

# COMPREHENSIVE CONSERVATION & MANAGEMENT PLAN FOR MORRO BAY

Published by the Morro Bay National Estuary Program, The Bay Foundation of Morro Bay and the Central Coast Regional Water Quality Control Board in cooperation with the U.S. Environmental Protection Agency Region IX

# VOLUME I

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### COVER DESIGN

In the fall of 1998, 211 Kindergarten through 12<sup>th</sup> Grade students entered the Morro Bay National Estuary Program "Turning the Tide" Poster Contest. Entries were judged in three age groups—Kindergarten through 3<sup>rd</sup> Grade, 4<sup>th</sup> through 6<sup>th</sup> Grade, and 7<sup>th</sup> through 12<sup>th</sup> Grade. Over 200 people attending the 1998 Oktoberfest in Baywood Park, California selected the final winners. Ben and Jerry's Ice Cream donated gift certificates to all of the winning entries, and Duke Energy and Kinko's Copies in San Luis Obispo provided funds for printing the 1999 MBNEP Calendars. The winning artwork provides the theme for the CCMP and appears throughout this document. Thanks to the following poster contest participants:

> Cynthia Bernal, Sunnyside Elementary School Chelsea Dauer, Home-school student Jacqueline Echevarria, Baywood Elementary School Tim Edge, Teach Elementary School John Fields, Judkins Middle School Jennifer Gosnell, Monarch Grove Elementary School Brittany Howlett, Judkins Middle School Megan Jio, Baywood Elementary School Erica Lindsay Oberg, Monarch Grove Elementary School Leland O'Connor, Baywood Elementary School Ryan Parker, Judkins Middle School Amie Wahl, Judkins Middle School

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# TURNING THE TIDE FOR MORRO BAY

Comprehensive Conservation & Management Plan for Morro Bay t

## Morro Bay National Estuary Program Resolution: Adoption of Public Draft CCMP

#### WHEREAS:

1. The Morro Bay National Estuary Program (MBNEP) is a three-year cooperative effort that involves the active participation of diverse environmental, social and economic interests, to promote effective management of the Morro Bay Estuary and to restore and maintain its water quality and natural resources;

2. The Watershed Committee (WC) and the Local Policy Committee (LPC) both represent unique partnerships of organizations that have overseen the preparation of various documents to characterize the estuary's problems and have worked together to prepare a Public Draft Comprehensive Conservation and Management Plan (CCMP);

3. The purpose of the CCMP, as specified by Section 320 of the federal Clean Water Act, is to "restore and monitor the ... integrity of the estuary, including restoration and maintenance of water quality, a balanced indigenous population of shellfish, fish and wildlife, and recreational activities in the estuary, and assure that the designated uses of the estuary are protected." The Act further states that the "plan shall be implemented;"

4. The members of the WC and LPC have strived to reach consensus on the draft CCMP goals, objectives and actions in each program area;

5. Recognizing that the Estuary is one of the nation's greatest resources, the WC and the LPC both adopted statements of support for and commitment to the efforts of the MBNEP in October of 1997; and,

6. To further encourage full participation in developing the CCMP, the MBNEP will conduct an active public review and comment period, and the comments will be reviewed and considered by the WC and LPC in approving the final CCMP in November 1999.

#### THEREFORE, BE IT RESOLVED THAT:

We, the members of the WC and LPC, with the knowledge that additional changes are likely, agree to:

- a) Adopt the July 22, 1999 draft CCMP, with changes as specified by the WC, as the Public Draft CCMP;
- b) Broadly distribute the Public Draft CCMP, facilitate public review, hold public meetings respond to public comments and revise the document to prepare the final CCMP; and,
- c) Work together to achieve consensus on a final CCMP by November 1999.

This resolution was approved by the Watershed Committee on August 5, 1999, and by the Local Policy Committee on August 11, 1999. //Q

101110M Brad Hagemann

Chair, Local Policy Committee

James White \_ Chair, Watershed Committee

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"If it is granted that biodiversity is at high risk, what is to be done? The solution will require cooperation among professions

[ and citizens] long separated by academic and practical tradition."...

"We should not knowingly allow any species or race to go extinct. And let us go beyond mere salvage to begin the restoration of natural environments, in order to enlarge wild populations and stanch the hemorrhaging of biological wealth. There can be no purpose more enspiriting than to begin the age of restoration, reweaving the wondrous diversity of life that still surrounds us." The evidence of swift environmental change calls for an ethic uncoupled from other systems of belief. Those committed by religion to believe that life was put on earth in one divine stroke will recognize that we are destroying the Creation, and those who perceive biodiversity to be the product of blind evolution will agree. Across the other great philosophical divide, it does not matter whether species have independent rights or, conversely, that moral reasoning is uniquely a human concern. Defenders of both premises seem destined to gravitate toward the same position on conservation.

"The stewardship of environment is a domain on the near side of metaphysics where all reflective persons can surely find common ground. For what, in the final analysis, is morality but the command of conscience seasoned by a rational examination of consequences? And what is a fundamental precept but one that serves all generations? An enduring environmental ethic will aim to preserve not only the health and freedom of our species, but access to the world in which the human spirit was born.

- Edward O. Wilson, "The Diversity of Life" [pg. 335,351]

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# TABLE OF CONTENTS

## VOLUME I

Chapter 1	Introduction	Page
· 1.1	The "Gibraltar of the Pacific"	1-1
1.2	Turning the Tide	1-4
1.3	A Call for Action	1-6
Chapter 2	Understanding the Morro Bay Watershed	
2 1	The Abundance of Morro Bay	2-1
2.1	Physical Resources	2-3
2.2	Biological Resources	2-10
2.5	Sharing the Resources of Morro Bay	2-20
2.7	Priority Problems	2-28
2.5		
Chapter 3	Understanding the Agencies & Existing Watershed Programs	
3.1	Inventory of Existing Federal Programs and Federal Consistency	3-1
3.2	Results	3-3
3.3	Recommendations	3-7
Chanter 4	The Plan for Action	
chapter	Introduction	4-1
41	Cross-Cutting Actions	4-9
4.1	Sedimentation	4-35
4.2	Bacteria	4-61
ч.5 4 д	Nutrients	4-85
4.5	Freshwater Flow	4-97
4.5	Heavy Metals & Toxics	4-107
4.0	Habitat	4-121
4.7	Steelhead	4-149
4.0 4 9	Public Education & Outreach	4-165
т.у	Tuble Education q Out each minimum m	
Chapter 5	Monitoring	
5.1	Introduction	5-1
5.2	Guiding Principles	5-3
5.3	Monitoring Goals and Objectives	5-4
5.4	Current Monitoring in Morro Bay	5-8
5.5	Summary of Monitoring Activities	5-13
5.6	Assessing EMP Performance	5-21
5.7	Data Management Strategy	5-26
Chapter 6	Action Plan Performance Monitoring	
6.1	Monitoring Performance	6-1
67	Evaluating Progress	6-1
0.2	2.4	

Chapter 7	Finance and Implementation	
7.1	Introduction	7-1
7.2	Guiding Principles for Implementing the CCMP	7-1
7.3	Early Implementation Efforts	7-1
7.4	MBNEP Implementation Structure	7-2
7.5	Strategies and Mechanisms for Implementing the CCMP	7-6
7.6	Decision-Making Guidelines	7-6
7.7	Finance Plan	7-9
7.8	Financing the CCMP	7-14
Appendix A	List of Acronyms	A-1-4
Appendix B	Glossary	B-1-4
Appendix C	APDPs & Lessons Learned	C-1-11
Appendix D	MBNEP Public Participation Summary	D-1-12
Appendix E	California Nonpoint Source Pollution Control Program	E-1-14
Appendix F	EPA Fact Sheet 1.0: Stormwater Phase II	F-1-1

### VOLUME II

### Table of Contents

1	Characterization	Ronart
<b>.</b> .	Characterization	Report

- 2. Environmental Monitoring Plan
- 3. Data Management Strategy

### VOLUME III Table of Contents

1. Response to Comments

2. Federal Consistency Report

3. Management Conference Agreement

4. Clean Water Act, Section 320

5. Base Programs Analysis Inventory

6. Base Programs Analysis

# VOLUME I: FIGURES

Figure 1.1	Historical 1920 Map of Morro Bay Prior to Harbor Improvements	1-2
Figure 1.2	Navigation Channels in Morro Bay as Diagrammed by ACOE	1-3
Figure 1.3	MBNEP Management Conference	1-8
Figure 2.1	The MBNEP Study Area	2-2
Figure 2.2	The Morro Bay Watershed	2-4
Figure 2.3	Current Bathymetry of Morro Bay	2-6
Figure 2.4	Location of Major Sub-basins of the Morro Bay Watershed	2-9
Figure 2.5	Distribution of Wetland Habitats in Morro Bay	2-12
Figure 2.6	Tideland Jurisdictions in Morro Bay	2-22
Figure 2.7	San Luis Obispo County Land Use Categories in the Morro Bay Watershed	2-26
Figure 2.8	Percentages of Land Use Categories in the Morro Bay Watershed	2-27
Figure 2.9	Total Sediment Yield Per Square Mile from Chorro and Los Osos	
	Creeks for an Average Storm Event	2-32
Figure 2.10	Relative Sediment Yield from Individual Tributaries to Los Osos and	
	Chorro Creeks, Based on 10-Year Storm Event	2-33
Figure 2.11	Shellfish Leases and Bacteria Sampling Sites in Morro Bay	2-36
Figure 2.12	Estimated Relative Contributions of Fecal Coliform in Dry and Wet Weather	2-37
Figure 2.13	Relative Contributions of Potential Sources of Nitrogen	2-42
Figure 2.14	Relative Contributions of Potential Sources of Phosphate	2-42
Figure 2.15	Percent of NOAA Screening Criteria Exceeded by Freshwater Surface	
0	Waters at Morro Bay Watershed Stormwater Sampling Sites	2-47
Figure 5.1	Programmatic and Environmental Monitoring in the EMP	5-2
Figure 5.2	Estimated Annual MBNEP Trend Monitoring Budget	5-21
Figure 5.3	Locations of TREND Workplan Morro Bay Watershed Sampling Sites	5-23
Figure 5.4	Locations of TREND Workplan Morro Bay Estuary Sampling Sites	5-24
Figure 5.5	CCAMP Web Site Options Menu	5-26
Figure 5.6	Data Entry Fields for CCAMP Data Management System	5-27
Figure 7.1	MBNEP Organizational Structure for CCMP Implementation	7-4
Figure 7.2	MBNEP Decision-Making Process	7-8
Figure 7.3	Percentage of Total Costs by Priority Action Category	7-13

# VOLUME I: TABLES

-

Table 2.1	Flow Characteristics and Drainage Areas of Morro Bay Watershed	
	Streams	2-10
Table 2.2	Land Use, Vegetation, and Presence of Barriers to Steelhead in Morro	
	Bay Watershed Sub-Basins and Streams	2-10
Table 2.3	Special Status Species Known to Occur Within the Study Area	2-18
Table 2.4	Areas of Special Biological Importance Within the Morro Bay Study	
	Area	2-19
Table 2.5	Population Centers	2-20
Table 2.6	National Pollutant Discharge Elimination System (NPDES)-Permitted	
	Facilities in the Vicinity of Estero Bay	2-20
Table 2.7	Activities of Users at Morro Bay	2-23
Table 2.8	Land Use and Zoning in the Morro Bay Area	2-25
Table 2.9	Potential Impacts	2-28
Table 2.10	Impacts from Sedimentation	2-30
Table 2.11	Impacts of Bacteria	2-35
Table 2.12	Potential Sources of Increased Bacterial Concentrations	2-38
Table 2.13	Impacts of Nutrients	2-40
Table 2.14	Sources, Concentrations and Contributions of Nutrients from	
	Common Point and Nonpoint Sources	2-40
Table 2.15	Examples of Impacts of Reduction in Freshwater Flow	2-44
Table 2.16	Examples of Impacts of Heavy Metals and Toxic Pollutants	2-46
Table 2.17	Relative Contributions of Potential Sources of Heavy Metals in Morro	
	Bay	2-50
Table 2.18	Impacts of Habitat Loss	2-51
Table 2.19	Potential Cause of Species Habitat Loss in the Morro Bay Watershed	2-53
Table 3.1	Local, State, and Federal Agencies Inventoried	3-2
Table 3.2	Criteria Used to Evaluate Effectiveness of Programs	3-3
Table 4.1	Number of Actions by Priority Issue	4-1
Table 4.2	Action Plan Components	4-2
Table 4.3	List of Action Plans	4-3
Table 4.4	Cross-Cutting Actions—Implementing Organizations	4-10
Table 4.5	Sedimentation Actions—Implementing Organizations	4-37
Table 4.6	Increased Bacterial Concentration Actions—Implementing	
	Organizations	4-63
Table 4.7	Nutrient Actions—Implementing Organizations	4-86
Table 4.8	Freshwater Flow Actions—Implementing Organizations	4-98
Table 4.9	Heavy Metals & Toxics Actions- Implementing Organizations	4-108
Table 4.10	Habitat Actions—Implementing Organizations	4-122
Table 4.11	Steelhead Actions—Implementing Organizations	4-150
Table 412	Public Education & Outreach Actions—Implementing Organizations	4-166

Table 5.1	Summary of Existing Physical/Chemical Monitoring on Morro Bay	5-9
Table 5.2	Summary of Existing Biological/Ecological Monitoring on Morro Bay	5-10
Table 5.3	Summary of Physical and Chemical Information on Morro Bay	5-11
Table 5.4	Summary of Biological and Ecological Information on Morro Bay	5-12
Table 5.5	Morro Bay Watershed Monitoring Parameters/Variables	5-14
Table 5.6	Morro Bay Estuarine Monitoring Parameters/Variables	5-15
Table 5.7	MBNEP Monitoring TREND Timetable	5-17
Table 5.8	Timeline for Deliverable Monitoring Tasks and Evaluation	5-25
Table 5.9	Summary of Public Reporting Venues for EMP	5-27
Table 6.1	Cross-Cutting Action Plans and Evaluation Methods	6-2
Table 6.2	Sediment Action Plan Objectives and Evaluation Methods	6-3
Table 6.3	Bacteria Action Plan Objectives and Evaluation Methods	6-5
Table 6.4	Nutrient Action Plan Objectives and Evaluation Methods	6-6
Table 6.5	Freshwater Flow Action Plan Objectives and Evaluation Methods	6-7
Table 6.6	Heavy Metals & Toxics Action Plan Objectives and Evaluation Methods	6-8
Table 6.7	Habitat Action Plan Objectives and Evaluation Methods	6-9
Table 6.8	Steelhead Action Plan objectives and Evaluation Methods	6-10
Table 6.9	Education Action Plan Objectives and Evaluation Methods	6-11
Table 6.10	Implementation Tracking System (ITS) Current Implementation	
	Status	6-12
Table 7.1	Preliminary Summary of Costs by Action Category	7-10
Table 7.2	Priority Actions and Primary Implementers	7-11
Table 7.3	Cross-Cutting Actions - Additional Potential Funding Sources	7-48
Table 7.4	Sediment - Additional Potential Funding Sources	7-53
Table 7.5	Bacteria - Additional Potential Funding Sources	7-58
Table 7.6	Nutrients - Additional Potential Funding Sources	7-61
Table 7.7	Freshwater Flow - Additional Potential Funding Sources	7-63
Table 7.8	Heavy Metals and Toxics - Additional Potential Funding Sources	7-65
Table 7.9	Habitat - Additional Potential Funding Sources	7-67
Table 7.10	Steelhead - Additional Potential Funding Sources	7-74
Table 7.11	Education and Outreach - Additional Potential Funding Sources	7-77

Table D.1	MBNEP Public Workshops, 1996-1999	D-8
Table D.2	Community Participation in CCMP Implementation Action Plans	D-10

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## 1.1 THE "GIBRALTAR OF THE PACIFIC"

"...to the south an estuary of immense size enters this valley, so large that it looked like a harbor to us; its mouth opens to the southwest and we noticed that it is covered with reefs which cause a furious surf. At a short distance from it, we saw a great rock in the form of a morro, which at high tide is isolated and separated from the coast by little less than a gunshot." — Father Crespi, Portola Expedition, 1769

The Morro Bay Estuary supports the most important wetland system on California's central coast. Rich in natural diversity, Morro Bay supports a wide variety of habitats and numerous sensitive and endangered species of plants and animals. The estuary and its watershed also support many beneficial human uses, such as agriculture, commercial and recreational fishing, recreational boating, tourist attractions which support a large business community, oyster farming, diverse water-oriented recreational opportunities, and electric utility power generation. In addition, Morro Bay provides a protected harbor for offshore marine fisheries. A healthy bay and watershed are important to all of these natural functions and human activities.

The rolling breakers of the outer bay, the sandspit, and quiet inner bay are guarded by the ancient Morro Rock, towering 576 feet above the entrance to Morro Bay. The last in a chain of seven impressive peaks running between San Luis Obispo and the sea, Morro Rock was a landfall for Spanish galleons sailing the coast of California. The town of Morro Bay was founded in 1870 by Franklin Riley. He built an embarcadero, or makeshift pier, where wagons could reach the deep water near the shore. This wharf soon became a center of thriving commerce, despite the treacherous harbor entrances. Thus, the changes to the estuary had begun (see Figure 1.1).

"The desire of the people of Morro Bay... is that the contractors' trestle from which the barrier was constructed be not removed and that the barrier be built up above high water throughout its length, thus closing the north channel permanently." —Letter dated September 22, 1913, from R.L. Weigel, Chief of Engineers, U.S. Army

Over the years, to improve the safety of the harbor and protect seafaring commerce, Morro Rock was quarried to provide materials for breakwaters and a jetty, which closed the north entrance to the harbor. The south channel was dredged and later the economy of Morro Bay boomed as commercial fisherman began bringing in huge catches of albacore, salmon, and cod (see Figure 1.2).

In 1968, Morro Rock was designated as a State Historical Landmark. While the years of quarrying had forever changed this natural monolith, it still covers 50 acres at its base. Now protected, this "Gibraltar of the Pacific" can only be altered by nature.

While Morro Rock is protected from further harm, the Morro Bay estuary is still vulnerable to environmental degradation. Although the Morro Bay estuary still remains relatively unspoiled, there are tremendous demands and stresses being placed on the estuary. The lack of estuarine data from the central coast of California severely limits the ability to assess potential effects of human activities. The known and potential threats to Morro Bay include accelerated sedimentation, water quality concerns, alterations in freshwater flows, and loss of critical habitat.

"We have now seen that an estuarine ecosystem is a living organism, a cohesive entity. The loss of one part by landfills, shoreline modifications or pollution may be compared to removing or damaging a vital part of an animal's anatomy." —U.S. Department of the Interior, 1969













## 1.2 TURNING THE TIDE

#### 1.2.1 LEGACY OF CARING

As far back as the 1960s, the Legislature recognized the need for a comprehensive approach to planning and managing the Morro Bay watershed and the estuary. In 1966, the California State Legislature declared that the preservation of Morro Bay's fish, wildlife, recreational, and aesthetic resources was of great importance to the people of California. In the early 1970s, the Morro Bay Task Force (MBTF) was formed and developed an initial plan. However, this early effort faded due to lack of community involvement in the plan development.

In 1986, the MBTF was reestablished. The community effort was revitalized and two non-profit organizations, The Bay Foundation of Morro Bay (BF) and the Friends of the Estuary at Morro Bay (FOE), were created. These two groups are charged with research and advocacy, respectively. The new MBTF started meeting on a quarterly basis and grew to 250 participants, ranging from state and federal agency representatives, private landowners, non-profit representatives, and the general public. Through the efforts of this group, strong, widespread, and multi-partisan support for the development of a comprehensive plan for Morro Bay and its watershed emerged.

In 1987, the Coastal San Luis Resources Conservation District (CSLRCD) obtained funding through the California State Coastal Conservancy (SCC) to quantify the historical loss of open water in the bay, and to locate and quantify sediment sources to the bay in order to create a baseline for future reference. Utilizing the information gained from this research, the CSLRCD developed the Morro Bay Watershed Enhancement Plan (MBWEP). The U.S. Department of Agriculture (USDA) and the U.S. Environmental Protection Agency (USEPA) have also contributed funding for the enhancement of the Morro Bay Watershed for education and technical assistance programs in the watershed region. To date, over 245 conservation practices have been installed in the watershed through technical and financial assistance provided through the MBWEP. The most significant single action included in the MBWEP is the Chorro Flats Enhancement Project (CFEP) constructed in 1997, which essentially reconnected Chorro Creek with its historical floodplain, thereby allowing sediment to be deposited there instead of in Morro Bay. These projects have resulted in the prevention of over 172,000 tons of soil erosion entering Morro Bay. Additionally, MBWEP projects have caught an estimated 300,000 cubic yards of sediment before it reached the bay.

The importance of Morro Bay was again recognized on June 29, 1990, when the Legislature enacted a resolution which "affirms the importance and value of Morro Bay, its estuary, and its environs to the people of California and supports the nomination of Morro Bay as a National Estuary as provided in federal law, to be administered by the USEPA." The community coalesced, and the first "State of the Bay" conference was held. However, Morro Bay was not yet accepted into the National Estuary Program (NEP).

In April 1994, through the efforts of the FOE, the Governor established Morro Bay as California's first State Estuary. This designation formally recognized the importance of "preserving and enhancing Morro Bay and its watershed as one of the state's rare natural treasures" and the special need for a multi-jurisdictional planning effort. The development of a comprehensive management plan by July 1997 was legislatively mandated. The Task Force convened an administrative committee, the Watershed Council, to oversee development of the plan. In 1998, the City of Morro Bay and the County of San Luis Obispo received the State Plan.

In October 1995, Morro Bay was accepted into the NEP primarily because of the long-term grass-root efforts, and because it was already a designated State Estuary. The Morro Bay National Estuary Program (MBNEP) is one of 28 national programs currently working to safeguard the health of some of the Nation's most important coastal areas.

The primary goal of the MBNEP is to develop and implement a Comprehensive Conservation and Management Plan (CCMP) that recommends priority corrective actions addressing point and nonpoint sources of pollution. These actions will restore and maintain the chemical, physical, and biological integrity of the estuary, including water quality, a balanced indigenous population of shellfish, fish, and wildlife, and recreational activities in the estuary, as well as assure that the designated uses of the estuary are protected. The Central Coast Regional Water Quality Control Board (CCRWQCB) and the BF, in conjunction with the USEPA Region IX, established a Management Conference to prepare the CCMP. Building on the efforts underway for more than two decades, the MBNEP has continued to work to further refine the problems, identify specific actions to address those problems, and define the necessary steps for implementing actions. This document is the result of these efforts. References for the numerous statements made throughout this document are located in the Characterization Report (Vol. II of this CCMP).



## 1.2.2 FROM CONCERNS TO IDENTIFYING PRIORITY PROBLEMS

For the past four years, a broad group of citizens, scientists and government specialists has been studying the Morro Bay Estuary and watershed, examining its health, identifying its high-priority problems, and devising a plan of action to address them. The goal has been to include representatives from all of those groups who have a stake in the process, including advisors and advocates from agriculture, citizen groups, landowners, tourism, recreation, fishing, and shellfish farming. In all, over 100 meetings have been held in the local community.

Guided by a vision of environmental and community vitality, this group worked with commitment and dedication to set forth a plan that enhances the rich variety of wildlife resources and addresses local economic needs and their associated accumulative impacts. From the many cross cutting actions such as Urban Runoff, Stream Geomorphology, and Total Maximum Daily Load Allocations, to specific actions under each priority problem, the CCMP strives to sustain existing wildlife resources and environmental quality, taking into account increased pollution from a growing population.

Important areas of concern were developed by this broad coalition—sedimentation, bacteria, nutrients, freshwater flow, heavy metals and toxics, habitat, and living resources. Focused studies were then undertaken to gather more information. This new information, coupled with past studies dating back as far as the 1960s, has provided important information about trends.

It is natural for estuaries to fill with sediment over time, but increased sedimentation may shorten the life of Morro Bay by as much as ten-fold. Other water quality concerns include excessive levels of bacteria, nutrients, and heavy metals. Water diversion, urban and agricultural runoff, and increasing impervious surfaces threaten the long-term health of the bay.

Not all threats to the bay are tied to water quality. Reductions in freshwater flows adversely impact in-stream resources and water habitats of the estuary. Several species that are state and/or federally listed as endangered---or are candidate species for listing---are at risk. The direct and indirect loss of habitat due to human activities is another threat to the bay. Habitat loss impacts the diversity and abundance of wildlife historically found in the bay and its watershed.

Another problem is the lack of data that exists for resources. The Bureau of Land Management (BLM) and the U. S. Fish and Wildlife Service (USFWS) have highlighted the lack of estuarine data from the central coast and the importance of this information to national planning. Data on estuarine species inhabiting smaller estuaries and estuaries remote from university and/or marine labs (in particular, Central California from Monterey to Point Conception) are scant. Biological and physical processes and interactions are poorly understood for major California estuaries and unknown for the smaller estuaries. The lack of such information severely limits the ability to assess potential effects on estuaries of human activities such as those associated with offshore oil and gas development.

#### PRIORITY PROBLEMS

The MBNEP examined these concerns and, together with new studies and those from the past, identified the following seven priority issues for Morro Bay:

- Sedimentation
- Bacteria
- Nutrients
- Loss of freshwater flow during the dry season
- Heavy metals and toxic pollutants
- Loss or degradation of habitat
- Loss of steelhead



#### 1.2.3 GOALS OF THE MORRO BAY NATIONAL ESTUARY PROGRAM

The following goals of the MBNEP have been identified through over a decade of MBTF and MBNEP activities:

- Slow the process of bay sedimentation through implementation of management measures which address erosion and sediment transport.
- Reestablish healthy steelhead trout habitat in Chorro and Los Osos creeks through measures including reduction of sediment loading in gravels, stabilization of riparian corridors, removal or mitigation of barriers, improvement of water quality, and restoration and maintenance of adequate freshwater flow.
- Ensure that bay water remains of sufficient quality to support a viable commercial shellfish mariculture industry, safe recreational uses, healthy eelgrass beds, and thriving fish and shellfish populations.
- Ensure the integrity of the broad diversity of natural habitats and associated native wildlife species in the bay and watershed.
- Maintain watershed functional integrity through appropriate riparian corridor management, impervious surface management, fire management, and grazing management.
- Protect social, economic, and environmental benefits provided by the bay and watershed, including agriculture and fisheries, through comprehensive resource management planning.
- **Promote public awareness and involvement in estuarine management issues** through outreach, educational programs, and the use of volunteers in ongoing bay monitoring and other programs.

## 1.3 A CALL FOR ACTION

## A Summary of Grassroots Participation in Watershed Management Planning

The Morro Bay Estuary and its watershed are important and extremely complex resources, and managing them is a significant challenge. Environmental protection must be balanced with the competing uses of the land, water, and other natural resources. To meet this challenge, the watershed communities of Morro Bay, Los Osos, Baywood, Cuesta-by-the-Sea, Los Osos, and Chorro Valleys succeeded in achieving widespread multipartisan support to develop a management plan for the estuary and watershed. This grassroots effort has involved hundreds of individuals and countless volunteer hours, working together with environmental specialists and government resource managers to produce a watershed management plan that integrates sound scientific analysis and technical data with local understanding of social and economic concerns and goals for a healthy environment.

A fundamental component of a successful management program arises from strong community involvement throughout each phase of the planning process. In early 1995, guided by the MBTF, and through a grant administered by the CSLRCD, a formalized plan for public involvement was first developed for the Morro Bay State Estuary Program (MBSEP). Drawing on a decade of experience and knowledge of the nearly 250 participants in the MBTF, a group of individuals including environmental specialists, stakeholders and interested citizens were nominated to serve on the MBSEP Watershed Council, a small executive committee responsible for leadership in developing the MBSEP.

One of the first acts of the Council was to form a Public Outreach Workgroup to begin developing a community education and outreach program in support of the goals of the estuary management planning process. The Council asked the Public Outreach Workgroup to focus efforts on two key areas: first, to begin informing the community about the issues and problems affecting the health of the bay and the watershed; and, second, to solicit broad-based input and involvement in the management planning process.



By early 1995, a public participation strategy began to take shape based on specific tasks set out by the Council. These included: 1) developing information for the community about the Estuary Program and watershed management goals; 2) drafting a list of interest groups and stakeholders for recruitment into the management planning process; and 3) identifying community resources for collaborative efforts to support community education and outreach.

These early steps organized by the Morro Bay watershed communities helped to demonstrate to the USEPA a strong commitment to achieve a community-based approach to environmental governance of the Morro Bay Estuary and its watershed. In July of 1995, when Morro Bay was designated as a National Estuary, much of the necessary groundwork for community involvement, education and outreach was in place, and the work of the MBSEP continued jointly with support and additional funding provided by the NEP. (See Appendix D: Public Participation Strategy for a summary of public participation during 1996-1999, and Volume III for a copy of the Management Conference Agreement.)

The MBNEP reorganized in 1997 to strengthen existing committees and provide clearer lines of communication. The results of the reorganization are reflected in Figure 1.3. The planning organizational structure carried the program through the planning phase. As the program moves into implementation, the organization will be restructured to better support completing CCMP Action Plans. The new implementation structure is outlined and discussed in Chapter 7.



# 2.1 THE ABUNDANCE OF MORRO BAY

The Morro Bay estuary supports the most significant wetland system on California's central coast. It serves as a link for migratory birds and is home to a diverse collection of wildlife species, many of which cannot be found anywhere else in the world. The uniqueness of the biotic resources and the scenic attraction of Morro Bay and its wetlands are enhanced by its relatively natural state and geographic location. Morro Bay is of vital importance to a great variety of migratory and resident species, including many rare and endangered species.

Over the past two years, a diverse group of stakeholders and technical experts has been synthesizing existing data on the estuary and watershed. Five technical studies of the estuary and watershed, and the dynamic processes occurring within them were conducted. This chapter is a summary of the technical studies and a synthesis of existing information on the Morro Bay estuary and watershed. More detailed information beyond this summary and references to source documents can be found in the Morro Bay National Estuary Program (MBNEP) Characterization document.

#### 2.1.1 AREAS UNDER STUDY

The MBNEP study area includes the Morro Bay estuary, the watershed that drains into it, and to some extent, Estero Bay from Point Buchon in the south to Point Estero in the north (see Figure 2.1).

#### 2.1.2 THE MORRO BAY ESTUARY

The Morro Bay estuary is a 2,300 acre semi-enclosed body of water where freshwater flowing from the land mixes with the saltwater of the sea. This mixing supports a unique ecosystem containing numerous plants and animals that are not found in either totally freshwater systems or the ocean. The estuarine system includes coastal wetlands, such as salt and brackish tidal marshes, and intertidal flats, as well as deepwater channels and parts of coastal streams. The estuarine system can be defined as consisting of deep water tidal habitats and adjacent tidal wetlands that are semi-enclosed by land but have access to the open ocean, and in which ocean water is diluted by freshwater runoff from the land. Some areas are continuously submerged while others are alternately exposed and flooded by tides (or wet by splashes from waves).

#### 2.1.3 THE MORRO BAY WATERSHED

The Morro Bay watershed covers approximately 48,000 acres or 75 square miles. Its highest elevation is 2,763 feet above sea level and its furthest point from the bay is approximately 10 miles. Morro Bay's watershed is comprised of two subwatersheds, Chorro and Los Osos. Chorro Creek drains the larger Chorro Creek subwatershed, which occupies approximately 60 percent of the watershed. Los Osos Creek drains the remaining 40 percent, and consists of combined flow from Los Osos and Warden Creeks. Chorro Creek terminates in a salt-marsh delta in the northeast portion of estuary, and Los Osos Creek terminates in tidelands in the southeast portion of the estuary. The semi-enclosed Morro Bay estuary in turn flows into the larger Estero Bay and the Pacific Ocean to the west.

Morro Rock is the most westerly visible in a chain of extinct volcanic plugs that are oriented east-west and divide the two coastal valleys that drain into the bay. The erosion of broadly folded sedimentary rocks formed the Chorro and Los Osos valleys. Underlying the deposition is a 180-million-year-old mélange of igneous, metamorphic and sedimentary rock.









The soils of the watershed are primarily clay loams in Clark Valley, Diablo and Cibo clays in the Los Osos Valley, and Salinas loams and Diablo clays in the Chorro Valley. Baywood fine sand is the predominant soil type in the South Bay area. Serpentine outcrops and soils are present in certain areas. Serpentine soils have a high metal content, and often support special status plant species and/or unique vegetation.

The Morro Bay watershed is also a seismically active area, with several earthquake faults within or near the watershed. The watershed is shown in Figure 2.2.

## 2.2 PHYSICAL RESOURCES

The Morro Bay estuary has changed over time due to both natural and human-caused disturbances. This section describes some of those disturbances and processes.

#### 2.2.1 GENERAL DESCRIPTION OF MORRO BAY AND NAVIGATIONAL CHANNELS - PRIOR TO 1920

Morro Bay is situated approximately in the middle of Estero Bay in San Luis Obispo County and is located on the central coast of California about 60 miles north of Point Conception and about 100 miles south of Monterey Bay. It is a shallow lagoon, approximately four miles long in the north-south direction and about 0.75 miles wide in the east-west direction at its maximum width. The bay was formed by the submergence of the river mouth at the confluence of Chorro Creek and Los Osos Creek during the post-glacial sea level rise about 10,000 to 15,000 years ago. The Morro Bay watershed, drained by Chorro and Los Osos Creeks, has an area of about 72 square miles.

In its natural condition, the entrance channel to Morro Bay passed around and close to the southeastern and eastern sides of Morro Rock. Prior to 1910, Morro Rock was separated from the shoreline, and the main channel now near the embarcadero was located just easterly of the sandspit, which was much thinner than it currently is. Neither the State Park Marina nor Cuesta inlet existed at that time.

In the late 1890s, extensive quarrying of Morro Rock began, and tons of rock were removed to form the breakwater for Port San Luis, as well as many local buildings. Port San Luis became the major port in the area. There was general agreement in the local community that when and if the Morro Bay harbor were ever to be improved, the North Channel would be preserved. In 1910, this sentiment shifted because the northern channel frequently filled with downcast drift, and incoming navigation was required to use the entrance on the south side. Eventually, in 1911, the San Francisco Bridge Company completed a barrier across the entire north entrance. They did not leave an entrance for fishing boats to be utilized during severe weather, as requested by the U.S. Army Corps of Engineers (ACOE).

At the extreme southern end of the bay, a southwest trending shoreline narrowed the bay to a tidal channel at Shark Inlet, adjacent to the sandspit. The southern portion of the bay was, and still is, dominated by tidal mud flats of very fine sediment. Fairly large areas of pickleweed-dominated salt marsh occur along the edges of this part of the bay. A narrow zone of saltwater marsh, and patchy fresh water marsh exist in this area. Little development was visible outside of the town of Morro Bay.



