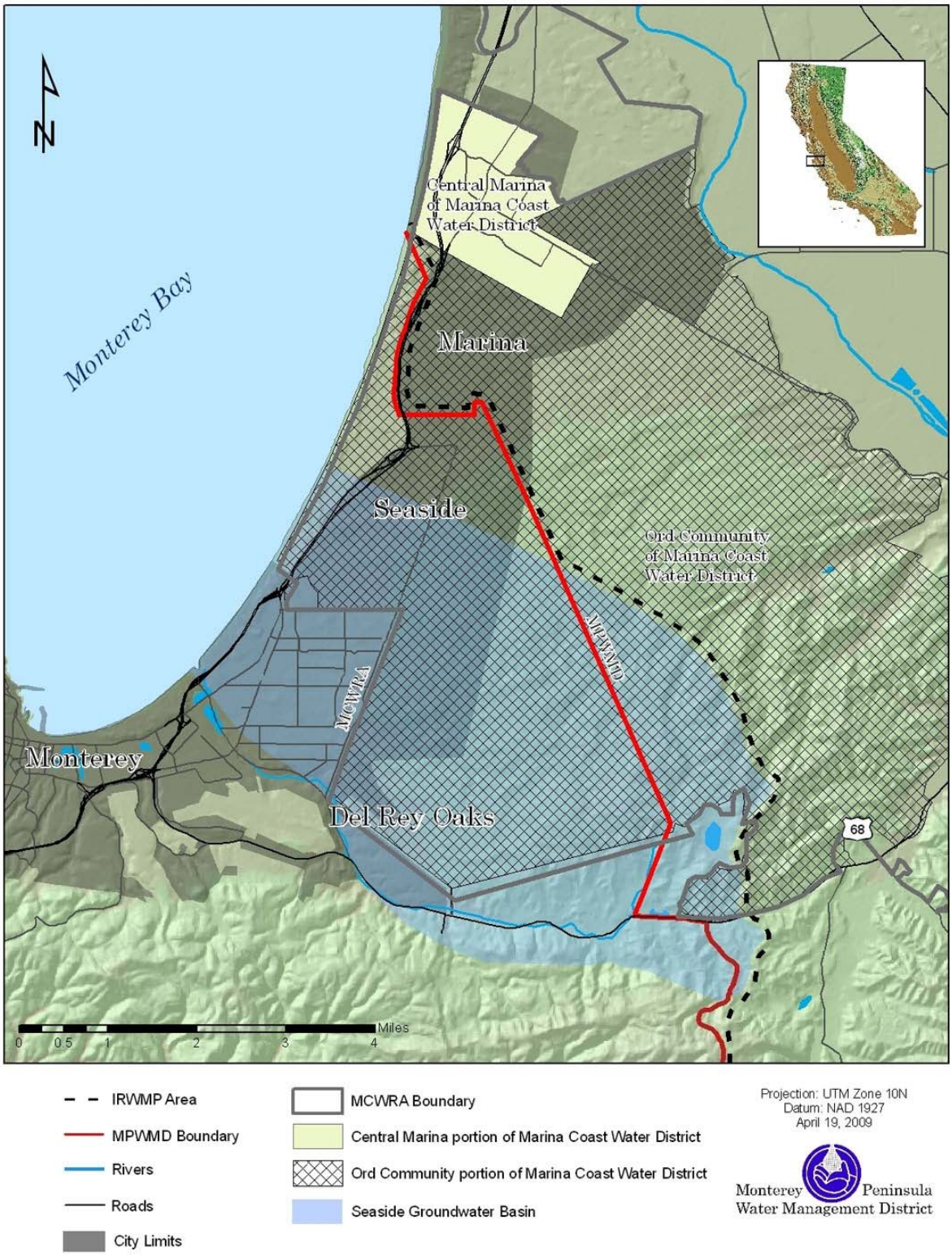
- Describe existing and future (20 year planning horizon) – refer to Fort Ord Base Reuse Plan
    - Water supply infrastructure
    - Water supplies available
    - Water needs

## Task C Monterey Bay Regional Water Project

The Regional Water Project consists of several individual project components, including a major new desalination plant and a recycled water distribution system, with construction planned in multiple phases. The project would link water resources in the Salinas Valley with supplies to the Seaside Groundwater Basin. There are ongoing discussions among agencies with responsibilities over these supplies, which include desalinated water, brackish groundwater near the coast, and recycled water. This task involves writing a detailed description of the Regional Water Project, including current status (i.e., outcome of a decision by the CPUC, status of project agreements, proposed schedule, etc.) and a summary of the project components. The goals and objectives of each component will be described, and the water supply benefits anticipated from each project component will be defined for each planning region.

- Describe the Regional Water Project and Anticipated Benefits

## Figure C: Jurisdictional Boundaries in the Ft. Ord Area



# Task D Inter-Regional Prioritization Processes

The Greater Monterey County IRWM planning region and the Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWM planning region have, or plan to develop, a stakeholder process to identify goals, objectives, and priorities within the region and to develop or update a process to select and prioritize projects to meet the respective IRWM goals. It is unlikely that each region will use an identical or equivalent approach to select projects. However, in order to reduce the potential for good projects to be stranded between the two regional plans, a process should be developed to identify and agree on a common set of priorities for the Ord Community and on a process to select projects to meet those priorities.

It is likely that the framework for incorporating the priorities and selecting projects for the Ord Community will be provided with the development and update of the respective IRWM Plans to Proposition 84 standards. However, the following tasks should be carried out in connection with the development of this joint chapter and in parallel with the development and update of each IRWM Plan:

- Form a sub-committee comprised of members of the Regional Water Management Group (RWMG) from each region that are familiar with the Ord Community area. The purpose of the sub-committee would be to identify objectives and priorities and solicit projects within the Ord Community.
- Identify any stakeholders and issues of concern that have not been represented in one or the other IRWM Plan. Include an investigation of any environmental justice concerns associated with the reuse of Fort Ord (note that several areas of Fort Ord have unexploded ordinance, pre-WW II lead paint contamination, and groundwater plumes of toxic substances).
- If appropriate, hold one or more public workshops to take input on issues and to comment on priorities and objectives for the Ord Community.
- Identify the issues, objectives, priorities, and projects for the Ord Community, which lies astride the common regional boundary. Identify project components that can most appropriately fit one region or the other. Using the respective ranking system and prioritization process from the appropriate region, these components may be prioritized within the respective region.
- Present these results to each RWMG for their consideration.
- Update each IRWM Plan to include the results of this process.
- It is anticipated that at least four quarterly meetings of the sub-committee would be required to complete this portion of the task.

**Exhibit A-6** – San Jose Creek Watershed Plan

**Summary and Need:** A complete, steelhead-centric, physical watershed assessment is proposed that will lead to a prioritized list of watershed management actions. The assessment will integrate information from sediment source analysis, hydrologic data, barrier evaluations, and lagoon monitoring.

San Jose Creek flows through a 14.2 mi2, steep, rugged, steelhead-bearing, watershed that empties into the Pacific Ocean near the southern head of Carmel submarine canyon (Fig. 1, FRGP proposal application). The watershed has a 7% average slope that gains 3150 ft of elevation at its highest divide over an 8.3 mile hydraulic length. The mouth passes through a small lagoon before its waters enter the Monterey Bay National Marine Sanctuary.

The coastal waters receiving its effluent are highly valued. The mouth of the watershed simultaneously empties into a "critical coastal area," a "State Marine Reserve" of the Marine Protected Areas, and a "State Water Quality Protection Area" (NOAA, 2009). Thus, San Jose watershed management is critical for both steelhead survival and for protecting the quality of the immediately adjacent marine environment. Steelhead in San Jose Creek are part of the South Central California Steelhead Distinct Population Segment that includes all naturally spawned anadromous O. mykiss (steelhead) populations below natural and manmade impassable barriers in streams from the Pajaro River (inclusive) to, but not including the Santa Maria River, California (listed as a threatened species on August 18, 1997; threatened status reaffirmed on January 5, 2006). Promoting the steelhead run is one of five regional priorities in the IRWM Plan.

Salmonid recovery can only occur if "major limiting factors" are prioritized and addressed. (NOAA, 2006). The 2006 Pacific Coast Salmon Recovery Fund Report lists the major salmonid limiting factors for the South-Central California Coast DPS (NOAA, 2006). The proposed work in this scope directly addresses these limitations that are present in San Jose Creek, including:

- sediment-impaired spawning or rearing habitat,
- altered stream flow,
- migration impediments, and
- altered channel/floodplain morphology.

**Scope of Work:** There are four basic tasks to be completed that address the four limitations described above. Please see pages 14 and 15 in the following Fisheries Restoration Grant Program (FRGP) Proposal.

**Deliverables:**

- Final Watershed Plan (written report in pdf format)
- GIS project with database and several layers
- Electronic files with data

**Schedule – see pages 11 and 12**

**Budget – Please see page 22**

## Project Objectives

### 1. Background information:

We are proposing a complete, steelhead-centric, physical watershed assessment that will lead to a prioritized list of watershed management actions. The assessment will integrate information from sediment source analysis, hydrologic data, barrier evaluations, and lagoon monitoring.

San Jose Creek is a 14.2 $mi^2$, steep, rugged, steelhead-bearing, watershed that empties into the Pacific Ocean near the southern head of Carmel submarine canyon (Fig. 1). The watershed has a 7% average slope that gains 3150 ft of elevation at its highest divide over an 8.3 mile hydraulic length. The mouth passes through a small lagoon before its waters enter the Monterey Bay National Marine Sanctuary.

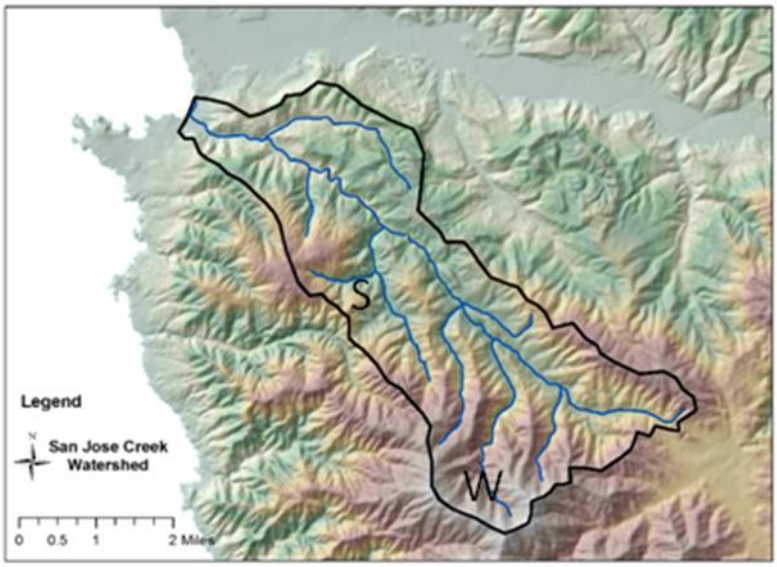



Figure 1: San Jose Creek watershed and major stream channels. S = Seneca Creek. W = Williams Creek.