## FIGURE 2.2 THE MORRO BAY WATERSHED



#### 2.2.2 GENERAL DESCRIPTION OF MORRO BAY AND NAVIGATIONAL CHANNELS - 1930S AND 1940S

In 1934, California established Morro Bay State Park on the northern edge of the bay.

In 1935, using federal funds from the Works Progress Administration, reinforcement of the bridge to Morro Rock was completed.

In 1941, the U.S. Navy requested that the Morro Bay harbor be improved for use as a base for naval patrol craft. From 1941 to 1946, the ACOE made a series of improvements, including:

- Two stone breakwaters, the north and the south,
- A dike extending 1,600 feet from Morro Rock to the mainland,
- A 1,000 foot long stone groin,
- A 7,000 foot revetment,
- An entrance channel (16 feet deep by 350 feet wide),
- The Navy channel (16 feet deep by 800 feet maximum width), and
- The Morro channel (12 feet deep by 150 feet wide).

These structural changes and the dynamics of outgoing tidal velocity and incoming sediment transport have resulted in a continual shoaling problem in the entrance, and in the Navy and Morro navigational channels of the bay. Between 1944 and 1975, maintenance dredging occurred in Morro Bay on average at least every five years. Presently, dredging occurs on the average of once every two to three years. A total of 3.5 million cubic yards had been dredged as of 1975 and the rate of shoaling has been estimated more than 120,000 cubic yards per year.

#### 2.2.3 CURRENT BATHYMETRY OF MORRO BAY

In 1998, a bathymetric survey was conducted and models were developed by Tetra Tech. The general bathymetry of the bay consists of extensive mudflat areas with little variation in slope and steep-sided channels that cut through the mudflats (see Figure 2.3). The depth and width of these channels show considerable variability.

By comparing the 1998 Tetra Tech bathymetry with the historical estimate of 1884 water depths, the following estimates can be made:

- Area of the bay covered at mean high tide has decreased by 15 percent;
- Area of the bay covered at mean low tide has decreased by 30 percent;
- Area of the bay covered at the lowest tides has decreased by 60 percent;
- Volume of water in the bay at mean high tide has decreased by 20 to 25 percent;
- Volume of water in the bay at the lowest tides has decreased by 15 percent;
- Volume of water below one foot, which approximates the smallest volume of water remaining in the bay during an extreme low tide, has decreased only five percent; and
- Decrease in the mean tidal prism is between 20 and 30 percent.

These reductions in area and volume of bay water in the bay indicate the bay boundaries have decreased; mudflat areas exposed during low tide have increased; and natural bay channels have become narrower and deeper.







## 2.2.4 MORRO BAY TIDAL CIRCULATION PATTERNS

In Morro Bay, there are two mechanisms available for dilution for flushing of bay waters. The primary mechanism is exchange with the Pacific Ocean (Estero Bay) through the open boundary at the entrance to Morro Bay. Bay water exits the entrance to Estero Bay during ebb tide and ocean water enters during flood tide. Tides in Morro Bay can be classified as mixed semi-diurnal with two highs and two lows occurring daily. Some re-circulation occurs at the bay entrance during the change from ebb to flood tide flow. In a 1974 study, the peak ebb tides were clocked at 1.7 knots in the Morro Channel. Since then, other studies place the flow at 1.8 to 2.0 knots within the channel at the harbor entrance. Breaking waves at the entrance to Morro Bay present a serious hazard to navigation; from 1979 to 1987, 21 people were killed in boating accidents in Morro Bay making it one of the eight most dangerous harbors in the United States.

The second dilution mechanism is freshwater flow from Chorro Creek and Los Osos Creek. The flushing analysis has shown that these freshwater flows have a significant impact on flushing in Morro Bay. During low-flow periods in the summer months, the bay is especially susceptible to build-up of pollutants in certain areas, most notably, the southwest portion of the bay, State Park Marina, and the delta area.

Minimal flushing occurs in the southwest portion of the bay with flushing half-life times on the order of 12 to 18 days. Another area of low flushing is inside the State Park Marina where flushing half-life times range from 5 to 13 days. As with the low-flow simulation, the two weakest areas of flushing are the southwest corner of the bay and State Park Marina. The high flow case indicates extremely fast flushing throughout the bay with a maximum half-life of seven days in the extreme southwest corner of the bay. However, it is unlikely that this extreme flow rate would be sustained for seven consecutive days.

Except during drought years, measurable dilution occurs in the tidal channels most years and in the bay itself during high flow events. In high flow events, the bay can be entirely dominated by freshwater.

# 2.2.5 STREAMS AND RIPARIAN SYSTEMS (PLANTS GROWING ALONG RIVERBANKS)

The creeks within the watershed are typical of Central California coastal streams in terms of their aquatic fauna, riparian overstory, and general geomorphology. Both Chorro Creek and Los Osos Creek support an assemblage of native and non-native fish that includes steelhead trout, three-spined stickleback, prickly sculpin, and, at least in the past, tidewater goby. The creeks serve as transportation corridors and habitat for numerous species of birds and wildlife.

Except for the dam at Chorro Reservoir, Chorro and Los Osos Creeks have unimpaired natural connection to the ocean through the estuary and bay. The major creeks within the Morro Bay watershed are also shown in Figure 2.4. The watershed is divided into two primary systems, the Chorro Creek watershed and the Los Osos Creek watershed.

**Chorro Creek Watershed:** Chorro Creek drains the northern two-thirds of the Morro Bay watershed, an area of 43 square miles. Chorro Creek flows southerly to Chorro Reservoir on Camp San Luis Obispo, continues in a southerly direction until it reaches Highway 1, then flows westerly south of Highway 1 into Morro Bay. Along this route, at least five major tributaries contribute flow, in particular San Bernardo Creek, San Luisito Creek, Pennington Creek and Dairy Creek. The middle segment of Chorro Creek below the sewer plant provides a significant percentage of the summer nursery habitat for steelhead, and sustains about 60 percent of the juvenile steelhead population. Pools provide the majority of the habitat. Summer temperatures range from 58 to 71 degrees Fahrenheit, within acceptable limits for steelhead.

**Chorro Reservoir:** Constructed in 1941 to store runoff water for Camp San Luis Obispo (California National Guard), Chorro Reservoir had an original storage capacity of 213 acre-feet (AF). However, due to sediment accumulation, capacity in 1994 was estimated at less than 150 AF. The California Water Resources Control Board places release requirements on Chorro Reservoir. If the creek is flowing at more than two cubic feet per second (cfs) above Chorro Reservoir (at the confluence of the two tributaries), one cfs must be released below the dam. If Chorro Creek is flowing less than two cfs above the reservoir, one-half of the flow must be released below the dam.



Sediment has had a major impact on Chorro Reservoir. Until the early 1990s, the California Men's Colony (CMC) operated a suction dredge to remove sediment, but no accurate estimates of amounts are available. The material was piped to basins on the eastern side of the reservoir, dried, then removed to other areas on camp, sometimes near enough to Chorro Creek to erode into it. Samples of the dredging piles and sediment basins showed high levels of chromium and nickel.

Los Osos Creek Watershed: The Los Osos Creek system is highly dynamic. Before 1963, the U.S. Geological Survey (USGS) topographic map for the area indicated that the Clark Valley and Warden Creek forks met nearly one mile above the point where Los Osos Creek now outlets to the bay. Today, this confluence is approximately 4,000 feet further upstream.

The headwaters of Los Osos Creek are located on the north-facing slopes of the Irish Hills. The Creek drains approximately 23 square miles, and is divided into two primary subwatershed areas, the Warden subwatershed and the Clark Valley subwatershed. In 1883, the Los Osos Valley was described as being a "spacious vale with numerous ponds." The soil was saturated and the valley difficult to cross. The western end of the valley was described as having "deep water courses." Today, downstream of the Warden Creek confluence, the effects of recent dredging are evident, with practically zero slope present in the lower 4,500 feet of channel immediately upstream of the Bay.

**Stream Sediment Transport:** Sediment yield and transport analyses were completed in 1998 on the major tributaries to Morro Bay to evaluate the sources, sizes, and quantities of sediment loading to the bay. Tetra Tech estimated the average annual loading to the bay to be 70,000 tons per year. About 10 percent of this loading is composed of sands and gravels and about 90 percent is composed of fines, such as clay and silt. Los Osos Creek, which makes up about a third of the contributing drainage area, is estimated to supply only about 14 percent of the total. Chorro Creek is estimated to contribute about 86 percent of the total annual sediment loading to the bay. When these totals are considered on a per acre basis for the Chorro and Los Osos watersheds, Los Osos Creek's contribution increases to 23 percent, and Chorro Creek's contribution decreases to 77 percent. These figures suggest that the Chorro Creek watershed should be the focus of the majority of sediment-related actions.

Flow Characteristics of Chorro Creek, Los Osos Creek, and other watershed streams are listed in Table 2.1. Land Use, vegetation, and other habitat characteristics are listed in Table 2.2.









Table 2.1	Flow Characteristics and Drainage Areas of Morro Bay
	Watershed Streams

Siream	2 Yr. Evení	100 Yr. Evení	Drainage area	Special Projects
	Average Flow	Average	(sq. mi.)	
	(cfs)	·		
Upper Chorro	90	743	7.6	Cattle exclusion
Dairy Creek	12	262	2.5	Cattle exclusion
Pennington	14	318	3.0	
Walters	5	144	2.0	Paired watershed
San Luisito	36	829	8.3	
San Bernardo	46	957	8.5	Maino
Lower Chorro	119	1134	11.4	Chorro Flats
Total Chorro			43.37	
Upper Los Osos –	9	462	7.0	Swift
Clark Valley				
Warden Creek	15	773	12.93	Los Osos Creek
				Wetland Reserve
Minor tribs			3.2	
Total Los Osos			23.1	

# Table 2.2Land Use, Vegetation, and Presence of Barriers to Steelhead in<br/>Morro Bay Watershed Sub-Basins and Streams

Stream	Steelhead	Red-legged Frog	Land Use	Streams within CA Coastal Zone	Predominant Vegetation
Upper Chorro			Public Facility		Brushland
Dairy Creek	✓ (3)	~	Recreation		Grassland
Pennington	· ·	~	Agriculture	~	Grassland
Walters		~	Agriculture	~	Grassland
San Luisito	✓ (3)	~	Agriculture	<b>·</b>	Grassland
San Bernardo	✓ (2)	~	Ag – Grazing	✓ ✓	Grassland
Lower Chorro	~		Ag - Field crops	¥	Prime Farmland
Upper Los Osos –Clark Valley	~		Agriculture	~	Oak Woodland
Warden Creek			Ag – Field crops	×	Prime Farmland

Refers to presence of barriers and numbers in parenthesis refer to the number of barriers

## 2.3 BIOLOGICAL RESOURCES

San Luis Obispo County is known for its rich biotic diversity. The uniqueness of the biotic resources and the scenic attraction of Morro Bay and its wetlands are enhanced by its relatively natural state and geographic location. As the "most significant wetland system in the central coast of California," it is of vital importance to a great variety of migratory and resident species, including many rare and endangered species.

The complex interaction of marine, estuarine and upland plant communities provides feeding, resting and nursery areas for thousands of migratory birds as well as fish and marine mammals. The high percentage of publicly owned lands in and adjacent to the bay helps to maintain the integrity of many environmentally sensitive areas, including habitats of rare species.
Unique, fragile or rare community types are represented in public areas such as the Morro Bay sandspit, Los Osos Oaks State Preserve, and the Elfin Forest. Rare and endangered species are protected at Morro Rock, Morro Dunes, Sweet Springs, and Morro Bay State Park. A number of Monarch Butterfly roosts that are present are currently unprotected. Outstanding representatives of natural communities are included within Morro Bay State Park, on Black Hill, and on the sandspit. Particular areas of educational value include the heron rookery at Morro Bay State Park, the Chorro delta, and Los Osos Oaks State Reserve. School groups and the public visit all of these areas regularly.

## 2.3.1 ESTUARY AND WATERSHED HABITATS

The estuarine system includes coastal streams, and coastal wetlands such as salt and brackish tidal marshes, intertidal flats and deepwater channels. It can be defined as consisting of deep water tidal habitats and adjacent tidal wetlands that are semi-enclosed by land but have access to the open ocean, and in which ocean water is diluted by freshwater runoff from the land. This system is strongly influenced by its association with land versus its association with the marine system.

Wetland habitats found in Morro Bay include open water and channels, subtidal and intertidal eelgrass, mudflats, coastal or tidal salt marsh, brackish marsh, freshwater marsh, and riparian woodland. These habitats support a number of sensitive or special status species. Many of the estuarine and wetland habitat types of Morro Bay can be differentiated by their levels of exposure and tolerance to salt water or freshwater. The vegetated habitat types are typically characterized by one or two dominant plant species (as shown in Figure 2.5). These habitat types have and continue to undergo transition due to many factors, some of which include long-term past sea level changes, and elevation changes caused by sedimentation.

## 2.3.2 FISHERIES

The role of the estuary as a fish nursery is significant to the coastal sport and commercial fishery. Recreational fishing takes place from shore, docks, piers, and from a variety of boats. Catches include a diversity of species with halibut, flounder, and shark in the prize category. The top species landed by fishermen include jacksmelt, black surf perch, starry flounder, and Pacific halibut.







Various species of rockfish and other reef-oriented fish are found only in a small area near the mouth of the bay near Morro Rock, where giant kelp can be found. The kelp beds provide a popular fishing location, and they are the target destination for a local tour boat.

A new study (1998) showed fewer species caught compared to previous years, but the results may be due to normal differences in sampling locations, seasonal or annual variation, and other factors.

## 2.3.3 INTERTIDAL AQUATIC BEDS - EELGRASS

Aquatic beds are wetlands and deep-water habitats dominated by plants that grow principally on or below the surface of the water for most of the growing season. They can be dominated by algal beds or by rooted vascular plants. Eelgrass is the dominant plant in the aquatic beds of Morro Bay and forms a critical element of the Morro Bay ecosystem.

Dense stands of eelgrass form meadow-like beds in the lower intertidal zone of the Morro Bay estuary. These beds are complex and highly productive environments. They serve as spawning and nursery grounds for many species of fish, including halibut and English sole. The density and diversity of benthic fauna are several times greater within the eelgrass beds than in other Morro Bay habitats. The dense foliage of the beds serves as substrate for a vibrant community of epiphytic flora and fauna, and functions as a trickling filter, providing the microbial environment, which decontaminates the bay's water. In addition, the beds effectively moderate current and wave action, permitting suspended sediments and organic particles to settle and improving the water clarity and quality of the Bay.

The Morro Bay estuary is the only significant eelgrass habitat available to the Black Brant in central and southern California. Eelgrass is the preferred food resource for wintering populations of the Black Brant and makes up more than 75 percent of their food intake. Since most of the flyway population of Brant transits Morro Bay in the course of the coastwise spring migration, their future health is dependent on the continued preservation of this resource.

Eelgrass is not robust in the face of environmental stresses. Research shows a correlation between the depth at which eelgrass will grow and depth of light penetration. Water transparency can be impacted by color (dissolved organic substances), turbidity (suspended sediments) and nutrient enrichment (increased algal abundance). Many studies have reported on the decline of seagrasses with degraded water clarity. Eelgrass is quickly and profoundly influenced by the same stresses identified as critical to the bay's broader ecosystem—sediment and water quality. Eelgrass is easily monitored by low-cost survey techniques. Consequently, its condition serves as an ideal bio-indicator of the health of the estuary.

Eelgrass is a carefully regulated resource. Any activity which directly impacts its habitat must be fully mitigated, as required by federal regulations. Impacts are additionally subject to state coastal review. Indirect cumulative effects associated with the urbanization of the watershed are not directly addressed in regulations. Nevertheless, the indirect effects of urbanization in similar small estuaries have proven capable of completely eliminating eelgrass.

**Current Conditions:** The eelgrass beds in Morro Bay are known as the largest and least impacted of any in Southern California. However, the estimated extent of eelgrass found in Morro Bay has fluctuated widely. Shoaling as a result of the deposition of creek sediments has eliminated beds in the Chorro delta. Shoaling due to wind-deposited dune sand has eliminated beds on the western edge of the bay. Recently, eelgrass in Morro Bay has undergone catastrophic contraction first observed in the 1994-95 winter season. This well documented decline coincides with the winter following the destructive Highway 41 fire in 1994, and concurrent end of the 1990s drought cycle. Eelgrass distribution continued to decline for subsequent years, and reached an historic low of less than 50 total acres, in the Spring of 1997. Comparison of historic photographs revealed that prior to the recent contraction the core areas of greatest plant density have remained relatively stable over the long term since 1949. Whether the recent decline represents an acute, but transitory, event or represents a chronic reduction has not been resolved.

In its present reduced state, eelgrass lines the harbor channels inland of Coleman Beach; beds are located opposite Tidelands Park and White's Point. The remnant of an extensive historic bed is found in the central portion of the bay south of the oyster barge channel and north of Baywood point. Eelgrass is insignificant in the southern and eastern sides of the bay—in the Chorro delta, Baywood cove, and south of Cuesta inlet.



Tetra Tech's 1998 survey identified a total of 81 acres of eelgrass in Morro Bay. Eelgrass was the dominant plant, accounting for nearly 100 percent of the vegetative cover. No non-native plants were identified in the eelgrass beds sampled. The total acreage of eelgrass beds and the acreage of densely vegetated eelgrass beds in Morro Bay have both decreased significantly compared with previous studies. However, the observed decrease may be due to differences in sampling period among studies, differences in sampling effort, known large (as large as an order of magnitude) natural interannual variations in eelgrass, and/or possible stressors (e.g., sedimentation).

## 2.3.4 MUDFLATS (ESTUARINE UNCONSOLIDATED SHORE)

Intertidal sand and mudflats are soft to semi-soft substrate, shallow water habitats. Tidal flats develop as depositional features, such as creek deltas, expand. Organisms that inhabit tidal flats rely on organic materials imported from adjacent coastal, estuarine, riverine, and salt marsh habitats. Many species of fish migrate over tidal flats with the incoming tides to feed on the organisms found on and in the sediments. Despite their lack of vegetation, tidal flats are recognized for their high productivity which is attributed to the diverse variety of primary food types such as benthic microalgae, phytoplankton, and imported particulate organic materials that are available to the organisms of the flat.

Tetra Tech's 1998 survey identified a total of 1,319 acres of mudflat in Morro Bay. Mudflats are the most abundant habitat type in Morro Bay, and provide primary foraging habitat for shorebirds. For the most part, intertidal mudflats of Morro Bay are devoid of vegetation.

Invertebrate populations in the mudflats are large and diverse. Some of the more important species are included below:

**Pacific Oysters:** Pacific Oysters have been cultivated and harvested in the bay since 1946. Oysters are filter feeders, and as such are critical indicators of water quality. The California Department of Health Services (CDHS) and the California Department of Fish and Game (CDFG) regulate and monitor all phases of the harvesting.

**Clams:** The gaper clam and the Washington Clam are the two most abundant clams in the estuary. Gaper clams are about four times as abundant as Washington clams. The clams are patchy in their distribution, occurring in greatest abundance near Target Rock, and most commonly along the northeast side of the main channel. A possible mechanism that may be regulating the distribution of clams in Morro Bay is sediment transport and deposition along the southwest margin of the channel, combined with periodic maintenance dredging of the channel. These factors may prevent recruitment and subsequent growth of clams in this area. Gaper and Washington clams are deep-burrowing species that often are found in burrows that exceed 15.75 inches in depth in soft sediment. Sea otter foraging data from 1988 indicate that otters had been feeding principally on these two clams, and, although the gaper clams were more abundant, the two species were represented almost equally in the diet of the sea otters of Morro Bay.

Popular clamming areas once existed between Fairbanks Point and White Point on the eastern side of the bay, inside the breakwater on the northwest side of the sandspit, and across from the city's boat ramp on the east side of the sandspit. Other clams present in the bay include Geoduck and Littleneck clams.

Other Species: Ghost Shrimp were once important commercially in Morro Bay and are currently used for bait by local fisherman.

**Fish:** Topsmelt is the most abundant fish in the eelgrass habitat. Other species that were collected in relatively high abundance at eelgrass stations included Pacific staghorn sculpin, shiner surfperch, arrow goby, and bay pipefish. Less abundant species were California halibut, jacksmelt, longjaw mudsucker, and snubnose pipefish.

Shorebirds: Mudflats and tidal flats also provide good-quality habitat for shorebirds.

## 2.3.5 ROCKY SHORE

Rocky substrate is found along the eastern shoreline of the estuary from Fairbank Point to the harbor entrance. Most of this substrate is intertidal rip-rap placed to prevent erosion. Subtidal rocky bottom areas are most extensive near Target Rock and along the two breakwaters.

## 2.3.6 SANDY BEACHES

Sandy beaches are limited in occurrence in the estuary, and include Coleman Beach, which is north of the T-piers (in the vicinity of Duke Energy Plant), and scattered areas on the eastern side of the sandspit. In addition, the Los Osos/Baywood Pier area at the southern end of 2<sup>nd</sup> Street, Cuesta Inlet near Doris Avenue, Pasadena coastal access off of Pasadena Drive, Bayshore Bluffs Park, Bay Mouth Buoy, and Sandspit-Oyster Unit are used for various inwater activities. Outside the estuary, within Estero Bay, sandy beaches exist north of Morro Rock and along the western edge of the sandspit. Dunes are generally found landward of beaches. The dunes migrate with wind action, and may or may not be vegetated.

## 2.3.7 COASTAL SALT MARSH (ESTUARINE EMERGENT WETLAND)

Coastal salt and brackish marsh are important components of the wetland habitat found at the edge of the Morro Bay estuary. Several sensitive species are found associated with these habitat types in Morro Bay, including California sea blight, salt marsh bird's beak, and the California Black Rail. Portions of these habitats have been severely impacted by sedimentation and aggressive takeover by introduced weed species, particularly hoary cress.

Tetra Tech's 1998 survey identified a total of 436 acres of salt marsh habitat in Morro Bay. The salt marsh was dominated by pickleweed in the low salt marsh and Jaumea in the high salt marsh. Five non-native plants were identified, but were not dominant, in salt marsh habitats sampled. The majority of the salt marsh habitat occurs in the Chorro/Los Osos Delta. A small portion of salt marsh habitat occurs near the Sweet Springs Preserve along the southern margin of the bay. Salt marsh exists at Shark Inlet, at several small inlets along the sandspit, and adjacent to Butte Drive. Areas of higher elevation, particularly within the marsh plain, appears to support a more diverse assemblage of plant species, such as salt grass, alkali heath, arrow grass, and western marsh-rosemary. Five non-native plants species were observed in the salt marsh habitat including fennel and wild radish. None of these non-native plants were dominant.

Due to cost and time constraints, not all areas of Morro Bay could be ground-truthed in 1998 to map salt marsh vegetation using aerial photos. Future monitoring studies should focus separately on the different habitat types; this would allow a more detailed and complete mapping of each of the habitat types.

## 2.3.8 BRACKISH MARSH (ESTUARINE EMERGENT WETLAND)

Coastal Brackish Water Marsh, found in the narrow zone between salt marsh and fresh water marsh or upland habitats, is characterized by salt grass, Jaumea, and alkali heath. Small areas of brackish marsh were observed near the mouth of Los Osos Creek and at Sweet Springs Marsh.

## 2.3.9 FRESH WATER MARSH (PALUSTRINE EMERGENT WETLAND)

Coastal freshwater marsh (35 acres) is primarily found at the edges of the south bay. This marsh is dependent on high ground water, and is supported in part by effluent from septic system disposal in Los Osos.

## 2.3.10 RIPARIAN (PALUSTRINE FORESTED WETLAND; RIVERINE SAND AND MUD BOTTOMS)

Healthy riparian corridors consist of tall overstory shade trees, shrubby vegetation, and understory grasses and forbs. The shade of the trees keeps creek water cool and reduces algal growth in the creek channel itself. Riparian corridors provide important nesting, feeding, and cover habitat for a number of birds, mammals, and other species. They also serve as wildlife corridors for migratory animals. Riparian vegetation also helps to prevent stream bank erosion and trap sediment before it reaches the stream.



#### **TETRA TECH 1998 SURVEY**

Tetra Tech's 1998 survey only characterized riparian habitat within one mile of the estuary along Chorro and Los Osos Creeks. They identified a total of 147 acres of riparian habitat. Riparian habitat samples were dominated by arroyo willow. The exotic, invasive cape ivy was a dominant plant in the herb layer of Chorro Creek and is also present along the lower reaches of Los Osos Creek. The riparian habitats of Chorro and Los Osos Creeks were the most diverse of all habitats sampled in Morro Bay. Forty-nine plant species were identified in riparian habitats.

**Chorro Creek:** For many years a portion of Chorro Creek just upstream from the Chorro Creek Bridge was diverted and held in place by a levee. In 1994, as an emergency measure, the Coastal San Luis Resource Conservation District (CSLRCD) removed a 450-foot section of this levee and Chorro Creek was allowed to flow through the breech into a restoration channel. In 1997, another 2,600 feet were removed as part of the Chorro Flats Project coordinated by the CSLRCD. The purpose of the project is to preserve agricultural land and restore habitat by allowing sediment to deposit on the Chorro Creek floodplain instead of in the Bay. The streambed of Chorro Creek consists of mixed coarse sand and small gravels in the one-mile reach upstream from the tidal marsh. Low water conditions leave exposed gravel and sand bars along the stream, particularly upstream of the confluence with the restoration channel. A thorough inspection of the channel within the study's reach revealed no barriers to anadromous fish movement.

Topography and agricultural practices have resulted in a narrow riparian corridor in the upper portion of the onemile study reach of Chorro Creek. The corridor of riparian vegetation widens near the mouth, indicating that the main channel has meandered in the recent past. Arroyo willow dominated the riparian habitat throughout the entire reach. In terms of mean percent cover, this species accounted for 40 percent of the shrub and canopy layers. Exotic, invasive cape ivy was a dominant of the shrub and herb layers in several locations along the reach, particularly in the lower portions. In the herb layer of Chorro Creek, Cape Ivy accounts for 54 percent of the mean vegetative cover. Other exotics found in the riparian habitat of Chorro Creek include fennel, annual beard grass, and Italian thistle.

Los Osos Creek: The narrow Los Osos Creek streambed is dominated by silt and mud in the one-mile reach upstream from its confluence with a tidal channel. Dense vegetation and deep, soft sediments prevented a thorough inspection of the stream channel within the study reach. Where visible, there appeared to be no barriers to anadromous fish movement when high flows occur.

Aerial photos of riparian habitat along the lower one-mile reach of Los Osos Creek indicate large areas of contiguous riparian habitat interspersed with small clearings and roads. Of the three willow species observed during vegetation sampling at Los Osos Creek, arroyo willow dominated the riparian habitat throughout the entire reach. Upstream areas of the floodplain adjacent to the reach appear to consist of evenly-aged stands of willow, indicating that either natural or man-made conditions had allowed willows to recently colonize this area.

In terms of mean percent vegetative cover, arroyo willow accounted for 19 percent of the shrub and canopy layers. California blackberry accounted for 23 percent of the layer. Exotic species found in the riparian habitat of Los Osos Creek include Cape Ivy, fennel, annual beard grass, and Italian thistle.

## 2.3.11 MORRO BAY UPLAND & WATERSHED HABITATS

**Coastal Dune Scrub:** Coastal dune scrub is one of the most endangered habitats in the state of California, primarily because of its location on relatively flat terraces adjacent to the Pacific Ocean, where development is common. Much of Los Osos is situated in the coastal dune scrub habitat. The few good-quality remnants of this habitat now support several endangered species, including the Morro Shoulderband Snail, the Morro Bay Kangaroo Rat, and the Morro manzanita. Silvery lupine, mock heather, and coyote brush are characteristic plants occurring within dune scrub. Sand verbena, beach primrose, live-forever, and sea rocket occur on the sandspit and in other areas. Several dune plants are considered to be Species of Special Concern by the California Native Plant Society. Lack of habitat continuity, encroachment of development, suppression of natural burns, invasion of veldt grass (an exotic species), and intrusions of domestic pets are all serious threats to this habitat.

Maritime Chaparral: Perhaps the most distinctive of chaparral communities, central maritime chaparral is dominated by Morro manzanita. It is scattered throughout the hillsides south of Los Osos and found on north-facing slopes of the marine terraces just south of Los Osos Creek. Maritime chaparral occurs on highly erosive, sandy

soils, and grades into pygmy oak woodland and other coastal scrub communities. The cool, moist climate provides frequent fog drip, an extremely important factor limiting the distribution of this community.

The dominant species associated with central maritime chaparral include plants adapted to fire such as Chamise and dominant Morro manzanita. There is little understory as the environment under this chaparral is one of low light and deep leaf litter. Chamise, as well as Morro manzanita, may be allelopathic, putting out toxins to retard other competitors. Only after a fire do other species get a foothold until canopies grow thick and are shaded out. Other characteristic plants include Coast Live Oak, Wedge-leaf ceonothus, Sticky Monkeyflower, and Manroot.

Grassland: Grassland is the most abundant upland habitat type in the Morro Bay watershed. Three types of grassland are generally recognized in the area:

- Valley needlegrass grassland occurs on heavy, clay soils that contain a large percentage of organic matter and have never been tilled. The soils are generally saturated in winter and dry in summer. Common plant species include both native and non-native annuals, which may be more abundant than the native bunchgrasses that are characteristic of the community. Some of the more common plant species are California poppy, shooting star, succulent lupine, buttercup, purple needlegrass, slender needlegrass, and johnny-jump-up.
- Non-native grassland is the most abundant grassland type and plant community in the watershed. Much of this community has been utilized as rangeland, and has been greatly altered by human activities. It consists mostly of introduced grasses, such as slender wildoats, common wild oats, rip-gut brome, soft chess, red brome, ryegrass, foxtail barley, and rat-tail fescue.
- Serpentine grassland occurs in shallow, rocky soils that are low in calcium and high in magnesium, nickel, and chromium. This community generally contains more native species than valley needlegrass grassland, and many species are locally rare. Some of the plants making up this community are: Rattleweed, San Luis mariposa lily, club-haired mariposa lily, Palmer's spineflower, blue-dicks, California poppy, Jones layia, small-leaved lomatium, California melic-grass, Palmer's monardella, purple needlegrass, and slender needlegrass.

**Oak Woodland:** Within the watershed, two distinct phases of coast live oak woodland can be found. The common phase typically occurs on mesic soils of north facing slopes and canyons throughout the watershed. The "pygmy oak" phase, known locally as the "elfin forest," occurs only in the South Bay area. Coast live oak dominates both communities. The elfin forest is populated by a stunted, wind-pruned variety of coast live oak, called pygmy oak, often occurring as a many-stemmed, gnarled shrub or tree. The elfin forest sits atop the oldest dunes, and can be viewed on the south side of Los Osos Creek, at the Elfin Forest Small Wilderness Preserve. Los Osos Oaks State Reserve also contains stunning examples of the pygmy oaks. This type of oak woodland is known from only two other areas in the state: Burton Mesa in Santa Barbara County, and the Presidio area on the San Francisco peninsula. Some of the more commonly occurring under story species are wood fern, manroot, bracken fern, coast live oak, pygmy oak, wild blackberry, gooseberry, and poison oak.

Coast live oak communities are extremely variable, and often intergrade with riparian and chaparral types, especially in the South Bay area. A progression in cover types is generally recognized from open savanna to oak woodland, to oak forest. Oak savanna usually has grassy understory, oak woodland contains scattered oak trees generally with a chaparral understory and oak forest contains large specimen-size trees where canopies touch providing a shady environment for shrubs and many ferns. The upper watershed of Los Osos Creek supports undisturbed stands of mostly oak woodland and oak forest, providing valuable wildlife habitat.

## 2.3.12 RARE, THREATENED, AND ENDANGERED SPECIES IN THE MORRO BAY WATERSHED & ESTUARY

Special status species are those species that are listed by various organizations and/or agencies as endangered, threatened, rare, or of special concern. Many species that are formally listed by the federal government as threatened and endangered are dependent upon the diverse habitats of the estuary and watershed for their survival and recovery. Two species of particular concern are the black brant and steelhead trout.



Morro Bay is increasingly being recognized as an area that plays a critical role in supporting resident and migratory bird species. This makes the protection of estuary and wetland habitats increasingly important. The Audubon Society consistently rates Morro Bay as among the top five spots out of 963 sites nationwide for diversity of winter bird species, with around 200 species and over 50,000 individual birds counted in a single day in December.

Morro Bay supports large numbers of wintering and migrating black brant from November through April. As many as 25,000 brant utilize Morro Bay as a feeding and resting site during migration to and from Mexico, with the majority of brant stopping on their way north from mid-January through early May. Eelgrass is the dominant forage of wintering brant on Morro Bay, but green algae is also a significant food resource each year when abundant. In California, wintering brant numbers have undergone a significant decline in the past few decades.

Central Coast steelhead populations have been listed as federally threatened by the United States National Marine Fisheries Service (USNMFS) because of declining habitat quality throughout the species range. This species is an anadromous fish (migrates from coastal streams to the ocean and back to the same stream to spawn) and both Chorro and Los Osos Creeks support populations of this species. Water diversion projects, migration barriers, drought and siltation upstream have greatly reduced the viability of local steelhead populations in these two streams. Historically, the southern steelhead trout populations once numbered in the ten thousands. Presently, the population has declined to less than one percent of their 1850 levels.

Additional special status species (birds, mammals, reptiles, amphibians, fish, invertebrates, and plants) are listed in Table 2.3.

Species	State Status	Federal Status	Recovery Plan Status
American peregrine falcon	Endangered	Delisted FE 1999	Final 1983, Delisted 1999
Brown pelican	Endangered	Endangered	Final 1983
California Black Rail	Threatened		
California Clapper Rail	Endangered	Threatened	
California red-legged frog		Threatened	Public draft under development
California sea-blite		Endangered*	Public draft under development
Chorro Creek bog thistle	Endangered*	Endangered*	Public draft 1997; final in progress
Cuesta Grade checkerbloom	Rare		
Indian Knob mountainbalm	Endangered*	Endangered*	Public draft 1997; final in progress
Least Bell's vireo	Endangered	Endangered	Public draft 1988; final in progress
Morro Bay kangaroo rat	Endangered*	Endangered*	Final 1982; under revision
Morro manzanita		Threatened*	Public draft 1997; final in progress
Morro shoulderband snail		Endangered*	Public draft 1997; final in progress
Salt marsh bird's-beak	Endangered*	Endangered	Final 1982
Southern sea otter		Threatened	Final 1982; revised public draft, 1996
Southern steelhead trout		Threatened	Contact National Marine Fisheries Service
Southwestern Willow		Endangered	
Flycatcher			
Swainson's Hawk	Threatened		
Tidewater goby		Endangered	
Western snowy plover		Threatened	Public draft under development

## Table 2.3 Special Status Species Known to Occur Within the Study Area

\*Endemic to the vicinity of the Morro Bay Watershed

Many species that are formally listed by the federal government as threatened and endangered are dependent upon the diverse habitats of the estuary and watershed for their survival and recovery (Table 2.4). Morro Bay is increasingly being recognized as an area that plays a critical role in supporting resident and migratory bird species. This makes the protection of estuary and wetland habitats increasingly important. Some of the Special status bird, mammal, amphibian, reptile, fish, and plant species occurring in the estuary and watershed are highlighted below.

# Table 2.4Areas of Special Biological Importance Within the Morro Bay<br/>Study Area

Агеа	Jurisdiction	Category
Black Hill Natural Area	State Parks & Recreation	2, 4
Elfin Forest	State Parks & Recreation (52 acres)	1
Elfin Forest	SLO County Parks & Recreation (38 acres)	1
Heron Rookery - Natural Preserve	State Parks & Recreation	3, 5
Los Osos Oaks State Reserve	State Parks & Recreation	1, 5
Los Osos Creek Mouth	State Parks & Recreation	2, 5
Morro Bay Sand Spit - Natural Reserve	State Parks & Recreation	1, 4
Morro Bay State Park	State Parks & Recreation	3, 4, 5
Morro Dunes Ecological Reserve	State Fish & Game	2
Morro Rock State Reserve	State Parks & Recreation	2
Morro Palisades	Private	2
Morros	Private	1
Sweet Springs Marsh	Morro Coast Audubon Society	1, 2
Warden and Eto Lakes	Private	1
Monarch Butterfly Wintering Areas	Private	3
Chorro Creek	State Fish & Game	3

Categories:

1 = Unique, rare, or fragile community

2 = Rare or endangered species habitat

3 = Specialized wildlife habitat vital to a species survival

4 = Outstanding representative natural community with an unusual variety of plants or animal species

5 =Areas with outstanding educational values to be protected for scientific research and educational uses



## 2.4 SHARING THE RESOURCES OF MORRO BAY

## 2.4.1 POPULATION TRENDS

San Luis Obispo County is one of the fastest-growing counties in California, growing at a rate of 2.7 percent from 1997 to 1998. The watershed is home to approximately 25,000 people. In addition, Morro Bay also attracts an average of 4,000 tourists daily, or 1.5 million people per year. The economy is dominated by tourism and visitor-serving businesses, which generate 37 percent of all jobs in the city and one-third of the general fund revenues for the City of Morro Bay (CMB).

Population centers are described in Table 2.5.

Tuble 2.5 Topulation CC	inter 5
	Population: 9,845
The City of Morro Bay	Principal industries: commercial fishing, electric power generation, tourism.
	Growth rate: 1.5 percent
	Population: 14,800 as of March 2000
Los Osos-Baywood Park	Growth rate: 213 percent from 1970 to 1980; curtailed since 1988 in some
	areas due to the CCRWQCB prohibition on septic tank discharges.
Other Watershed Areas:	470
Cuesta College	Annual enrollment: 7,900
California Men's Colony	Inmate Population: 9,000
Camp San Luis	Population: 1,000
TOTAL IN WATERSHED AREA:	43,015

## Table 2.5 Population Centers

## 2.4.2 POINT SOURCE INVENTORY

The major permitted point sources within the Morro Bay NEP study area and Estero Bay are summarized below in Table 2.6.

# Table 2.6National Pollutant Discharge Elimination System (NPDES)-Permitted Facilities in the Vicinity of Estero Bay

Facility	Receiving Water Body	Permitted Flow
Chevron Estero Marine Terminal	Estero Bay	0.21 MGD <sup>1</sup> (intermittent)
Cayucos Water Plant	Old Creek to Estero Bay	0.035 MGD <sup>2</sup> (intermittent)
Morro Bay/Cayucos Wastewater Treatment Plant	Estero Bay	1.36 MGD <sup>3</sup>
Morro Bay Desalination Plant	Estero Bay	0.83 MGD <sup>4</sup> (intermittent)
Morro Bay Power Plant	Estero Bay <sup>5</sup>	725 MGD <sup>6</sup>
California Men's Colony Wastewater Treatment Plant	Chorro Creek to Morro Bay	1.2 MGD <sup>7</sup>

<sup>1</sup> Dry weather flow, 30 day average (WDR Order No. 95-67)

<sup>2</sup> Dry weather flow, 30 day average (WDR Order No. 95-67)

<sup>3</sup> Peak flow, (WDR Order No. 98-15); Permitted dry weather flow is 1.6 MGD

<sup>4</sup>Peak flow, (WDR Order No. 98-15); Permitted dry weather flow is 1.6 MGD

<sup>5</sup> A portion of site stormwater flows are discharged to Morro Bay harbor (outfall 002)

<sup>6</sup> Seawater (WDR Order No. 95-28)

<sup>7</sup>Dry weather flow rate, 30 day average (WDR Order No. 95-80)



## 2.4.3 MORRO BAY POWER PLANT

The Morro Bay Power Plant and neighboring switchyard occupy approximately 140 acres entirely within the boundary of the CMB. The power plant consists of four generation units with a combined electrical production capability of 1,030 gross megawatts. Although the plant was originally designed to utilize both fuel oil and natural gas as the source of fuel for the boilers, no fuel oil has been used since 1995. Current and future plant operations will use only natural gas as the fuel source.

The power plant's interaction with the Morro Bay estuary is primarily through its use of seawater pumped from the estuary for cooling purposes required for power plant operation. The plant's boilers use natural gas to create steam, which drives turbines that in turn drive electrical generators. Seawater is used to further cool and condense the steam after it leaves the turbines. The plant pumps seawater (limited to 725 MGD (millions of gallons/day)) from its intake structure located near the T- Pier at the northernmost end of Morro Bay. The seawater passes through the condensers and is discharged into Estero Bay via tunnels and a canal at the base of Morro Rock. The Central Coast Regional Water Quality Control Board (CCRWQCB), the agency that administers the plant's National Pollutant Discharge Elimination System (NPDES) permit. A map of Duke Energy Power Plant's monitoring station is located in the Environmental Monitoring Plan (see Volume II).

As a result of legislation encouraging the deregulation of the California's electricity market, PG&E sold the Morro Bay Power Plant to Duke Energy (Duke), of Charlotte, North Carolina, in July of 1998. Since taking ownership, Duke has announced plans to retire the existing power plant and update the units with smaller generating units that are more efficient (per kilowatt hour). Should Duke's project proceed, most of the existing power plant would be demolished by the year 2015 and be replaced with a larger capacity facility.

As a result of Duke's announcement to modernize the generating units at the Morro Bay Power Plant, several questions have been raised about the ecological effects of the power plant. These concerns have been identified as a research need in the Monitoring Plan. The MBNEP will utilize regulatory data sets from AC, CCRWQCB, and CEC to assess the impacts to the estuary. Duke's modernization project would be governed by the California Energy Commission (CEC), whose application and approval process includes a CEQA-equivalent review. Should Duke proceed with their announced plan, it is expected that they will be required to address these questions and concerns as part of the CEC process.

#### 2.4.4 PRINCIPAL USES OF MORRO BAY

Tidelands within the Morro Bay estuary are owned or managed by a variety of entities, including private individuals (about 604 acres), the CMB (about 440 acres), and State tidelands and submerged lands that are ungranted (1,300 acres).

The tidelands outside the CMB limits are under the jurisdiction of the State Lands Commission (SLC) as sovereign public trust lands. In 1992, the SLC entered into a 25-year lease agreement with the CDFG and the California Department of Parks and Recreation (CDPR) (Morro Bay State Park) to manage the tideland outside the City limits. These lease areas are known as Area 1 and Area 2 (see Figure 2.6), and are managed by CDPR and CDFG, respectively.

Prior to the 1992 lease agreement, CDPR and CDFG administered some of the "backbay" area of the estuary for recreational boating and natural resource protection, preservation, and management. CDFG also managed private shellfish mariculture and had oversight of waterfowl porthunting activities.

Most of those who share the resources of Morro Bay are engaged in the activities described in Table 2.7.

The CCRWQCB has developed objectives for maintaining water quality such that these uses remain viable. This has been discussed in the MBNEP Base Programs Analysis (Volume III of this CCMP). The CCRWQCB also has an anti-degradation policy that states: "Wherever the existing quality of water is better than the quality of water established...as objectives, such existing quality shall be maintained..."









## Table 2.7 Activities of Users at Morro Bay

Commercial and Sport Fishing and Hunting	The central coastline of California is one of the longest unprotected shorelines on the Pacific coast. The Morro Bay estuary provides a large year-round and all-weather commercial and recreational boat harbor. Since the nearest such harbors are over 100 miles to the north and south, Morro Bay provides a critical resource to fishing and recreational boating industries, with over 100 commercial fishing boats contributing an ex-vessel value of \$7 million to the area's economy. Morro Bay began and is still widely known as a fishing community. Sport fishing of lingcod, rockfish, cabezon, king salmon, albacore and halibut account for well over \$1 million in gross revenues. Between 50 and 300 transient commercial vessels use the harbor and facilities each year.
Aquaculture	This includes propagation, cultivation, maintenance or harvesting of aquatic plants and animals for human consumption or bait. Abalone production has occurred in Morro Bay and could once again contribute important economic benefits to the area. High water quality is critical to aquaculture operations.
Shellfish Harvesting	Morro Bay has in the past and may in the future contain significant shellfisheries, providing clams, oysters and mussels for human consumption. Currently it is the site of one primary shellfish operation. Central and southerly portions of the estuary are used for oyster growing. Presently, 269 acres of mudflats are leased for shellfish growing.
Water Navigation	Area waters are used for shipping, travel and other transportation by private, military and commercial vessels.
Agricultural Water Supply (for grazing and croplands)	Sixty percent of the watershed area is grass rangeland, primarily for cow/calf enterprises. Emphasis on rangeland beef production and economic return has brought steeper and more marginal areas of rangeland into use. Non-irrigated cropland is farmed using a grain-garbanzo bean rotation. Grazing livestock use the grain stubble. Snow peas and vegetables are grown where irrigation water is available and winter temperatures permit active growth.
Industrial Service (cooling water for electric power generation)	A thermal plant at Morro Bay owned by Duke Energy Power Services is one of the major steam electric-generating plants on the Pacific coast. Water is drawn directly from the bay to cool its boilers, then the heated water is discharged to the ocean just north of the bay. This plant is the single largest industrial employer in Morro Bay, employing 130 people.
Education and Scientific Research	The estuary's large and readily accessible tracts of intertidal and marsh area provides an ideal location for both educational and scientific work. The Coastal Resources Institute at Cal Poly University and other universities regularly conduct research at the bay. The Bay Foundation provides funding for research. The Morro Bay Natural History Museum serves 10,000 students and 79,000 visitors annually.
Groundwater Recharge	Groundwater (including surface water underflow) can be naturally or artificially recharged for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.



r	
Freshwater Replenishment	Surface water quantity or quality (e.g. salinity) can be replenished naturally or artificially though one body of water that supplies another downstream. This includes streams that supply reservoirs, lakes, or estuaries; and reservoirs and lakes that supply streams.
Municipal & Domestic Water Supply	Community, military and individual water supply systems, including drinking water.
Recreation (with or without water contact)	Morro Bay and Montana de Oro State Parks represent the second largest land use acreage next to agriculture in the watershed. State and city parks and beaches in the area include over 2250 acres within the city limits of Morro Bay. Morro Bay State Park, visited by 500,000 people each year, is home to a 100-boat capacity marina, a natural history museum, and a golf course that is also an environmental sanctuary. Its land includes fresh and saltwater wetlands, open water and upland habitats. The estuary also contains other parks, a bird sanctuary, environmentally sensitive wildlife and plant habitats. The last decade has seen a dramatic increase in the use of canoes, kayaks, and small boats. Party and whale-watching boats also operate out of the bay. Swimming also occurs in the bay.
Habitat Use	<ul> <li>Water supports, preserves and enhances several different kinds of habitats:</li> <li>Terrestrial ecosystems containing vegetation and wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), as well as wildlife water and food sources;</li> <li>Cold and warm freshwater habitats where water preserves or enhances the vegetation, fish or wildlife including invertebrates;</li> <li>High quality aquatic habitats suitable for reproduction, spawning and early development of fish;</li> <li>Biological habitats of special significance, such as refuges, parks, sanctuaries, ecological reserves or Areas Of Special Biological Significance, where the preservation or enhancement of natural resources requires special protection.</li> <li>Habitats necessary for migration or other temporary activities by aquatic organisms such as anadromous fish.</li> <li>Estuarine habitats, the ecosystem of a semi-enclosed body of water having a free connection with the open sea at least part of the year and within which the seawater is diluted with fresh water drained from the land.</li> </ul>
Habitat Use (by rare, threatened, or endangered species)	These plant and animal species require the support of certain types of water for their survival, and usually must be treated according to specific governmental regulations.

## 2.4.5 LAND USE

The primary land uses in the watershed area are agriculture, urban lands and multi-use public lands. The types of land use/zoning types identified by local, county, and state governments are shown in Table 2.8.

	СМВ:	Agriculture
		Suburban Residential
		Neighborhood Commercial
		General Office
		Light Industrial
		Coastal Dependent Industrial
		Open Area
		Waterfront
		Commercial/Recreational Fishing
		Harbor and Navigable Waters
San L	uis Obispo County:	Agriculture
		Urban Lands
		Recreation
		Rural Lands
		Residential
		Public Facilities
		Open Space
		Residential Rural
State of California:	California Coastal Commission:	All of the above land uses/zoning types
	State Lands Commission:	Tidelands

 Table 2.8
 Land Use and Zoning in the Morro Bay Area

These land use categories, as defined in the San Luis Obispo County "Framework for Planning, Coastal Zone" (1996) are discussed below, and shown in Figure 2.7. Figure 2.8 shows percentages of land use categories in the Morro Bay watershed.

Sensitive and Protected Areas: Through zoning, the CMB and San Luis Obispo County balance the needs of the area. The City's Mariculture and Marine Research designation is used for the operation of coastal-dependent mariculture and marine research utilizing sea water for research and breeding, hatching and raising fish, shellfish and marine organisms for scientific and commercial purposes. The City's Environmentally Sensitive Habitat Overlay is a zoning designation that protects and preserves areas in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in the ecosystem, and which could easily be disturbed or degraded by human activities and development. This zone also includes buffers to ensure continued protection of the habitat areas. Environmentally sensitive habitat areas within the CMB include wetlands, the estuary, sand dunes, sandspit, stream corridors and other restricted areas. The high percentage of publicly owned lands in and adjacent to the bay helps to maintain the integrity of many environmentally sensitive areas, including habitats of rare species.

The San Luis Obispo County General Plan (1996, 1999) identifies environmentally sensitive habitats and other Sensitive Resource Areas that are protected through special development standards in the Area Plans and the Coastal Zone Land Use Ordinance. The State Lands Commission has jurisdiction over tidal land on behalf of the public trust. The California Coastal Commission has jurisdiction over coastal lands through the Coastal Zone Management Act and Local Coastal Plans.



## Figure 2.7 San Luis Obispo County Land Use Categories in the Morro Bay Watershed









## 2.5 PRIORITY PROBLEMS

In all, the Morro Bay National Estuary Program has identified seven priority problems:

- Sedimentation
- Bacteria contamination
- Nutrient overenrichment
- Loss of Freshwater Flow During Dry Seasons
- Heavy Metals and Toxic Pollutants
- Habitat Loss
- Steelhead Loss

All of the species that share Morro Bay, including humans, affect and are affected in complex ways by changes to the ecosystem. A small problem upstream, for example, may seem completely unrelated to shellfish harvesting, but may indirectly have a profound impact. Some of these interrelationships will be explored in the descriptions of individual priority problems. In addition, associated reductions in dissolved oxygen levels and increases of temperature and salinity may also be problems in the estuary.

Table 2.9 lists the potential impacts and serves as an introduction to some of the details that will follow.

	Sedimentation	Bacteria	Nutrients	Loss of Freshwater Flow during Dry Seasons	Heavy Metals and Toxic Pollutants	Habitat Loss	Steelhead Loss
Navigation	X					X	
Commercial	X		X	X	X	X	X
& Sport Fishing							
Shellfish Harvesting	Χ	X	X		X	X	
Agriculture Water Supply	X			X		X	X
Drinking Water Supply	X	X	X	X		X	X
Water Contact Recreation	Χ	X		X	X	X	
Non-Water Contact Recreation	X			X		X	
Rare, Threatened, Endangered &	X		X	X	X	X	X
Special Status Species			1				
Ecosystem Balance & Habitat	X		X	X	X	X	X
Global Ecosystem	X	X	X	X	X	X	X

## Table 2.9Potential Impacts

## 2.5.1 SEDIMENTATION

## PRIORITY PROBLEM

Studies conducted by various authors over the past 25 years have concluded that Morro Bay is suffering from a rapid increase in sedimentation. These studies have provided estimates of sediment loadings to the bay from the creeks emptying into the bay, and estimates of sediment accumulations within the bay. One of these studies estimated that Morro Bay has lost more than one quarter of its tidal volume in the last 100 years. In this study, it was estimated that under "normal" circumstances, the bay would naturally fill in with sediment in several thousand years but, if the recent accelerated rates continue, the bay could fill in within the next 300 years. Other studies have reached similar

conclusions regarding sediment yields. It is likely that structural changes to the mouth of the estuary in addition to the dynamics of outgoing tidal velocity and incoming sediment transport are factors in this problem.

Over time, all estuaries eventually fill in due to sedimentation. However, there is concern in Morro Bay that this natural process has been accelerated due to watershed disturbance. The changes due to increased sedimentation are most evident in the delta formed by Chorro and Los Osos Creeks and in the southern portion of the bay in general.

Morro Bay, Los Osos and Chorro Creek are listed as "impaired waters" under the federal Clean Water Act, Section 303(d) (Appendix E). The CCRWQCB must prepare a determination of pollutant loadings and water quality attainment strategies for these water bodies.



## Table 2.10 Impacts From Sedimentation

Beneficial Use	Impact
Navigation:	The bay is an important harbor for commercial and recreational fishing vessels. Shoaling,
L L	which results from excessive sediment supply creates a need for increased dredging. Small
	boats can be stranded in the State Park Marina during low and medium tides causing a
	potential safety hazard.
Commercial &	Most commercial fishing in this area is conducted outside the Morro Bay estuary. However,
Sport Fishing:	during heavy storms, plumes of sediment from watershed creeks reach outside the estuary into
·····	Estero Bay, affecting marine resources in that area.
Shellfish	Although sedimentation could clearly affect shellfish populations, there is not any document
Harvesting:	that establishes, either qualitatively or quantitatively, a clear impact. The economic impacts
	are evidenced, however, by \$30,000 in lost revenue reported by the local oyster grower
	following the Highway 41 fire and winter storms.
Wildlife Habitat:	Coastal brackish marsh, a sensitive habitat present at the mouths of the creeks, is being rapidly
	lost due to sill accretion. This affects rare and/or endangered species such as sait marsh bird's
Warm R Cald	beak, the California brackish water shall, and the California black rail.
warm & Cold	denosited smother the gravel hade that are artical for anotyping. Sodiment also file the deep
ricinwater naunat:	nools that smolts need to survive dry neriods
Fetuarine Habitat	Excessive sediment loading into the bay is of primary concern to the long term health of
Estuarine Habitat,	Morro Bay Sedimentation is resulting in losses of mudflat and open water habitat and other
	resources dependent upon specific water denths and salinity ratios. Elevated turbidity and
	suspended solids result in decreased light penetration through the water column impacting
	aquatic plants such as eelgrass and the organisms dependent on them. Aquatic vegetation.
	fish, and bottom dwelling organisms can be smothered by excessive sedimentation, both in the
	estuary and in adjacent tributaries. Also, the salt marsh area is increasing in size, the riparian
	area at the mouth of Chorro Creek may be increasing, and the deeper water areas, those that
	support eelgrass, are decreasing due to bottom buildup of sediment. Salt marsh habitat is
	being replaced near the delta in the upper delta by lower salinity tolerant species such as Hoary
	Cress. Near the mouth of the creek at the Chorro Creek Bridge, sediment buildup has been
	instrumental in the transformation of a brackish marsh area into a riparian/fresh water wetland
	with totally different plant species than what historically existed.
	dry periods.
Nigration of	Excessive sediment during high flow events impairs steelnead migration, as sediment can
Aquatic Organisms:	Freding group hanks mention accurate of anounting group for a stream but arguing of fine
Spawning:	textured soils (e.g., clave, silts, and fine sends) can reduce habitat quality for fish. Taxonomic
	richness of henthic invertebrates (a measure of biological diversity) has declined recently in
	Chorro Dairy and Pennington Creeks as a result of the Highway 41 fire. In addition to
	prevent the buildup of fine sediments, periodic high velocity flushing flows are needed to
	scour gravel spawning grounds.
Rare, Threatened &	Three additional sensitive species found in cold water systems, the red-legged frog (federally
<b>Endangered Species</b>	threatened), the southwestern pond turtle (a federal species of concern), and the tidewater goby
Habitat:	(federally endangered), are all adversely affected by sedimentation. The sediment fills in
	pools that would normally provide safe habitat, especially during summers and droughts, when
	the creeks have little or no flow.
Water Contact and	The bay is an important recreational area. Sedimentation can impact recreational activities
Non-Contact	such as kayaking, boating, and wind surfing. Swimming can be dangerous in turbid water and
Kecreation:	Increased sedimentation impacts the capacity of the bay to support these uses.
wunicipal water	Drinking water sources can be impacted by sedimentation. Sedimentation of the California
A grieultures	A grigultural lands can be advorsaly imported by argain. The loss of valuable targeil are
Agriculture:	Agricultural ratios can be adversely impacted by erosion. The loss of valuable topsoll can have substantial long-term economic impacts. Streambark erosion results in a loss of ecrosed
L	have substantial long-term economic impacts. Streambank crosion results in a loss of acreage.



#### **PROBABLE CAUSES**

Contributing factors include:

- Sheet and rill erosion on brushlands over 30 percent slope;
- Streambank erosion;
- Sediment transported by ocean currents;
- Land disturbances such as roads, construction, agricultural activities, and mining activity; and
- Urban runoff;
- Water diversion.

#### TRENDS AND STUDY RESULTS

Since 1941, when Morro Bay was dredged to create navigation channels, other structures such as breakwaters, a dike, a stone groin and a revetment have been added. These structural changes have altered flow dynamics in the estuary. Since 1944, maintenance dredging has occurred in Morro Bay on average at least every five years. A total of 3.5 million cubic yards had been dredged as of 1975 and the rate of shoaling has been estimated at over 120,000 cubic yards per year.

Overall loss of tidal volume from sedimentation has significant implications for the estuary's long term flushing ability. Accumulated sediment has caused the creek bottom at Twin Bridges to rise over 13 feet in the last 50 years. In addition, over time, there has been an associated rise in the elevation of the Chorro delta as well. Sediment has other environmental and economic impacts on the bay and watershed. Areas in the back bay that used to be navigable by small boats are no longer navigable. Areas in the Chorro delta that were formerly salt water wetlands are now covered by terrestrial non-wetland weedy plant species like hoary cress. Sediment greatly impairs stream habitat, causing damage to fish, particularly steelhead trout. Increased deposition of sediment in the vicinity of the Twin Bridges crossing of South Bay Boulevard over Chorro Creek required the replacement of the bridge—an expensive, multimillion-dollar undertaking. The large amount of sediment that entered the bay following the fire of August 1994 and the floods of 1995 destroyed many acres of oyster beds. It is estimated that the local oyster grower's business suffered \$30,000 damage from this event alone. In addition, there was a great reduction in the amount of eelgrass following the increase in sediment flow, which followed the 1994 fire.

**Study Results:** A number of studies have been conducted over the past quarter century to assess sediment contribution from creeks and streams. In years without much rainfall or with smaller storms spaced evenly apart, only small amounts of sediment are delivered; in severe storm events, amounts much greater can be delivered. The Tetra Tech 1998 study estimates an annual average loading of approximately 70,000 tons of sediment per year into Morro Bay from Chorro and Los Osos drainages. Ten percent of this total loading is sand and gravel, and 90 percent of this is fine material such as clay and silt particles.

According to Tetra Tech, the Chorro Creek watershed is estimated to contribute 86 percent (60,689 tons) of the total sediment produced in the Morro Bay watershed and the Los Osos watershed is estimated to contribute 14 percent, or 9,557 tons. San Bernardo, San Luisito, and Chorro Creek above Highway 1, and the Clark Valley segment of Los Osos creek contribute the greatest amounts of sediment to the bay.

**Transport Mechanisms:** Sediment studies indicate that accelerated sedimentation has been caused primarily by river and ocean sediment transport. Sedimentation at the harbor entrance is dominated by ocean transport, or longshore transport, whereas sedimentation in the southern and eastern bay is dominated by fluvial or river transport. Wind is also a factor, as a good deal of sand is deposited within the estuary as winds blow across the sandspit.

Sediment Loading in Creeks and Streams: Based on data collected on soils, flow rates, volumes, sediment, and rainfall data, a computer model was developed for Morro Bay which simulates runoff response to storm events. Estimates of average annual loading in the bay are now calculated at 70,000 tons per year. About 10 percent of this loading is composed of sands and gravels, and about 90 percent fines. These fine particles typically require almost no-flow conditions to settle out, which does not occur until stream flow meets the bay. The analysis indicates that a single 100-year event would contribute about 700,000 tons of sediment to the Bay—about 400 acre-feet of sediment.



In contrast, a two-year event is expected to contribute about 1,300 tons of sediment to the Bay, or less than one acrefoot of sediment.

San Bernardo Creek, San Luisito Creek, and Chorro Creek upstream of Highway 1 are estimated to contribute about 68 percent of the total sediment yield from the Chorro Creek watershed, although these three streams comprise only 58 percent of the total drainage area (see Figure 2.). Los Osos Creek, which makes up about a third of the contributing drainage area, supplies only about 14 percent of the total average annual loading to the Bay and only about three percent of the coarse material. The Clark Valley is estimated to be the most significant source of sediment yield from within the Los Osos Creek watershed, despite its small size relative to Warden Creek. The overall conclusion is the majority of sedimentation is coming from Chorro Creek into Morro Bay.

Although the percentages change slightly (23 percent Los Osos vs. 77 percent Chorro), when total sediment loading is examined on a per square mile basis, the same general patterns are apparent (Figure 2.9). Sediment yield from all tributaries within the watershed are shown in Figure 2.10.

In addition to those discussed above, the key findings and conclusions from the Tetra Tech 1998 study include:

- Erosion from the higher elevation brush-covered steep slopes is the most significant source of sediment loading to Morro Bay;
- Streambank erosion contributes relatively little to the total sediment loading to the bay, while sheet and rill
  erosion contribute the most;
- Identification of an aggradational trend (increase in sediment) in the lower reaches of Chorro and Los Osos creeks, with a resultant very low capacity of the lower two miles or so to transport coarse sediments;
- The bed material transport capacity of the lower reaches of Chorro and Los Osos creeks prevents the delivery of bed material sediments to the bay (as opposed to the supply from the upstream watershed).
- Wash load materials (fines) have a limited presence in the local bed load of Chorro and Los Osos creeks, indicating that the supply of fines available from the upper watershed is controlling the amount of these materials delivered to the bay.

The Tetra Tech study involves numerous assumptions, regressions, and reconstruction techniques, but the results are considered to be comparable with the previous Noda and Jen 1975 study and the 1989 SCS study.

## Figure 2.9 Total Sediment Yield Per Square Mile from Chorro and Los Osos Creeks for an Average Storm Event





Although the study indicates that the majority of sediment transport to the bay consists of fine grained sediment, certain very important areas are clearly being heavily impacted by large particle size sedimentation. For example, the primary flow channel of Chorro Creek was filled in with sediment shortly before the installation of the new bridge in 1997, and again after the area was dredged and the new bridge was built. The area surrounding the new bridge is filling at a rapid rate and the materials are primarily gravels and sand. The Los Osos Creek Wetland Reserve has captured a large amount of sand-sized particles believed to be from stream bank erosion of the "Clark Valley" portion of Los Osos Creek. And some are concerned that endangered species like the tidewater goby and red-legged frog are more affected by the 10 percent of the erosion problem consisting of large particles than the 90 percent consisting of small particles.

The Highway 41 fire burned the upper watersheds of Chorro, Dairy, Pennington, San Luisito, and San Bernardo Creeks and excessive amounts of turbidity and suspended sediment were found in San Luisito and Chorro Creeks. This is probably a result of high erosion rates in the upper watershed. The upper watershed appears to be stabilizing as recent data indicates turbidity is decreasing.

**Urban Runoff:** Urban runoff contributes to high turbidity and suspended sediment levels in the bay. Construction and landscaping activities are also sources of sediment, particularly when undertaken during the rainy season. Unvegetated areas, including unpaved roads and road shoulders, contribute to these increased sediment concentrations.

The "first flush" sampling conducted in 1995 showed that levels of turbidity and filterable solids increase in gutters and storm drains throughout the urban drainages of Morro Bay and Los Osos during rainstorms. Though the sediment load carried to the bay by way of the creeks is undoubtedly a far more significant source, sediment leaving urban areas may also be a problem in some areas, particularly since other pollutants may be carried with the sediment.

## Figure 2.10 Relative Sediment Yield from Individual Tributaries to Los Osos (light colored) and Chorro Creeks (dark colored), Based on 10-Year Storm Event





## SEDIMENT REDUCTION ACTIONS RECENTLY IMPLEMENTED IN THE MORRO BAY WATERSHED

**The Morro Bay Watershed Enhancement Project:** The CSLRCD and the Natural Resources Conservation Service (NRCS) have been leading the Morro Bay Watershed Enhancement Project (MBWEP) for the last nine years. Working with their partners in the University of California Cooperative Extension (UCCE), State Coastal Conservancy (SCC), CCRWQCB and watershed landowners the MBWEP has resulted in the implementation of more than 235 best management practices in the watershed. The implementation of these projects has resulted in the prevention of more than 172,000 tons of soil erosion. The partners of the MBWEP purchased and constructed the Chorro Flats Enhancement Project (CFEP). Although it was only completed in 1997, the CFEP has caught more than 210,000 tons of sediment to date. Additionally, the Los Osos Creek Wetland Reserve site on Los Osos Creek was acquired by the partners of the MBWEP. This site has already trapped more than 135,000 tons of sediment.

**Paired Watershed Monitoring Project:** As part of the National Monitoring Program's paired watershed study, turbidity samples have been taken in order to evaluate the effectiveness of Best Management Practices in reducing erosion. Treatment at Chumash Creek includes development of smaller pastures (including a riparian pasture), improvement of roads with water bars and culverts, development of a watering system and revegetation of portions of the creek corridor. Preliminary data show that the best management practices that have been implemented in the treated watershed (Chumash Creek) are resulting in decreased turbidity levels during storm events when results are compared to the untreated control watershed (Walters Creek).

## 2.5.2 BACTERIA

#### PRIORITY PROBLEM

In Morro Bay, elevated levels of bacteria present a potential health threat to those who utilize the bay for recreational purposes and economic threats to those who depend upon the resources of the bay for their livelihood. Elevated levels of bacteria are an indication that other pollutants such as bacterial or viral pathogens may be present. Twenty-five of the 28 National Estuary Programs, from every region of the United States, have identified pathogens such as bacteria as a water quality management issue. This indicates the significance and pervasiveness of increased bacteria problems.

Human illness can result from eating seafood that has been contaminated by bacteria. To prevent illness, the CDHS requires the Morro Bay oyster grower to shut down for many days after significant rainfall and not harvest on portions of his lease area. Elevated levels of fecal coliforms are an indication that the bay may be unsafe for seafood consumption as well as swimming and other forms of water contact activities.

In Morro Bay, oysters have been harvested since the 1930s and 1940s. The first oyster lease was established in 1932, and shortly thereafter Morro Bay became the leading oyster-producing area in the state. Recently, portions of the bay's oyster beds have been closed for harvest because of high fecal coliform levels. One area of the bay was reclassified in 1996 as "restricted" for shellfish harvesting; this greatly reduces the economic viability of the oyster operation (Figure 2.11).

Recreation and tourism play a large part in this area's economy. Both of these uses are becoming increasingly important in Morro Bay. However, in the Morro Bay estuary, water quality has violated safe water body-contact standards as defined by the CCRWQCB.

The Morro Bay estuary is listed as an "impaired" water body under the federal Clean Water Act, Section 303(d) for pathogens.

## Table 2.11 Impacts of Bacteria

Beneficial Use	Impact
Recreation and Tourism:	Increased levels of bacteria present a potential health threat to
	those who utilize the bay for recreational purposes such as sailing,
	boating, canoeing, kayaking, wading and swimming.
Shellfish Harvesting:	Portions of the commercially-harvested oyster beds have been periodically shut down due to intermittent and unpredictably high bacteria counts in the bay, resulting in financial hardships for the growers. The entire lease area is closed for several days following significant rainfall.
Los Osos Drinking Water Supplies:	Bacteria levels in water contained in wells in the upper and lower aquifers beneath Los Osos have been studied. Concentrations were found to be highest in the most heavily developed areas. The upper aquifer is contaminated and there is a concern that it will contaminate the lower aquifer, which is the primary source of drinking water.

## PROBABLE CAUSES

Contributors to high bacteria levels may include:

- Discharged effluent (such as during a wastewater treatment plant failure, malfunctioning sewer lifts, line leaks, breaks, and backups)
- Failing septic systems
- Domestic animal waste
- Waste from marine animals & wildlife
- Illegally moored boats with inadequate waste disposal capabilities
- Urban runoff
- Runoff from rangeland & cattle operations

Many of these sources of bacteria arise only during storm events, while others are year-round. Point sources such as the Morro Bay/Cayucos wastewater treatment plant are monitored by the operators and the CCRWQCB, and are generally not contributing routinely to the problem.