The coastal waters receiving its effluent are highly valued. The mouth of the watershed simultaneously empties into a "critical coastal area," a "State Marine Reserve" of the Marine Protected Areas, and a "State Water Quality Protection Area" (NOAA, 2009). Thus, San Jose watershed management is critical for both steelhead survival and for protecting the quality of the immediately adjacent marine environment.

There are four challenges facing steelhead populations trying to utilize San Jose Creek.

A. Excess bedload and siltation is impacting spawning gravels and rearing habitat (Nelson, 2006; Nelson et al., 2006), and locally eliminating pool volume.
B. Summer base flows have greatly diminished in recent years (MPWMD gage data). This reduction may be due to diversions (Nelson, 2006).
C. There are migration barriers that may require monitoring and management for sediment trapping and barrier assessment (Nelson et al., 2006; Nelson 2006).
D. The lagoon is briefly open to the sea, and has a poor geometry for adult fish passage.

#### A. Sediment

The watershed is underlain by several highly erodible geologic units (granodiorite, quartz diorite, and Monterey Shale). While the crystalline bedrock units might be very stable in some parts of California, slip between the Pacific and North American plates has pervasively faulted and fractured the bedrock in the

study regions. Those three rock units have been implicated in various adjacent watersheds for producing voluminous sandy bedload or producing slope failures when disturbed (Smith et al., 2003; 2004a; 2004b; 2005a; 2005b, 2006). These units are regionally mapped as highly erodible and prone to slope failure in many areas of Monterey County (Rosenberg, 2001). Excess sediment from these units and exposed stream banks may be the leading causes of physical habitat impairment. We propose to measure watershed sediment yield, develop a ranked inventory of all sediment sources, and to ascribe a proportion of the sediment yield to the various sources including stream bank retreat. The work will involve sediment transport and geomorphic studies. The outcome will be a watershed restoration/management - plan focused on sediment management. It will be quantified through serial cross geomorphic surveys and stream-bank retreat analysis. The analysis will capture one winter runoff, but the benchmarks will remain for future monitoring beyond the life of the grant.

**B. Base flow**

Central coast watersheds commonly lack rainfall for the 6 months from May to November. Dry-season flow that maintains habitat for young steelhead is strictly limited to groundwater base flow. Winter rains recharge the regional aquifers and then the water is slowly released through seeps and springs in summer months. Near-stream groundwater extraction has been shown to significantly reduce base flow in local rivers (e.g., Maher, 2008), and has been linked to stream incision and steelhead takes as well (SWRCB, 1995). Upland well use might also influence long-term base flow, but this effect is still under research (Ford, 2004; Smith et al., 2004; Croyle, 2009; Croyle and Smith, 2007; Castorani and Smith, 2009). Numerous upland wells exist in or near the watershed on Santa Lucia Preserve property, and several private wells exist near the stream channel within San Jose watershed (Nelson et al., 2006). The possibility exists that observed base-flow reduction in San Jose Creek is influenced by both climate and diversion. We propose to develop a spatially explicit hydrologic budget for the watershed. The total surface water yield will be determined, and the yield will be analyzed in terms of subwatershed contribution and land-use impacts. We will be paying close attention to summer base flow for two summers during this grant, but the rain and stream gaging infrastructure will remain in place for continuous future monitoring. We will also analyze the historic gage record to better quantify base flow trends and to separate climate influence from anthropogenic influence.

**C. Barriers**

Steep forested streams are prone to sediment and large woody debris jams that both trap sediment and hamper fish passage. These blockages occur in natural streams, and they form part of the large-scale roughness and habitat diversity found in the natural landscape. Their removal or modification should be given considerable forethought. Potential steelhead migration barriers have been located in the San Jose watershed on San Jose Creek (Nelson et al., 2006), on Seneca Creek (Nelson, 2006), and Williams Creek (Smith et al., 2003). The focus of this study will not be fish passage. We propose to assess the geomorphic role of the jams by

1) precisely mapping the present potential migration barriers relative to potential spawning habitat,
2) providing estimates of sediment storage (material that would be liberated by barrier removal), and
3) providing a judgment about the likely geomorphic impacts of barrier removal or manipulation (grade control, slope stability, etc.).

As was done in neighboring Garrapata watershed, the study will provide a prioritized list of locations where there are opportunities to improve fish passage, without major channel alteration or negative impacts (Casagrande and Smith, 2005). The prioritization will be broadly based upon a balance of current and future geomorphic impacts and amount of spawning habitat gained by barrier alteration. The results

will be linked to a GIS database.

**D. Lagoon**

Estuaries and lagoons along central California are utilized by steelhead in a variety of important ways (e.g., Bond, 2006). Estuaries provide a point-of-entry for winter spawning events, a transitional zone for smolts to acclimate to the marine environment, and protective habitat for juveniles. Water quality in a lagoon can greatly influence juvenile success. Generally, steelhead prefer low temperatures, low salinity and high dissolved oxygen (Smith, 1990; Bond, 2006).

Large seasonal lagoons are clearly an advantage to steelhead survival, but little is known about the steelhead utilization of very small, or marine-dominated lagoons present on smaller or steeper streams along the central coast (e.g., Casagrande and Smith, 2006). San Jose Creek has a small lagoon that seasonally forms downstream of a constricted culvert below State Hwy 1. It is pinched between the highway grade and the tall beach berm of Monastery Beach. Limiting factors associated with the lagoon include

1) short period of access to the sea,
2) coverless shallow wide sandy channel where predation is easy
3) extremely steep swash ramp connecting the back-beach channel to the sea, and
4) limited space and time for smolting.

According to a survey by the U.S. Army Corps of Engineers, the swash zone of Monastery Beach is the steepest in North America. This condition makes the entrance to San Jose Creek a very steep sandy channel that typically maintains shallow critical or supercritical flow at all but the highest tides.

No studies detail the annual hydrologic and geomorphic evolution of the lagoon, so we do not even know the timing and duration of conditions that favor fish passage to and from the lagoon. We propose to initiate a monitoring program that will help develop an understanding of the role that small lagoons play in the steelhead life cycle. The understanding may lead to recommendations about lagoon management.

While we will not be directly studying steelhead utilization, we will be monitoring physical conditions. We propose to continuously monitor water stage in the lagoon and to establish benchmarked surveys of lagoon geometry. Seasonal automated photomonitoring will capture the timing of the lagoon's dynamic changes. The product will be a report describing the dynamic changes in lagoon structure and hydrology, and an interpretation of the physical causes of change. The lagoon behavior will be interpreted in the context of the potential for steelhead utilization and the potential to reduce the limiting factors imposed by human impacts.

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**2. List task information:**

The watershed plan is comprehensive in scope and would address three Priority 5 tasks on the Central Coast-Santa Lucia Hydrologic Unit Steelhead Trout Management Tasks list:

Fish Passage, Id CC-08 – "Assess…steelhead migration barriers in Central Coast watersheds…"

Sediment, Id CC-30 – "Identify and assess sediment sources within Central Coast watersheds (i.e., Whitehouse and San Jose creeks)"

Streamflow, Id CC-27 – "Develop guidelines for maintaining instream flows to protect fisheries resources downstream of water diversions in Central Coast watersheds."

**3. Need for the project:**

Salmonid recovery can only occur if "major limiting factors" are prioritized and addressed. (NOAA, 2006). The 2006 Pacific Coast Salmon Recovery Fund Report lists the major salmonid limiting factors for the South-Central California Coast DPS (NOAA, 2006). The listed limitations include

- sediment-impaired spawning or rearing habitat,
- altered stream flow,
- migration impediments, and
- altered channel/floodplain morphology.

The proposed work directly addresses those four components of San Jose Creek.

The need for this work is also expressed in the FRGP PSN-III, where a watershed plan for steelhead restoration in San Jose Creek (Monterey County) forms a strong FRGP focus combination.

San Jose Creek watershed is underlain by geologic materials that are susceptible to high erosion rates if disturbed (Fig 2). Nelson (2006) recommended a more specific geomorphic study in San Jose watershed following a stream inventory study where sediment impacts and barriers were identified (Fig 3).

Ford (2004) noted a decrease in base flow using existing gage data (Fig. 4).

First-hand observations of the lagoon environment indicate that limitations exist there (Fig. 5). The figure shows the typical lack of cover and shallow flow conditions.

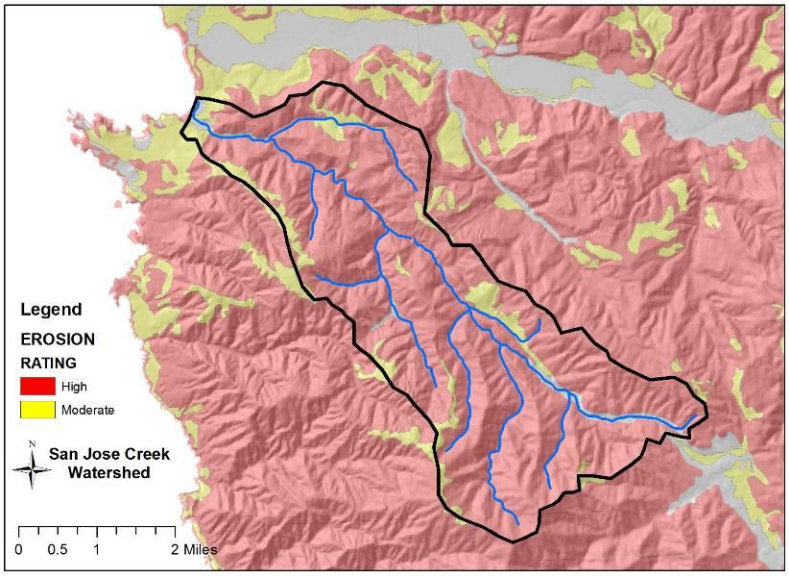



Figure 2: San Jose Creek watershed is underlain by easily eroded geologic units (erosion potential GIS layer from Rosenberg, 2001).

Figure 3: Excess sand-size bed material in Seneca Creek.