## TRENDS AND STUDY RESULTS

Studies dating back to 1974 examined bacteria levels in shellfish samples in Morro Bay and along tributary streams. The first sources suspected included septic tank failures and the California Men's Colony (CMC) wastewater treatment plant, which were later studied in more depth. During subsequent water quality studies, researchers concluded that it takes at least five days for the shellfish in the area to purge after a 0.5 inch rainfall during a 24-hour period. Additional sources of bacteria were identified, such as urban runoff. By 1985, bacterial contamination was shown to be entering from the ocean, and the CMB's wastewater treatment plant was identified as the most probable source, since it did not disinfect its effluent. In 1986, due to concerns about bacterial contamination, the California Fish and Game Commission closed Morro Bay to harvesting of shellfish in general. Shortly after, the CMB initiated a chlorination process at its wastewater treatment plant and Morro Bay was opened to harvesting of shellfish as bacteria levels were reduced. In 1988, a very thorough study pointed to Chorro Creek as the greatest single point source of bacterial contamination at that time. Chorro Creek differed from Los Osos Creek in that it received effluent discharge from the CMC wastewater treatment plant and had more acreage devoted to rangeland and cattle operations. Although levels of bacteria had been monitored in different locations, concentrations and loadings from specific land uses had not yet been identified. A Cross-Cutting Action Plan (see Chapter 4) calls for a Total Maximum Daily Load (TMDL) to identify sources and set target reductions to achieve bacterial standards.





Figure 2.11 Shellfish Leases and Bacteria Sampling Sites in Morro Bay



The National Monitoring Program data (1998) indicate that both major creeks contribute bacteria to the estuary. Chorro Creek's levels are elevated year-round and 50 percent of the samples exceed the standard. Los Osos Creek levels are higher than Chorro Creek primarily during wet weather periods and approximately 60 percent of the samples exceed the standard. According to Tetra Tech, of the total bacteria loading into Morro Bay during a wet weather model simulation period, 48 percent came from Chorro Creek, nine percent from Los Osos Creek, 42 percent from urban surface runoff, and less than one percent from groundwater, as illustrated in Figure 2.12. It should be noted that the data used for these simulations had a high margin of error. The value of these model simulations lies more in the relative change in bacteria concentrations, rather than absolute percentages.

**Cattle grazing and holding pens:** Preliminary National Monitoring Program data collected since 1993 suggest that bacteria levels are significantly reduced at a cattle exclusion project on Dairy Creek, and at a riparian pasture project on Chumash Creek. The Dairy Creek project consists of one mile of stream-side fencing and the Chumash project includes smaller pastures, an upland watering system, and riparian revegetation.

## Figure 2.12 Estimated Relative Contributions of Fecal Coliform In Dry and Wet Weather



Bacteria, originating from septic systems, entering the bay through groundwater appear to have a minimal impact on oyster-growing areas, but may play an important role in contamination of shoreline recreation areas.

Elevated fecal coliform levels have been continuously found in freshwater seeps located along the fringes of Los Osos and Baywood Park. Samples of freshwater seeps taken during both dry weather and wet weather periods have been elevated. Levels reaching 28,000 MPN/100ml were found at one location in August 1997. Likely sources include leaking or failing septic tanks, birds and wildlife, or domestic animals. Additional research is needed to determine if the fecal coliform is of human or animal origin. Groundwater depths vary and transport mechanisms across the horizontal plane are unknown.

Urban runoff also contributes substantially to bacteria levels, affecting oyster-growing areas and recreational areas. Levels are greatly elevated during the wet season.

Discharge of collected surface and subsurface flow to the bay occurs at two San Luis Obispo County sites. These are the "standpipe" in the bay near the intersection of  $3^{rd}$  and El Moro Streets, and the outfall near the intersection of Ramona and Fearn Streets. The standpipe drains the  $8^{th}$  and El Moro sump area, and the Ramona outfall drains the Donna and Mitchell area. The CCRWQCB has taken quarterly samples at the intake and outfall for each drainage



believed by some that increased development of septic systems in Los Osos has caused water levels in the upper aquifer to rise in elevation. This is due to the presence of an underlying clay layer that is believed to separate the upper and lower aquifers, and prevent movement of water from the upper to the lower layers.

**Liveaboard vessels** in the estuary may be contributing to the bacteria problem affecting shellfish. Discharge from these vessels is not always effectively controlled through multiple governmental jurisdictional areas in the bay. There are pumpouts located in the bay, but inoperative vessels may not always be able to transport waste to the proper disposal facility.

Waste from marine animals & wildlife may be originating from birds roosting on oyster bag floats and/or marine mammals; however, background levels are difficult to assess.

**Fish processing on commercial fishing boats** has not been identified as a significant source of bacteria to date. Currently, there is little processing being done on boats.

Table 2.12 lists the potential sources of bacterial contamination to the bay. The magnitude of each source contribution is not yet known, but in 1986 it was estimated that Chorro Creek was contributing the greatest amount. Ongoing efforts to reduce bacterial pollution from many of these sources include activities such as wastewater treatment plant operation improvements, elimination of septic tanks through construction of additional wastewater treatment facilities, cattle exclusions and managed riparian pastures (e.g. time-controlled grazing), sediment retention projects and boater education.

Location	Source
Bay	State Park Marina: Lack of Vessel waste-disposal
-	facilities
	Morro Bay embarcadero storm drains
	Morro Bay/Cayucos wastewater treatment effluent
	Los Osos: Failing septic systems (groundwater)
	Unauthorized live-aboard vessels
	Polluted natural seeps
	Waste from marine mammals and wildlife (birds)
	Domestic animal waste
	Malfunctioning sewer lifts (City)
Freshwater input: Chorro Creek	Agricultural runoff/confined animals
-	Periodic effluent spills at CMC wastewater treatment
	plant
Freshwater input: Chorro basin	Chorro basin creeks: Feed lots along San Bernardo
creeks	Creek
Freshwater input: Los Osos creek	Agricultural runoff/confined animals
Storm runoff	Urban runoff (via storm drains)

## Table 2.12 Potential Sources of Increased Bacterial Concentrations

## 2.5.3 NUTRIENTS

## PRIORITY PROBLEM

Nutrient enrichment, primarily nitrogen and sometimes phosphorus, is one of the primary problems confronting the Nation's estuaries. Excess nutrients increase the growth of algae, which then dies and decays, robbing the water of oxygen. Fish and some species of plants require certain levels of oxygen in the water, so fish kills and losses of sea grass beds are common consequences of high nutrient levels.

Nutrients are of concern both in the estuary and the watershed. Algal blooms, which are often the result of excessive nutrients in the water body, have been a problem in Morro Bay. High levels of nutrients are entering the Morro Bay estuary from its tributary creeks, from shoreline seepage in the vicinity of onsite septic systems, and from surface and groundwater discharge systems.

Chorro Creek and Los Osos Creek are both listed as "impaired waters" for nutrients, and are scheduled for pollutant loading determinations and water quality attainment strategies under Section 303(d) of the Clean Water Act.



## Table 2.13 Impacts of Nutrients

Beneficial Use	Impact
Drinking water supply:	High nutrient levels can make water unsafe for drinking.
Commercial and sport fishing:	Reduced oxygen can kill fish.
Shellfish harvesting:	Reduced oxygen can make the water unsuitable as a nursery habitat.
Rare and endangered species:	The federally endangered tidewater goby is susceptible to oxygen reductions; loss of marine life affects species on higher trophic levels.
Local habitat, primarily for fish:	Impaired habitat in creeks for fish and possibly wildlife.

## PROBABLE CAUSES

Various sources of information have been used to determine sources and concentrations of nutrients in the Morro Bay watershed. The CMC wastewater treatment plant monitoring results for 1997 have been used to estimate nitrogen and phosphorous concentrations. Concentrations from agricultural sources have been estimated for the San Luis Obispo Creek watershed, a neighboring drainage area to the Morro Bay watershed. Morro Bay National Monitoring Program values have also been applied to determine grazing concentrations. Sources and concentrations of nutrients from common point and nonpoint sources (in USEPA protocol for developing Nutrient TMDLs, 2000) have been provided, including untreated wastewater and atmospheric deposition. These values are shown in Table 2.14.

## Table 2.14Sources, Concentrations and Contributions of Nutrients fromCommon Point and Nonpoint Sources

Source	Total Nitrogen (mg/l)	Total Phosphorous	Contributions
Cronlands	<u>47</u> 7	Linknown	High
Untreated Wastewater	35	10	Medium
Treated Wastewater	5-21.6	0-14.6	Medium
Urban Runoff	3-10	0.2-1.7	Low
Grazing	0.3855	Unknown	Low
Atmosphere (wet deposition)	0.9	0.015 <sup>b</sup>	Low

<sup>b</sup>sorbed to airborn particulate

## TRENDS AND STUDY RESULTS

Five years of data have been collected from a number of locations in the watershed on a bi-weekly basis, with weekly sampling during winter months. Nutrients have not yet been studied in detail in the Morro Bay estuary, but nitrate and phosphate are pollutants of concern. Depressed levels of oxygen have been recorded, particularly in the southern reaches of the bay. Nuisance algae may have increased in recent years.

Chorro Creek: Tetra Tech's wet weather model simulations illustrated in Figure 2.13 and 2.14, show that Chorro Creek contributes 86 percent of the total nitrogen to the estuary. The simulations show that groundwater contributes seven percent and Los Osos Creek contributes six percent. Surface water accounts for less than one percent (fertilizer, domestic animal waste, birds and wildlife). Phosphate levels are also elevated throughout the watershed,

although phosphate levels are generally lower than nitrate levels. Again, data used for those nutrient simulations had a high margin of error, so relative values should be noted, not absolute percentages.

In Chorro Creek, the pattern of higher nutrient concentrations at lower water flow levels is different from that observed for the problem of bacteria, suggesting a different mechanism for nitrate loading to streams. According to Tetra Tech, bacteria concentrations appear to be strongly influenced by grazing practices, while nitrate concentrations appear to be controlled by fertilization and soil management practices.

In the Los Osos Creek watershed, median nitrate concentrations are high at the Turri Road (21.7 mg/l), Warden (17.3 mg/l), and Santa Ysabel Road (11 mg/l) sampling locations. At the Los Osos Valley road sampling location, the median nitrate concentration is lower (1.6 mg/l). Although stream flows were not measured in the Los Osos Creek watershed, there is a relationship between nitrate concentrations at the Santa Ysabel Road station and flows at Chumash and Walters Creeks. This suggests that runoff or rising groundwater drives nitrate loading to the streams. The observations of high nitrate concentrations at the Turri Road, Warden, and San Bernardo Creek stations, and the relationships between streamflows and nitrate concentration, lend further credence to the statement above that fertilization and soil management practices are largely responsible for determining nitrate loading to the streams.

For all creeks sampled (except Pennington Creek) excessive nitrogen has saturated organisms physiological requirements. Since organisms nutrient requirements are at a nitrate to phosphate ratio of 8:1, any ratio of nitrate to phosphate over eight indicates a system that is limited in phosphate, and saturated in nitrate. Therefore, algal growth, as well as all biological organisms, in the Morro Bay watershed has all the nitrates required and depends on the pulses of phosphates that is bound to sediments. Pennington Creek, which is used as a control for BMPs because of its healthy corridor and lack of impacting uses, is the only system that is nitrogen limited. This ratio can effect management decisions for controlling algal blooms and eutrophication illustrating a relative demand on a system. This relationship does not infer nitrates are less of a priority in cases such as drinking water contamination or impacts on other beneficial uses.

**Urban Runoff:** Urban runoff also constitutes an important source of nutrients in localized areas and can result in impacts to the estuary and its beneficial uses. Very high pulses of nutrients have been noted entering the bay throughout the year, as well as following rain, from subsurface flows. Nitrate levels in the bay adjacent to Los Osos are elevated above Basin Plan standards and high levels have been observed in runoff. A community sewer system is planned.

**Groundwater:** Another potentially important source of nutrients to Morro Bay is generated from leaking and failing septic tanks in Los Osos. The community of Los Osos/Baywood Park, with a population 14,600, is located directly on the edge of Morro Bay and is still served exclusively by onsite septic systems. It has been shown that nitrates are entering the groundwater in this area. It is possible that some of the degraded groundwater is entering the bay. Nutrients have been monitored bimonthly at freshwater seeps located in the bay, and high levels may be related to nitrates in Los Osos groundwater, but more study is needed to assess water quality trends.

Levels of nitrates considerably above the level for safe drinking water appear in subsurface flow discharged from a County "standpipe" during non-rainfall periods. Elevated levels of nitrates have been detected draining to the bay from freshwater discharges in the Los Osos area. Levels of nitrates approaching 65 mg/l are consistently released from the San Luis Obispo County "standpipe" at El Moro and 3rd Streets in Los Osos during non-rainfall periods. This standpipe was originally designed for surface stormwater runoff as an emergency measure, but now also discharges groundwater nearly continuously. The 8<sup>th</sup>/El Moro sample site had the highest sampled value of 55.4 mg/l during October 1996. The 3rd El Moro standpipe is regulated as enforcement action by the CCRWQCB due to the high nitrate concentrations. Other drains similar to this are under stormwater regulations.





## Figure 2.13 Relative Contributions of Potential Sources of Nitrogen

## Figure 2.14 Relative Contributions of Potential Sources of Phosphate



# 2.5.4 LOSS OF FRESHWATER FLOW DURING DRY SEASONS PRIORITY PROBLEM

Low levels of freshwater flow in the watershed during summer months reduce the amount of water reaching the Morro Bay estuary. The estuary's ecosystem is dependent on a balance of salt water and fresh water, and significant reductions in freshwater flow threaten the habitat. In Los Osos Creek during drought years, extractions may exceed the total surface flow of the creek. A decrease in summer water flow also reduces the flushing that takes place in the bay, contributing to the build-up of pollutants. Increased temperatures and reduced dissolved oxygen may be

associated with losses of freshwater flow. The CCRWQCB is reviewing and updating their list of impaired waters and may find the need to list other waters in the Morro Bay Watershed for temperature and dissolved oxygen.

The freshwater that flows into Morro Bay comes from a variety of sources largely dependent upon the seasons. During large rainfall events the dominant freshwater inflows to the bay come from Chorro Creek, Los Osos Creek, and urban runoff from the Cities of Morro Bay and Los Osos. As the rainy seasons give way to the dry summers typical of this part of the coast of California, surface water runoff from the watershed and urban areas is virtually non-existent and the freshwater inflows to the estuary are highly dependent upon subsurface water. The subsurface water makes its way to the estuary in several ways. In the inland portions of the watershed water that has soaked into the soil at high elevations seeps into the creeks and maintains their surface flows during some portion of the dry season. In effect the watershed acts as a storage device, retaining some of the rainwater of the winter and gradually releasing it to the streams after the rains have stopped. Historically, three streams flowed into Morro Bay. One of these streams, Morro Creek, was diverted from the bay in the 1940s.

Another significant source of freshwater flow to the bay during the dry season comes from shallow groundwater that seeps and upwells into the bay both at the shoreline and in open water areas. The South Bay area with its unique sand dune geology contains numerous areas of freshwater seeps. While a few of these freshwater springs, such as Sweet Springs, may be affected by the Los Osos fault, an earthquake fault that runs through the valley and into the bay, the majority of the flow results because of the nature of sand dunes. The wind shapes the dunes; over time some areas in the dunes become shaped like bowls. During rainy seasons fine sediment is washed into the bottom of the bowls. When enough sediment is washed to the bottom of the bowl it begins to bind together to become clay. Unlike the surrounding sand that allows water to flow freely between the grains, the clay presents a barrier that prevents the water from flowing upward or downward. The South Bay area contains a virtually uncountable number of large and small barriers of this type. This results in subsurface water in some areas traveling horizontally far more quickly than it can travel vertically.

One other source of flow in the dry season is effluent from the CMC wastewater treatment plant. This facility has dedicated a minimum flow or its entire output (whichever is less) for the purpose of maintaining downstream habitat.

The differences in the processes that provide freshwater flow to the bay during the dry season require different ways of evaluating the issues and different forms of solutions to problems.

#### IMPACTS

Reductions to freshwater flows in the watershed and to the bay have a direct impact on a wide variety of designated beneficial uses of water and on social and economic conditions in the region, but it is believed to have significant impacts on localized runs of steelhead trout. Concerns over degradation to a number of these uses have caused portions of the Chorro Creek Watershed and the entire Los Osos Creek Watershed to be listed as "fully appropriated." What this means in somewhat oversimplified terms is that anyone seeking to extract water from these areas and use it in other areas must provide the State Board with evidence that the extraction will not cause damage to the designated beneficial uses. All of Los Osos Creek and all of its tributaries are listed as fully appropriated from May 15 through October 31. Chorro Creek and all of its tributaries downstream of the CMC wastewater treatment plant outfall are listed for the period between July 15 and November 30.

Reductions in freshwater flow impact:

- Freshwater replenishment (e.g., Chorro Reservoir, agricultural storage reservoirs)
- Groundwater recharge
- Commercial & sport fishing
- Water contact recreation
- Non-water contact recreation
- Local habitat
- Preservation of biological habitats of special significance
- Rare, Threatened & Endangered Species
- Spawning, reproduction and early development of fish



Examples of impacts from a reduction in freshwater flow can be found in Table 2.16.

## Table 2.15 Examples of Impacts of Reduction in Freshwater Flow

Beneficial Use	Impact
Agricultural Water Supply:	Agriculture relies upon ground water and creek flows for both stock watering and crop production. On Los Osos Creek, during drought, years demand for water exceeds the supply.
Local Habitat:	Local habitats of all types are affected: warm and cold freshwater, estuarine, and wildlife. It has been suggested that the willow trees in the vicinity of Chorro Creek are dying because of increased salinity due to overpumping in upstream water supply wells.
Rare and Endangered Species: (Steelhead)	Extraction of surface water in the past has resulted in fish kills. Steelhead is now a federally listed species.

## PROBABLE CAUSES

Water usage: For much of the year, Chorro and Los Osos creeks are "fully appropriated"—extractions of freshwater by agricultural and municipal users can equal or even exceed the amount of water flow.

**Poor water management:** The number of well permits, amount and timing of water extractions, etc., can reduce the amount of water flow.

## TRENDS AND STUDY RESULTS

**Chorro Creek:** Chorro Creek surface and subsurface flows are impacted by a variety of public and private sector activities. The watershed and its creeks have been altered and managed for so long that attempts at determining natural flow levels are speculative at best. During the dry season, Chorro Creek flow is often entirely dependent upon the effluent outflow from the CMC wastewater treatment plant. A recent study of freshwater influences on Morro Bay estimated that, during drought years, Chorro Creek was dry at its confluence with the bay for 126 days per year. A more recent study that employed more extensive numeric modeling techniques indicated that Chorro Creek was dry at its confluence with the bay for more than 300 days per year during dry years. Extensive diversion occurs in the watershed for both agricultural and municipal purposes, and it has resulted in a severe lack of flow in the lower reaches of the creeks.

A number of efforts over the last few years have been undertaken to ameliorate the problems. In issuing well permits to the CMB the State Water Resources Control Board placed specific limitations on the amount and timing of extractions that are permitted. The City will be installing flow gages upstream and downstream of its well fields in order to provide the information necessary to manage extractions while at the same time maintaining minimum stream flow at 1.4 cubic feet per second. In the past the City has derived up to two-thirds of its domestic drinking water supply from the Chorro Creek watershed. The completion of the State Water pipeline in the valley and the City's use of state water have dramatically altered the water budget of the Chorro Valley at the present time. Two of the major users of water in the valley, the CMB and the CMC, are now using state water and for the immediate future have significantly reduced extractions from the Chorro Valley. The CMB also owns a desalinization plant that is not used except in emergency situations.

The CMC wastewater treatment plant has dedicated specific minimum discharges for the purpose of maintaining public trust resources in the form of steelhead habitat from their point of discharge to the estuary.

**Chorro Reservoir and CMC Wastewater:** The CMC operates Chorro Reservoir, imports Whale Rock water into the basin, supplements its water supply through the State Water Project, and extracts water from wells in the basin. CMC also operates a wastewater treatment facility that disposes its effluent into Chorro Creek to Cal Poly and the



Dairy Creek golf course for mitigation purposes. The combined summertime discharge from Chorro Reservoir and the wastewater treatment facility provides approximately half of the flow in Chorro Creek. The CMC has dedicated .75 cubic feet per second or the entire output of its treatment plant (whichever is less) for the purpose of maintaining downstream habitat. Both the CMB and the CMC have agreements with the county to acquire additional State water during drought periods. The intent of these agreements is to provide the fully subscribed amount of water even when the State Project cuts back its deliveries to customers in general.

**CMB Wells:** The CMB has used wells in the valley for many years to meet the freshwater needs of their population. The completion of the state water pipeline and the fact that a number of the water users are subscribers to state water has changed the water budget of the watershed. Reduced extractions from both groundwater and subterranean creek flows should result in increased surface flow in the creek for some period of time. However, if CMB resumes active extraction from the wells, creek flows will decrease.

**Dairy Creek Golf Course:** The County of San Luis Obispo operates several facilities within the Chorro Creek basin including a new golf course. The golf course has been designed to use effluent from the CMC wastewater treatment plant located on Chorro Creek. The County is supplementing its water supply for facilities in this area through the State Water Project. The golf course includes several design and operation components intended to minimize water use and continue delivery of minimum stream flow to both downstream users and the public trust resources of wildlife and instream habitat. The County Board of Supervisors expresses the County's commitment to work with other water users in the Chorro valley to maintain a minimum instream flow of 1.5 cubic feet per second from the area of the CMC to the bay.

Storage Reservoirs: The California Polytechnic State University maintains two additional storage reservoirs at Chorro Valley Ranch.

Agricultural users: Within the Chorro basin, agricultural users rely on Chorro Creek and groundwater sources for irrigation of their crops. The viability of prime agricultural land within the Chorro Valley is dependent upon equitable management of upstream sources of creek flow and groundwater recharge.

Los Osos Creek: In drought years, extractions of water may exceed the total surface flow of the creek. The State Water Regional Control Board has listed the Los Osos drainage as "fully appropriated" and believes the drainage cannot support further appropriative extractions from the area.

**Urban Drainage:** The problem of flooding in the Los Osos/Baywood Park area is due to residential development and the corresponding increase in impermeable surfaces, disruption of natural drainage routes without provisions for surface drainage, and inadequate containment of onsite drainage. Rising groundwater is also likely a factor. The lower aquifer is used as a domestic water supply while households are discharging septic system effluent into the upper aquifer, contributing to rising groundwater elevations. Rising groundwater elevations affect the ability of the upper aquifer to retain water, resulting in increased overland flow to the bay and streams. It is believed that the upper aquifer is a fresh water source for springs at the south end of the bay and the amount of flow from these springs controls the boundary and vitality of fresh and brackish water ecosystems. If overdraft of the aquifer occurs, saltwater intrusion of the sub-estuary aquifers may occur as the area's population increases.

## 2.5.5 HEAVY METALS & TOXIC POLLUTANTS

#### PRIORITY PROBLEM

Heavy metals such as iron, nickel, cadmium, chromium, and arsenic are a serious water quality concern because of their toxicity, persistence, and potency. Toxic pollutants include pesticide residuals, organic compounds, and heavy metals. Recent sampling has shown that the concentrations of chromium and nickel in Chorro Creek sediments exceed the CCRWQB Basin Plan Water Quality Objectives. Contact and non-contact water recreation are two beneficial uses that could be adversely affected by concentrations of these pollutants, and human health impacts could result. Marine wildlife, shellfish harvesting, fish migration, spawning habitat, and rare, threatened, and endangered species habitat are additional beneficial uses that are impacted by heavy metals and other toxic pollutants. Such metals can accumulate in sediments and are magnified in biological receptors, such as fish and shellfish tissue. Aquatic organisms can be acutely affected even by very low concentrations of toxic pollutants.



Dredge material sediments containing metals or toxic substances in concentrations that are unsuitable for unconfined aquatic disposal can result in additional costs for material handling, drying, and upland disposal. Special handling, including treatment and disposal, can increase the cost of dredging.

Toxic constituents primarily pose a threat to aquatic organisms, which can be acutely affected by concentrations of toxic substances discharged to surface waters during wet weather storms or from other sources such as spills or illegal discharges. Toxic constituents include pesticide residuals and metals arising from inappropriate disposal practices. Both toxic constituents and metals can sometimes be found in wastewater discharge. Dredge spoils are another potential source of heavy metals and toxic contamination that can be unsuitable for unrefined aquatic disposal.

The Morro Bay estuary and Chorro Creek are listed on the CCRWQCB 303(d) list as "impaired water bodies" for metals. The 303(d) list identifies water quality limited bodies. A water quality limited segment is any known segment that does not meet applicable water quality objectives and/or is not expected to meet applicable water quality objectives. Even Los Osos Creek is listed for priority organics primarily because of historical data regarding pollutants from the Los Osos landfill. More recent data show that this problem has been corrected.

## IMPACTS OF HEAVY METALS AND TOXIC POLLUTANTS

The CCRWQCB has identified metals as potentially affecting aquatic life in Morro Bay. The beneficial uses that could be affected are: ocean commercial and sport fishing, preservation of rare and endangered species, marine habitat, warm fresh water and cold fresh habitats, fish spawning, shellfish harvesting, water contact recreation, non-water contact recreation, and domestic, municipal, and agricultural water supply.

## Table 2.16 Examples of Impacts of Heavy Metals and Toxic Pollutants

Beneficial Use	Impact	
Commercial and Sport	Metals can be toxic to adult steelhead trout or their young in any stage of their	
Fishing	development.	
Shellfish Harvesting	Trace metals and toxics can build up in sediments and magnify in shellfish tissue,	
	making them unfit for human consumption.	
Water Contact Recreation	Human health impacts can result from toxics and heavy metal exposure such as	
	DDT derivates and chromium, respectively.	
Rare, Threatened,	Toxics have negative impacts at very low levels to aquatic endangered and	
Endangered & Special Status	threatened species such as steelhead trout, the tidewater goby, red-legged frogs, and	
Species	southwestern pond turtles.	

#### **PROBABLE CAUSES**

Sources of metals vary and sometimes can be found in:

- Storm water runoff;
- Vehicle brake pad dust, exhaust, oil, grease, tire and gasoline discharges;
- Runoff from inactive mine tailings;
- Solid waste disposal areas;
- Household and industrial sources such as pesticide residuals and illegal or inappropriate disposal practices;
- Agriculture;
- Irrigation practices;
- CMC wastewater treatment plant discharge; and
- Boat paints and boat repair activities.

#### TRENDS AND STUDY RESULTS

**Tissue samples:** Available data collected from the State Mussel Watch and the Toxic Substance Monitoring Programs suggest that metal concentrations and toxic constituents are not present in estuary waters in concentrations dangerous to fish or mussels. However, sampling within the upper watershed suggests a persistent problem with


metals eroding from waste rock at the mines. Tissue samples from mussels have never contained levels high enough to violate health standards, but on a one-time basis, cadmium and mercury were found at a higher than expected level. Lindane, chlorbenside, and phosphorothoic acid were also found in higher than expected concentrations on a one-time basis. Lindane and Chlorbenside are pesticides, but detection in the mussel tissue did result in regulatory action such as initiation of public health quarantine on commercial oysters grown in Morro Bay. Effective monitoring at regular intervals can assess potential effects and ensure water quality standards are protected.

**Bay Bottom sediments:** Bay bottom sediments have not been systematically sampled and data collected do not suggest a problem. However, further monitoring and investigation is warranted.

The community of Morro Bay and Los Osos are required to comply with USEPA regulations on Phase II stormwater discharges. The CCRWQCB found elevated levels of heavy metals such as copper and lead in "first flush" storm sampling events of 1995 and 1996. This sampling effort is intended to capture samples of the runoff from the first storms of the season, and determine the levels of pollutants in those samples. Although Morro Bay stormwater sampling data are limited, and additional data are necessary to determine trends, it is generally recognized that urban and boatyard runoff is a significant source of toxics and metals. Figure 2.15 illustrates the percent of National Oceanic and Atmospheric Administration (NOAA)/Hazmat's Screening Criteria for freshwater surface waters exceeded by heavy metals. This criteria, CMC, (Criteria Maximum Concentrations) is merely a screening level, to denote the highest level for a 1-hour average exposure not to be exceeded more than once every three years, and is synonymous with "acute." These limits are based upon the protection of aquatic organisms. Based on 1994-1997 stormwater sampling data, the boatyard on Morro Bay's waterfront displays the highest copper levels, exceeding 240 times the CMC screening level (Figure 2.15).

# Figure 2.15 Percent of NOAA Screening Criteria Exceeded by Freshwater Surface Waters at Morro Bay Watershed Stormwater Sampling Sites (Criteria Maximum Concentrations, and Should Not Be Exceeded More Than Once Every Three Years)





**Metals in Watershed creeks.** In 1994, the CCRWQCB collected sediment samples from 5 locations at the Creek mouths and in the bay. The upstream Chorro location contained the most chromium and nickel (80 and 280 ppm, respectively), followed by the Chorro Creek mouth location and the upper Los Osos creek location (37 and 35 ppm, respectively).

The Central Coast Ambient Monitoring Program (CCAMP) data show elevated levels of nickel and chromium in sediment samples taken from Chorro Creek, when compared to other coastal creeks. This could be due to geological strata that include nickel and chromium --bearing formations that have been mined throughout the basin's economic history. Not all levels are due to human impacts.

In comparison, heavy metals in Los Osos Creek are relatively low. Note, however, that the data are based upon a single sample from 1998.

**Organic Compounds in Creeks.** The CCAMP monitors levels of toxic pollutants in numerous creeks in the region. The preliminary results indicate that Chorro and Los Osos Creeks have relatively low detectable levels. Minute levels of 4,4'-DDT and 4,4'-DDE (a DDT derivative) were found in Chorro Creek. In contrast, creeks in neighboring watersheds, such as San Luis Creek, had elevated levels of PCBs, and Santa Maria Creek, with its intensive agriculture and higher populations, had much higher levels of DDT compounds.

**Inactive Metal Mines in the upper watershed.** Chromite has been mined sporadically in San Luis Obispo County since 1870, with peak production occurring during World War I. Most mines were never properly reclaimed, and waste rock and polluted flow are entering nearby creeks. Heavy metals are believed to be eroding from several key inactive chromite mines that are located near the ridges at the northern perimeter of the watershed. Extensive data show that the major source of metals contamination in the Chorro Creek watershed is several abandoned chromium mines in the major tributaries of Chorro Creek. It has also been shown that, in the absence of acid producing elements, the metals in the Chorro Creek watershed are bound in sediments and are not readily leached. Therefore, it appears that the predominant source of metals contamination in the watershed are metal-enriched sediments which are primarily the products of erosion from mine tailings and barren slopes at specific inactive mine sites.

Contaminated sediments have eroded and washed into sediment basins on Camp San Luis Obispo and into Chorro reservoir. In addition, dredged materials from the reservoir and mine tailings have been used to resurface roads, thus adding to the contamination problem.

From 1992 to 1996, CCRWQCB staff conducted limited monitoring of water quality and sediments in Chorro reservoir, Chorro Creek, Chorro Creek tributaries, and Morro Bay. Grab samples of sediment were collected and analyzed for various metals. In sediments from the Chorro reservoir, the primary constituents found were chromium (262-474 ppm) and nickel (543-2139 ppm). Nickel was found to be over the hazardous waste level of 2000 ppm, exceeding hazardous waste standards. These elevated levels are most likely the result of sediment from abandoned chromium mines located within the upper watershed.

Los Osos Landfill: There has been concern that the now-closed Los Osos landfill may leach toxics into Los Osos Creek and possibly the bay, but recent data are indicating that there is not a problem. In the past, toxics have been found in monitoring wells at the landfill. Both Chorro and Los Osos creeks are relatively low in various toxics, especially compared with neighboring watershed creeks that drain areas of intensive agriculture and high populations.

**Boat paint residues:** Boat paint residues may be a problem in the bay, but there is very limited data indicating the severity of this problem. Nickel has been found in bottom sediments near boating operations, but the exact source is unknown. "First flush" monitoring samples taken near the boatyards in Morro Bay show very high copper levels, but the data are limited.

**Other sources:** The CCRWQCB's monitoring efforts also indicates that additional potential sources of toxic chemicals are agriculture, irrigation practices, and the CMC wastewater treatment plant discharge.

**Pesticides:** All growers producing agricultural commodities for sale are required to hold a Pesticide Use Permit, which specifies which types of pesticides a grower may use, each growing site, and the commodities on which



pesticides may be applied. California law requires that the County Agriculture Commissioner be notified 24 hours prior to the intended application of a Restricted Use Pesticide. Following applications, growers and agricultural pesticide control businesses are required to submit monthly Pesticide Use Reports, which may then be used to map trends in pesticide use and help identify problems such as human health issues, crop damage or correlation with pesticide residues found in crops. Pesticide monitoring in the water is expensive and not required by the County Agricultural Commissioner. The CCRWQCB is planning to perform screen monitoring for pesticides next year.



# Table 2.17Relative Contributions of Potential Sources of Heavy Metals in<br/>Morro Bay

Potential Problem	Source				
Increased heavy metals: copper, nickel, chromium,	Urban runoff				
iron	Inactive Mines (via Chorro Creek and its tributaries)				
	Maintenance activities at boatyards (vessel antifouling				
	paints)				
	Wastewater Discharges				
Other toxics: Pesticides	Agriculture; Irrigation Practices				
Other toxics: polycyclic aromatic hydrocarbons	Fuel stations; Oil spills				
(PAH's)					
Other toxics: polychlorinated biphenyls (PCB's)					
Other toxics	Los Osos landfill				

# 2.5.6 HABITAT LOSS

# PRIORITY PROBLEM

Habitat loss occurs as a result of many of the priority problems discussed in the earlier sections of this chapter. Because of the interdependency of elements of the ecosystem, habitat loss has become a significant priority problem.

Loss and degradation of key habitats due to water quality impairments are a significant problem in the Morro Bay watershed. These key habitats include: wetlands, submerged aquatic vegetation, riparian areas and upland. Many activities contribute to habitat loss, such as impaired water quality, development pressure, sedimentation, water diversion, wetland alteration, over grazing by livestock, detrimental farming activities and competition by introduced exotic species. Although there is little quantitative data showing decreases in habitats over time, there are general trends that are being observed.

Wetland habitats being threatened include eelgrass beds, coastal salt, brackish, and freshwater marsh, and riparian vegetation. Eelgrass beds were seriously affected by the sedimentation caused by the highway 41 fire and the storms that resulted afterward. These eelgrass beds are critically important as a food resource for brant geese. Portions of coastal salt marsh, brackish marsh and freshwater marsh habitats have been greatly affected by sedimentation and aggressive takeover by invasive exotic species. As developable lots in Los Osos decrease, more pressure is put on wetland habitats that occur at the edge of the bay. Some are protected by virtue of their present land ownership status.

Riparian areas are increasingly being threatened by residential development and the threat of encroaching agricultural activities in the watershed.

Threatened upland types include coastal dune scrub and maritime chaparral. Coastal dune scrub is considered one of the most imperiled habitat types in California. It is inherently rare, occurring only in a few areas along the California coast, and locally it has been seriously affected by the spread of invasive exotic species (e.g., veldt grass) and the pressures of residential development.

Maritime chaparral provides habitat for the endangered Morro manzanita. Habitat for this species is declining due to past and potential development in the Los Osos area. Maritime chaparral habitat overall is also being affected by off-road-vehicle use and invasive exotic species introduction and spread.