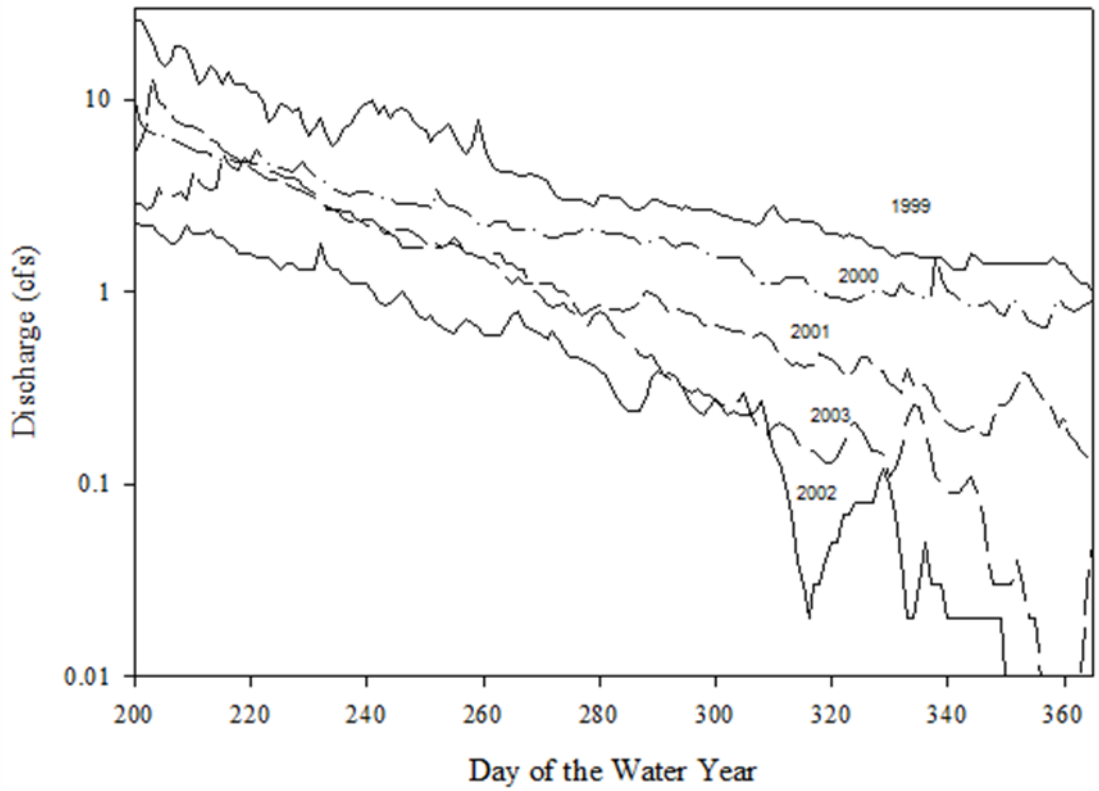



Figure 4: Summer hydrologic recession at MPWMD gage shows marked decrease through time (from Ford (2004)).

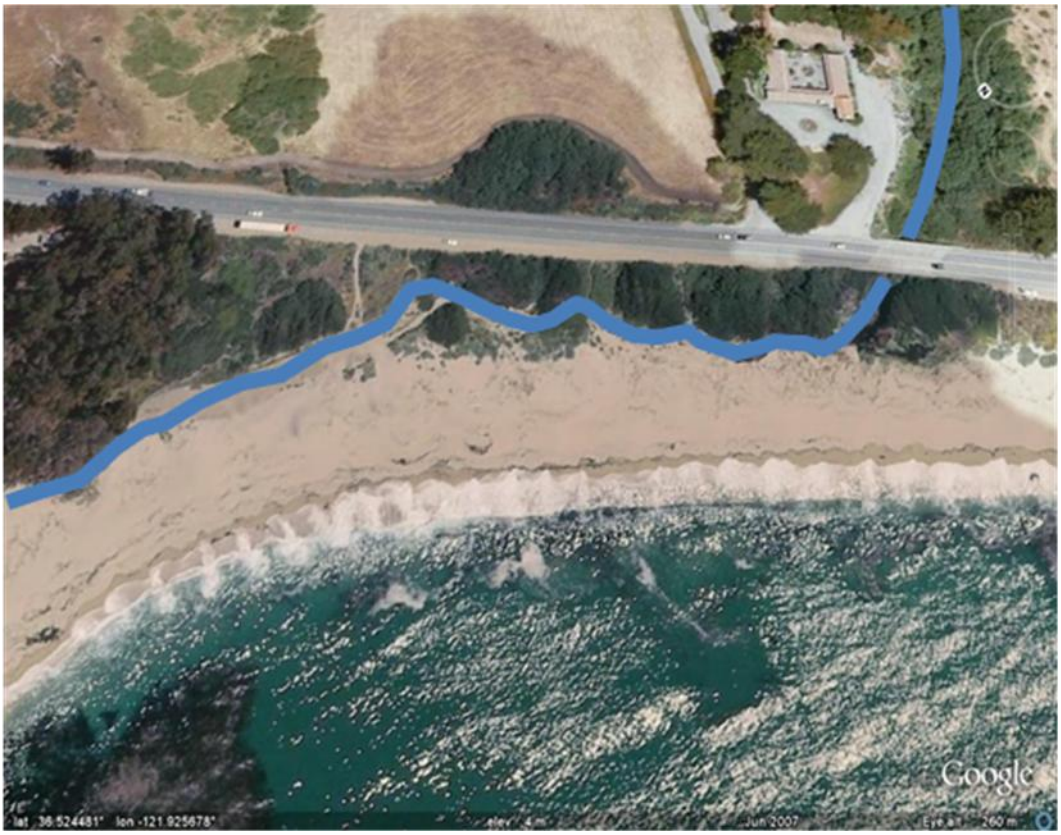



Figure 5: Blue line shows position of back-beach lagoon channel at Monastery Beach.

Figure 6: San Jose Lagoon 2/20/09; 15 cfs. Note lack of cover.

| | |
|---|---|
| **4. Limiting factors to salmonids remediated by proposed project:** | ☒ Water quantity (lack of flow, diversions, runoff)<br>☐ Water quality (temperature, chemistry, turbidity)<br>☐ Riparian dysfunction (lack of shade, excessive nutrients, roughness, elements)<br>☒ Excessive sediment yield (pool and gravel quality)<br>☒ Spawning requirements (gravel, resting areas-pools)<br>☒ Rearing requirements (velocity, lack of shelter, pools)<br>☒ Estuary / lagoon issues (closure during migration periods)<br>☒ Fish passage (emigration and immigration) |

**5. <u>Limiting factor remediation:</u>**

This proposal will not immediately remediate any habitat limitations. The assessment will eventually lead to improved habitat because any restoration objectives described in the final Watershed Plan might be implemented in future work. Therefore, the potential exists for this proposed work to eventually reduce excess sediment, increase base flow, improve fish passage to more miles of spawning habitat, and improve the habitat conditions of the lagoon

**6. <u>Additional objectives:</u>**

Develop baseline conditions for future assessments

Initiate long term hydrologic and geomorphic monitoring program

Develop reference reach conditions for assessment and restoration

Train undergraduate and graduate students in the field techniques of watershed science

**Project Tasks and Results**

**1. *Detailed project tasks*:**

**A. Sediment**

Sediment transport rating curves will be made at several key points in the watershed to parse the total load into sub-watershed, major impact, or land-use sources. Upstream-downstream and paired watershed sampling strategies will be employed to capture local effects (e.g., Rosgen 2004). Total watershed annual yield will be estimated by applying the local rating curves to the stream gage data (see "baseflow" below). Helley-Smith bedload samplers and DH-48 depth integrated suspended load samplers will be used in connection with stream flow measurements to develop these relationships. Sediment analysis will be performed at the CSUMB Watershed Geology Lab.

a. Upland and Valley Bottom Sources

-Fixed wing aerial reconnaissance oblique photos (2X--once in beginning and once at end)
-Car and foot traverses to investigate general landscape, with focus on potential impacts discovered by flight.
-GPS locations of upland sediment sources. Add to GIS database for project.
-Benchmarked monitoring or photomonitoring may be established for potentially devastating sediment sources.
-For sediment sources deemed to be potentially harmful to steelhead habitat, list typical published restoration practices (e.g. Flosi et al., 1998).
-Prioritize upland and valley bottom restoration practices by weighing potential sediment volume, delivery ratio, and sensitivity of subjacent stream reach and downstream reaches to excess sediment load (e.g. is the channel above the limit of anadromy? Does it have functioning steelhead habitat? Is it steep enough to transport elevated sediment loads, and where will the excess sediment make a downstream impact?)

b. Stream channel sources

-Visual inspection of river banks will provide a rough inventory of river reaches that are potentially generating excess sediment. Reflection upon past DFG surveys (Nelson, 2006; Nelson et al., 2006) will be used to analyze time trends to determine if the site is a chronic sediment source.
-Stream reaches with what appears to be chronic lateral erosion will be mapped and prioritized for restoration using methods recommended in Flosi et al. (1998). In cases where significant channel modifications are warranted, the recommended actions may be based upon the principles of "natural channel design" (e.g., Rosgen 2007), especially as applied to incised rivers (e.g., Rosgen, 1997).
-Actual sediment delivery rates will be established for a subset of river reaches. The erosion data will come from both benchmarked stream surveys and bank pin arrays. A variety of monitoring sites will be selected to reflect varying levels of apparently severity and drainage area. Several sites that appear geomorphically stable will be monitored as well to determine reference conditions for impact assessment. Data from the reference sites will be used to calculate the rough proportion of the total watershed sediment load ascribable to unstable banks.
-Data from the monitoring sites can be extrapolated in the watershed by estimating the total stream length of each kind of bank present in the study area.

**B. Base flow**

-At least 3 stream gaging sites will be selected and rated to capture the water yield, as parsed among subwatersheds and major land use.

-Two tipping rain gages will be deployed to capture event and total precipitation.
-Total water yield and total rainfall will be used to estimate an annual hydrologic budget.
-Base flow analysis at various points in the watershed can be used to estimate the timing of base flow termination each year as a function of major land-use or watershed conditions (% forest, etc). The influence of near stream groundwater extraction use will be investigated as well.
-Historic gage records (Monterey Peninsula Water Management District data) will be analyzed for previous time trends in base flow.
-Recommendations for improving summer base-flow conditions will be presented.

**C. Barriers**

-Foot and vehicle reconnaissance to find and visually assess the geomorphic roles of migration barriers and material jams. Special attention will be made to further assess the barriers and jams described in Nelson (2006) and Nelson et al. (2006).
-Barriers that appear to have the potential to fail or the potential to be modified for fish passage will be further assessed for geomorphic impacts related to modification and the relative benefits of removal or modification.
-Assessment will include an estimate of stored sediment volume, grade control, adjacent slope stability, and the amount and value of underutilized steelhead habitat present upstream from the barrier.
-Barriers will be mapped and prioritized for modification using methods recommended in Flosi et al. (1998)

**D. Lagoon**

-Analysis of historic aerial photographs will reveal time-trends in lagoon geometry, and may provide insights into the impact of the Highway 1 grade.
-Continuous recording stream gage will be deployed and rated for discharge and sediment transport near the highway 1 bridge (Fig. 5) to record lagoon stage through time.
-Automatic camera will be placed in the trees near the mouth to capture the timing and character of lagoon connection during the few weeks that the stream has access to the sea (Fig. 6).
-Benchmarked cross sections will monitor the channel geometry through time during the time when the mouth is open.
-Recommendations for habitat improvement will be made based upon a synthesis of site inspection, automated camera, survey, stage, and history data.

**1. *Time frame:***

Spring 2011

Initial tasks will vary pending the initial contract date
Flyover to plan foot and vehicle reconnaissance
Determine optimal stream gage placements in watershed
Set stream gage in lagoon
Set automated camera in lagoon (if stream is still open to the sea)
Purchase all materials
Develop GIS database for data input

Summer 2011

Aerial photographic assessment of historic impacts and trends
Begin mapping upland and valley bottom sediment sources
Begin mapping in-stream conditions
Install stream gaging sites

Fall 2011

Continue assessing in-stream conditions
Select sites for long-term survey and bank pin monitoring
Perform baseline surveys of benchmarked sites
Install bankpins
Deploy rain gages

Winter 2012

Deploy automatic camera in lagoon
Rate stream gages for water and sediment
Sediment transport measurements above and below potential sediment sources
Sediment lab analyses

Spring 2012

Rate stream gages for sediment and water

Summer 2012

Resurvey benchmarked survey sites
Measure and reset bankpins
Barrier assessment

Fall 2012

Finish field work
Hydrologic analysis
Flyover to document upland changes
Report writing

Winter 2013

Complete final Watershed Plan document
Community meeting to disseminate and discuss results (Parks)

**3. *Deliverables*:**

Final Watershed Plan (written report in pdf format)
GIS project with database and several layers
Electronic files with data

**4. *DFG protocols to be used in project development and implementation*:**

☒ DFG *California Salmonid Stream Habitat Restoration Manual*

List: see description in text below

☒ DFG monitoring protocols for restoration project effectiveness and validation monitoring

List: see description in text below

☐ California Content Standards

☐ National Science Content Standards

**5. *Other protocols:***

The prioritized list of restoration practices will rely on typical restoration practices recommended in Flosi et al. (1998), but will be modified for specific sites using best professional judgment in the context of site-specific constraints and opportunities. In cases where significant channel modifications are warranted, the recommended actions may be based upon the principles of "natural channel design" (e.g., Rosgen 2007), especially as applied to incised rivers (e.g., Rosgen, 1997). Site descriptions in the reports will reference the level-IV stream habitat typing defined in Flosi et al. (1998), and will use Rosgen (1994) reach classification (as recommended in Flosi et al. (1998)).

While we will not be monitoring restoration effectiveness, we will be establishing long-term geomorphic monitoring sites using standard stream survey techniques described in DFG monitoring protocols and as described in Harrelson at al. (1994).

Many of the upland erosion inventory tools and principles described in "Part X" of Flosi et al. (1998) will be used in this work. We will be focusing on slopes that might have a direct negative impact on steelhead habitat. Road impacts have previously been assessed; those protocols will not be employed, unless new erosion sites are discovered. As described in "Part X" we will be purchasing historic aerial photography of the watershed to investigate historical changes and trends. We will augment that analysis with flyovers.

**6. *Expected quantitative results (project summary):***

| Quantitative Result | Units | Project Type(s) | Result |
|---|---|---|---|
| a. Overall stream length treated or affected by habitat improvement projects | miles | HA, HB, HI, HS, HR, FL, FP | |
| b. Workshop/training events | number | ED, TE | |
| c. Participants in workshop/training events/students educated | number | ED, TE | |
| d. Publications completed/distributed | number | ED, TE | 4 |
| e. Schools/institutions reached | number | ED, TE | 1 |
| f. Length of stream bank acquired/protected | miles | HA | |
| g. Area acquired/protected | acres | HA | |
| h. Barriers/blockages removed or modified (other than culverts) | number | HB, FL | |
| i. Stream length made more accessible by removing barriers other than culverts | miles | HB, FL | |
| j. Stream crossings/culverts improved for fish passage | number | HB, FP | |
| k. Stream length made more accessible by treating stream crossings | miles | HB, FP | |
| l. Length of instream habitat treated | miles | HI | |
| m. Instream habitat and/or bank stabilization structures to be installed | number | HI, HS | |
| n. Length of riparian stream bank treated (measure both sides of the bank, if appropriate) | miles | HR | |
| o. Riparian area treated | acres | HR | |
| p. Trees planted | number | HR | |
| q. Fencing length to be installed/repaired | miles | HR | |
| r. Stream bank stabilized (measure both sides of the bank, if appropriate) | miles | HS | |
| s. Road length treated | miles | HU | |
| t. Watershed culverts treated | number | HU | |
| u. Sediment volume prevented from entering the stream | cubic yards | HU, HR | |
| v. Upslope area treated | acres | HU | |
| w. Stream sites monitored | number | MD, MO | 30 |
| x. Public meetings | number | OR, PI | 2 |
| y. Public meeting attendees | number | OR, PI | 25 |
| z. Stream length assessed | miles | PL | 15.43 |
| aa. Road length assessed | miles | PL | 81.3 |
| bb. Area assessed | acres | PL | 8421 |
| cc. Juvenile fish produced | number | RE | |
| dd. Juvenile fish released | number | RE | |
| ee. Fish screens installed | number | SC | |
| ff. Flow rate of diversions treated | cfs | SC | |
| gg. Quantity of water protected by screens | acre-feet/year | SC | |
| hh. Flow of water (average or range) returned to or maintained in | cfs | WC, WP | |

| | | | |
|---|---|---|---|
| stream | | | |
| ii. Water flow gauges installed | number | WD | 3 |
| jj. Amount of water leased/purchased | acre-feet | WP | |

**7. *Other products and results*:**

**A) Monitoring Baseline and Infrastructure-**The proposed work will synergistically initiate a base-line snapshot of watershed conditions that can be used to measure changes in flow and geomorphology, or to measure the impacts of watershed alteration. The survey benchmarks and gage stations will serve to offer a long-term opportunity for hydrologic and geomorphic monitoring beyond the life of the grant.

**B) Reference Stream Parameters—**River assessment and restoration is made more robust if one can find "reference reaches" that serve as models for comparison or blueprints for design (e.g., Dunne and Leopold 1977; Smith et al., 2009). We will be establishing benchmark surveys on both impaired and reference channel reaches having a variety of drainage region. The product will be published to be used in local assessments or restoration projects.

**C) Background Sediment Yield**---Despite the need to develop sediment TMDL's on 303(d) listed streams, there is little data available to use as reference (expected natural) conditions. This study will produce sediment yield and sediment rating curves for subwatersheds of San Jose Creek. If any of these watersheds is found to be unaltered by human activites, the resulting sediment data may serve as a valuable benchmark for regional sediment TMDL assessments.

**D) Human Resources and Synergy**—The data and analyses will be used in classroom activities and as case studies to teach applied watershed science in the undergraduate and graduate watershed science programs at CSU Monterey Bay. Over half of the wages paid to CSU-Monterey Bay workers will be to graduate and undergraduate students who will use the field and laboratory experience as the basis for theses and honing their technical watershed skills and basic science savvy. These students will co-author reports and journal articles, as have 85 previous students. With history as evidence, these same students will use these valuable skills in the technical watershed workforce of California after graduation. CSU Monterey Bay is a certified Hispanic Serving Institution (HSI) and has a mission of reaching out to groups who are underrepresented in science (minorities and women). The proposed work will help serve that part of the mission and vision of CSU Monterey Bay.

**8. *Applicant's qualifications and experience*:**

The Monterey Peninsula Regional Park District is a special district sub-division of the State of California with the mission to protect and preserve open space and the public trust resources/values associated with open space, including agricultural, aesthetic and ecological values, for the public benefit. It was established in 1973 by the local voters. The Park District owns and manages over 13,000 acres in the Monterey Peninsula area.

The Park District acquired the 4300-acre Palo Corona Regional Park in 2002 and since that time has demonstrated its ability to responsibly manage wild lands by supporting several plans and studies: a Grassland Management Plan, Fire and Fuels Management Plan, Aquatic Amphibians Management Plan, Smith's Blue Butterfly research, CDFA invasive weed grant and the San Jose and Seneca creeks inventories. The agency is part of the Northern Big Sur Integrated Management Partnership, a group of 9 agency and non-profit conservation groups that have signed a Memorandum of Understanding to manage their adjacent lands in an integrated fashion. The partners meet quarterly to coordinate projects such as this watershed plan.

Dr. Douglas Smith is the lead scientist on the proposal. Dr. Smith is a professor in the Division of Science and Environmental Policy at CSU Monterey Bay. He teaches undergraduate and graduate courses in applied watershed sciences and assessment/restoration practices. Dr. Smith is a Board Certified Professional Geologist in California and Tennessee. He has 15 years experience in watershed and river assessments and stream restoration design. He has authored 22 peer-review journal articles, 52 abstracts, and 41 professional technical reports. Of the 41 technical reports, 38 are watershed topics and 22 focus on watersheds and streams of the Monterey area. The most relevant studies include steelhead-centric watershed assessments of Williams Creek (tributary to San Jose Creek), Garrapata Creek (sediment, hydrology, barriers, lagoon), and the Carmel River (upland sediment sources and hydrology). Each of these past studies led to technical reports that prioritized restoration targets to improve conditions for steelhead. The Williams and Garrapata assessments have led to implementation grants and restoration implementation.

**9. *Previously completed projects and outcomes under FRGP:***

Williams Creek Erosion Prevention Implementation Project is currently in process on The Big Sur Land Trust and Santa Lucia Conservancy property in Williams Creek Watershed, a tributary to San Jose Creek.
The following studies and reports were contracted to Dr. Douglas Smith by third parties who received primary funding through California Department of Fish and Game. Some of these studies have resulted in restoration funding and implementation.


Smith D.P., Curry, R., Jackson, D., Thistle, A., and Marin, C., 2003, Steelhead Habitat Assessment and Restoration in Upper Williams Canyon Creek: Mitteldorf Redwood Preserve, Monterey County, California Redwood Preserve, Monterey County, California: The Watershed Institute, California State University Monterey Bay, Publication No. WI-2003-07, 31 pp, includes ArcMap GIS Project, and PDF web document.

Smith, D.P., Newman, W.B., Watson, F.G.R., and Hameister, J., 2004b, Physical and Hydrologic Assessment of the Carmel River Watershed, California. The Watershed Institute, California State University Monterey Bay, Publication No. WI-2004-05. 83 pp.

Newman, W.B., Smith, D.P. and Watson, F.G.R., 2004, The Carmel River Watershed - Map Set. The Watershed Institute, California State University Monterey Bay, Publication No. WI-2004-04. 5 maps.

Casagrande, J. and Smith, D.P, 2005, Garrapata Watershed Steelhead Barrier Assessment: The Watershed Institute, California State University Monterey Bay, Publication No. WI-2005-2, 76 pp. http://science.csumb.edu/~ccows/ccows/pubs/reports/CCoWS_Garra_Barrier_050124.pdf (Last accessed May 13, 2009)

Smith, D.P., Casagrande, J., and Ramsey-Wood, C., 2006, Garrapata Watershed, California: Water and Sediment Monitoring in 2004-2005. Prepared for the California Department of Fish and Game and the Garrapata Creek Watershed Council: The Watershed Institute, California State University Monterey Bay, Publication No. WI-2006-2, 27 pp.

Casagrande. J., and Smith, D. 2006. Garrapata Creek Lagoon, Central California: A Preliminary Assessment, 2005-2006. Prepared for the California Department of Fish and Game and the Garrapata Creek Watershed Council. The Watershed Institute, California State University Monterey Bay, Publication No. WI-2006-1, 62pp.