# IMPACTS

Virtually all those who use the estuary and watershed are or will be impacted by habitat loss. The impacts include those discussed below in Table 2.19. Losses of these crucial habitats directly affect wildlife populations, pollutant loads and the recreational and commercial value of Morro Bay.

Beneficial Use	Impact
Waterfowl and Wildlife Habitat	Changes in Morro Bay's wintering Brant populations are intimately tied to foragable acreage. The decrease of approximately 10,000 Brant over the last thirty years may be due to declining eelgrass beds in the estuary. The decline in eelgrass habitat is discussed in the Characterization document.
Preservation of Biological Habitats of Special Significance, Rare, Threatened, or Endangered Species	The Morro Bay Kangaroo Rat has lost approximately 97 percent of its coastal dune scrub habitat to development and is now considered the most endangered species in California. Other species such as the Morro shoulderband snail and the shrub, Morro manzanita, are also affected by changes to coastal dune scrub habitats.
	Habitat alteration in or near riparian corridors also directly affects special status species such as red-legged frog, tidewater goby, steelhead trout and many shorebirds and migratory species.
Migration of Aquatic Organisms,	Many of the priority problems (sediment, nutrients and lack of freshwater
Spawning, Reproduction, and/or	flow) in the estuary have caused loss of habitat for aquatic organisms.
Early Development and Cold	Decreased stream flow caused by municipal and agricultural well pumping
Freshwater Habitat	in fine sediment deposition can cause reductions in fish spawning areas developing aquatic organisms.
Contact (REC-1) and Non-Contact	Habitat loss reduces the recreational, commercial, and tourism value of
(REC-2) Water Recreation	wetlands and estuaries. Non-contact recreational uses, such as hiking, beachcombing, sightseeing, and birding also rely on open areas with high animal and plant diversity that increases the intrinsic value of the Morro Bay area.
Agricultural Supply, Ground Water	Reduced wetland acreages can decrease the buffering capacity of the
Recharge and Fresh Water	estuarine and riparian systems, and thereby increase pollution inputs to the
Keplenishment	estuary due to the loss of the filtration function that the habitat provides. A
	slows and filters sediment and nutrient pollutants. Without such filtering, excess algae blooms can occur leading to fish kills.

# Table 2.18 Impacts of Habitat Loss

# PROBABLE CAUSES

Probable causes of loss of habitat within the Morro Bay watershed include:

- Land development
- Competition from non-indigenous species
- Road maintenance activities, off-road vehicle use
- Water diversion projects; water extraction; stream channelization, flood control maintenance on streams
- Overgrazing by livestock
- Sedimentation of habitat
- Wetland alterations



# TRENDS AND STUDY RESULTS

Land Development: Increased urban development results in the direct destruction of habitat. In the community of Los Osos, 85 percent of the area's coastal dune scrub community has been converted to suburban or urban development. The Morro manzanita and the Morro shoulderband snail are both endangered species found in Baywood fine sands. Their numbers continue to decline because of urban development. In addition to direct habitat loss, habitat fragmentation caused by new residences and roads is likely to: 1) eliminate effective dispersal resulting in isolated populations; 2) diminish or eliminate gene flow between these isolated populations; and 3) diminish the likelihood of habitat maintenance such as the use of prescribed burns.

**Competition from Introduced Species:** Several non-invasive non-native plant species and aquatic organisms are encroaching into native habitats. Since European settlement of the Morro Bay area, substantial expanses of those native habitats have been lost to invasion of the following exotic plant species:

- Eucalyptus
- Iceplant
- Veldt Grass
- Non-native Annual Grasses
- Cape Ivy
- Pampas Grass
- Hoary Cress
- Poison hemlock
- Giant Reed
- European beach grass
- Tortellini Sea Slug
- Castor Bean
- Red fox
- Brown-headed Cow Bird
- European Starling

**Road Maintenance Activities:** Plant populations adjacent to roads are vulnerable to maintenance activities, including mowing, grading, herbicide application, and road expansion. In addition to subjecting individual plants to removal, these activities may create conditions favorable to the establishment and spread of invasive, non-native species.

**Off-Road Vehicle Activity:** Off-road vehicles are destructive to most plant communities, ruining wildlife food sources and shelter. Once vegetation cover is lost, soil movement is increased whether in sand dunes or silty farmland. The erosion is drained into the estuary, clogging filter feeders such as oysters and clams, and blocking sunlight for sensitive eelgrass. Historically, off-road vehicle activity was heavy on Morro spit, degrading much of the coastal dune scrub. A ban on vehicle use on the spit has shown a significant growth in dune vegetation.

**Over Grazing by Livestock and Detrimental Farming Activities:** Farming practices can also affect habitats. Additional erosion can result from disturbed soils. Disturbance of land near riparian areas can result in loss of wetland and riparian corridors, and decrease the effectiveness of streamside vegetation, which acts as a filter to reduce sedimentation.

Water Diversion: Both Chorro and Los Osos creeks have historically supported steelhead populations and both still have remnant populations of resident (non-migratory) steelhead trout. In past years, large numbers of ocean run fish have been documented in Chorro Creek. For example, in 1976 more than a dozen adult steelhead were found stranded and killed in a single pool as a result of a surface water diversion. This points to one of the primary problems confronting these fish, which is excessive water diversion from the creeks. Steelhead need adequate winter flows to enable them to migrate up and down the creek to the ocean, and sufficient summer flows to maintain sufficient cold water habitat for juvenile rearing.

# Table 2.19 Potential Causes of Species Habitat Loss

Habitat	Species	Cause of Decline*					
Brackish Marsh	Tidewater goby	Alterations of flow and changes in salinity distributions;					
		Sedimentation of habitat					
Maritime Chaparral	Morro manzanita	Growth and development leading to population					
		fragmentation					
		Invasive exotic species: iceplant					
	· · · · · · · · · · · · · · · · · · ·	Invasive exotic species: eucalyptus					
Coastal Dune Scrub	Morro Shoulderband	Invasive exotic species: veldt grass					
	Snail	Recreational use (off-road vehicles)					
Coastal Salt Marsh	California Suaeda	Wetland alterations					
Sandy Beaches Western Snowy Plover		Dredging; recreational use					
	_	Invasive exotic species: European beachgrass					
		(Ammophila arenaria)					
Freshwater wetland and	Bog thistle	Livestock grazing					
Riparian							
Riparian	Red-legged frog	Growth and development					
		Livestock grazing					
		Wetland alterations					
		Storm damage repair and flood control maintenance on					
		streams					
		Stream channelization projects					
Riparian/Aquatic	Steelhead	Sedimentation					
		Introduced exotic species: squawfish					
		Water diversions (see freshwater flow)					
		Water extraction (see freshwater flow)					

# in the Morro Bay Watershed

# 2.5.7 STEELHEAD LOSS

# PRIORITY PROBLEM

Steelhead populations in the Morro Bay watershed fall into the South-Central Evolutionary Significant Unit (ESU) as defined by the USNMFS. This ESU's critical habitat of 7,246 square miles includes all river and estuarine reaches from the Pajaro River down to the Santa Maria River. It is part of the larger grouping of southern steelhead (all populations south of San Francisco) which has been suggested to be the "most ancient of all rainbow trout". Main characteristics of this ESU habitat include flash floods and high erosion rates that are thought to be stressful to steelhead. Historically, the southern steelhead trout populations once numbered in the ten thousands. Presently, the population has declined to less than "one percent of their 1850 abundance."

Steelhead trout are a cold water fish species. Temperatures over 65 degrees Fahrenheit can become lethal for these fish, particularly over prolonged periods. When water flow is abundant and shaded by adjacent vegetation, temperatures remain cool. Steelhead also require fairly high dissolved oxygen levels in the water. Cooler water holds more oxygen. Well-shaded corridors are an important way to maintain appropriate water quality temperatures for these fish.

If steelhead trout are stranded in pools, the increased water temperature and decreased dissolved oxygen levels can be fatal. The CDFG documented such a steelhead trout kill in 1976. This incident was attributed to water diversion.



Sedimentation of instream habitat is another serious problem. Steelhead are anadromous, which means that they spend most of their adult life in the ocean, returning eventually to their home streams to spawn. Spawning success can be greatly affected by the amount of sediment present in the spawning gravel. Sediment fills in the spaces between the gravel, actually smothering eggs and larvae, reducing the insect food sources attached to the gravel, or "cementing" the gravel, making it too compacted for use as spawning habitat. Creek gravels that are clean enough to support steelhead spawning and reproduction probably also indicate a system that is not overloaded by sediment.

Steelhead trout are an important recreational species on the Pacific coast. The CDFG Code recognizes steelhead as a valuable resource that has a limited range. It also recognizes that California's steelhead resources are largely dependent upon the quality and quantity of habitat available to them.

## IMPACTS

Southern steelhead populations have been listed as federally endangered by the USNMFS because of declining habitat quality throughout the species range. This species is an anadromous fish that migrates from coastal streams to the ocean and back to the same stream to spawn. Chorro and Los Osos Creeks both support populations of this species. Water diversion projects, migration barriers, drought and siltation upstream have greatly reduced the viability of local steelhead populations in these two streams. Steelhead trout are generally spring spawners, but will often move up major coastal rivers in the fall and wait until spring to spawn.

## PROBABLE CAUSES

Causes for the reduction in steelhead populations supported by Morro Bay include:

- Reduced freshwater flow due to water diversion, drought, etc.
- Higher water temperatures and lower dissolved oxygen levels, due in part to the loss of shade-providing vegetation
- Sedimentation due to the discharge of fill and erosion
- Migration barriers, such as the Chorro Reservoir

# TRENDS AND STUDY RESULTS

Because of damage and threats to their restricted habitat, state policy requires that emphasis shall be placed on management programs to inventory, protect, and restore or improve the habitat of natural steelhead stocks (CDFG). The Federal Fishery Conservation and Management Act of 1976 and Fish and Wildlife Coordination Act also emphasize the importance of maintaining anadromous fishery resources and habitats. Section 404(b)(1) of the Clean Water Act (450 CFR Part 230) specifically identifies riffle and pool habitat "complexes" as special aquatic sites of concern. These areas provide primary feeding, spawning and rearing habitat for steelhead and other fish. Siltation is regarded as a source of fill under Section 404, and is particularly detrimental to riffle and pool habitat. The Clean Water Act specifically recognizes the need to regulate the discharge of fill in and adjacent to riparian habitats, wetlands and streams.

Additional details regarding threats to steelhead habitat and trends is in the resource presented in Volume II of this CCMP under Section 8, "Freshwater Flows," and Section 10, "Habitat Loss."

**Steelhead in the Morro Bay estuary.** During some life phases, steelhead is especially dependent upon low salinity estuarine environments and fresh water habitats. The Morro Bay estuary provides the transition environment critical to the juvenile phase of this fishery. Estuary and lagoon environments have been identified as the optimum nursery areas for juvenile steelhead with growth rates and densities of fish much higher than in fresh water areas.

**Steelhead in the Chorro Creek Watershed.** There has been a marked reduction in the number of steelhead trout in the streams of the Morro Bay watershed. Water diversion, coupled with drought, has impacted surface flows in the lower Chorro Creek, an area identified as supporting significant rearing habitat. Though 0.75 cubic feet per second (cfs) of CMC effluent is dedicated to supporting steelhead trout and other fishery resources in the lower creek, this amount seldom reaches the estuary during dry years. In the dry summer months instream flow is critical. Changes monitored in Chorro Creek stream flow and water temperature in the Chorro Flats are described further in Volume II of this CCMP.

The construction of Chorro Reservoir eliminated steelhead trout access to the upper watershed. Steelhead strain trout are still present above the reservoir and are trapped within the reservoir. Fish passage structures constructed above the reservoir apparently do not work.

In Chorro Creek, steelhead migrate upstream from the ocean during the winter months (December to March). Chorro Creek and its tributaries are all historical steelhead trout habitat when flows are sufficient for fish to move into these tributaries.

The Chorro Creek watershed supports one of the southernmost remaining runs of steelhead on the Pacific Coast. From this standpoint they represent a valuable genetic resource for restoration of populations in more southerly streams, as southerly stocks are more tolerant of the extreme conditions found in southern California streams. CDFG estimates that the Chorro Creek drainage will support a basin run of at least 450 adult steelhead. This run was estimated at 160 adults in 1976. The current run is thought to be only a fraction of this number.

Other creeks in the Chorro watershed that are considered to be steelhead habitat when flows are sufficient include San Luisito, Pennington, Dairy, and San Bernardo creeks.

Steelhead in the Los Osos Creek Watershed. Adult steelhead have recently been observed in Los Osos Creek, along with resident trout.



# 3.1 INVENTORY OF EXISTING FEDERAL PROGRAMS AND FEDERAL CONSISTENCY

# 3.1.1 PURPOSE OF THE BASE PROGRAMS ANALYSIS

The purpose of the Base Programs Analysis (BPA) is to assist the MBNEP in developing effective mechanisms for addressing priority problems and their causes. The BPA offers decision-makers a clearer picture of the existing institutional "infrastructure" or framework of the estuary and watershed. It provides an opportunity to guide management of the estuary and watershed by:

- Describing the framework of institutions and programs within which a CCMP will be implemented;
- Assessing the effectiveness of that framework in managing and protecting the estuary's resources; and
- Recommending, in conjunction with the technical characterization, issues to be addressed in the CCMP based on potential management enhancements or alternatives.

The BPA is a required component of the CCMP planning and implementation process. Additionally, this BPA was developed by following the *National Estuary Program Guidance, Base Programs Analysis* (1993). This analysis also considered the approach currently underway by State of California agencies to identify actions consistent with the Coastal Zone Act Reauthorization Amendments (CZARA). Integration and coordination of local needs with this state process should result in more technical and financial support to implement the actions developed for the CCMP. Development of the BPA in parallel with the State's approach to identify actions included the following:

- Identification of issues and actions to be addressed in the CCMP based on the results of the effectiveness analysis;
- Evaluation of applicable management measures from those included in the Management Measure Review Document (1998) developed under authority of CZARA; and
- Description of how recommended actions for the CCMP implement the applicable management measures.

# 3.1.2 METHODS OF ANALYSIS

The staff of the Central Coast Regional Water Quality Control Board (CCRWQCB) and the California Coastal Commission (CCC) inventoried existing programs from the 43 agencies with jurisdiction over land or resources in the Morro Bay estuary and/or watershed (see Table 3.1). They also evaluated the effectiveness of their respective programs by responding to a questionnaire developed by CCRWQCB/CCC staff. Table 3.2 lists the criteria used for evaluation. The types of programs inventoried and evaluated included the following institutional framework categories:

- regulatory;
- resource management;
- finance; and
- other non-regulatory, including voluntary initiatives or incentives, public education and technical assistance, and planning efforts.



# Table 3.1 Local, State, and Federal Agencies Inventoried

AGENCY NAME
City of Morro Bay
Planning & Building Department
Public Works Department
Harbor Department
Recreation & Parks Department
San Luis Obispo County
Planning & Building Department
Public Health Department, Environmental Health Division
Engineering Department
Agriculture Department
General Services, Parks
Coastal San Luis Resource Conservation District
Air Pollution Control District
Council of Governments
State of California
California Coastal Commission
Department of Fish and Game
Office of Oil Spill Prevention & Response (Department of Fish & Game)
Department of Health Services (Health and Welfare Agency)
Department of Pesticide Regulation, CAL-EPA
Regional Water Quality Control Board, CAL-EPA
State Coastal Conservancy
State Land Commission
State Resources Agency
State Water Resources Control Board CAL-EPA
California Conservation Corps
California Integrated Waste Management Board, CAL-EPA
Camp San Luis Obispo. California National Guard
Department of Boating & Waterways
Department of Conservation
Department of Forestry & Fire Protection
Department of Parks & Recreation, CAL-EPA
Department of Toxic Substances Control, CAL-EPA
Department of Transportation (Business, Transportation & Housing Authority)
Department of Water Resources
Office of Environmental Health Hazard Assessment, CAL-EPA
University of California Cooperative Extension
United States Government Federal Agencies
U.S. Environmental Protection Agency
U.S. Army Corps of Engineers
U.S. Fish & Wildlife Service (Department of the Interior)
Natural Resources Conservation Service (Department of Agriculture)
Farm Service Agency (U.S. Department of Agriculture)
National Oceanic & Atmospheric Administration (U.S. Department of Commerce)
National Marine Fisheries Service (U.S. Department of Commerce)
U.S. Coast Guard
U.S. Forest Service (U.S. Department of Agriculture)
U.S Geological Society (U. S. Department of the Interior)



Table 3.2	Criteria Used	l to Evaluat	te Effectiveness	of Programs
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Su	ccessful Aspects	Pre	oblems
	Clear goals, responsibilities or procedures		Unclear goals, responsibilities, or procedures
-	Complementary programs	•	Competing or conflicting programs
•	Good coordination/cooperation with other organizations	•	Difficulties in coordinating/cooperating with other organizations
	Uniqueness of the program		Duplication of effort
•	Sufficient resources		Insufficient resources
	Support through statutory authority	-	Lack of statutory authority
	Support of the public		Lack of public support

Detailed methodology and results are contained in the Inventory and Evaluation sections of the Base Programs Analysis (Volume III of this CCMP). Some updated information of the Base Programs Analysis is contained in this chapter.

# 3.2 RESULTS

In general, the effectiveness analysis indicated that the most common problem identified for all types of programs was insufficient resources. Following insufficient resources, difficulty coordinating and cooperating with other agencies was cited most frequently as limiting program effectiveness. Several agencies also indicated that unclear goals, responsibilities, and procedures limited the effectiveness of some programs. The most common successful aspects of the programs include complementary programs and statutory authority. Several agencies also indicated that the programs they implement have public support.

The following paragraphs provide a summary by institutional framework category of the problems regarding the effectiveness of programs and suggestions for improvement.

State and federal **regulatory programs** seem to be more limited by *difficulties coordinating and cooperating* with other agencies than by insufficient resources. The following suggestions were repeatedly made to improve effectiveness of state and federal regulatory programs: streamline permit processes, improve public outreach, improve interagency coordination, and implement comprehensive approaches [watershed management, habitat conservation planning, and Total Maximum Daily Loadings (TMDLs).

In addition to insufficient resources, state and federal resource management programs are limited by the difficulty of coordinating and cooperating with other agencies, and by *unclear goals, procedures, and responsibilities*. Suggestions to improve the effectiveness of resource management programs included: streamline permit processes, improve public outreach, offer incentives for implementation of nonpoint source pollution controls, coordinate monitoring efforts, evaluate urban runoff as a source of metals and develop appropriate control measures, and improve interagency coordination.

State and federal **finance mechanisms** are limited by *insufficient resources* and *difficulties coordinating and cooperating* with other agencies. Suggestions to improve effectiveness of finance mechanisms included: improve public outreach and improve interagency coordination to avoid duplication of spending.

Other state and federal **non-regulatory programs** seem to be more limited by *difficulties coordinating and cooperating with other agencies* than by insufficient resources. The following suggestions were repeatedly made to improve effectiveness of other state and federal non-regulatory programs: expand existing education and monitoring activities, improve public outreach, and improve interagency coordination.

The local agency programs were not grouped by institutional framework category because local agency functions overlapped these categories much more than state and federal agency functions. The successful aspects and problems reported for the variety of functions implemented by the local agency departments were similar. Consequently, local agency functions were analyzed as a group, rather than separated into institutional framework categories, to avoid repetition of the effectiveness analysis criteria; the effectiveness analysis is included under each priority problem discussion on the following pages.



The following sections provide a summary by priority problem regarding the effectiveness of programs and suggestions for improvement.

# 3.2.1 SEDIMENTATION

#### Key Programs:

- County Development Review, Permitting, and CEQA Review (pertains to all other problem areas)
- County Drainage Plan Review
- CCRWQCB NPDES, Nonpoint Source Management, TMDL, Monitoring, CWA Grant Programs
- CDFG Streambed Alteration Permits
- NRCS/CSLRCD Watershed Enhancement Plan, Wetland Reserve Program
- USEPA TMDL, Nonpoint Source/CZARA, National Monitoring Program, CWA Grant Programs
- USFS Los Padres National Forest Plan

#### **Problems and Suggestions:**

The current County Land Use ordinances and Coastal Zone Land Use Ordinance do not require consideration of the effect of drainage waters on receiving water quality and do not address routine grading or tree and riparian vegetation removal for agricultural cultivation and crop production on agricultural lands. This has been both a controversial and countywide issue for many years. The locations selected by County Engineering for the placement of spoils from road projects may need to be reviewed with the intent to identify locations that are far enough away so that the spoils do not wash into the estuary. The CCRWQCB approach to TMDLs and nonpoint source management is duplicative and not understood by other agencies or the general public. The USEPA, however, is promoting (and requires per the CWA) the development of TMDLs and sees this as a useful model for watershed planning and management to incorporate local interests. Simultaneously, the SWRCB and CCC are upgrading the state Nonpoint Source Management Plan under direction (and required per the CZARA) of the USEPA. This includes development of an Implementation Strategy that specifies actions to be taken by the CCRWQCB to address nonpoint sources of pollution.

The implementation strategy is likely to include technical and financial assistance to municipalities for municipal urban runoff programs to address sedimentation and other constituents impacting storm water. Additionally, the CCRWQCB has determined that the monitoring efforts by all responsible agencies are not comprehensive and that gaps exist in locations and frequency of monitoring and compatibility of data. The CCRWQCB could improve their monitoring program with a volunteer monitoring element. The NRCS could benefit by continuing to integrate their efforts with this CCMP (e.g. prioritize efforts based on locations or types of problems identified) and by having access to geomorphology expertise. The SWRCB, CCRWQCB, and USEPA should improve coordination of grant funding priorities (amongst themselves and with other grant funding agencies and organizations) to pool resources and avoid duplication of spending. A collaborative effort to display agency funded projects by the SWRCB, CCRWQCB, and USEPA on the Internet is underway throughout the University of California at Davis. The Natural Resources Project Inventory address is http://ice.ucdavis.edu.nrpi.

In addition, the USFS Los Padres National Forest does not adequately address fire management or remediation of inactive mines.

## 3.2.2 BACTERIA

#### Key Programs:

- City wastewater treatment
- City sewer master plan
- County waste management
- CCRWQCB NPDES, Nonpoint Source Management, TMDL, Monitoring, CWA Grant Programs
- CDFG State Mussel Watch
- CDHS Shellfish Sanitation (growing area certificates, handling and marketing certificates), Contamination of Public Water Systems, Maximum Contaminant Levels for Drinking Water
- CDBW Pumpout Grants



- CCC Boating Clean and Green
- USEPA TMDL, Nonpoint Source/CZARA, National Monitoring Program, CWA Grant Programs
- CDPR and CDFG and CMB Liveaboard Regulatory Authority

## Problems and Suggestions:

The City of Morro Bay (CMB) adopted the area's first Liveaboard Ordinance in 1993. The CDPR, CMB, and CDFG need to coordinate policies and enforcement relating to liveaboards and disposal of head waste. Additional pumpout facilities are needed. San Luis Obispo County initiated the planning of a sewer system for the community of Los Osos as required by the CCRWQCB. The responsibility to continue this effort has shifted to the Community Services District (which was established after completion of the BPA). See Problems and Suggestions for Sedimentation above for CCRWQCB (most importantly with regard to monitoring efforts), SWRCB, and USEPA programs.

# 3.2.3 NUTRIENTS

### Key Programs:

- CDWR Agricultural Drainage Reduction, Efficient Water Management Practices, Training and Education Program
- CCRWQCB NPDES, Nonpoint Source Management, TMDL, Monitoring, CWA Grant Programs
- CDOC Land Stewardship Program
- UCCE Watershed Management Education Program
- UCCE Ranch Planning Short Courses
- USEPA TMDL, Nonpoint Source/CZARA, National Monitoring Program, CWA Grant Programs
- Others as above

#### Problems and Suggestions:

See Problems and Suggestions for Bacteria above for San Luis Obispo County, CCRWQCB, SWRCB, and USEPA programs, and Sedimentation for NRCS programs.

## 3.2.4 HEAVY METALS AND TOXICS

## Key Programs:

- City Storm Drain Master Plan
- County Agricultural Commissioner Hazardous Materials, Environmental Monitoring Programs
- County Planning & Building Surface Mining Operations Permit and Reclamation
- California Department of Pesticide Regulation & CAC Statewide Pesticide Program, Restricted Materials Permits, Registration of Users, Pesticide Management Zones
- CCC Model Urban Runoff Program
- CCRWQCB NPDES, Nonpoint Source Management, TMDL, Monitoring, Inactive Mine Reclamation/Remediation, CWA Grant Programs, Water Code Cost Recovery
- CAL-EPA CDTSC Toxics Update, Emergency Response Training
- CDFG State Mussel Watch and Toxic Substances Monitoring
- CDFG OSPR Programs
- USEPA NPDES, TMDL, Nonpoint Source/CZARA, National Monitoring Program, CWA Grant Programs

# **Problems and Suggestions:**

Efforts to address heavy metals and other toxins would likely improve with local implementation of programs and/or program elements of the California Department of Pesticide Regulation and the CCC. Specifically, neither financial mechanisms nor information exchange on monitoring data through California Department of Pesticide Regulation has been used as extensively as possible in the watershed. The CCC could provide additional education and technical assistance regarding implementation of municipal urban runoff controls and programs. The City Storm Drain Master Plan needs to be updated to address Phase II Stormwater Regulations. The CDFG Mussel Watch and



Toxic Substances Monitoring has a limited scope and does not use the most sensitive invertebrates to detect toxicity from heavy metals. See Problems and Suggestions for Sedimentation, Bacteria, and Nutrients above.

# 3.2.5FRESHWATER FLOW

## Key Programs:

- SLO County Estero Area Plan proposed program to develop a Water Management Plan addressing water quality, water conservation, and groundwater protection
- City of Morro Bay Master Water Plan
- County Flooding and Drainage Permits and Programs
- CDFG Lake and Streambed Alteration Agreements, Fisheries Management, Ocean and Coastal Area Management, Riparian Habitat Conservation, Stream and Watershed Planning and Restoration, Take of Fish and Wildlife Programs
- Water rights
- CCRWQCB, SWRCB, and USEPA NPDES Storm Water Discharge Permits
- Habitat Acquisition and Restoration Programs of SCC, ACOE, USFWS, and NRCS

# Problems and Suggestions:

At the local level, drainage issues are considered on an individual site basis and should be considered on an areawide basis. The County (or the Los Osos Community Services District as appropriate) should consider area-wide drainage permitting and planning for the Los Osos community. The CCRWQCB should provide additional assistance and direction to urban areas regarding control of storm water discharges. Many typical storm water quality controls promote increased instream flows and groundwater recharge (e.g. wetlands, vegetated filter strips). Small municipalities will be required to obtain NPDES permit coverage for storm water discharges in the near future which should include area-wide drainage plans and permitting approaches. Construction and industrial facilities are currently required to implement storm water pollution prevention plans compliant with NPDES permits; however, the CCRWQCB has limited staff resources to address related flow issues on an area-wide basis (sites are handled individually, if at all). Habitat Acquisition programs and opportunities, such as those of the SCC and NRCS, should be implemented as much as possible to address this priority problem.

# 3.2.6 HABITAT

Key Programs:

- County Development Review, Permitting, and CEQA Review
- County Estero Area Plan, Transfer of Development Credits, Agricultural Preserve Programs
- County Parks Master Plan, Elfin Forest Resource Management Plan
- City Waterfront Master Plan
- CCRWQCB & CDFG CEQA Review
- CCRWQCB & SWRCB CWA 401 Water Quality Certification
- ACOE CWA Sections 404 and 10 Permits
- Habitat Acquisition and Restoration Programs of SCC, ACOE, USFWS, and NRCS
- USEPA Nonpoint Source/CZARA
- MEGA and the Steering Committee of the Partnership for the Conservation of Coastal Dunes around Morro Bay and Los Osos
- BF Conservation Land Program

# **Problems and Suggestions:**

Local plans should designate or rank areas most likely to address this priority problem along with the focus of the local plan. Mapped ESHs at the county plan level are based on the USFWS National Wetlands Inventory which has not been ground-truthed and is based solely on aerial photos. The CCRWQCB has insufficient resources to provide a thorough review and comment on CEQA documents. CCRWQCB staff time should be increased for CEQA document review and CWA 401 Water Quality Certification preparation. ACOE should consider regional or watershed permitting (along with other approaches to streamlining permitting). Streamlining the permit process may provide an incentive for landowners wishing to install and implement management measures on their property.



Habitat Acquisition programs and opportunities, such as those of NRCS and the SCC should be implemented as much as possible to address this priority problem. Currently, there is a streamlining project being implemented by the MBNEP with the CCC, CCRWQCB, SLO County, USFWS, CDFG, and ACOE—the six regulatory agencies with jurisdiction over dredge and fill operations.

# 3.3 RECOMMENDATIONS

Few new programs are necessary to improve the current institutional framework. This analysis indicates that existing programs should focus on increasing available financial resources, improving interagency coordination, and improving public outreach.

Therefore, recommendations to improve the effectiveness of state and federal agency programs include actions to:

- Capitalize on existing state and federal finance mechanisms to provide more financial resources to local agencies and landowners;
- Improve interagency coordination;
- Increase public education and outreach;
- Implement more comprehensive approaches for developing strategies to address priority problems;
- Provide incentives for implementation of nonpoint source pollution control; and
- Expand existing monitoring activities.
- Permit streamlining project (see APDP projects)

The specific actions to improve the institutional framework are described in the BPA. In the BPA, these actions are presented in tables illustrating their correlation with both the priority problems of the Morro Bay watershed and with the nonpoint source management measure categories identified in California's *Management Measure Review Document* (1998). The actions recommended in the BPA have been included in or incorporated into the CCMP actions. The Federal Consistency Review is located in Volume III of this CCMP.





# THE PLAN FOR ACTION

# INTRODUCTION

The 61 actions presented in "The Plan for Action" are the heart of the CCMP—they are both a blueprint for and a call to action. These actions have been developed through the hard work and dedication of the many stakeholders in the Morro Bay National Estuary Program (MBNEP). These actions are based on scientific studies, the goals and objectives developed for each of the priority issues, and significant input from the stakeholders of the Morro Bay Estuary and its watershed. Not all of these actions represent new activities or approaches—some of them build on or expand existing efforts already underway by agencies and organizations, while others identify new opportunities.

The actions are organized by the priority issue they most directly address and include seven broad cross-cutting actions—Land Acquisition, Drainage, TMDLs, Urban Runoff, Stream Geomorphology & Water Quality, Volunteer Monitoring Program, and Watershed Crew, which have been organized separately due to the multitude of issues they address. Table 4.1 provides a breakdown of the organization of actions by priority issue. Table 4.2 describes the specific components of each action plan. Table 4.3 provides a complete listing of all of the action plans. Please note that all costs and timeframes are estimates used for planning purposes, dependent upon many variables that are not currently within the MBNEP's control such as, funding, jurisdiction, and competing interests.

# Table 4.1Number of Actions by Priority Issue

Priority Issue	# of Actions
Cross-Cutting Actions	7
Sedimentation	8
Bacteria	9
Nutrients	4
Freshwater Flow	4
Heavy Metals & Toxics	4
Habitat	10
Steelhead	4
Public Outreach & Education	11
Total	61

Many actions outlined in this chapter address nonpoint source pollution through fieldwork to achieve environmental results. In California, nonpoint sources of pollution (as defined by the Clean Water Act and California Law) are reduced through the implementation of specific management measures. The California Nonpoint Source Pollution Control Program provides accepted management measure to address this type of pollution. A summary of recommended management measure is located in Appendix E. For example, keeping grazing animals out of streams is a management measure for agricultural sources of NPS pollution. The MBNEP will work to incorporate California's recommended management measures into projects that implement the actions outlined in this chapter. The management measures come from guidance developed by EPA and NOAA titled the *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* (g-Guidance) (USEPA [1993]).



Chapter 4

COMPONENT	DESCRIPTION						
Action Title:	Describes a specific means to address one or more of the priority issues.						
" ≻ "	Designates a Priority Action.						
Background/Major Issues:	Discusses why the action is important and identifies which of the priority issues are being addressed, what has contributed to the problems, and previous or ongoing management activities.						
Example of Similar In-Place Actions:	Provides examples of similar actions that have proven successful in addressing the priority issues.						
Benefit of the Action:	Describes the environmental and/or programmatic benefits that may be realized by implementing the action.						
Implementation:	Describes methods and/or steps for implementing the action. This is not an exhaustive list, but rather suggestions for approaches or tools believed to best address the action at this time. The approaches and tools will be evaluated by the implementing agencies and organizations and potentially revised over time.						
When:	Provides a suggested timeframe for initiating and completing implementation of the action. Short term is one year, Medium term is two to four years, and Long term is five years and beyond.						
Who—Primary:	Defines who would take the lead in implementing the action. The responsibilities of the "primary" implementers are to: (1) secure financial support; (2) provide in-kind services; (3) provide technical and administrative expertise; (3) implement regulations, if appropriate; (4) obtain commitments; (5) initiate actions; (6) communicate progress; (7) advocate with constituencies; and (8) enter into written agreements.						
Who—Support:	Defines who would need to be involved with the implementation of the action- coordination, communication, funding, personnel, equipment, technical assistance, in-kind services, etc. The role of supporting partners will vary depending on the action and statutory responsibilities.						
Where:	Describes location of action.						
Cost:	Provides preliminary cost estimates for implementation of the action. Actual costs will be further refined and determined by the primary implementer as funding sources are identified.						
Basis for Cost:	Describes rationale for preliminary cost estimates (i.e., comparison of costs of similar project, agency estimate).						
Potential Funding Sources:	Identifies potential funding sources for the action. Chapter 7 discusses sources of funding in more detail.						
Evaluation:	Describes how the progress of the action will be measured. Some measures are environmental (i.e., reduced pollution, species recovery) and other are programmatic (i.e., progression or status of the action).						
Related Actions:	Provides cross-referencing to other related actions in the CCMP.						



HAB-1*>	Develop planning overlay maps for sensitive habitat and listed species within the watershed, based on habitat functions and values, particularly wetlands and dune habitat in and near the bay.	123			
HAB-2*	Inventory and protect ecologically significant upland habitat required by bay and wetland species.	126			
H A B - 3 *	Map shoreline, near shoreline wetlands, upland vernal pools, and riparian vegetation along all creeks and their tributaries in conjunction with San Luis Obispo County (currently a proposed Combining Designation Program within the draft Estero Area Plan).	128			
H A B - 4	- 4 Implement appropriate actions in existing and future species recovery plans, in alignment with MBNEP goals and objectives.				
HAB-5*	Implement policies and projects to protect, restore, and create habitats, including wetlands, in connection with dredging activities.	133			
HAB-6*	Maintain and promote adequate wetland resources and riparian vegetation through identification and implementation of proven management techniques.	135			
HAB-7*	Develop methods, including voluntary and incentive programs, and possibly standards, to provide additional protection to riparian and wetland resources.	138			
HAB-8*≻	Implement restoration activities to improve the quality and quantity of eelgrass habitat.	141			
HAB-9*≻	Implement management measures to control the impacts of non-indigenous species on wetland and upland habitats.	143			
HAB-10*	O*Implement a pilot project to remove A. donax from riparian vegetation corridors along Chorro Creek and its tributaries, and continue treatment based on monitoring.				
STL-1	TL-1 Implement agency decision-making in the Morro Bay watershed consistent with steelhead trout recovery goals, and support the implementation of the United States National Marine Fisheries Service (USNMFS) Recovery Plan.				
STL-2*≻	Restore and enhance access to critical habitat for steelhead trout.	154			
STL-3*≻	Maintain and enhance pool/riffle structure and other aspects of instream habitat in trout bearing waters.	158			
STL-4*	Maintain and enhance riparian corridors adjacent to trout bearing waters to improve bank stability and structure, creek shading, and biological productivity	161			
EDU-1>	Conduct general public outreach and education focused on the value of a healthy environment and the role of individuals in protecting the natural resources of the Morro Bay watershed.	167			
EDU-2≻	Develop educational materials and programs regarding marine pollution and habitat issues geared toward the commercial and recreational boating community of Morro Bay.	170			
EDU-3≻	Develop educational materials regarding erosion, sedimentation, sensitive resources, fertilizers, and habitats within the watershed geared toward agricultural and ranch landowners and various public agencies to improve partnering, lessen impacts and educate all parties of pressing issues.	172			
EDU-4≻	Conduct cross-educational workshops and individual orientations on the positive and negative uses of pesticides.	174			
EDU-5≻	Coordinate and seek funding for a biennial "State of the Estuary" conference to support the biennial review process, share progress reports, address challenges, recognize environmentally responsible citizens and businesses, and provide public education.	176			
EDU-6≻	Develop an interactive monitoring display for the Morro Bay Natural History Museum Morro Bay State Park and support other Central Coast Natural History Association education projects.	178			



# Chapter 4

EDU-7≻	Increase communication to the public through media [i.e., graphic/text, television, continuation of "Turning the Tide," MBNEP newsletter, and website] to spotlight collaborative efforts, forums, ongoing status, and informational messages.	180
EDU-8>	Improve existing locations of public access to the estuary within the community of Los Osos by balancing various user needs and protection of sensitive species.	182
EDU-9⊳	Develop a strategic education plan to provide educational opportunities focusing on natural resources and watershed enhancement for K-12 schools.	184
EDU-10>	Develop a mini-grants program for community organizations and students to assist in implementation of the CCMP.	186
EDU-11>	Review and refine the CEQA/NEPA initial study environmental checklist to increase awareness of beneficial uses of water and estuarine resources.	188



# Timeline for Action Plans in Years\*

	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
CC-1 Land Acquisiton	1343	(i.e.s.)	tinis as	5.55 A.				44 B.B.B.		
CC-2 Drainage						an iving a	19796 av	elonin 19 Kostori	e ye.	4
CC-3 TMDLs					1.					
CC-4 Urban Runoff					San S					
CC-5 Stream Geomorphology						Second and				
CC-6 Volunteer Monitoring			Start i	sse in		in ha		10005	in de Sa	i glande
CC-7 Watershed Crew				C.S. SPEC			1. 1997 - 1998			ar const
SED-1 Road Management										
SED-2 Sediment Traps	_	<b>Mark</b> it	tra est							
SED-3 Fire Management										
SED-4 Land BMPs	32.00									
SED-5 Creek Restoration		P.C.C.C.	Alines.		Seds at ,	249-210				
SED-6 Sandspit Revegetation						1.000			n (Freinig) Church Albert	an an taon an t Taon an taon an t
SED-7 BMP Incentives			10 2 5 12 5 4							
SED-8 Estuary Restoration									ratus constructor	61. s. S. N
BACT-1 Grazing Management										
BACT-2 Pump-outs		de la composición de la compos								
BACT-3 Illegal Moorings			Ч. <del>т.</del>							
BACT-4 Abandoned Boats										
BACT-5 Liveaboards						ana para Ngana				
BACT-6 Biofilteration										
BACT-7 Bird Deterents			South							
BACT-8 Pet Waste				17. P.S.						
BACT-9 Water Quality Standards										
		20 10 10 10 10 10 10 10 10 10 10 10 10 10				<b>N</b>				
NUTR-1 Los Osos Wastewater										
NUTR-2 CMC Wastewater										
NUTR-3 Agricultural BMPs								i Anglad Anglad		
NUTR-4 Residential BMPs								걸 흔들었	98-98 1	
	-		NEX STREET	96 TEXN 867 724	SECONDERS		187373338	a a se	- Matria (S. M.	U SPENSION
FLOW-1 CMB Wastewater			105 y X S	( and the second se	Sector Sector					
FLOW-2 Chorro Water Workgroup										
FLOW-3 Water Conservation						8		63.2		
FLOW-4 Wastewater Releases			1						1999 	지하는 것을 
UMT 1 Mine Demodiation	10.000							Angga sata		 Versik
HMT 2 Marine Remediation						N.				
UMT 3 Root Have out						rický († 1937) <b>S</b>		977日日本		NAR BE
HMT-4 Hazardous Waste Network		5.1/5 (A)				<b>S</b>				
IIM I T HAZALUOUS WASIE NELWOFK					<u> </u>				<u></u>	
Planning			In	aplem	enta	ion				
Monitoring				Maint	enan	ce				
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# Timeline for Action Plans in Years\*

	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
HAB-1 Overlay Maps				nia mun Sin an	i server se					
HAB-2 Upland Habitat			an di	21 - CA <b>P</b> AR						
HAB-3 Mapping				Autoritation			States		6	-
HAB-4 Species Recovery Plan										
HAB-5 Beneficial Dredging										
HAB-6 Riparian Vegetation		Est						1.09		
HAB-7 Riparian Wetland Policy			3. S							
HAB-8 Eelgrass					List i					
HAB-9 Non-indigenous Species				an a	na San San					
HAB-10 Arrundo donax Removal					1	1	1	1	1	ł
STL-1 Recovery Plan										
STL-2 Habitat Access		en de ant	NACTO STO		ar en c	generansas N	SHORNALDI	sart-slæu	i an	- <b></b>
STL-3 Pool/Riffle Structure										
STL-4 Riparian Corridor		(Color								1
EDU-1 General PEO										
EDU-2 Boater Education			an ann an		Sector and					
EDU-3 Agricultural Education		a serve de			- 				1. 10	(
EDU-4 Pest Workshop		an a								
EDU-5 Estuary Conference										
EDU-6 CCNHA Exhibit										
EDU-7 Media										
EDU-8 Public Access										
EDU-9 K-12 PEO									85 (B.)	
EDU-10 Minigrants										
EDU-11 CEQA List										
Planning				Implei	nentati	on		0 A		
Monitoring			Maintenance					]		

cooperation and additional resources.



# CROSS-CUTTING ACTIONS

# 4.1 CROSS-CUTTING ACTIONS

Most of the action plans are organized by the priority issue they most directly address. However, due to the complexity of the watershed environment and the interrelationships of problems, many of the recommended actions also address more than one or all priority issues. In particular, there are seven broad "cross-cutting" action plans:

# CC-1 LAND ACQUISITION:

- Can resolve sedimentation issues if purchased land is situated such that it captures sediment.
- Can resolve nonpoint source pollution issues if land contains wetland habitat that functions as a filter (also Drainage).
- Can resolve habitat loss issues if sensitive or rare habitats are acquired or protected.
- Can minimize nonpoint source pollution from upland sites.

### CC-2 DRAINAGE:

- Sediment
- Bacteria
- Heavy Metals and Toxics

## CC-3 TOTAL MAXIMUM DAILY LOADS (TMDLS):

- Sets water quality targets for sediment, bacteria, nutrients, metals, and organics.
- Identifies ways to reach the water quality targets.

#### CC-4 URBAN RUNOFF:

- Nutrients
- Sediment
- Bacteria
- Heavy metals and toxics

### CC-5 STREAM GEOMORPHOLOGY & WATER QUALITY:

- Sedimentation
- Nutrients
- Freshwater flow
- Heavy metals and toxics
- Habitat
- Loss of steelhead

#### CC-6 VOLUNTEER MONITORING:

 Supports water quality monitoring throughout the watershed and in the estuary providing data assessments of change over time.

# CC-7 WATERSHED CREW:

- Sedimentation
- Habitat
- Steelhead and creek restoration
- Education and outreach

Agency/Organizations	CC-1 Habitat Acq	CC-2 Drainage	CC-3 TMDLs	CC-4 Urban Runoff	CC-5 Stream WQ	CC-6 VMP	CC-7 W. Crew
ACOE		S			S		
BF	P	S				S	
CCC	S	S	S	S	S		
Cal Poly						S	
CCNHA		T				S	
CCCorps						S	P
CCRWQCB		S	P	P	S	P	
CDFG		S			S		
CDPR	P						
СМВ			S	P			
СМС					S		
CSLCNG					S		
CSLRCD	S	S			P		
ECA						S	
FOE	S		S		S	P	
LOCSD	S	P		P			
LAND CONSERVANCY	S						
Public/Private Landowners	S		S		P	S	S
MBNEP	S	S	P	S		S	Р
MEGA	P	S				S	
NMFS					S		
NRCS					S	S	
SCC	P				S		
SLOCo.		P	S	P			
SSRCSCCC					S		
SWAP	S						
SWRCB	S		S	S			
TRUST FOR PUBLIC LANDS	P						
UCCE			S				
USCG				P			
USEPA			S	S			
USFWS	S				S		
USNMFS					S		
Volunteer Organizations				}	S		

# Table 4.4 Cross-Cutting Actions—Implementing Organizations

P = Primary role in implementation and monitoring project outcomes and effectiveness S = Supporting role in implementation

CC-1 LAND ACQUISITION: Acquire or otherwise protect lands that contain ecologically valuable habitat or habitats that provide beneficial functions to the estuary, in order to minimize nonpoint sources of pollution entering the estuary. Such acquisition will occur in cooperation with willing public and private landowners.

# Priority Action

# BACKGROUND/MAJOR ISSUES:

Land acquisition and preservation provide multiple benefits throughout the ecosystem, including habitat protection, water quality, maintenance, and enhancement. The Morro Bay Watershed is home to at least fourteen species that are listed by the Federal Endangered Species Act as Threatened or Endangered. Many more special status species also occur in the watershed. The estuary and watershed contain tideland and wetland habitat vital to the Pacific Flyway, highly-restricted salt marsh and bay fringe wetland habitat, globally rare dune habitat, and upland serpentinite and older dune habitat containing rare and endemic species. These natural landscapes often function as water quality filters that capture and reuse sediment and nutrients, as well as reduce the energy of surface water flows and increase groundwater recharge.

Much of this land is at risk from coastal development, or from land uses that damage natural habitat, and will require protection if the species and habitat are to survive. Land prices are high, and therefore some prioritization of lands and species in need of protection must be made to enable protection measures to be optimized. Acquisition of habitat, especially wetlands, riparian areas and low-lying areas, from willing sellers can meet the multiple goals of the MBNEP.

### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- The current programs being coordinated through Morro Estuary Greenbelt Alliance concentrate on dune habitat around Los Osos and have, in association with the U.S. Fish and Wildlife Service, and the California Department of Fish and Game, identified parcels of dune habitat for purchase.
- Morro Coast Audubon Society has identified and protected shoreline habitat important to shore birds at Sweet Springs and at the Audubon Overlook.
- The CSSLRCD purchase of Chorro Flats resulted in significant reductions of sediment into the estuary by diverting creek flow into an expanded flood plain.

# **BENEFITS OF THIS ACTION:**

- This action includes the first critical steps in the acquisition of critical habitat within the watershed and the follow through actions needed to acquire or protect habitats in the watershed. It will result in the increase of protected habitats in the watershed.
- Reduction of drainage and sediment problems through the setting aside of acquired floodplain areas and use
  of detention and retention solutions on low-lying lands. Restoration of habitat for floodplain species,
  protection of downstream estuarine habitat such as eelgrass. This in turn supports estuarine species and
  estuary's function as a biological protection system.

### **IMPLEMENTATION:**

- 1. MBNEP will establish a science-based Habitat Committee to assess habitat protection needs on the basis of species and species habitat requirements and the goals of the MBNEP. The committee will include, by recommendation, representatives of state and federal wildlife agencies, local conservation organizations, public and private landowners, scientific experts drawn from the area, and representatives of conservancies that are active, plus representatives of MBNEP and USEPA. The committee will elect a chair and define its structure, guiding principles, and operating procedures with the intent of implementing actions 2 and 3 listed below. The committee will be coordinated through the MBNEP.
- 2. The Habitat Committee will develop an inventory of federal and state species protection programs and species recovery programs to identify potential sources of funds.

- 3. In cooperation with willing sellers, the committee will identify criteria based on habitat resources. These habitats may include those identified in programs for sensitive habitats of the Estero Area Plan and for the Morro Bay Estuary and its watershed described in Chapter 6.
- 4. In cooperation with the Habitat Committee, willing sellers, and other appropriate groups, the MBNEP implementation committee (lead by primary implementers) will seek funding and set up mechanisms to purchase, or protect through conservation easement or other methods, high resource habitat by the Habitat Committee.
- 5. The MBNEP implementation committee will develop plans, agreements and financing for the long-term management of lands protected or acquired through this action plan, with appropriate non-profit entities.

## WHEN:

- Short Term: The Habitat Committee will be formed as soon as possible to begin identifying key habitat and applying for grants. While the committee will be coordinated through the NEP office, other nonprofit organizations that have been active in coordinating meetings between agencies for the purposes of making land purchases continue in this role.
- Medium Term: The committee will establish relationships with land conservancy organizations, develop a priority habitat list and, in concert with the NEP program, explore means by which high priority parcels can be protected while respecting private property concerns. The committee will also advise county or city government on their land acquisition key habitat resources.
- Long Term: It is hoped that the Habitat Committee would be reconvened as needed to continue to function as originated under the NEP.

## WHO:

Primary:

- SCC (funding land acquisition)
- MEGA (continue to coordinate the Partnership for Coastal Dunes; efforts will be combined where possible)
- BF (funding; continue coordinating acquisition in the Chorro and Los Osos Creek watersheds)
- Trust for Public Lands (lands negotiation)
- CDPR (funding; potential land manager)

Support:

- Land Conservancy of SLOCo. (potential land manager)
- Public & private landowners (willing sellers)
- SWAP (advisory)
- LOCSD (funding; potential land manager)
- MBNEP (will manage the land acquisition deal, establish a Habitat Committee, and advertise the meetings, which will be open to all interested parties)
- USFWS (funding)
- SWRCB (funding)
- FOE (advisory)
- CCC (advisory and funding)
- CSLRCD (advisory, funding, and potential land manager)

## WHERE:

Throughout the watershed.

## COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Cost of committee meeting under the current NEP Program—to meet monthly after priority list is developed. NOTE: costs do not include MBNEP staff time.	\$500	1-2 years
Acquisition, conservation easements, and other protection actions	\$20,000,000	2-5 years

BASIS FOR COST:

• Current real estate prices, costs for other development rights transfers.

## POTENTIAL FUNDING SOURCES:

- MBERF
- Species recovery programs (see HAB-4)
- Donated services from committee members
- CWA Section 320 Funds
- Better America Bonds (if passed by Congress)
- Also see Chapter 7, Table 7.3.

# EVALUATION:

- Establishment of an appropriately structured and fully functioning Habitat Committee.
- Selection criteria for key species and habitats, preparing recommendations, developing goals based on species needs; assembling qualitative and quantitative data on them and preparing habitat recommendations for acquisition and protection.
- Acres of land purchased or put into easement.
- Prioritized list of land acquisition opportunities.

## **RELATED ACTIONS:**

- HAB-2 (Upland Habitats) and all other HAB Actions
- CC-2 (Drainage)
- CC-5 (Stream Geomorphology & WQ)
- SED-2 (Sediment Traps)
- SED-4 (Landowner BMPs)
- SED-5 (Creek Restoration)
- STL-4 (Riparian Corridors)



# CC-2 DRAINAGE: Reduce Los Osos drainage problems by acquiring low lying parcels for use as detention and retention areas.

# > Priority Action

## BACKGROUND/MAJOR ISSUES:

For years, the community of Los Osos has experienced flooding problems. As population has increased and impervious surfaces have proliferated without a community wide drainage plan, these problems have grown increasingly severe. Storm water runoff entering the bay throughout the rainy season contains a variety of pollutants such as nitrogen, phosphate, fecal coliform, copper, zinc, lead, and natural constituents such as sediment. In Los Osos, surfacing septic tank effluent during storm events adds to the problem. San Luis Obispo County recently developed a drainage study that offers various solutions to problems in different areas of the community of Los Osos.

The community has been debating wastewater treatment alternatives, including sewering, for many years now. Although the sewer will address many of the pollutants mentioned above, it will not directly solve flooding problems. Sewering Los Osos will result in changes to freshwater outflows along the shore of the bay and the freshwater wetlands dependent upon these flows. The sewer will increase groundwater recharge and overall drinking water supply for the community by decreasing the outflow from septic leach fields. Beneficial uses that would be affected by long-range solutions to flooding and stormwater retention problems include estuarine habitat, riparian habitat, wetland habitat, and municipal water supply.

## **BENEFITS OF THIS ACTION:**

- Homeowner protection from flood impacts, reduced economic damages due to flooding
- Recreational opportunities created by parkland
- Improved water quality
- Increase in estuarine, riparian and other wetland habitat
- Reduced impervious surfaces

## EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

In cooperation with the Town of Marion, the Buzzards Bay Project (BBP) prepared an application for funding from the State's USEPA 319 h Non-Point Source Grant Program for design and construction of a three-acre wetland adjacent to Silvershell Beach in Massachusetts. The purpose was to treat stormwater runoff and associated non-point source pollutants from impervious areas such as roads, driveways, and rooftops in a 64-acre watershed. The BBP worked with the town to acquire four separate grant awards for various phases of design and construction of the project. USDA Natural Resources Conservation Service provided technical expertise. Design and construction were complete in 1995. Intensive sampling over the course of the summer of 1996 indicated an overall reduction in fecal coliform bacteria.

## IMPLEMENTATION:

- 1. Develop a community-wide drainage plan that specifically looks at land acquisition of parcels for use as detention and retention basins for drainage and provide list of priority low-lying areas to the Habitat Committee.
- 2. Negotiate and acquire land from willing sellers. This may involve acquisition of flood-prone housing or other structures, or low-lying parcels of vacant land.
- 3. Design Treatment Plan for constructed wetlands. Project designs should include such features as seasonal recreational use, linear and neighborhood parks, etc. Conduct CEQA and NEPA review as necessary.
- 4. Develop implementation schedule, detailed cost estimates, and an overall financial strategy for cooperative funding of projects
- 5. Convey flood flows to retention areas if appropriate, using appropriate design plan. Sites need to be large enough to either retain all inflow or hold it long enough to improve water quality before discharge. It may be more effective to develop a number of small retention sites rather than a few very large ones.
- 6. Provide for continued maintenance.
- 7. Implement other "engineered" drainage projects contained in the Preliminary Engineering Evaluation prepared for County Service Area No. 9J by EDA, Inc, and the Morro Group, Inc. (1998). These measures

include installation of storm drains, construction of retention and detention basins, and maintenance and regrading of roads in the community of Los Osos.

Possible obstacles to implementation include land availability in appropriate locations, private sector reluctance to sell key parcels, and funding availability to continue with overall drainage plan. These retention and detention areas can act as the initial component for a community-wide drainage plan.

#### WHEN:

- Short Term: Properties should be identified as soon as possible, with priority for acquisition placed first on most critical sites, and second on properties currently for sale or available for acquisition.
- **Medium Term:** Conveyance facilities should be designed and developed in association with the sewer collection system whenever possible.
- Long Term: Construction of drainage facilities, retention areas, and wetland treatment areas.

#### WHO:

Primary:

- LOCSD and Drainage Sub-Committee (Drainage planning/projects, land acquisition, financial strategy, flood retention areas, maintenance)
- SLOCo. (Drainage planning/projects, land acquisition, financial strategy, flood retention areas, maintenance, drainage from county roads technical assistance; permitting)

## Support:

- MBNEP (monitoring and coordination assistance)
- BF (funding)
- MEGA (land acquisition)
- CCRWQCB (technical assistance)
- CDFG (technical assistance; permitting)
- ACOE (technical assistance; permitting)
- CSLRCD (advisory)
- CCC (advisory)

## WHERE:

Los Osos and Baywood Park

## COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Identify, prioritize, and conduct feasibility study	\$30,000	1 yr.
Negotiate and acquire land	\$2,000,000 - \$5,000,000	1-2 years
Treatment Design Plan and Review	\$400,000	1-3 yrs.
CEQA/NEPA review	\$60,000-\$100,000	1 yr.
Construction and Installation	\$1,000,000- \$4,000,000	2-5 yrs.
Maintenance	\$300,000	3-5 yrs.

Low Estimate: \$2,000,000; High Estimate: \$4,000,000

## BASIS FOR COST:

County recommended property cost evaluations included in Engineering Evaluation, Los Osos/Baywood Park Community Drainage Project (EDA 1998).

- \$100,000 per undeveloped residential lots;
- \$205,000 per developed residential lot;



• \$150,000 per acre for undeveloped commercial lots.

# POTENTIAL FUNDING SOURCES:

- MBERF
- Local Assessment District fees
- Also see Chapter 7, Table 7.3.

# **EVALUATION:**

- Number of projects implemented.
- Acreage of wetland habitat created.
- Reduced incidents of structure and road flooding in Los Osos.
- Increased total water retention volume.
- Improved quality of water discharged to Los Osos Creek and Morro Bay.
- Community-wide drainage plan.

# **RELATED ACTIONS:**

- CC-1 (Land acquisition)
- CC-5 (Stream Geomorphology & WQ)
- All SED Actions
- NUTR-1 (Los Osos Wastewater)



# CC-3 TMDLs: Develop and implement Total Maximum Daily Loads for siltation, pathogens, nutrients, metals, and priority organics.

# BACKGROUND/MAJOR ISSUES:

The Regional Water Quality Control Board is mandated to develop and implement Total Maximum Daily Loads (TMDLs) for the Morro Bay watershed. A TMDL is the allowable total maximum daily load from each source of pollution, which assures attainment of water quality standards. Pursuant to Section 303(d) of the Clean Water Act, water is listed as impaired if evidence exists that a violation or potential future violation of a water quality standard may occur. Water quality standards may be numeric (e.g., 75 mgl/1 of DO) or narrative (e.g., suspended sediment load shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses). Development of a TMDL for impaired waters is required by Section 303 of the Clean Water Act. The Clean Water Act requires that TMDLs be incorporated into the state's water quality management plan (which consist of CCRWQCB basin plans). Porter Cologne Water Quality Control Act, in turn, requires that basin plans have a program of implementation to achieve water quality objectives.

The following TMDLs are required for waterbodies within the Morro Bay watershed:

- Siltation for Chorro Creek and Los Osos Creek, and for the Morro Bay estuary
- Pathogens for the Morro Bay estuary
- Nutrients for Chorro Creek and Los Osos Creek
  - D Monitoring and assessment are needed to determine if TMDLs are necessary for:
  - □ Metals for Chorro Creek (and for Morro Bay estuary\*)
  - Priority Organics Los Osos Creek\*

\*This TMDL will be developed when sufficient data is available.

This is accomplished by a phased process which includes assessing point and nonpoint sources of pollution, determining the contribution from each source, determining appropriate load reductions for each source, implementing a program to achieve load reductions, adoption of a basin plan amendment, and monitoring to determine attainment of water quality standards. Federal regulations require a TMDL to include a problem statement, numeric targets, source analysis, and load allocations (also referred to as a "technical" TMDL). State regulations (previously revised) require the basin plan be amended to include the technical TMDL, the implementation plan and monitoring plans. Public participation is critical during development of the technical TMDL, development of the implementation plan, adoption of the basin plan amendment, implementation of control actions, and monitoring for effectiveness.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

 TMDLs are being developed in other watersheds throughout the state and nation as required by Porter Cologne Water Quality Control Act and The Clean Water Act. Numerous waterbodies are listed in the Clean Water Act 303(d) list of impaired waters and, therefore, must develop and implement TMDLs.

## **BENEFITS OF THIS ACTION:**

Participation of the MBNEP in the development and implementation of TMDLs for the Morro Bay estuary and Chorro and Los Osos Creeks will strengthen the process from development through implementation. The MBNEP recently completed five Technical Studies that will provide a scientific foundation for the TMDLs. The Morro Bay NEP will also provide the forums for the public participation activities critical for development and implementation of TMDLs for the Morro Bay Watershed. Implementation of management measures for public and private landowners will be the shared responsibility of agencies and public and private landowners. They may be funded by cost-sharing, public agency funds, and/or private funds in order to reduce pollutant loads.

#### **IMPLEMENTATION:**

The MBNEP will coordinate with the CCRWCQB in the development and implementation of Total Maximum Daily Loadings for all the following components of a TMDL:

- 1. Develop Problem Statement The objective of problem identification is to identify the key factors and background information for a listed waterbody that describe the nature of the impairment and the context for the TMDL. CCRWQCB staff will develop and write a problem statement based on existing information collected and developed for the Morro Bay National Estuary Program and National Monitoring Program, and other relevant information.
- 2. Identify Numeric Targets When the standard for a pollutant is in narrative form, it must be interpreted quantitatively in order to provide a numeric target(s) for the TMDL. The purpose of this component is to identify measurable indicators and target values that can be used to evaluate the TMDL and attainment of water quality standards. Multiple indicators can be used, to provide a stronger basis for assessing attainment of standards. CCRWQCB staff will develop and write numeric targets based on existing information, including but not limited to, information for the Morro Bay National Estuary Program and National Monitoring Program. CCRWQCB will also consider using a "weight of evidence" approach, which will look at indicators as a group, and will not consider exceedence of one target as proof that a TMDL is not working.
- 3. Conduct Source Analysis The purpose of the source analysis is to demonstrate that all pollutant sources have been considered, and significant sources estimated, in order to help determine the degree of pollutant reductions needed to meet numeric targets and allocation of pollutant allowances among sources. CCRWQCB staff will develop and write up the sources and analysis methods based on existing information collected and developed for the Morro Bay National Estuary Program and National Monitoring Program and other relevant documents. Review of similar budgets may make it possible to extrapolate some information (e.g., in the San Diego Creek sediment TMDL, a budget found that slightly more than half the sediment discharge to the creek from upland sources settled out, with the remainder being discharged to the Bay).
- 4. Assign Allocations A TMDL is defined as the sum of the individual waste load allocations for point sources, load allocations for nonpoint sources and natural background pollutants or analysis of controls needed to attain needed load reductions. Allocations may be assigned in a variety of ways (e.g. discharger sector, land use), but the relationship must be explained. CCRWQCB staff will develop best estimates for allocations based on information, including but not limited to that collected for the Morro Bay National Estuary Program and National Monitoring Program. Development and description of the allocations will include e. and f., as follows.
- 5. Conduct Linkage Analysis In order to develop a TMDL, a linkage must be defined between the numeric targets and the loading capacity. This linkage demonstrates how allocations attain standards. Linkage may be based on information from within the watershed, or in similar watersheds, on established practices. CCRWQCB staff will include this in task d. above.
- 6. Establish Margin of Safety TMDLs must be established at levels necessary to attain and maintain the applicable narrative and numerical water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. The margin of safety can either be incorporated implicitly through conservative analytical approaches and assumptions used to develop the TMDL or added explicitly as a separate component of the TMDL. Given the uncertainties in developing TMDLs for large watersheds, the most sensible approach would appear to be to incorporate and document conservative assumptions and approaches to be used. CCRWQCB staff will include this in task d. above.
- Prepare Technical TMDL Report CCRWQCB staff will prepare report (assemble elements "a-f") including the state peer review process for submittal to USEPA in a format similar to existing TMDL reports.
- 8. Foster Stakeholder Participation This task would include activities such as participation with or facilitation of stakeholder groups, including public and private landowners, to be involved in technical TMDL development, implementation planning, monitoring and implementation of management measures. Current public participation forums of the Morro Bay National Estuary Program will be

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used for stakeholder participation in TMDL development and implementation planning. Existing educational programs, such as UCCE Watershed Management Education, will also be utilized. New forums may be developed via the Morro Bay National Estuary Program or other programs for monitoring and implementation.

- 9. Develop Implementation Plan CCRWQCB staff will develop and write an implementation plan by 1) reviewing and incorporating results of current implementation planning from the Morro Bay National Estuary Program Comprehensive Conservation and Management Plan, 2) facilitating and focusing existing forums of the Morro Bay NEP, or new forums sponsored by the CCRWQCB or other watershed partners, and 3) write up the results of 1) and 2), including a phased approach to allow for implementation, monitoring, and feedback to adjust numeric targets and activities as appropriate over time.
- 10. Conduct Monitoring/Re-evaluation CCRWQCB will evaluate past and current monitoring activities of the Morro Bay NEP and National Monitoring Program and continue or modify these activities as appropriate to inform the TMDL process. Results of data and information analysis will determine whether and how targets, implementation activities, etc. need to be changed.
- 11. Staff Workshops CCRWQCB staff will build workshops into the stakeholder participation activities described above and implement the CCRWQCB's existing public hearing process to address l. and m. below.
- 12. Public Notice of Filing for Public Hearing before the CCRWQCB. Regional Board will provide the public an opportunity to comment on the proposed TMDL.
- 13. CCRWQCB Hearing and Basin Plan Amendment. The State of California requires a public hearing to adopt TMDLs into state regulations.
- 14. CCRWQCB to review data to determine if additional listing of waters is appropriate, i.e., D.O. temperature, etc.

#### WHEN:

- Short Term: Prepare draft TMDL report
- Medium Term: Approve TMDL and start implementation plan
- Long Term: Conduct monitoring and re-evaluation

## WHO:

Primary:

- CCRWQCB required to develop and implement TMDLs for 303(d) listed waters
- MBNEP—assists CCRWQCB in support of addressing priority pollutants, stakeholder participation, and technical assistance.

## Support:

- SWRCB (advisor and approval of final TMDLs)
- USEPA (technical assistance and review)
- UCCE (education and stakeholder participation)
- All associated priority action plan implementers (see matrices for Sedimentation, Bacteria, Nutrients, Heavy Metals and Toxics)
- Public and private landowners
- FOE (monitoring)
- CMB (implementation)
- CCC (advisory)
- SLOCo. (priority implementer)

## WHERE:

Throughout the watershed

# COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Develop Siltation TMDL	\$40,000; \$5,000 (320)	l yr
Develop Bacteria TMDL	\$40,000; \$5,000 (320)	l yr
Develop Nutrient TMDL	\$40,000; \$5,000 (320)	l yr
Develop Metals TMDL	\$5,000 (320)	1 yr
Develop Priority Organics TMDL*	\$40,000; \$5,000 (320)	1 yr

\*This TMDL will be developed when sufficient data is available, or the water will be delisted.

## BASIS FOR COST:

Federal grant funds per Clean Water Act Section 106, 205(j), and 319 have funded TMDL work performed to date. This includes components of TMDLs for San Lorenzo River, San Luis Obispo Creek, Morro Bay Watershed, Pajaro River, Llagas Creek, and Salinas River. CCRWQCB has several additional waters listed in the Clean Water Act 303(d) list of impaired waters and, therefore, must develop and implement TMDLs for these waters.

The CCRWQCB has secured federal grant funds and state general funds to build upon and incorporate previously funded and future-funded efforts of the MBNEP in developing TMDLs. These funds are assumed to be adequate for this effort.

#### POTENTIAL FUNDING SOURCES:

See Table above and Chapter 7, Table 7.3.

## **EVALUATION:**

- Development and Implementation of required siltation, nutrients, metals, and bacteria TMDLs.
- Removal of waterbodies from the 303(d) list or improvements in water quality (based on current federal regulations).

## **RELATED ACTIONS:**

- CC-5 (Stream Geomorphology & WQ)
- FLOW-1 (Water Reclamation)
- FLOW-2 (Chorro Water Workgroup)
- FLOW-4 (WWTP Releases)
- BACT-1 (Grazing Management)
- BACT-2 (Pump-outs)
- BACT-3 (Illegal Moorings)
- BACT-4 (Abandoned Boats)
- BACT-5 (Live-aboard)
- BACT-6 (Biofiltration)
- BACT-7 (Bird Deterrents)
- BACT-8 (Pet Waste)
- HMT-1 (Mine Remediation)
- HMT-2 (Marina BMPs)
- HMT-4 (Hazardous Waste Network)
- All SED Actions
- All NUTR Actions


## CC-4 URBAN RUNOFF: Implement urban storm water Best Management Practices (BMPs) to reduce pollutants entering Morro Bay and its tributaries.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

Urbanization significantly increases storm water volume, velocity, and pollutant loadings because the roofs, driveways, and roads associated with residential, commercial and industrial sites reduce the ability of the land to absorb and filter rainwater and collect pollutants generated by activities at these sites. The City of Morro Bay and the community of Los Osos are both located adjacent to the Morro Bay Estuary. During rainfall events, Morro Bay receives storm water runoff from these city and community streets. Elevated levels of pollutants such as heavy metals, petroleum products, bacteria, sediment, and nutrients, have been found within this runoff during "first flush" and mid-winter rainfall events.

The widespread nature of the storm water runoff problem requires a comprehensive strategy that combines regulation with community-wide education, participation, and outreach; incentive-based and volunteer programs; and practical, cost-effective implementation mechanisms. One of the key features of such a strategy are BMPs—practical methods for controlling, preventing, reducing, or removing pollutants in urban runoff. Street sweeping, for example, is an example of an effective BMP. Source control BMPs are intended to prevent or minimize the introduction of pollutants into runoff. Dry cleanup of gas station fueling areas is an example of a source control BMP. Treatment BMPs are designed to remove the pollutants from storm water runoff. Vegetated filter strips for runoff to flow across before discharge to the Bay is an example of a treatment BMP. Considered together, the types of BMPs selected for implementation should form a comprehensive programmatic framework that reduces storm water pollution to the maximum extent practicable.

Phase II of the National Pollutant Discharge Elimination System (NPDES) Storm Water Regulations (finalized in December, 1999) will obligate municipalities and unincorporated county areas with a population density of greater than 10,000 and/or a population density of at least 1,000 persons per square mile to be covered by an NPDES permit for municipal storm water discharges. This will include the City of Morro Bay and the community of Los Osos. These federal permits are issued and administered by the State Water Resources Control Board and Regional Water Quality Control Boards. Additionally, construction activity that disturbs one or more acres will need to be covered by permits. Industrial sites with storm water discharges and construction sites that disturb greater than five acres are currently required to be covered by permits.