**Section 6: Landowners, Access and Permits**

| | |
|---|---|
| **1. Landowners Granting Access for Project:** (Please attach provisional access agreement[s])<br>*a. Monterey Peninsula Regional Park District*<br>*b. State Parks*<br>*c. The Big Sur Land Trust*<br>*d. Santa Lucia Conservancy*<br>*e. Michael and Denise Malcolm*<br>*f. Carmelite Monastery*<br>*g. Whisler Family Trust* | |
| **2. Permits:** | None required |
| **3. Lead CEQA agency:** | No CEQA required |
| **4. Required mitigation:** | Yes ☐ No ☒ |

## Section 7: Project Budget

### 1. *Detailed Project Budget* (Excel spreadsheets can be used)

| Detailed Project Budget | | | | | | |
|---|---|---|---|---|---|---|
| (San Jose Creek Watershed Plan) | | | | | | |
| | | | | Amount Requested | Amount of Cost Share | Total Project Cost |
| **PERSONNEL SERVICES** | | | | | | |
| **Level of Staff** | **Number of Hours** | **Hourly Rate** | | | | |
| MPRPD Project Manager | 60 | $ 50.00 | | $ - | $ 3,000.00 | $ 3,000.00 |
| State Parks Proj Mgr | 30 | $ 40.00 | | $ - | $ 1,200.00 | $ 1,200.00 |
| SLC Proj Mgr | 20 | $ 40.00 | | $ - | $ 800.00 | $ 800.00 |
| BSLT Proj Mgr | 10 | $ 30.00 | | $ - | $ 300.00 | $ 300.00 |
| TNC Proj Mgr | 4 | $ 40.00 | | $ - | $ 160.00 | $ 160.00 |
| Private Landowners | 10 | $ 40.00 | | $ - | $ 400.00 | $ 400.00 |
| | | | | | | |
| Subtotal | | | | $ - | $ 5,860.00 | $ 5,860.00 |
| Staff Benefits @ 25% | | | | $ - | $ 1,465.00 | $ 1,465.00 |
| **TOTAL PERSONNEL SERVICES** | | | | **$ -** | **$ 7,325.00** | **$ 7,325.00** |
| **OPERATING EXPENSES** | | | | | | |
| **Description** | **Number of Units** | **Units** | **Unit Price** | | | |
| Subcontractors | | | | | | |
| Project Manager for MPRPD | 200 | Hourly | $ 50.00 | $ 7,500.00 | $ 2,500.00 | $ 10,000.00 |
| | | | | | | |
| *CSUMB Subcontract* | | | | | | |
| PI: Summer | 206 | Hourly | $ 52.00 | $ 10,712.00 | $ - | $ 10,712.00 |
| PI: Overload | 206 | Hourly | $ 52.00 | $ 10,712.00 | $ - | $ 10,712.00 |
| Graduate Student | 1428 | Hourly | $ 16.00 | $ 22,848.00 | $ - | $ 22,848.00 |
| Undergraduate Student | 612 | Hourly | $ 12.00 | $ 7,344.00 | $ - | $ 7,344.00 |
| Staff Benefits (PI) | 34% | Percent | $21,424.00 | $ 7,284.16 | $ - | $ 7,284.16 |
| Staff Benefits (Students) | 10% | Percent | $30,192.00 | $ 3,019.20 | $ - | $ 3,019.20 |
| Overhead (Personnell) | 20% | Percent | $61,919.36 | $ 0.00 | $ 12,383.87 | $ 12,383.87 |
| *CSUMB Personnell Subtotal* | | | | *$ 61,919.36* | *$ 12,383.87* | *$ 74,303.23* |
| | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Materials and Supplies | | | | | | |
| *CSUMB Subcontract* | | | | | | |
| Printing | 2 | Annual | $ 100.00 | $ - | $ 200.00 | $ 200.00 |
| Stream Gages | 3 | Item | $ 1,200.00 | $ - | $ 3,600.00 | $ 3,600.00 |
| Sediment Filters | 3 | Item | $ 100.00 | $ - | $ 300.00 | $ 300.00 |
| Rebar | 1 | Item | $ 200.00 | $ - | $ 200.00 | $ 200.00 |
| Benchmark Caps | 1 | Item | $ 100.00 | $ - | $ 100.00 | $ 100.00 |
| Sediment Bags | 1 | Item | $ 100.00 | $ - | $ 100.00 | $ 100.00 |
| Automated Camera | 1 | Item | $ 500.00 | $ - | $ 500.00 | $ 500.00 |
| Waterproof Monitoring Camera | 1 | Item | $ 200.00 | $ - | $ 200.00 | $ 200.00 |
| Garmen GPS | 1 | Item | $ 200.00 | $ - | $ 200.00 | $ 200.00 |
| Field Computer | 1 | Item | $ 1,500.00 | $ - | $ 1,500.00 | $ 1,500.00 |
| Computer memory | 1 | Item | $ 250.00 | $ - | $ 250.00 | $ 250.00 |
| Tipping Rain Gage | 2 | Item | $ 300.00 | $ - | $ 600.00 | $ 600.00 |
| HistoricAerial Photos | 1 | Item | $ 1,000.00 | $ - | $ 1,000.00 | $ 1,000.00 |
| Gasoline for Vehicle | 300 | Gallon | $ 3.00 | $ - | $ 900.00 | $ 900.00 |
| Reconnaissance Flights | 2 | Flight | $ 500.00 | $ - | $ 1,000.00 | $ 1,000.00 |
| Mileage | 7200 | Miles | $ 0.85 | $ - | $ 6,120.00 | $ 6,120.00 |
| Overhead (Supplies) | 20% | Percent | $16,770.00 | $ - | $ 3,354.00 | $ 3,354.00 |
| *CSUMB Supplies Subtotal* | | | | *$ -* | *$ 20,124.00* | *$ 20,124.00* |
| | | | | | | |
| Rotating laser | 1 | Item | $ 800.00 | | $ 800.00 | $ 800.00 |
| Current meter | 1 | Item | $ 1,500.00 | | $ 1,500.00 | $ 1,500.00 |
| | | | | | | |
| **TOTAL OPERATING EXPENSES** | | | | **$ 69,419.36** | **$ 37,307.87** | **$106,727.23** |
| SUBTOTAL | | | | $ 69,419.36 | $ 44,632.87 | $114,052.23 |
| ADMINISTRATIVE OVERHEAD @ 10 % | | | | $ 5,702.61 | $ 5,702.61 | $ 11,405.22 |
| **GRAND TOTAL** | | | | **$ 75,121.97** | **$ 50,335.48** | **$125,457.46** |
| | | | | | | |
| SOFT COST SHARE %10 | | | | | | |
| HARD COST SHARE %30 | | | | | **Hard** | **Soft** |
| SOURCE AND AMOUNT OF COST SHARE : | | Mtry Pen Rgnl Park District | | | $ 22,000.00 | $ 9,452.61 |
| | | State Parks | | | $ 1,000.00 | $ 1,500.00 |
| | | The Big Sur Land Trust | | | $ 5,000.00 | $ 375.00 |
| | | The Nature Conservancy | | | $ 7,500.00 | $ 200.00 |

| | | | |
|---|---|---|---|
| | Santa Lucia Conservancy | $ 2,500.00 | $ 1,000.00 |
| | Private Landowners (time only) | $ - | $ 500.00 |
| | **Totals** | **$ 38,000.00** | **$ 13,027.61** |
| | | | |
| | | | |

**2. *Summary project costs***

| Sources of Funds | Cash | In-kind (if applicable) | Status S,P,U (secured, pending, unknown) | Anticipated award date | Total |
|---|---|---|---|---|---|
| Grant Program | $60,000 | | | | $60,000 |
| Other State Agencies<br>Name(s) and amount(s) of each:<br>State Parks | $1,000 | $1,500 | S | 2011 | $2,500 |
| Federal<br>Name(s) and amount(s) of each: | | | | | |
| Applicant (indicate if Federal): | $30,000 | $9,453 | S | 2011 | $39,453 |
| Other Sources<br>Name(s) and amount(s) of each:<br>The Big Sur Land Trust | $7,500 | $370 | S | 2011 | $7,870 |
| The Nature Conservancy | $10,000 | $200 | S | 2011 | $10,200 |
| Santa Lucia Conservancy | $3,500 | $1,000 | P | 2011 | $4,500 |
| Private Landowners | | $500 | S | 2010 | $500 |
| **Total** | **$112,лл0** | **$13,023** | | | ***$125,023*** |

**3. *Estimated Project Cost by Task***

| ***San Jose Creek Watershed Plan*** | | | |
|---|---|---|---|
| **Type of Work** | **Amount Requested** | **Cost Share** | **Total** |
| CC-08. Fish Passage | $25,041 | $16,778 | $41,819 |
| CC-30, Sediment | $25,041 | $16,778 | $41,819 |
| CC-27, Streamflow | $25,041 | $16,778 | $41,819 |
| **Total** | **$75,123** | **$50,334** | **$125,457** |

**4. *Budget justification:***

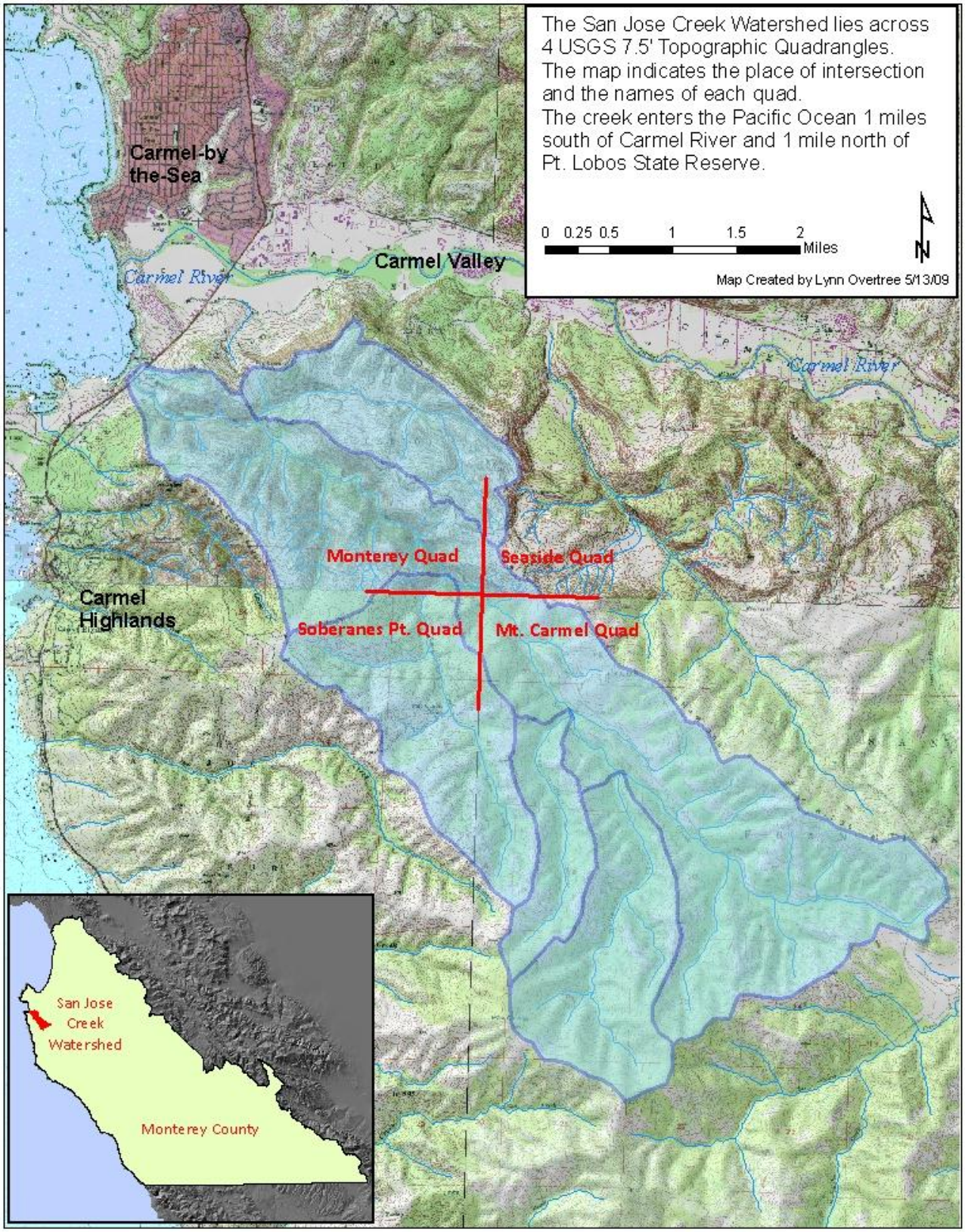
Watershed Plan will be based on intensive fieldwork, lab analyses, reconnaissance flyovers, and literature research. Supplies and materials are those that are required for the study.

**5. *Administrative overhead:***

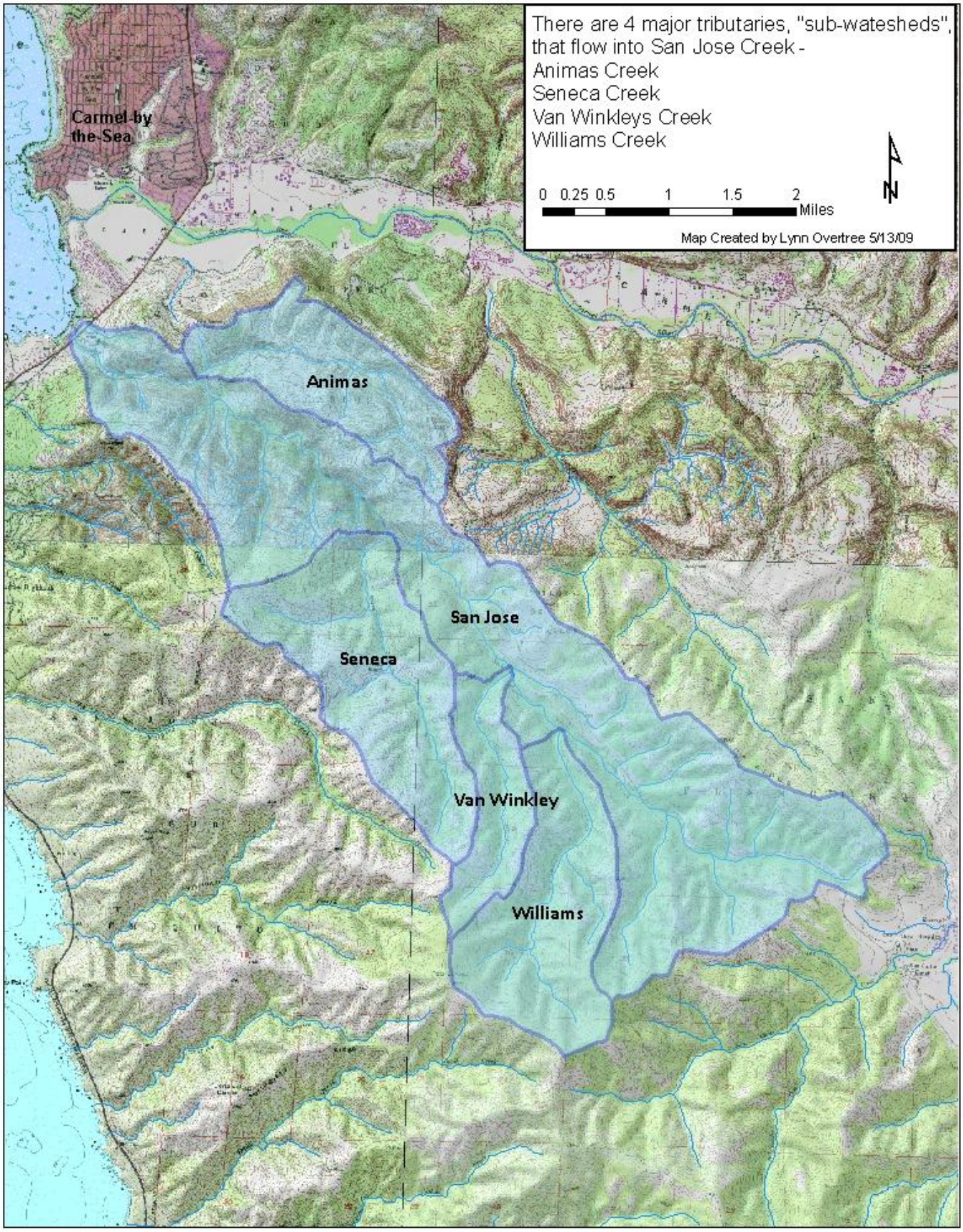
The Calif. State University Monterey Bay overhead rate of 20% is an established, negotiated rate between the University Corporation and DFG and is, therefore, the rate used as a subcontractor in this grant. The 10% overhead charged by the Park District is standard for that agency.

**Supplement #4. Watershed Maps**

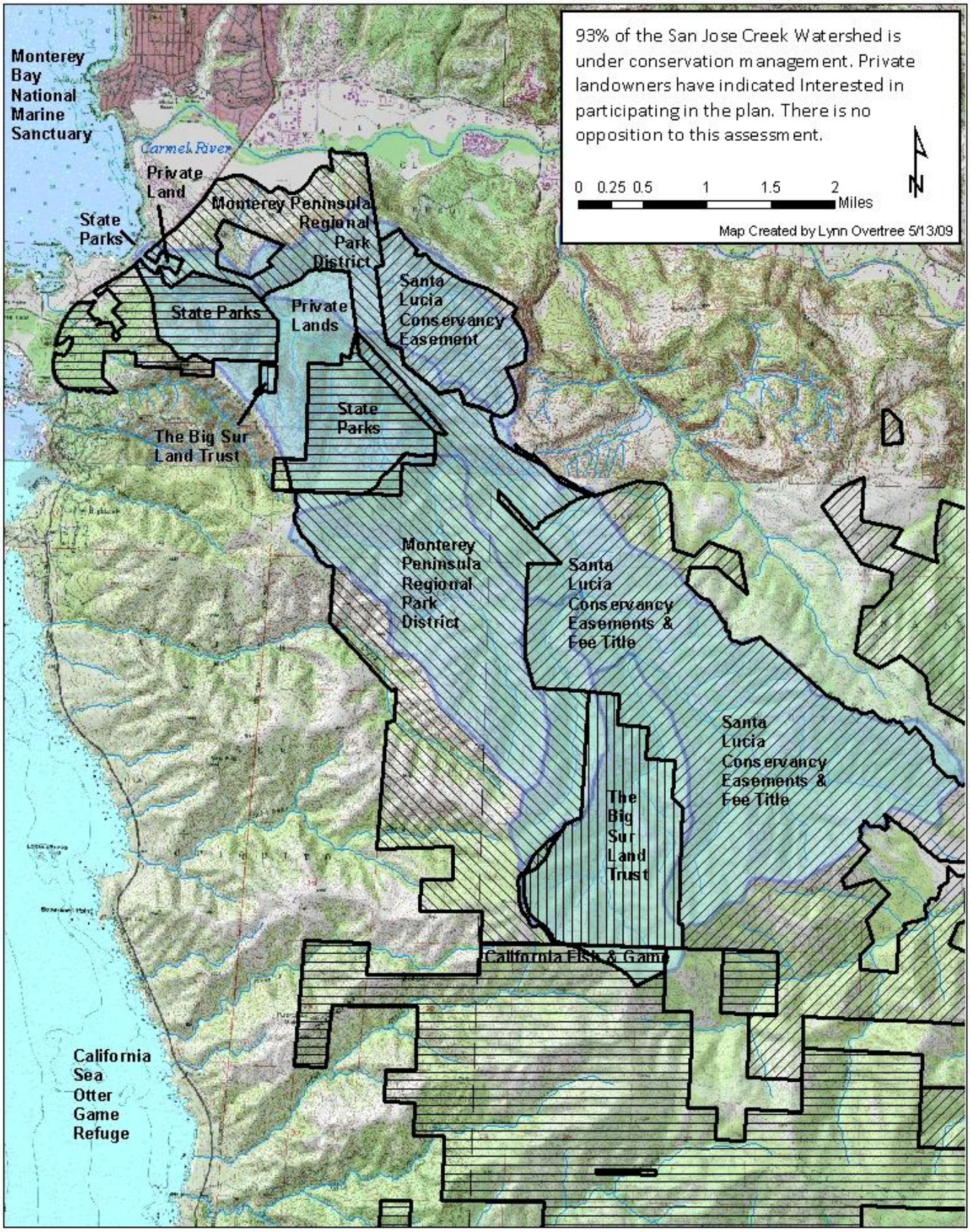
# Location Map for San Jose Creek Watershed Plan



# San Jose Creek Sub-Watersheds



# Landownership in the San Jose Creek Watershed

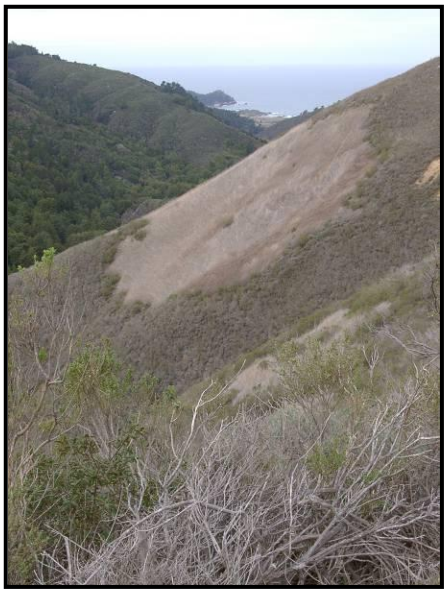


## Supplement #5. Provisional Landowner Access Agreements

**Intentionally Left Blank –**
**Agreements behind this page**

**Supplement #13. Photographs of the Property**

View of Animas Creek looking downstream from ~1 mile upstream of the confluence with San Jose Creek (left image). The right image is a view of the upper Animas Creek watershed with Carmel Bay in the distance. This area is owned privately and has a Santa Lucia Conservancy conservation easement on all but two home sites. This tributary to San Jose Creek is primarily grass and scrub habitat. The small pocket of coast live oaks (*Quercus agrifolia*) in this photo is rare.



This image (left) shows San Jose Creek and its relation to Pt. Lobos State Reserve. The creek outlet is located just north of the reserve

View of San Jose Creek looking upstream from 1 mile below confluence with Seneca Creek. The south-facing slope (left side) is coastal scrub, the canyon is redwood forest and the north-facing slope (right side) is redwood-tanoak-bay forest transitioning to maritime chaparral at the upper sections of the hill. State Parks owns the land shown on the right foreground portion of this image, while the Park District owns the remainder in this view.