The CCRWQCB is currently encouraging municipalities to develop and implement urban runoff programs consistent with the State's upgraded Nonpoint Source Pollution Plan and Phase II of the NPDES Storm Water regulations.

Phase II NPDES permits may take the form of a state- or region-wide general permit. A general permit will obligate "designated" urbanized areas to file for coverage under this general permit. If a general permit is issued, the CCRWQCB would retain the authority to issue individual or area-wide permits for high priority or problem areas. The permit will require a municipal storm water management plan.

The CCRWQCB's goal is to facilitate implementation of urban runoff control programs to protect water quality. To meet this goal, MBNEP and CCRWQCB staff will provide encouragement and support for municipalities to develop and implement urban runoff control programs that address local water quality concerns and comply with the terms of the NPDES permits. Activities to meet this goal will include providing public education and outreach, and technical assistance to municipalities.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- Yards and Neighbors—Action Plan Demonstration Project (APDP) funded by MBNEP to decrease urban pollutants that flow to Morro Bay through storm water runoff sources by offering residents model landscape plans, a drought tolerant plant list, and tips on how to reduce pollutant discharge and conserve water.
- Model Urban Runoff Program (MURP)—A How To Guide for Developing Urban Runoff Programs for Small Municipalities currently being used in cities in the Monterey Bay area.
- Santa Monica Bay. The SMBNEP established a storm water NPDES storm water permit that applies to 88 cities within the Santa Monica Bay Watershed to improve the water quality of the beaches of the Santa Monica Bay.
- Monterey Bay. Selected cities within the Morro Bay Marine Sanctuary, primarily those cities that surround Monterey Bay Proper, have joined forces under a general storm water permit with a focus on reducing pollution from urban sources.

#### **BENEFITS OF THIS ACTION:**

Actions to reduce non-point source pollutants from entering the estuary are necessary to insure a continued viable fishing and shellfish growing industry, safe recreation, and a healthy marine ecosystem. Implementing BMPs would improve the quality of storm water runoff, in turn supporting continued beneficial uses for the estuary.

#### **IMPLEMENTATION:**

- 1. Assess the polluted runoff problem within the Morro Bay watershed including mapping land cover as potential sources of pollution and mapping areas and channels where storm water discharges to the Bay. Determine potential sources of oil spills and other toxic substances, review prevention and control plans, and strengthen as necessary to reduce the possibility of contamination.
- 2. Gather information and research to identify resources, problems, opportunities, and priorities for implementing BMPs using automated storm samples to collect flow-weighted data. Identify appropriate BMPs, such as street sweeping, sand filter inlets, catch basins, oil/water separators, detention ponds, vegetated buffer areas, storm drain stenciling, boat wash-downs, and redirection of storm drains to sewer lines. Provide technical assistance and funding to local governments in developing and implementing municipal urban runoff programs.
- 3. Implement/install identified BMPs.
- 4. Through monitoring validate the effectiveness of devices in reducing pollutants of concern.
- 5. Provide for maintenance of devices and measures as appropriate.
- 6. Issue and ensure compliance with NPDES storm water discharge permits as required and/or as necessary.
- 7. Educate the community about the problem as a means to promote public participation in the proposed BMPs.

#### WHEN:

- Short Term: Assess the polluted runoff problem within the Morro Bay watershed including mapping land cover as potential sources of pollution and mapping areas and channels where storm water discharges to the Bay.
- Medium Term: Gather information and research to identify resources, problems, opportunities, and priorities for implementing BMPs using automated storm samples to collect flow-weighted data. Implement/install identified BMPs. Through monitoring validate the effectiveness of devices in reducing pollutants of concern.
- Long Term: Provide for maintenance of devices and measures as appropriate.

#### WHO:

#### Primary:

- CMB Public Services Department (a lead agency for NPDES permit)
- SLOCo. Engineering Department co-lead agency for NPDES permit)
- CCRWQCB (permitting agency)
- LOCSD (co-lead agency for NPDES permit)
- USCG (technical assistance, possible co-lead agency)



#### Support:

- CCC (advisory)
- MBNEP (coordinator)
- BF (funding)
- SWRCB (advisory)
- USEPA (technical assistance)

#### WHERE:

Urban areas near the estuary

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Assess polluted urban runoff problem areas	\$50,000	1-2 years
Purchase and maintenance of automatic samplers	\$75,000	1-3 years
Community education on BMP's	\$10,000	1-3 years
City of Monterey estimate for municipal program development (approximately 3200 hours/year)	\$200,000	2-5 years
Install BMP's	\$200,000	2-5 years
BMP Maintenance	\$100,000	1-5 years

NOTE: Cost will vary depending on the BMP implemented.

#### BASIS FOR COST:

- APDP Yards and Neighbors
- City of Monterey experience

#### POTENTIAL FUNDING SOURCES:

- MBERF
- Municipal general funds by benefit assessment or user fee for users of storm water system
- Also see Chapter 7, Table 7.3.

#### **EVALUATION:**

- Trends in water quality samples above and below storm drain filters.
- BMP installation and maintenance.
- Annual reports for permit compliance
- Data gathered by flow-weighted storm samplers.

- CC-5 (Stream Geomorphology & WQ)
- SED-1 (Road Management)
- SED-4 (Landowner BMPs)
- SED-5 (Creek Restoration)
- SED-7 (BMP incentives)
- HMT-2 (Marina BMPs)
- NUTR-4 (Residential BMPs)
- FLOW-1 (Water Reclamation)
- EDU-1 (General PEO)

# Demonstration Project: Install storm drain filters at urban storm water discharge drop inlets to reduce impacts from storm water runoff.

One strategy to remove pollutants in urban runoff is to install storm drain filters, which are placed in catch basins and effectively filter petroleum-based contaminants while permitting the undisturbed passage of water. Currently, in Morro Bay there are approximately twenty direct discharge points to the estuary from drains. These drains have anywhere from three to ten drop inlets that would be filtered as appropriate. The City of Morro Bay installed two filters on urban streets in 1999. This action will significantly reduce petroleum and other pollutants in storm water runoff discharging to the estuary.

Tasks include:

- 1) Inventory discharge inlets and outlets to determine appropriate sites.
- 2) Install low cost filters at existing sites within the City of Morro Bay as funding allows. Filters similar to the Fossil Filter <sup>TM</sup> design should be considered. This filter is non-toxic and easy to maintain, causing no excess pooling which can occur in other filters. The filters can be used on a variety of drainage designs, and can fit into the existing systems, as well as throughout the proposed Morro Bay Storm Drain Master Plan.
- 3) Maintain filters, through checkups preceding storm seasons, as well as proper disposal and replacement every six months.
- 4) Monitor water quality at discharges before and after installation.

This demonstration project should be implemented by the City of Morro Bay within two years. The MBNEP will support the implementation, with funding provided by the Restoration Fund.

The cost per filter installed is estimated at \$500-\$1,000. Evaluation of this project will include:

- 1) Trends in water quality samples taken pre- and post-installation
- 2) BMP installation and maintenance
- 3) Data gathered by flow-weighted automatic samples.

# CC-5 STREAM GEOMORPHOLOGY & WATER QUALITY: Maintain, restore, and enhance stream geomorphology and water quality to provide quality habitat for steelhead.

#### BACKGROUND/MAJOR ISSUES:

Steelhead trout serve as excellent indicators of overall water and habitat quality because they are relatively sensitive to degraded stream conditions. They are a cold water species and do not tolerate extreme or extended elevations in water temperature or reductions in dissolved oxygen levels. Typically, water temperatures should remain around 18 degrees Celsius and dissolved oxygen should remain above seven milligrams per liter. Though steelhead can tolerate poorer conditions for periods of time, they will not thrive.

Low dissolved oxygen has been documented in several locations in the watershed. At the lower ends of both Chorro and Los Osos creeks, oxygen sags are common (particularly on Los Osos Creek). In both cases, high levels of nutrients have been documented as well. Oxygen sags are often associated with high levels of nutrients and associated biological activity. In the Chorro Valley, nutrients enter the stream from the CMC wastewater treatment plant. In both streams, nutrients associated with fertilizer use are also of concern. At times, nitrate concentrations have been documented in excess of 100 mg-NO3/l.

High concentrations of sediment in the water column and in the associated stream bottom gravels will result in reductions in overall steelhead carrying capacity. Sediment in the water column during high winter flows is abrasive to fish gills and reduces visibility, which is important for feeding and avoiding predators. Sediment in bottom gravels reduces viability of spawning habitat and rearing habitat, by "cementing" gravels together, reducing water circulation in interstitial spaces, reducing food supply, filling pools, etc. Sediment is a major pollutant of concern in the Morro Bay watershed and definitely has an impact on trout habitat quality.

Healthy stream geomorphology is also a critical component in ensuring high quality trout habitat. Riffles oxygenate water and provide best invertebrate food supplies. Pools provide cool, deep water for resting and oversummering habitat. When streams have been channelized, straightened, or deepened, this instream structure is jeopardized. Streams which are downcutting, aggrading, or which have no access to a flood plain tend to accumulate fines and have poorly defined pool/riffle structure. In portions of the Morro Bay watershed, downcutting, channelization, and straightening of the channel have resulted in degradation to instream habitat and other associated problems, such as increased sediment delivery and habitat loss. Adequate stream flows are required to support temperature, dissolved oxygen and balanced sediment-carrying capacity.

Several additional and related problem areas in the watershed are of particular concern:

- Temperatures are known to be excessive on Chorro Creek downstream of Chorro Reservoir, because of the heating effect of the reservoir. Additional shading of the downstream channel wherever possible would help mitigate this effect. In addition, an evaluation of the heating effects of the long concrete spillway should be undertaken to determine whether either shading this discharge or discharging through a pipe instead of across the flat spillway would substantially improve water temperatures during summer months. If so, appropriate remedial action should be taken.
- Oxygen sags have been noted at the lower ends of both creeks. Los Osos Creek in particular shows levels well below Basin Plan standards for cold water habitat. Though this may in part result from the low gradient of the creek and the "backing" effect of the bay, every effort should be made to reduce nutrient inputs to this reach through implementation of nutrient action plans.
- Areas should be prioritized for riparian restoration where channel shading is reduced below 50 percent.



#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- Expensive alterations to reservoir releases are made to ensure that water entering salmon and trout-bearing rivers is well-oxygenated and cool. Restoration projects for steelhead trout typically include improvements to channel shading to ensure water temperatures remain cool. Large scale restorations to stream geomorphology are being undertaken throughout the country to improve instream trout habitat (Rosgen, 1998).
- In the Morro Bay watershed, several projects have been undertaken to improve corridor shading. Downstream of Chorro Reservoir, where warm reservoir water impacts temperatures, the NRCS has fenced the riparian corridor and planted shade trees. The Chorro Flats project resulted in removal of a levee, restoration of flood plain, and improvements to stream channel geomorphology. On private property in the Los Osos Valley, several projects have included planting of shade trees along the top of bank.
- CDFG and the USFWS currently have restoration projects underway on private holdings along the lower Los Osos Creek that may need to be expanded through additional funding to meet the goals of this action plan.

#### **BENEFITS OF THIS ACTION:**

- This action plan will ensure that steelhead trout are provided with adequate water quality, habitat quantity, shading, food, and cover.
- Shading of the stream is critical for maintenance of appropriate oxygen and temperature regimes.
- Maintenance and improvements to stream geomorphology will result in appropriate sediment movement, pool/riffle structure, bank stability and overall habitat quality.
- Improved water quality will also result in positive benefits to other aquatic life, including threatened and endangered species.
- Restoration of steelhead to non-threatened status could ultimately result in reestablishment of a sport fishery in the watershed, with its associated economic, social, and cultural benefits.

#### **IMPLEMENTATION:**

Water quality benefits will be a direct or indirect effect of implementing many of the action plans in this document. All actions, which reduce sedimentation and erosion, reduce nutrient inputs to the stream increase stream flow, and improve channel shading will be of benefit. Therefore, specific actions do not need to be identified in this action plan for water quality benefit.

Stream geomorphology:

- 1. Channel typing should be undertaken for the entire watershed and incorporated into Geographic Information Systems to allow for whole system evaluation and prioritization.
- 2. All stream restoration projects should be undertaken with an understanding of "big picture" stream geomorphology issues in mind. In other words, large amounts of money should not be spent doing individual site stabilization projects in a channel, which is unstable because of major geomorphological impacts. Projects such as these are unlikely to be successful.
- 3. The watershed should be evaluated to determine whether specific areas would benefit from major geomorphological restoration. Areas to be considered should include those where the stream channel has been moved, leveed, or channelized, or in areas where major downcutting or aggradation is occurring. These projects should not be undertaken without expert evaluation and design, as they can result in impacts of their own and must be undertaken with care and for good reason.
- 4. Tree planting to improve shading can be relatively inexpensive, but maintenance of young trees can require additional labor and time, which should be anticipated.
- 5. Some nutrient management measures can ultimately result in cost savings to land owners because of reduced fertilizer use, but may require investment in soil analysis.
- 6. Stream channel alterations to improve geomorphology are extremely costly, and could range from thousands to millions of dollars, depending upon the scale of the project.

#### WHEN:

- Short Term: Channel typing, GIS work, and project prioritization.
- Medium Term: Development and design of complex stream restoration projects

C C - 5

Long Term: Implementation of complex stream restoration projects.

#### WHO:

Primary:

- CSLRCD (work with landowners, watershed permit)
- Public and private landowners (access and implementation)

Support:

- NRCS (technical assistance, watershed permit)
- CCRWQCB (technical assistance, watershed permit)
- CDFG (technical assistance, watershed permit)
- ACOE (funding, technical assistance, watershed permit)
- CSLCNG (access)
- CMC (water supply)
- Volunteer organizations (implementation and education)
- CCC (advisory)
- USFWS (technical assistance)
- FOE (monitoring)
- SSRCSCCC (implementation and advocacy)
- USNMFS (technical assistance)
- SCC (funding and expertise)

#### WHERE:

Throughout the watershed.

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Channel typing	See SED-8	1-2 yrs.
Restoration projects	See SED-8	1-5 yrs.
Evaluation for geomorphological restoration sites	See SED-8	1-3 yrs.
Tree planting	See CC-7	1-2 yrs.
Nutrient management measures	See NUTR-3, 4	1-3 yrs.
Stream channel alteration	See SED-8; MBERF	1-5 yrs.

#### BASIS FOR COST:

NRCS Morro Bay Watershed restoration efforts

#### POTENTIAL FUNDING SOURCES:

- USEPA (319h Non-Point Source Grant Program)
- MBERF
- CDFG
- State Coastal Conservancy
- Also see Chapter 7, Table 7.3.

#### EVALUATION:

- Number of projects implemented within the target area.
- Improvements in water quality over time.
- Periodic Channel Typing evaluation.
- Periodic Riparian corridor mapping and GIS update.
- Identification of areas of stability and critical habitat for targeting maintenance and restoration efforts.
- Reduced number of stream channel sites with long-term patterns of either aggradation or degradation.

#### **RELATED ACTIONS:**

C C - 5

- . All CC Actions
- All NUTR Actions
- . All SED Actions
- All FLO Actions .
- HAB-6 (Riparian Vegetation) HAB-10 (A. donax Removal) HMT-1 ((Mine Remediation) STL-1 (Recovery Plan) STL-2 (Habitat Access) STL-3 (Pool/Riffle Structure) STL-4 (Ripagian Corridors) •

- R
- .
- STL-4 (Riparian Corridors)
- . EDU-1 (General PEO)
- EDU-3 (Agricultural Outreach) EDU-4 (Pesticide Workshop) .
- R
- EDU-5 (Estuary Conference)
- EDU-9 (K-12)

# CC-6 VMP: Expand and maintain the existing Volunteer Monitoring Program

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

For the last two years, the Morro Bay National Estuary Program, Friends of the Estuary, and the Regional Water Quality Control Board have partnered in implementing the Volunteer Monitoring Program (VMP) that is focused on the water quality of the estuary and the watershed. Parameters such as flow, nitrates, coliforms, dissolved oxygen, water temperature, turbidity, phosphates and macroinvertebrates have been recorded. In addition, geomorphology, vegetation cover and storm water runoff is assessed yearly within the watershed. Over two hundred citizen monitors ranging in age from school children to retirees have participated in this very successful program.

#### BENEFITS OF THIS ACTION:

The primary benefit of this action is to expand and maintain the existing VMP to assist in detecting change in the Morro Bay watershed and estuary, to evaluate the effectiveness of the CCMP, as well as to provide education and outreach to the public. A sustained program will increase public awareness and also assist the MBNEP in recording trends in environmental resources and water quality. The data will be used to strengthen the mathematical models used by the MBNEP for management decisions.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

San Francisco Estuary Institute in California supports a large regional volunteer monitoring program, as well as Barataria-Terrebonne NEP in Louisiana.

#### IMPLEMENTATION:

#### Project Management:

- Technical Advisory Committee (TAC)—The TAC will be charged with technical review of recruitment and education strategies, as well as sampling design, sampling protocols, site selection and quality assurance procedures. The committee will work with guidelines of MBNEP's Monitoring Plan (Draft) to assist in evaluating actions and filing data gaps.
- Develop a Quality Assurance Plan (QAPP) for the VMP—Amend and upkeep of current VMP QAPP to insure standardization of protocols. Conduct continuous quality assurance trainings to assure proper collection techniques
- 3. Develop a Volunteer Handbook—Develop handbook, based on EPA's volunteer monitoring handbook, for the volunteer monitor with sampling protocols as well as background information on the Morro Bay estuary and watershed.
- 4. Prepare community updates—Produce updates summarizing VMP data to inform the community (such as flow updates to local landowners) thus refocusing efforts to coordinate, review, and refine the VMP to better accomplish objectives. Publish summaries in the MBNEP newsletter, "Turning the Tide," FOE newsletter, and on the MBNEP website.
- 5. Prepare Annual Reports—The Annual Report will provide a summary of volunteer monitor recruitment and outreach efforts, VMP implementation, and results of data collected to evaluate the success of actions in reaching MBNEP goals. The Annual Reports will provide essential information for the MBNEP's biannual review process.

#### Project Coordination:

- 6. Identify and advertise public outreach and scientific projects to Cal Poly faculty and students to assist with evaluation of CCMP actions.
- 7. Create a summer internship program, rallying efforts of conservation science students and research academia across the region to assist in filling data gaps as identified by the MBNEP Monitoring Plan and Characterization document.
- 8. Update technological tools to improve precision of data collected.
- 9. Establish baselines and monitor at statistically appropriate even-intervals.
- 10. Coordinate with the Morro Bay National Monitoring Program and MBNEP Monitoring Plan to continue sampling BMPs to confirm long-term trends.

- 11. Coordinate with local landowners to hold trainings to better utilize distributed test kits.
- 12. Coordinate with groups such as AmeriCorps to assist in creating a regional volunteer network for ecological emergencies and to reduce redundancy.

#### Data Reduction, Analysis, Reporting and Presentation:

- 13. Monitor data to strengthen the models used by MBNEP for management decisions.
- 14. Collaborate with Central Coast Ambient Monitoring Program (CCAMP) to standardize and store data with consistent names and protocols. This will improve data management, facilitate regional coordination, and increase ability to assess trends for evaluation of BMP or TMDL development.
- Partner with California Polytechnic University, San Luis Obispo to help with data collection and analyses of extended monitoring programs.
- 16. Develop biological indicators, such as steelhead trout, to better assess estuarine health.
- 17. Develop maps of eelgrass and kelp forests through groundtruthing every five years to measure increase or decrease of eelgrass bed.
- 18. Prepare frequent and regular reports to inform community (such as flow updates to local landowners).
- 19. Sponsor annual recognition events to showcase data collected by volunteers.

#### WHEN:

-

- Short Term: All project management and coordination activities.
- Medium Term: All data reduction, analysis, reporting, and presentation.

#### WHO:

Primary:

- FOE (Lead Agency on the Following: TAC, Quality Assurance Plan, Volunteer Handbook, Community Updates and Public Outreach, Annual Reports, Monitoring, Trainings, Data Management)
- CCRWQCB (technical assistance, data repository)

#### Support:

- BF (funding)
- CCRWQCB (technical assistance, data repository)
- Cal Poly, SLO (technical assistance)
- NRCS
- CCNHA (disseminate information)
- CCCorps (work crew)
- ECA (advisory)
- MEGÀ (coordination)
- MBNEP (Assist on: TAC, Quality Assurance Plan, Volunteer Handbook, Community Updates and Public Outreach, Annual Reports, Monitoring, Trainings, Data Management)
- Public and private landowners (Attend trainings, use test kits)

#### WHERE:

Morro Bay, Los Osos, and Chorro Creeks and their tributaries

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Project management and coordination	\$50,000	5-10 years
Data reduction, analysis, reporting and presentation	\$30,000	5-10 years

#### BASIS FOR COST:

\* Friends of the Estuary 319(h) grant contract for monitoring.

#### POTENTIAL FUNDING SOURCES:

- USEPA Section 320 Funds
- MBERF
- SWRCB Grants [USEPA 319h Non-Point Source Grant Program]
- Also see Chapter 7, Table 7.3.

#### **EVALUATION:**

- Significant changes in public survey polls in understanding of local issues; participation in VMP; annual status reports.
- Filling of data gaps

#### **RELATED ACTIONS:**

- All actions that require environmental monitoring (see Ch. 6, Tables 6.1 6.9).
- CC-5 (Stream Geomorphology & WQ)
- STL-3 (Pool/Riffle Structure)
- EDU- 5 (Estuary Conference)
- EDU- 6 (CCNHA Exhibit)
- EDU- 10 (Mini-grants)

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# CC-7: WATERSHED CREW: Establish Watershed Crew to provide planning, labor, outreach, and mapping services throughout the watershed and across the breadth of the priority issues.

#### BACKGROUND/MAJOR ISSUES:

Due to the complexity of the watershed environment and the interrelationships of the problems, many of the recommended actions also address more than one or all priority issues. The actions proposed under this plan require a trained labor source that can provide a variety of services ranging from pulling weeds to plotting maps using hi-tech equipment linked to Geographic Positioning System satellites. The Watershed Crew are trained in natural resource management, and are local residents familiar with the issues facing Morro Bay consisting of individuals from the California Men's Colony.

#### **BENEFITS OF THIS ACTION:**

- This action would simplify the process of finding the technical assistance and labor needed to implement the plan's other actions.
- This action would make technical assistance and labor available at a lower cost.
- Watershed crew members would become more knowledgeable about the watershed and as a result would be able to provide a higher quality of services.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- The CCCorps currently has approximately 100 corps members based at their San Luis Obispo facility who
  work on projects very similar to many of the actions included in this plan.
- In Northern California, the CCCorps operates a Watershed Stewards program that provides planning, restoration, and outreach services for coastal rivers and streams, focusing on restoring and protecting salmon habitat.

#### **IMPLEMENTATION:**

- 1. The MBNEP would establish a MOU to agree to types of services to be provided, compensation amounts, and other expectations for a Watershed Crew (to supplement volunteer work).
- 2. When billable work is to occur, the MBNEP and the CCCorps would enter into a contract specifying actual work and compensation amounts for the particular job.
- 3. MBNEP would promote the Watershed Crew as the primary source of specified services.

#### WHEN:

- Short Term: The MOU can be developed within two weeks of completed contract, and the Watershed Crew can be put together within two weeks of the MOU signing.
- Long Term: The MOU can be renewed indefinitely.

#### WHO:

**Primary:** 

- CCCorps
- MBNEP

Support:

- Organizations needing Watershed Crew services
- Public & private landowners needing Watershed Crew services
- Other possible organizations involved in on-the-ground implementation of watershed restoration work

#### WHERE:

Throughout the watershed

### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Establish and maintain Watershed Crew	\$50,000	1-5 years

Would vary depending on number of hours worked, type of work, size of crew, etc. A crew of ten, including a supervisor, transportation, tools, etc., would cost \$960 per day. A GIS crew of four, including supervisor, transportation, tools, equipment, etc., would cost \$544 per day.

#### BASIS FOR COST:

• Size of crew, type of work, and number of hours worked.

#### POTENTIAL FUNDING SOURCES:

- MBERF
- State, federal and local grants
- Public and private landowners receiving services
- Also see Chapter 7, Table 7.3.

#### EVALUATION:

- Feedback from MBNEP staff and those receiving services
- Input from Watershed Crew members and organizations

- SED-1 (Road Management)
- SED-2 (Sediment Traps)
- SED-3 (Fire Management)
- SED-4 (Landowner BMPs)
- SED-5 (Creek Restoration)
- SED-6 (Sandspit Revegetation)
- BACT-1 (Grazing Management)
- BACT-7 (Bird Deterrents)
- NUTR-3 Agricultural BMPs)
- HMT-1 (Mine Remediation)
- HAB-1 (Overlay Maps)
- HAB-2 (Upland Habitats)
- HAB-3 (Mapping)
- HAB-6 (Riparian Vegetation)
- HAB-9 (Nonindigenous Species)
- STL-2 (Habitat Access)
- STL-3 (Pool/Riffle Structure)
- STL-4 (Riparian Corridors)
- EDU-9 (K-12)
- CC- 5 (Stream Geomorphology & Water Quality)



# 4.2 SEDIMENTATION

The filling in of Morro Bay by sediment produced in the watershed has been identified as the number one problem facing the estuary. Sedimentation is resulting in the loss of mudflat and open water habitat. Salt marsh habitat is likewise being replaced by upland habitat. The shellfish industry is negatively impacted by sedimentation in the bay, as is the commercial fishing industry and the power plant. Freshwater habitat in lakes, ponds and other wetlands is being lost due to sedimentation. Fish habitat in the creeks is being lost or negatively impacted due to sediment. Pools are filled in, spawning gravel is clogged and habitat diversity and cover is lost. Riparian habitat is being lost due to streambank erosion.

While it is a natural process for estuaries to eventually fill due to sedimentation over time, the concern with Morro Bay is that the natural processes have been accelerated due to watershed disturbances. It has been estimated that Morro Bay has lost more than 25 percent of its tidal volume in the last 100 years due to sedimentation. The contributing factors may include upland erosion, streambank erosion, sediment transport by ocean currents, and land disturbances, such as roads, construction, agricultural activities, and mining activities.

The rapid increase of sedimentation in Morro Bay may have negative impacts on following: navigation, commercial and sport fishing, shellfish harvesting, estuarine habitat, wildlife habitat, freshwater habitat, migration of aquatic organisms, spawning, endangered species habitat, water contact and non-contact recreation, municipal water supply, and agriculture.

#### MBNEP GOALS SUPPORTED BY SEDIMENTATION ACTION PLANS:

- Slow the process of bay sedimentation through implementation of management measures that address erosion and sediment transport.
- Reestablish healthy steelhead trout habitat in Chorro and Los Osos creeks through measures including
  reduction of sediment loading in gravels, stabilization of riparian corridors, removal or mitigation of
  migration barriers, improvement of water quality, and restoration and maintenance of adequate fresh water
  flow.
- Ensure the integrity of the broad diversity of natural habitats and associated native wildlife species in the bay and watershed.
- Maintain watershed functional integrity through appropriate riparian corridor management, impervious surface management, fire management, and grazing management.
- Protect social, economic, and environmental benefits provided by the bay and watershed through comprehensive resource management planning.

#### SEDIMENTATION OBJECTIVES AND SUMMARY OF ACTIONS:

A summary of objectives, detailed action plans to meet those objectives, and a matrix of actions and their implementing organization follows (Table 4.5).

SED OBJECTIVE 1: Reduce sedimentation into the estuary and increase clarity of estuary waters.

- Action SED-1: Increase use of management measures for road maintenance and construction activities to reduce damage to streams and the Morro Bay estuary.
- Action SED-2: Install new and maintain existing sediment traps in order to reduce the delivery of sediment to Morro Bay.
- SED OBJECTIVE 2: Reduce erosion from upland brush-covered slopes.



Action SED-3: Develop and implement a watershed fire management plan to create and maintain an uneven age class of brush to prevent loss of erosion buffers.

SED OBJECTIVE 3: Reduce agricultural soil loss and increase stakeholder development and implementation of best management practices

Action SED-4: Supply technical and financial assistance to landowners to implement Best Management Practices (BMPs) on their land.

SED OBJECTIVE 4: Reduce bedload (in-stream) and stream bank soil erosion.

Action SED-5: Supply the technical and financial assistance to landowners to implement creek restoration projects (including re-establishing floodplains and meander patterns) in Los Osos and Chorro Creeks.

SED OBJECTIVE 5: Reduce the rate of shoreline erosion and dune migration.

- > Action SED-6: Re-vegetate north sandspit areas without impacting snowy plover or least tern habitat.
- Action SED-7: Provide incentives for landowners to encourage implementation of Best Management Practices (BMPs) for erosion control and sediment retention, and also addresses Sed. Objectives 1, 2, and 3.
- Action SED-8: Improve degraded navigation channels and estuary habitat conditions, and increase circulation patterns.



#### Table 4.5 Sedimentation Actions-Implementing Organizations

]	SED-1	SED-2	SED-3	SED-4	SED-5	SED-6	SED-7	SED-8
	Road	Sed	Fire	Land-	Creek	Sandspit	BMP	Estuary
Agency/Organizations	Mgmt	Traps	Mgmt	owner	Restrtn	Reveg	Incentives	Restrtn
		i di		BMPs	$\sum_{i=1}^{N} \frac{N_{i}}{N_{i}} = \sum_{i=1}^{N} \frac{N_{i}}{N_{i}} = \sum_{i$			Project
ACOE		S		S	S			P
Air Resources Board			S					
Audubon Society						S		
BF		S		Р	S			S
CA Native Plant So.						S		
Cal Poly		S		S	S			
Cattlemen's Assoc.		S		S	S			
CCC	S	S	S	S	S	S	S	S
CCCorps	S	S	S	S	S	S		
CCRWQCB	S	S		S	S			
CDF			P					
CDFG		S		S	<u>P</u>	S		S
CDOT	P	<u> </u>						
CDPR		<u>s</u>	S	S	S	S		<u> </u>
СМВ	<u>P</u>	S						
СМС	<u> </u>	S		S	S			
Consultants/Engineers		S			P			
CSLCNG	S	S	S	S	S			
CSLRCD		P		P	P		S	
Cuesta College		S		S	S			
Farm Bureau		S		S	S			
FOE	<u>S</u>	S	S	S	S	S	<u> </u>	
Land Conservancy								
LOCSD		S			<u> </u>		S	
MBNEP	S	S	S		S	S	Р	<u> </u>
MEGA								
NRCS	S	P	S	P	P		S	
Public/Private Landowners	<u>P</u>	P	S	<u> </u>	S	P	P	
SCC								<u> </u>
Sierra Club						S		
SLOCo.	<u>P</u>	S		S	S			
SWRCB	<u> </u>	S	S	S	S	S	S	
UCCE	<u> </u>			P	P	S	S	
USEPA		S	L	S	S	S	S	
USFS	S	S	P	S	S			
USFWS		S		S	S	S	S	
USNMFS		S		S	S			

 $\mathbf{P}$  = Primary role in implementation and monitoring project outcomes and effectiveness.  $\mathbf{S}$  = Supporting role in implementation



# SED-1: Increase use of management measures for road maintenance and construction activities to reduce damage to streams and the Morro Bay estuary.

#### BACKGROUND/MAJOR ISSUES:

The optimum time to address control of nonpoint source pollution from roads and highways is during the initial planning and design phase. New roads and highways should be located with consideration of natural drainage patterns and planned to avoid encroachment on surface waters and wet areas. Where this is not possible, appropriate controls should be used to minimize the impacts of runoff on surface waters.

Poorly designed or maintained roads on public and private lands can generate significant erosion that is deposited into surface waters. In areas where this is occurring, retrofit management projects or improved maintenance techniques can be implemented to reduce erosion and sedimentation to Morro Bay and its tributaries.

The community of Los Osos contains a number of dirt roads, the majority of which are not maintained by the San Luis Obispo County. The roads exist on rights-of-way dedicated to, but not accepted by, the County. Therefore, the ownership of these roads is split between the property owners on each side. While the primary management emphasis needs to be directed toward Los Osos roads, other watershed roads may also require maintenance.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

The six county area of the South Fork Trinity River has implemented a training and implementation
program for the roadways adjacent to the Trinity River to address nonpoint source pollution from these
roads.

#### **BENEFITS OF THIS ACTION:**

Reduced sedimentation to Morro Bay and its tributaries.

#### IMPLEMENTATION:

- 1. Inventory Los Osos and Chorro Valley roads to determine required management (i.e., paving, restoration)
- 2. For new road construction on public and private lands:
  - Plan, site, and develop roads to protect areas that are particularly susceptible to erosion or sediment loss.
    - Limit land disturbance, such as clearing and grading, to reduce erosion and sediment loss.
  - Limit disturbance of natural drainage features and vegetation.
- 3. For existing roads on public and private lands:
  - Identify priority sediment reduction opportunities.
  - Implement appropriate controls (i.e., vegetated filter strips, grassed swales, detention basins, constructed wetlands, infiltration trenches).
- 4. For dirt roads on public and private lands:
  - Develop an inventory of rural roads, their condition, and level of use.
  - Retire unnecessary roads.
  - Identify management measures for road maintenance and sediment management.
  - Incorporate measures into county, city, and state practices.
  - Provide training to maintenance crews and private landowners.
- 5. Coordinate and oversee implementation.

#### WHEN:

- Short Term: Inventory roads to determine required management
- Medium Term: Plan, develop, and design management measures
- Long Term: Coordinate and oversee implementation



#### WHO:

#### Primary:

- Public & private landowners (Road construction/maintenance, oversee implementation)
- CDOT (state highways, oversee implementation, road inventory, maintenance, and construction)
- CMB (city roads, oversee implementation, road inventory, maintenance, and construction)
- SLOCo. (county roads, oversee implementation, road inventory, maintenance, and construction)

#### Support:

- CSLCNG (oversee implementation, road inventory, maintenance, and construction)
- CMC (oversee implementation, road inventory, maintenance, and construction)
- USFS (oversee implementation, road inventory, maintenance, and construction)
- MBNEP (oversee implementation)
- UCCE (maintenance)
- CCRWQCB-Ranch Plans (maintenance)
- CCCorps (building/maintaining water bars, sediment traps, maintaining culverts; GIS crew can assist with mapping and inventory)
- SWRCB (advisory)
- FOE (monitoring)
- CCC (advisory)
- NRCS (advisory)

#### WHERE:

Roadways throughout the watershed

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Inventory & Identify measures	\$25,000	1 yr
Implementation	See CC-2 +\$100,000	2-5 yrs
Crew Training	\$25,000	2-5 yrs

#### BASIS FOR COST:

1/2 person year for inventory; 1/4 person per year for implementation

#### POTENTIAL FUNDING SOURCE:

- Local agency funds, agency staff oversight, plus 75,000 in MBERG, ISTEA funds, watershed crew to implement.
- Also see Chapter 7, Table 7.4.