View of confluence of San Jose and Seneca creeks. San Jose is running from left to right in middle of image. Seneca Creek runs from the center point of the image into the background up to Palo Corona Peak. Yellow flowering plant in foreground is the invasive weed French broom (*Genista monspessulana*).

View looking west across Seneca Creek and up Panoche Tributary. Note all the small natural landslides. This photo was taken in April, 2001, most of the slides occurred three years prior in spring 1998.

View of the upper watersheds of Van Winkleys in the foreground and Williams in the background. Forests at these higher elevations are dominated by Canyon live oak, madrone and tanoak.

Sudden oak death has killed thousands of tanoaks in all the watersheds except Animas. The impacts of this die-off of trees is not known. The San Jose Creek Inventory identifies an area 1000 feet long of dead tanoaks and proposes that landslides may result from the lack of root structure holding soil during heavy rains. Fire behavior may also be altered by the increase of fuels.

This diversion dam for a water takeout is located at the confluence of Animas and San Jose creeks.

San Jose Creek a short distance upstream of the confluence with Seneca Creek.

The left image shows the creek flow during winter months.

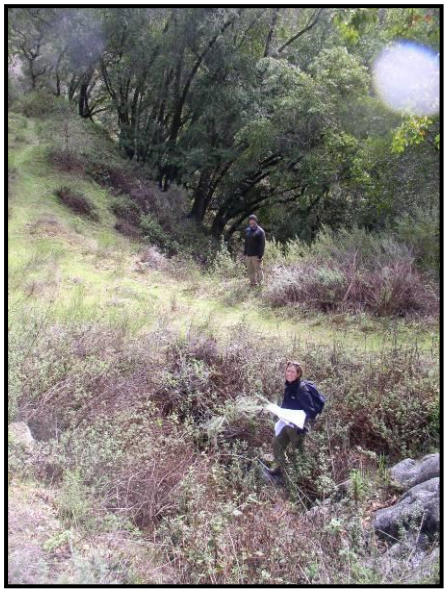
The right image shows a road that runs alongside the creek. It is part of the current roads assessment being conducted by the California Geological Survey of all roads on Palo Corona Regional Park.

Seneca Creek with sediment accumulation. The roads assessment confirms that roads are not the only source of sedimentation. As illustrated in the earlier photo, the steep granitic hillsides are prone to slides. This watershed plan will address natural upslope contributions to sedimentation of the creeks.

The extensive network of ranch roads presents a large source of man-made sediment contribution to the watershed.

There is approximately 1000 acres of redwood forest in the San Jose Creek watershed. Many of which are lightly touched by commercial logging.

The watershed hosts breeding populations of federally listed California red-legged frog and California tiger salamander.



The Big Sur Land Trust is currently implementing the Williams Creek Erosion Prevention Implementation Project that was funded by FRGP. This image shows an old logging road and failing culvert that drains into Williams Creek.

**Exhibit A - 7** Scope of Work

City of Monterey and Pacific Grove ASBS Refined 2006 Feasibility Study of Alternatives Management Plan

**Introduction:**

In 2006, DWR awarded a Prop. 50 planning grant for $497,000 to the region that included $250,000 to analyze all feasible options to address regulatory restrictions imposed by SWRCB on Areas of Special Biological Significance (ASBS). The ASBS analysis was presented in the study completed in 2006 titled "Final Alternatives Analysis and Data Acquisition for Pacific Grove and Carmel Bay Areas of Special Biological Significance" by MACTEC Engineering and Consulting, Inc. (MACTEC)

In addition to completing this analysis, during development of the IRWM Plan adopted in 2007, five regional priorities were identified by stakeholders. One of those priorities is to address water discharges to ASBS. The proposed project would divert and treat urban water runoff from the Pacific Grove ASBS. Under consideration is a system that would divert both dry-weather and most of the wet-weather flows to either on-site treatment system or to Publically Owned Treatment Works (POTW) facility. This project will help meet the regional water demand for water supply through reuse of dry weather flows as well as use of storm water by diverting flows to the sanitary sewer, to a reservoir, or for reuse. Opportunities for conjunctive reuse will be explored in collaboration with the cities, California American Water, and the Monterey Regional Water Pollution Control Agency.

The scope of work presented in this exhibit is to:

A) Refine five of the twenty two alternatives identified in the 2006 MACTEC study, taking into consideration new information available and any additional studies prepared since 2006;
B) Select a preferred project based on the refined alternatives, considering which project components will result in the most cost-effective and environmentally superior alternative to divert and/or treat dry weather and wet weather flows currently entering the Pacific Grove ASBS; and
C) Develop conceptual design plans for the preferred project and at least one feasible alternative;
D) Prepare the CEQA environmental review document for the preferred project, as well as the feasible alternative(s).
E) Develop work plan for project implementation, including additional permitting and regulatory requirements, and schedule as needed for project implementation grants.

At this time, the alternatives identified in the 2006 MACTEC study require the above further planning analysis. Based upon findings from this project planning work, and further identification of permitting and regulatory requirements, the preferred project, as determined through the CEQA review process, would be ready for implementation.

A combinations of on-site or off-site treatment of storm water diversion of all dry-weather flows from the Pacific Grove ASBS are viable options. Dry weather flows could be treated and then may be discharged either into or outside of the ASBS. The discharge of treated water into or

outside of ASBS may provide compliance with either the proposed Special Conditions for ASBS (SWRCB, 2006) or compliance with water reuse program guidelines. It is expected that the diverted water would be treated to below Ocean Plan and/or Basin Plan Limits, respectively.

## Scope of Work

### A. Refine Project Alternatives

**Task A-1:** Further identify surface areas and groundwater locations of potential reserve capacity. Analysis which includes, capacity, treatment, and limitations for water recycling, storage, and storm water recharge/reuse areas to include, but not limited to are; Lake El Estero, Naval Postgraduate lake, MRWPCA wastewater facility, CAWD wastewater facility, abandoned Pacific Grove WTP, abandoned CalAm David Avenue reservoir, Pebble Beach Forest Lake, and the Seaside Groundwater basin.

**Task A-2:** Refine the analysis of the following five options from the 2006 MACTEC alternatives study and the potential of a superior project alternative from analysis of these five:

**1. TREAT DRY WEATHER FLOWS ONSITE (OPTIONS 1 AND 2)**

Under Options 1 and 2, dry weather flows will be treated at a treatment facility located in the City of Pacific Grove. Option 1 consists of treating both New Monterey and City of Pacific Grove flows while Option 2 consists of treating City of Pacific Grove flows only. Dry weather flows would be diverted from the City of Monterey and City of Pacific Grove storm drain systems at 32 locations. The diversion structures would divert up to 119 gallons per minute of dry weather flows through a series of underground gravity pipelines and force mains to a constructed wetland or wet pond located at the abandoned Pacific Grove Wastewater Treatment Plant (WTP) located at the Pacific Grove Municipal Golf Course. The reduction in TSS load to the Pacific Ocean is 203,391 lbs per year. The resulting Cost Effectiveness Ratio (CER) for Option 1 is $1.4 and Option 2 is $1.7 dollars per pound of TSS removed.

**2. TREAT DRY AND WET WEATHER FLOWS IN PACIFIC GROVE (OPTIONS 3, 4, AND 5)**

Under Options 3, 4, and 5, dry and wet weather flows will be treated at the wastewater treatment facility in Pacific Grove. Option 3 consists of treating both City of Monterey and City of Pacific Grove flows, Option 4 consists of treating City of Monterey flows only, and Option 5 consists of treating City of Pacific Grove flows only. For Option 3, dry weather flows would be diverted from the City of Monterey and City of Pacific Grove storm drain systems at 32 locations. The diversion structures would divert wet weather flows for various rainfall recurrences and up to 119 gpm of dry weather flows. Diverted wet weather and dry weather flows would flow through a series of underground gravity pipelines and into equalization basins for pumping through a force main to a media filter or constructed wetlands/wet pond located at the abandoned Pacific Grove WTP at the Golf Course on Pt. Pinos. Sizing requirements for diverting different wet weather events (85th percentile, 2-year, 10-year, and 25-year) and the resulting cost and water quality differences were evaluated.

Estimated Load Reductions for Option 3 (Wet pond as Treatment BMP)

| RAINFALL RECURRENCE | AVG. ANNUAL CAPTURE (%) | ANUAL LOAD REDUCTION (LBS) | CER - $ PER LB OF TSS REMOVED |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 85th Percentile | 93% | 361,171 | $1.1 |
| 2-Year | 96% | 372,643 | $2.7 |
| 10-Year | 98% | 381,247 | $3.4 |
| 25-Year | 100% | 387,198 | $4.3 |

### 3. REUSE CALAM RESERVOIR (OPTION 22)

Under Option 22, dry and wet weather flows from the upper New Monterey drainage basin will be diverted into the CalAm reservoir and lower New Monterey dry and wet weather flows will be diverted out of the Pacific Grove ASBS and into Monterey waters. Dry and wet weather flows diverted into the CalAm reservoir could be reused for irrigation of nearby park areas, pumped to Forest Lake, or pumped to Seaside for aquifer injection. Show the required area needed to provide sedimentation, media filtration and disinfection to distribute stored water for irrigation or injection, within the reservoir site.

Wet weather and dry weather flows from New Monterey would be diverted at three locations. Dry weather and wet weather flows diverted from lower New Monterey would flow through a series of underground gravity pipelines to an outfall located approximately 1,000 feet southeast of the southern boundary of the Pacific Grove ASBS. Sizing requirements for diverting different wet weather events (85th percentile, 2-year, 10-year, and 25-year) and the resulting cost and water quality differences were evaluated.

Estimated Load Reductions for Option 22

| RAINFALL RECURRENCE | AVG. ANNUAL CAPTURE | ANUAL LOAD REDUCTION (LBS) | CER – $ PER LB OF TSS REMOVED |
|---|---|---|---|
| 85th Percentile | 89% | 18,059 | $6.2 |
| 2-Year | 91% | 18,632 | $6.6 |
| 10-Year | 96% | 19,627 | $9.3 |
| 25-Year | 100% | 20,379 | $10.2 |

### 4. PUMP WET WEATHER FLOWS AND SANITARY SEWER FLOWS TO MRWPCA WTP (OPTIONS 18, 19, AND 20)

Under Options 18, 19, and 20, dry weather, wet weather, and sanitary sewer flows will be pumped to the MRWPCA WTP for treatment. Option 18 consists of pumping both New Monterey and City of Pacific Grove flows. Option 19 consists of pumping New Monterey flows only, and Option 20 consists of pumping City of Pacific Grove flows only.

For Option 18, wet and dry weather flows would be diverted from New Monterey and City of Pacific Grove storm drain systems at 32 locations. The diversion structures would divert up to 119 gallons per minute of dry weather flows and wet weather flows to detention basins. The flows would then be pumped through an underground force main tying into the existing sanitary sewer pipeline at strategic times when the MRWPCA WTP would be able to accept flows (such as from 2:00 to 5:00 AM when the sewage flow is at a minimum). The combined wet weather, dry weather, and sewer flows would be pumped to the MRWPCA WTP in a single force main. Note that this option is only feasible for the 85th percentile event. The time it would take to drain the detention basins for the other events (weeks and months) would exceed typical Department of Health Services criteria for vector control.

For Option 19, wet and dry weather flows would be diverted from the City of Monterey storm drain systems at three locations. The diversion structures would divert wet weather flows and up to 12 gpm of

dry weather flows. Diverted dry weather and wet weather flows would flow through a series of underground gravity pipelines to a detention basin at the Hopkins Marine Station Parking Lot. The flows would then be pumped through an underground force main tying into the existing sanitary sewer pipeline at strategic times when the MRWPCA WTP would be able to accept flows (such as from 2:00 to 5:00 AM when the sewage flow is at a minimum). The combined wet weather, dry weather, and sewer flows would be pumped to the MRWPCA WTP in a single force main. Note that this option is only feasible for the 85th percentile event.

For Option 20 the diversion structures would divert up to 107 gpm of dry weather flows and wet weather flows. This option differs from Option 18 primarily with respect to the disconnection of the New Monterey storm drainage system from the Pacific Grove storm drainage system.

Estimated Load Reductions for Option 18

| RAINFALL RECURRENCE | AVG. ANNUAL CAPTURE (%) | ANUAL LOAD REDUCTION (LBS) | CER - $ PER LB OF TSS REMOVED |
|---|---|---|---|
| 85th Percentile | 93% | 361,171 | $1.3 |

**5. DO NOTHING APPROACH (OPTIONS 14 AND 15)**

Options 14 and 15 represent the "do nothing" approach for the City of Pacific Grove and New Monterey, respectively.

## B. Select Preferred Project

**Task B-1:** Prepare a current and thorough cost analysis for the preferred project and at least one feasible alternative. Provide the advantages and disadvantages of each option including capital costs, ongoing maintenance/replacement costs, and treatment requirements to meet Ocean Plan limits.

**Task B-2:** Present the most cost-effective and environmentally superior options to divert and/or treat dry weather and wet weather flows into the Pacific Grove ASBS, to basin stakeholders for review and input. Address comments and concerns in a Final Plan.

**Task B-3:** Identify and initiate any necessary multi-party agreements required for project implementation (i.e. with MRWPCA for receipt of dry-weather flows to their treatment facility or with California American Water for site use, water reuse or distribution)

## C) Develop conceptual design plans for the preferred project and at least one feasible alternative

Task C-1: Work with a Technical Advisory Committee during development of concept design

Task C-2: Prepare conceptual design plans with sufficient detail of project facilities for environmental review of the preferred project and at least one feasible alternative

## D) Prepare the CEQA environmental review document

**Task D-1:** Prepare an IS/MND in conformance with the California Environmental Quality Act (CEQA) of 1970, Section 21000 et. seq. of the CEQA Guidelines (California Administrative Code Section 15000) for the proposed project. The IS/MND will provide an analysis describing potential environmental impacts associated with the proposed project, and determine if EIR is required.

The proposed IS/MND will include the following sections:

- CEQA Determination Page
- *Table of Contents*
- *Introduction:* This section will cite the environmental review requirements of the proposed project, pursuant to CEQA.
- *Project Description:* This section will describe the proposed project. A brief description of the project's location, environmental setting, and existing uses within the area affected will be included. Text and exhibits will be used to describe and illustrate the characteristics of the proposed project. The environmental document will include a maximum of four (4) exhibits to enhance the written text and clarify the project and potential environmental impacts. Exhibits are anticipated to include: Regional Vicinity Map, Local Vicinity Map, Site Plan, and details and sections.
- *Evaluation of Environmental Impact:* Use the environmental checklist in Appendix G of the CEQA Guidelines to address the environmental topics of CEQA. This section will describe the potential impacts and mitigation measures for the proposed project.

**Task D-2:** Prepare the Public Review Draft IS/MND or EIR, if determined to be required.

## E) Develop project implementation work plan

Task E-1: Identify additional permitting and regulatory requirements,

Task E-2: Develop project timeline/schedule

Task E-3: Prepare project work plan

**Budget** rev 9/23/10

| | | | | |
|---|---|---|---|---|
| Proposal Title: City of Monterey and Pacific Grove ASBS Refined 2006 feasibility study of Alternatives Management Plan | | | | |
| Project Title: City of Monterey and Pacific Grove ASBS project alternative. | | | | |
| Budget Category | | Non-State Share (Cost Match) 36% | Requested State Share (Grant Funding) 64% | Total 100% |
| (a) | Direct Project Administration Costs (6%) | $8,597 | $15,280 | $23,876 |
| (b) | TASK A: Refine project alternatives Identify surface and ground water areas for ASBS discharge | $61,740 | $109,760 | $171,500 |
| (c) | Task B: Select the preferred project and at least one feasible alternative. | $17,820 | $31,680 | $49,500 |
| (d) | Task C: develop conceptual design for the preferred project and at least one feasible alternative. | $12,600 | $22,400 | $35,000 |
| (e) | Task D: Prepare the CEQA environmental review document | $47,520 | $84,480 | $132,000 |
| (f) | Task E: Develop project implementation work plan. | $3,600 | $6,400 | $10,000 |
| | | | | |
| | Grant Total [Sum (a) through (g) for each column] | $151,877 | $270,000 | $421,876 |
| Source(s) of funds for Non-State Share (cost match) | | CIP | n/a | |

**Schedule**

| | | | |
|---|---|---|---|
| Proposal Title: City of Monterey and Pacific Grove ASBS refined 2006 feasibility study of Alternatives Management Plan | | | |
| Project Title: City of Monterey and Pacific Grove ASBS project alternative. | | | |
| Schedule Category | | Start Date | Completion DATE |
| (a) | Project Administration; | January 17, 2011 | November 1, 2012 |
| | Send out RFP, review, and award contract | January 30, 2011 | August 30, 2012 |
| (b) | TASK A: Refine project alternatives Identify surface and ground water areas for ASBS discharge | September 1, 2011 | December 30, 2011 |
| (c) | Task B: Select the preferred project and at least one feasible alternative. | January 1, 2012 | April 1, 2012 |
| (d) | Task C: develop conceptual design for the preferred project and at least one feasible alternative. | April 1, 2012 | June 1, 2012 |
| (e) | Task D: Prepare the CEQA environmental review document | June 1, 2012 | September 1, 2012 |
| (f) | Task E: Develop project implementation work plan. | September 1, 2012 | November 1, 2012 |
| | | | |

**Exhibit A-8** – Development of a Surface and Groundwater Model for the Carmel Valley Alluvial Aquifer

## Introduction

The lower 15.5 miles of the aquifer underlying and closely paralleling the surface water course of the Carmel River is water flowing in a subterranean stream and subject to the jurisdiction of the SWRCB (WRO 95-10). Essentially, the Carmel River flows above the ground surface when the aquifer is full and below the surface when the aquifer is drawn down (the aquifer is unconfined). Thus, aquifer storage and river flows are directed connected.

The Carmel Valley Alluvial Aquifer and the Carmel River have been modeled with various techniques in the past. However, many of these models are not current, and have limited ability to answer questions necessary to best manage the coupled resource of the river flow and groundwater storage. New models, such as GSFLOW, more accurately model the link between stream flow and the underlining aquifer and can incorporate the effect of individual diversions on aquifer storage and surface flow. Blending the useful portions of the old models with a new updated model will provide answers to the following questions that will translate into better management of the coupled resource.

MPWMD will take the lead in carrying out this task.

## Need and Goals

In 2009, SWRCB imposed a Cease and Desist Order (CDO) on the region to reduce Carmel River diversions to the amount previously authorized by the SWRCB in WRO 95-10 (see SWRCB Order WR 2009-0060). The 2009 order is being contested in Superior Court by MPWMD and CAW. The lawsuit is in a preparation stage and is not likely to be heard until 2011 (possibly after a decision by the PUC on the Coastal Water Project). The CDO sets a schedule for reductions in Carmel River diversion that could result in a 70% reduction in CAW diversions from the basin by WY 2017.

Developing a GSFlow model will provide MPWMD with the most up-to-date model to simulate the interaction between stream flow and groundwater movement in the alluvial portion of the Carmel River. With this tool, MPWMD will be able to provide recommendations concerning the best management practices for the resource and will be able to answer questions surrounding the effects of regional and local projects on the resources of the Carmel River.

The ability to model the effects of stresses on the resource are important for day-to-day and future management of the Carmel River and the underlying Alluvial Aquifer. The model will help to;

1. Predict the effects of changes in well pumping patterns and locations on the surface flow and aquifer storage along the Carmel River.

2. Achieve better management of flows in the Carmel River to protect riparian vegetation and reduce erosion.

3. Predict effects of regional projects on the Carmel River and prescribe best management practices for Carmel River diversions.

4. Assess effects of ASR diversions of the Carmel River on critical riffles that may block migration of adult salmon.

5. Assess the effects of main stem dam removal or modifications on the flows in the Carmel River.

6. Assess the effects on aquatic habitat in the Carmel River Lagoon by better management of flows in the Carmel River or from projects proposed to augment lagoon volume.

7. Assess the effects of climate change on aquifer storage and flows in the Carmel River.

8. Assess the impacts of single water distribution systems (private wells) on flows in the Carmel River.

The work product from this task would be used in a Request for Proposal to fully develop the surface-groundwater model for the basin.

**Tasks**

MPWMD will assess the capability of the previous models, catalog datasets, and build a conceptual model that will be used to guide the construction of a new model. This would be accomplished with the following tasks;

1. Assess previous models used for simulating flows in the Carmel River and groundwater movement in the Carmel Valley Aquifer. Previous models used in the Carmel Valley include:
    a. Modflow – groundwater simulation in the Carmel Alluvial Aquifer,
    b. CVSIM – Surface water simulation of flows and groundwater extraction in the Carmel River developed by MPWMD
    c. Arc Hydro – Digital elevation model of flow accumulation in the Carmel River Watershed.

2. Inventory data available – Catalog all data used in previous models and data available for incorporation into a new model, such as GSFlow.

3. Construct a conceptual model that outlines the architecture of a new model.

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## Budget

**Estimated Contribution for Conceptual Model for GSFlow by MPWMD**

| | Hours To Date | Future Hours | Total Hrs | Rate ($/hr) | Total Contribution |
|---|---|---|---|---|---|
| Hydrologic Modeling Effort | | | | | |
| Eric Sandoval<br>Arc Hydro Set Up | 60 | 30 | 90 | 85 | 7,650 |
| Thomas Christensen<br>Arc Hydro Set Up | 40 | 60 | 100 | 85 | 8,500 |
| Jon Lear<br>Arc Hydro Set Up | 60 | 60 | 120 | 85 | 10,200 |
| | | | **MPWMD Total** | | **26,350** |

**Estimated Contribution for Conceptual Model for GSFlow by USGS**

| | Hours | Rate ($/hr) | Cost |
|---|---|---|---|
| Assess previous models used in the Carmel Valley Watershed | 50 | 100 | 5,000 |
| Inventory and catalog data sets from models | 50 | 100 | 5,000 |
| Construct conceptual model of GSFlow Architecture | 100 | 100 | 10,000 |
| | **USGS Total** | | **20,000** |

## Schedule

Work by MPWMD to be completed within six months of initiation of Planning Grant update.
Work by USGS to be completed within six months after completion of MPWMD tasks.