#### **EVALUATION:**

- Training for maintenance crews and public and private landowners.
- Inventory of roads and identification of problem areas.
- Number of control measures implemented.
- Incorporate management measures into city, county, and state practices.

- CC- 2 (Drainage)
- CC-4 (Urban Runoff)
- CC- 5 (Stream Geomorphology & WQ)
- CC-7 (Watershed Crew)
- SED- 2 (Sediment Traps)
- SED- 4 (Landowner BMPs)
- SED- 5 (Creek Restoration)
- SED- 7 (BMP Incentives)
- NUTR-4 (Residential BMPs)



- •
- HAB- 8 (Eelgrass) STL- 1 (Recovery Plan) EDU-11 (CEQA Checklist) .



### SED-2: Install new and maintain existing sediment traps in order to reduce the delivery of sediment to Morro Bay.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

Sediment trapping upstream of the bay can take many forms. Every type of sediment trap has environmental and economic costs and benefits that need to be evaluated on a case-by-case basis to determine the correct project for the site. Examples of sediment traps include:

Flood plain restoration Sediment ponds Stock water ponds Buffer and/or filter strips Natural lakes and wetlands Small ponds high in the watershed Small traps associated with the road network at culvert inlets and along roadside ditches

Within the road network there are opportunities to create small sediment traps. Inlets to culverts can be raised in order to create a sediment trap. Within a roadside ditch, small holes can be scooped out that will trap sediment. These types of projects require a commitment from the entity that maintains the roads to also maintain the traps.

The Reconnaissance Study completed by the ACOE identified a federal interest under ACOE programs to develop a plan to reduce the significant adverse impacts of sedimentation, tidal circulation, and flushing restriction that are causing the degradation of valuable wetland and aquatic habitat areas along the Morro Bay Estuary. The ACOE is planning to conduct a feasibility study for the area.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

The partners of the MBWEP (CSLRCD, NRCS, SCC & CCRWQCB) purchased and constructed the Chorro Flats Enhancement Project (CFEP). The CFEP has already caught more than 210,000 tons of sediment. A perpetual easement on the Los Osos Creek Wetland Reserve site on Los Osos Creek was acquired by partners of the MBWEP. This site has trapped more than 135,000 tons of sediment. These two sites are examples of flood plain restoration for collecting sediment. Both sites will require funds in the future for maintenance.

Examples of sediment ponds include those found at the Los Osos Landfill. In that case a series of ponds were built for the sole purpose of collecting sediment from a site that was known to be a high producer of sediment. Sediment ponds trap the sediment on site, thereby filtering the water before it reaches a stream.

Many ranchers in the watershed have small dams on tributary creeks in the watershed. The ponds created by the dams serve many purposes including: providing water for livestock and wildlife, sediment capture and storage, flood water detention, habitat for amphibians, turtles and other wildlife, fire protection and irrigation. After several years these ponds fill with sediment and lose their capacity to store water and further sediment. These ponds occasionally need to be cleaned out in order to maintain their effectiveness.

Buffer and filter strips are usually used adjacent to cropland, but can be used in urban and other areas as well. A buffer or filter strip is a strip of land parallel to a creek that is heavily vegetated. This zone of vegetation traps sediment and other pollutants before they reach the stream. NRCS has programs that have incentive payments for landowners that chose to install buffer or filter strips.

Natural wetlands and lakes, such as Warden Lake, collect sediment from the streams that feed them. It is possible to alter these sites in order to increase their sediment trapping efficiency. It is also possible to dredge these sites in order to remove the accumulated sediment and create room for future sedimentation. Projects



SED-2

such as these need careful consideration and planning in order to minimize environmental damage and unintended consequences such as altering ground water levels.

#### **BENEFITS OF THIS ACTION:**

- Less sediment delivered to the bay by trapping and storing sediment.
- Increased riparian, freshwater, wetland and fishery habitat.
- Monitoring by the National Monitoring Program has shown that sediment control BMPs also reduce bacteria and nutrients in the creeks.
- Slow and reduce flood flows.
- Source of water for fighting fires.

#### IMPLEMENTATION:

- 1. Inventory existing sediment trap sites and fund a study of the potential sites for trapping sediment.
- 2. Fund the NRCS and UCCE and the CSLRCD to a level where they can provide technical assistance to landowners within the watershed to install and maintain sediment traps.
- 3. Provide funding to landowners to share the costs of implementing sediment control practice so that the cost for the landowner is reasonable and economically feasible.
- 4. Provide incentives, such as permit streamlining, to landowners to implement sediment control practices.
- 5. Fund a feasibility study on the potential of Warden Lake as a sediment trap.
- 6. Coordinate technical oversight of implementation.
- 7. Install and Maintain existing sediment trap sites.
- 8. Inventory the upper watershed to evaluate the potential for small sediment ponds.
- 9. Utilize funding sources, such as WRP and CRP and USEPA 319h Non-Point Source Grant Program.
- 10. Find funding for the long-term maintenance of Chorro Flats and the Los Osos Creek Wetland Reserve.
- 11. Encourage SLO County, CalTrans, and the CMB to install sediment traps within their road networks.

#### WHEN:

- Short Term: Inventory existing sediment trap sites and fund a study of the potential sites for trapping sediment. Fund the NRCS and UCCE and the CSLRCD to a level where they can provide technical assistance to landowners within the watershed to install and maintain sediment traps. Provide funding to landowners to share the costs of implementing sediment control practice so that the cost for the landowner is reasonable and economically feasible. Provide incentives, such as permit streamlining, to landowners to implement sediment control practices.
- Medium Term: Fund a feasibility study on the potential of Warden Lake as a sediment trap. Install and Maintain existing sediment trap sites. Inventory the upper watershed to evaluate the potential for small sediment ponds. Inventory the upper watershed to evaluate the potential for small sediment ponds. Encourage SLO County, CalTrans, and the CMB to install sediment traps within their road networks

#### WHO:

#### Primary:

- NRCS (Inventory, Funding, Technical Oversight)
- CSLRCD (Inventory, Funding)
- UCCE (Inventory, Funding)
- Public & private landowners (Inventory, Funding)

#### Support:

- MBNEP (Technical Oversight, Inventory, Funding, Interagency Cooperation)
- BF (Inventory, Funding, Incentives)
- CMB (Inventory, Funding, Maintenance, Interagency Cooperation)
- Public Landowners (CSLCNG, USFS, Cal Poly, SLOCo., CDPR, Cuesta College, CMC) (Funding, Maintenance, Interagency Cooperation)
- USEPA (Inventory, Funding)
- Permitting Agencies (SLOCo., USFWS, ACOE, CCRWQCB, USNMFS, CDFG) (Inventory, Funding, Technical Oversight, )
- Farm Bureau (Funding, Technical Oversight, )
- California Cattlemen's Association (Funding, Technical Oversight, )
- LOCSD (Funding, Technical Oversight, Maintenance, Inventory)



- Private Engineers and/or Consultants (Inventory)
- CCCorps (Maintenance)
- SWRCB (Funding, Technical Oversight)
- FOE (monitoring)
- CCC (advisory)
- Cal Trans (Interagency Cooperation)

#### WHERE:

Public and private lands throughout the watershed.

#### COST:

Task/Step	Cost/year	Duration
Technical	\$120,000	1-5 years
Assistance		
Installation	See CC-1 + \$3,000,000	1-5 years
Maintenance	\$50,000	1-5 years

#### BASIS FOR COST:

- Existing program costs.
- Estimate of cost share potential.

#### POTENTIAL FUNDING SOURCES:

• See Chapter 7, Figure 7.4.

#### EVALUATION:

- Sediment traps used in road networks.
- Feasibility study of Warden Lake
- Increase in public and private landowners using sediment traps on their property.
- NMP water guality data on practice effectiveness.
- Habitat measurements.
- Direct measures of sediment removed from the system using upstream/downstream and before/after using evaluation designs.
- Number of additional sediment trap projects.

- All SED Actions
- CC-1 (Land acquisition)
- CC-2 (Drainage)
- CC-5 (Stream Geomorphology & WQ)
- CC-7 (Watershed Crew)
- BACT-1 (Grazing Management)
- HMT-1 (Mine Remediations)
- NUTR-3 (Agricultural BMPs)
- NUTR-4 (Residential BMPs)
- HAB-6 (Riparian Vegetation)
- HAB-8 (Eelgrass)
- STL-1 (Recovery Plan)
- STL-4 (Riparian Corridors)
- EDU-11 (CEQA Checklist)



# SED-3: Develop and implement a watershed fire management plan to create and maintain an uneven age class of brush.

### Priority Action

#### BACKGROUND/MAJOR ISSUES:

Sedimentation is the leading cause of degradation of the Morro Bay Estuary. Although fire and erosion are natural components of the Morro Bay watershed ecosystem, studies (Tetra Tech) indicate that the steep slopes of the upper watershed are the single largest contributors of sediment to the Bay. A large damaging fire on the steep slopes unnaturally increased the amount of material delivered to the bay. For example, after the Highway 41 Fire of August 1994, which burned 9700 acres of the Chorro Creek watershed (35 percent of the watershed), there was a tremendous delivery of sediment to Morro Bay. It is estimated that more than five feet of sediment was deposited on some areas of the Chorro Flats floodplain. When the torrential rains of the following rainy season occurred right after the burn, it was estimated that the watershed experienced a 5000-year sediment event. This same scenario can repeat itself in the future unless a planned approach, using prescribed fires, is initiated in the Morro Bay Watershed.

The use of prescribed fire to break up large blocks of even-aged vegetation is a common practice employed by resource managers. This allows smaller burn events to occur, and the resulting mosaic of uneven aged classes of brush is less likely to contribute to a catastrophic fire event, thus reducing the probabilities of extreme sediment events. The erosion and sedimentation can be "metered out", rather than released all at once. Other benefits include increased fire protection for people living in and adjacent to wildland areas, reduced impacts from fire suppression activities and more diverse wildlife habitat.

A fire management plan will take into consideration the following factors at a minimum:

- Weather (maritime influence, prevailing wind direction)
- Topography (steep slopes, aspect)
- Vegetation Type (fire dependent, age class, fuel models)
- Soil Type (serpentine, erodibility)
- Sensitive Species (Threatened, Endangered and Sensitive)
- Economics
- Fire History (frequency, size, locations)
- Burning Techniques (time of year, equipment requirements)

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

No watershed fire management plans are available that can be recommended by the MBNEP at this time. The California Department of Forestry and Fire Protection has created a web page with up-to-date information on fire management activities at http://frap.cdf.ca.gov/fire\_summit.html.

#### **BENEFITS OF THIS ACTION:**

 Reduced risk of fire; reduced build-up of fuels; reduced amounts of sediment; reduced erosion; meter-out the natural sediment over time; improvement of habitat diversity; facilitation of the reestablishment of a natural fire cycle on watershed lands; and conservation of chaparral species, including fire-follower species.

#### **IMPLEMENTATION:**

- 1. Develop a partnership to fund a fire management plan, the Morro Bay Estuary Fuels Management Planner.
- 2. Develop a team in cooperation with the MBNEP, USFS, CDF, NRCS, other appropriate regulatory agencies (such as the Air Resources Board), public and private landowners and other stakeholders to coordinate and oversee the Fire Management Program.
- 3. Complete the inventory and analysis of the watershed area.



- 4. Develop the Action Plan outlining steps to manage fire in the watershed, using CA Dept. of Forestry and Fire Protection guidelines.
- 5. Conduct environmental analysis of each project contained in the plan. (USFS).
- 6. Coordinate the environmental analysis of each project contained in the plan.
- 7. Develop a monitoring plan to determine effectiveness of projects.
- 8. Implement projects in the Action Plan. (CDF).
- 9. Coordinate regulations and planned actions.
- 10. Monitor results of the Fire Management Plan to determine effectiveness. (NRCS/NEP)

#### WHEN:

- Short Term: Develop a partnership to fund a fire management plan. Complete an inventory and environmental analysis of the watershed.
- Medium Term: Develop an Action Plan outlining steps to manage fire in the watershed. Develop a
  monitoring plan to determine effectiveness of projects. Start implementing projects.
- Long Term: Continue implementing projects and monitor results to determine project and overall plan effectiveness.

#### WHO:

**Primary:** 

- USFS (Funding, Interagency Cooperation, Inventory, Develop the Action Plan, Environmental Analysis, Monitoring Plan, Implement Projects, Coordinate regulations, Monitoring)
- CDF (Funding, Interagency Cooperation, Inventory, Develop the Action Plan, Environmental Analysis, Monitoring Plan, Implement Projects, Coordinate regulations, Monitoring)

#### Support:

- NRCS
- CDPR (Interagency Cooperation, Inventory and Analysis, Action Plan, Monitoring Plan, Implement Projects)
- CCCorps (Interagency Cooperation, Implement Projects)
- Public & private landowners (Interagency Cooperation)
- Air Resources Board (Interagency Cooperation)
- SWRCB (Monitoring)
- CCC (advisory)
- CSLCNG
- MBNEP (Interagency Cooperation)
- FOE (monitoring)

The Morro Bay Estuary Fire Planner will coordinate with the USFS, CDF, NRCS, public and private landowners and other stakeholders.

#### WHERE:

Upper watershed forested lands

#### COST:

Task/Step	Cost/yr	Duration of Project (once initiated)
Fire Management Planner and expenses	\$150,000	5 years
NEPA & CEQA	\$20,000	1-5 years
Implementation (500-1000 acres/year)	\$30,000-\$60,000 (\$150/acre treated)	1-5 years
Monitoring	\$5,000	1-5 years

**NOTE:** To reduce costs, a contract could be developed to create a plan with local agency participation used as a match.



#### BASIS FOR COST:

 Comparison to existing projects under CDF Vegetation Management Program and Forest Service Fire Management Program.

#### POTENTIAL FUNDING SOURCES:

- MBERF
- 50 percent matching funding by CDF, USFS, and public and private landowners
- See Chapter 7, Figure 7.4.

#### **EVALUATION:**

- Vegetation analysis of age classes.
- Annual reports documenting projects implemented.
- Estimated reduction in sediment loading to the bay.
- Evaluation of the effects to sensitive species, habitats, air quality, and impacts of an escaped fire.
- Action plan implementation

- EDU-11 (CEQA Checklist)
- CC-2 (Drainage)
- CC-5 (Stream Geomorphology & WQ)
- CC-7 (Watershed Crew)
- SED-2 (Sediment Traps)
- SED-4 (Landowner BMPs)
- SED-5 (Creek Restoration)
- SED-7 (BMP Incentives)
- HAB-8 (Eelgrass)
- STL-1 (Recovery Plan)



# SED-4: Supply technical and financial assistance to landowners to implement Best Management Practices (BMPs) on their land.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

Many landowners (private and public) in the watershed recognize that erosion is an issue on their land. Landowners need technical assistance, others need financial assistance, and many need both types of assistance.

Technical assistance to landowners includes:

- Developing conservation plans for their land.
- Development of plans and specifications for best management practices.
- Construction inspection during the implementation of best management practices.
- Organization of workshops and short courses for landowners regarding soil erosion prevention.
- Coordination of the permitting process.
- Monitoring the effectiveness of installed best management practices.
- Coordination of financial assistance to landowners for erosion prevention projects.
- Review of projects for soil erosion impacts.
- Informational and educational activities for the general public.

Financial assistance to landowners includes:

- Sharing the costs of implementing best management practices.
- Granting funds for the implementation of best management practices.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- On the John Maino Ranch, cattle watering devices have been installed away from creeks. Fencing was installed to establish approximately 35 separate pastures. Grazing of these cattle through the pastures has been established in order to utilize land more evenly, thereby allowing a longer period of rest for closed pastures during the year. This BMP can reduce sediment yield by as much as 50 percent. Other BMPs that may also reduce sediment erosion include establishing or expanding riparian buffers.
- The Monterey Water Resources Agency has implemented a program to decrease irrigation runoff to reduce erosion levels.

#### BENEFITS OF THIS ACTION:

- Reduced erosion.
- Sediment trapped before it reaches the bay.
- Less sediment delivered to the bay.
- Increased riparian, freshwater, wetland and fishery habitat.
- Monitoring by the NMP has shown that erosion and sediment BMPs also reduce bacteria in the creeks.
- Productivity of farms and ranches is maintained and improved.
- Permit streamlining will allow for the removal of a disincentive to implementation of BMPs.
- Awareness of the erosion problem is increased.

#### IMPLEMENTATION:

- 1. Fund the NRCS and UCCE and the CSLRCD to a level where they can provide technical assistance to landowners within the watershed.
- 2. Provide funding to landowners to share the costs of implementing best management practices to ensure that they are economically feasible and reasonable to implement.



#### WHEN:

- Short Term: Fund the NRCS and UCCE and the CSLRCD to a level where they can provide technical assistance to landowners within the watershed.
- Medium Term: Provide funding to landowners to share the costs of implementing best management practices to ensure that they are economically feasible and reasonable to implement.

#### WHO:

#### Primary:

- NRCS (technical and financial assistance) (Funding)
- CSLRCD (local funding entity) (Funding)
- BF (financial assistance) (Funding)
- UCCE (education) (Funding)

#### Support:

- Public & private landowners (CSLCNG, USFS, Cal Poly, SLOCo., CDPR, Cuesta College, and CMC) (willing participants to implement BMPs)
- USEPA (technical support)
- Permitting Agencies (SLOCo., USFWS, ACOE, CCRWQCB, USNMFS, CDFG) (cooperating in watershed permit)
- Farm Bureau (advisory)
- California Cattlemen's Association (advisory)
- CCCorps (work crew, technical assistance)
- SWRCB (advisory)
- FOE (monitoring)
- CCC (advisory)
- CCRWQCB (award of USEPA 319h Non-Point Source Grant Program funds for specific projects)

#### WHERE:

Public and private landowners throughout the watershed

#### COST:

Task/Step	Cost/year	Duration of Project (once initiated)
Technical Assistance	\$120,000	1-5 years
Installation	\$700,000	1-5 years
Maintenance	\$50,000	1-5 years

#### **BASIS FOR COST:**

- Existing program costs.
- Estimate of cost share potential.

#### POTENTIAL FUNDING SOURCES:

See Chapter 7, Figure 7.4.

#### **EVALUATION:**

- National Monitoring Program data on practice effectiveness.
- Number of practices installed.
- Estimates of erosion prevented (RUSLE or WEPP)
- Estimates of sediment captured.
- Reduction in suspended sediment and turbidity at downstream sites following implementation.
- Landowners provided with opportunities for technical assistance.



- CC-1 (Land acquisition)
- CC-2 (Drainage)
- CC-4 (Urban Runoff)
- CC-5 (Stream Geomorphology & Water Quality)
- CC-7 (Watershed Crew)
- BACT-2 (Grazing Management)
- All SED Actions
- HMT-14 (Mine Remediation)
- HAB-6 (Riparian Vegetation)
- HAB-8 (Eelgrass)
- NUTR-3 (Agricultural BMPs)
- NUTR-4 (Residential BMPs)
- STL-1 (Recovery Plan)
- STL-4 (Riparian Corridors)
- EDU-1 (General PEO
- EDU-3 (Ag. Outreach)
- EDU-4 (Pesticide Workshop)
- EDU-11 (CEQA Checklist)



S E D - 5

# SED-5: Supply the technical and financial assistance to landowners to implement creek restoration projects (including re-establishing floodplains and meander patterns) in Los Osos and Chorro Creeks.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

Many landowners (private and public) in the watershed recognize that streambank erosion is an issue on their land. Some landowners need technical assistance and others need financial assistance, many landowners need both types of assistance.

Technical assistance to landowners for creek restoration projects includes:

- Developing overall conservation plans for their land.
- Development of plans and specifications for creek restoration projects.
- Construction inspection during the implementation of projects.
- Organization of workshops and short courses for landowners regarding creek restoration projects.
- Coordination of the permitting process.
- Monitoring the effectiveness of installed projects.
- Coordination of financial assistance to landowners for creek restoration projects.
- Review of projects for creek impacts.
- Informational and educational activities for the general public.

Financial assistance to landowners includes such things as:

- Sharing the costs of implementing creek restoration projects.
- Granting funds for the implementation of creek restoration projects.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

The CSLRCD and the NRCS have been leading the Morro Bay Watershed Enhancement Project (MBWEP) for the last nine years. Working with their partners from the UCCE, SCC, CCRWQCB and watershed landowners the MBWEP has resulted in the implementation of more than 235 best management practices in the watershed. The implementation of these projects has resulted in the prevention of more that 172,000 tons of soil erosion. The partners of the MBWEP purchased and constructed the Chorro Flats Enhancement Project (CFEP). Although it was only completed in 1997, the CFEP has caught more than 210,000 tons of sediment to date. Additionally, the Los Osos Creek Wetland Reserve site on Los Osos Creek was acquired by partners of the MBWEP. This site has trapped more than 135,000 tons of sediment.

The SCC funded \$400,000 for cost sharing erosion control projects. The MBWEP has used other grants from the SCC, CCRWQCB, USDA, NRCS, CDFG, the MBNEP, and others to fund these efforts. Most of these funds have been used. In order to keep this program going new funds will have to be found.

The MBWEP has funded and or cost shared on more than 15 creek restoration projects. Projects have included simple fencing projects, migration barrier removals, bioengineering practices, fish stream improvements, flood plain restorations, riparian pastures, native plantings and many more.

#### BENEFITS OF THIS ACTION:

- Reduced erosion.
- Less sediment delivered to the bay.
- Increased riparian, freshwater, wetland and fishery habitat.
- Monitoring by the NMP has shown that erosion BMPs also reduce bacteria and nutrients in the creeks.
- Productivity of farms and ranches is maintained and improved.
- Permit streamlining will allow for the removal of a disincentive to implementation of BMPs.
- Awareness of the erosion problem is increased.
- Restored creeks.



#### IMPLEMENTATION:

- Address and evaluate entire stream systems for upstream effects. Coordinate with MBNEP Environmental Monitoring Program stakeholders to identify key sites for flood plain expansion and other sites suitable for sediment reduction.
- 2. Fund the NRCS and UCCE and the CSLRCD to a level where they can provide technical assistance to landowners within the watershed.
- 3. Provide funding to landowners to share the costs of implementing best management practices.
- 4. Provide assistance to landowners interested in applying for grants such as CDFG (SB-271) funding.
- 5. Coordinate and oversee implementation.

#### WHEN:

- Short Term: Evaluate entire stream systems for upstream effects. Fund NRCS, UCCE, and CSLRCD to
  where they can provide technical assistance to landowners.
- Medium Term: Provide assistance and funding to landowners to share in implementation costs. Coordinate and oversee implementation

#### WHO:

Primary:

- NRCS (technical assistance) (Evaluate streams, funding, oversee implementation)
- CSLRCD (technical assistance)
- UCCE (short courses)
- CDFG (plan review)
- Private Engineers and/or Consultants (technical support)

Support:

- MBNEP (workshops and monitoring)
- BF (funding)
- Public & private landowners (CSLCNG, USFS, Cal Poly, SLOCo., CDPR, Cuesta College, CMC) (receive technical assistance for actions on property)
- USEPA (funding and/or advisory)
- Permitting Agencies (SLOCo., USFS, ACOE, CCRWQCB, USNMFS, CDFG, USFWS)
- Farm Bureau (coordination; advisory)
- California Cattlemen's Association (advisory)
- CCCorps (work crew and technical assistance)
- SWRCB (advisory)
- FOE (monitoring)
- CCC (advisory)

#### WHERE:

Properties adjacent to Los Osos and Chorro Creeks and their tributaries

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Technical assistance	\$30,000	2-5 yrs
Short Courses	\$25,000	2-5 yrs.
Workshops	\$5,000	2-3 yrs
Project plan review	\$10,000	2-3 yrs
CEQA review	\$25,000	2-5 yrs.
Implement projects	\$50,000- 100,000	2-5 yrs.

#### BASIS FOR COST:

- Existing program costs.
- Estimate of cost share potential.



#### POTENTIAL FUNDING SOURCES:

See Chapter 7, Table 7.4.

#### **EVALUATION:**

- Technical assistance and funding provided to public and private landowners
- National Monitoring Program data on practice effectiveness.
- Number of practices installed.
- Estimates of erosion prevented. (RUSLE or WEPP)
- Habitat measurements.
- Number of creeks restored.

- CC-1 (Land acquisition)
- CC-2 (Drainage)
- CC-4 (Urban Runoff)
- CC-5 (Stream Geomorphology & WQ)
- CC-7 (Watershed Crew)All SED Actions
- BACT-1 (Grazing Management)
- HMT-1 (Mine Remediation)
- NUTR-3 (Agricultural BMPs)
- NUTR-4 (Residential BMPs)
- HAB-6 (Riparian Vegetation)
- HAB-8 (Eelgrass)
- STL-1 (Recovery Plan)
- STL-4 (Riparian Corridors)
- EDU-1 (General PEO)
- EDU-11 (CEQA Checklist)



# SED-6: Re-vegetate north sandspit areas without impacting snowy plover or least tern habitat.

#### BACKGROUND/MAJOR ISSUES:

Morro Bay is an important harbor for commercial and recreational fishing vessels. Tidally driven currents directly affect the deposition and scouring of sediment in all channels of the bay. Sedimentation affects navigation through shoaling, as it causes changes to the circulation patterns in the bay. Shoaling, which results from excessive sediment supply, causes a need for increased dredging.

The average annual displacement of Morro Bay's volume by eastward migration of the sandspit has been estimated at approximately 4,000 to 5,000 cubic yards of the tidal prism. A 1975 estimate was made of 8,300 cubic yards per hear of total aeolian transport. The difference of 4,000 cubic yards per year is accounted for by the amount of wind deposited sediment transported and deposited elsewhere in the bay through tidal channels.

The Draft Estero Area Plan states that the State Department of Parks and Recreation and other applicable agencies should monitor and restore sensitive habitats by continuing the existing program to revegetate the sandspit to control sedimentation of the bay.

The Land Use Plan for the City of Morro Bay (1982) proposes that "privately-owned parcels on the sandspit shall be designated as environmentally sensitive habitat" and that "an appropriate state agency acquire the privately-owned parcels on the sandspit." In addition, the plan requests the State of California to initiate a revegetation program on the northern sections of the sandspit.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

APDP - Veldt Grass Suppression

#### BENEFITS OF THIS ACTION:

Reduced sedimentation of the harbor and bay occurring from windblown sand.

#### IMPLEMENTATION:

- 1. Advocate for the implementation of the policies (1.43-1.45) in the Land Use Plan for the City of Morro Bay to designate the sandspit as environmentally sensitive habitat with passive recreational use allowed consistent with resource protection policies. Support the program in the draft Estero Area Plan for the CDPR and other applicable agencies to monitor and restore sensitive habitats by revegetating the sandspit to control sedimentation of the bay.
- Support the state acquisition of privately owned parcels on the sandspit by coordinating with the Habitat Committee. Where privately owned parcels cannot be acquired, provide incentives and technical assistance to encourage local landowners to undertake revegetation efforts to restore native species on the sandspit.
- 3. Initiate a program to stabilize and revegetate the northern section of the sandspit using native species in order to reduce sedimentation of the harbor occurring from windblown sand without impacting snowy plover or least tern habitat.

#### WHEN:

• Long Term: Support the state acquisition of privately owned parcels on the sandspit. Stabilize and revegetate the northern section of the sandspit using native species.

#### WHO:

Primary:

Private and public landowners (Implementation)



#### SED - 6

#### Support:

- MBNEP (coordinating)
- USFW (Coordination of species habitat identification)
- Sierra Club (Advocate Implementation)
- Audubon Society (Advocate Implementation)
- California Native Plant Society (organize work teams and coordinate planting seeds)
- CCCorps (work crew)
- UCCE (technical assistance)
- Public & private landowners (implement revegetation)
- SWRCB (advisory)
- FOE (monitoring)
- CDPR (support restoration efforts)
- CDFG
- CCC (Advocate Implementation, Land Acquisition)
- EPA (funding)

#### WHERE:

North Sandspit

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
ESH designation	\$25,000	1-2 yrs
Land acquisition	\$150,000	2-3 yrs
Develop Reveg Plan	\$25,000	<1
Implement Reveg (Phase I)	\$50,000	1 <sup>st</sup> yr
Implement Reveg (Phase II)	\$25,000	2-3 yr

#### BASIS FOR COST:

 The estimates for cost are very rough general figures. Exact costs are not known and are highly dependent upon volunteer contributions and the actual overall area used by snowy plover and lest tern will not be revegetated.

#### POTENTIAL FUNDING SOURCES:

• See Chapter 7, Table 7.4

#### **EVALUATION:**

- ESH designation.
- Number of acres of revegetated sandspit.
- Number of stabilization projects initiated.
- State acquisition of privately-owned sandspit areas.

- EDU-11 (CEQA Checklist)
- CC-2 (Drainage)
- CC-5 (Stream Geomorphology & WQ)
- CC-7 (Watershed Crew)
- SED-2 (Sediment Traps)
- SED-4 (Landowner BMPs)
- SED-5 (Creek Restoration)
- SED-7 (BMP Incentives)
- HAB- 8 (Eelgrass)
- STL-1 (Recovery Plan)



## SED-7: Provide incentives for landowners to encourage implementation of Best Management Practices (BMPs) for erosion control and sediment retention.

#### BACKGROUND/MAJOR ISSUES:

The MBNEP characterization indicates that brush-covered steep slopes are the primary sources of sediments in the creeks and the bay. Implementing conservation practices geared towards upland land uses on public and private lands will reduce the accelerated rate of erosion in the watershed and sedimentation in the bay. In order to implement some (e.g., stream bank) management measures to reduce soil loss and erosion, numerous permits must be obtained. Permits are required by agencies, including, but not limited to the following: ACOE, CCRWQCB, CCC, USNMFS, CDFG, USFWS, and SLOCo. One major disincentive to conservation work is the lengthy, arduous, and costly permitting process.

Many landowners decline to implement practices that may reduce erosion because of the perception that the permitting process is too difficult, expensive, and/or time-consuming. The lengthy process and associated fees often make obtaining the required permits and implementing the project infeasible. In addition, many conservation practices are expensive. However, despite these difficulties, many conservation practices are currently in use in the Morro Bay watershed.

Management measures such as setbacks from creeks, buffers, and in-stream clearances are being implemented throughout the watershed with the assistance of cost-sharing programs on both private ranches and public lands. Continuing to implement conservation practices geared towards upland land uses will reduce the accelerated rate of erosion in the watershed and sedimentation in the bay. Developing incentives for landowners would increase the numbers of conservation practices that would be carried out in the watershed.

Presently the NRCS and the CSLRCD are working with an organization called Sustainable Conservation to develop a permit streamlining process for the implementation of best management practices. This effort is funded through the NEP early action funds. The MBWEP has participated in several short courses and workshops and tours for the education of the landowners and the general public. See APDP project description in Appendix C.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- Sustainable Conservation, in partnership with the Natural Resources Conservation Service, the Water Quality Protection Program, and the Monterey Bay National Marine Sanctuary, have designed the innovative Partners in Restoration program. The Morro Bay Watershed is completing a Partners in Restoration watershed permit with Sustainable Conservation. This program is designed to improve water quality, enhance wildlife habitat and preserve agricultural resources. In the Elkhorn Slough area, near Salinas California, this watershed, streamlined permit program is improving water quality, enhancing wildlife habitat, and preserving agricultural resources by streamlining the regulatory review for farmers willing to voluntarily implement conservation practices on their lands. Management measures are being implemented throughout the watershed with the assistance of cost-sharing programs on both private ranches and public lands.
- Through the efforts of the California Coastal Conservancy, CSLRCD, NRCS, SWRCB, and numerous private and public landowners, conservation practices have been implemented throughout the Morro Bay watershed. The California Coastal Conservancy granted \$400,000 to the CSLRCD to carry out an erosion control cost-sharing program. The CSLRCD shared the cost of implementing management practices with local landowners. Landowner acceptance and response to the Program was very good. The local workgroup has applied for Environmental Quality Incentives Program (EQIP) funding for the watershed, but it has not yet been successful.



SED-7

 Illinois Department of Agriculture, Office of Soil and Water Conservation—Taxes on qualifying land used as a vegetative filter strip can be reduced to one-sixth its value under an Illinois state law in effect since 1997. During the first year, 845 landowners have been certified for 1,149 individual filter strips that cover about 8,722 acres.

#### BENEFITS OF THIS ACTION:

- Reduced erosion and sedimentation—as much as 80 percent.
- Increased implementation of conservation practices in the Morro Bay watershed.
- Increased voluntary participation by landowners in erosion control projects.
- Streamlined process and easier implementation of conservation practices by landowners.

#### **IMPLEMENTATION:**

- 1. Evaluate and apply where appropriate the lessons learned from other programs regarding permit streamlining. (See APDP project description in Appendix C) (MBNEP)
- 2. Consult with tax expert on innovative incentive options, such as the Fish-Timber Tax Credit Program. (MBNEP)
- 3. Work with agencies to make incentive programs available, such as EQIP, Wildlife Habitat Incentives Program, Rangeland Water Quality Management Program, Conservation Reserve Program, Safe Harbors Agreements, and Partners for Wildlife.
- 4. Develop Incentive programs (MBNEP cost-sharing programs for erosion control investigate effectiveness of aerial seeding of native grasses in upper watershed).
- 5. Contract with CSLRCD to carry out cost-sharing programs.
- 6. Implement the Morro Bay Watershed Permit Program

#### WHEN:

- Short Term: Consult with tax expert on innovative incentive options, such as the Fish-Timber Tax Credit Program. Work with agencies to make incentive programs available.
- Medium Term: Develop Incentive programs, contract with CSLRCD to carry out cost-sharing programs, and implement the Morro Bay Watershed Permit Program.

#### WHO:

#### Primary:

- MBNEP (coordination)
- Public & private landowners (Agricultural Water Quality Program Coordination Committee)

Support:

- CSLRCD (Lessons Learned, Taxes, Incentives, Permits)
- UCCE (Incentives, Permits)
- USEPA (technical assistance and funding)
- NRCS / (Wildlife Habitat Incentives Program, Wetlands Reserve Program, and Conservation Reserve Program)
- USFWS (Partners for Wildlife) (Lessons Learned, Incentives, Permits)
- LOCSD (Taxes)
- SWRCB (advisory)
- FOE (monitoring)
- CCC (advisory)

#### WHERE:

Upper watershed highly erodable land and erodable land throughout the watershed.

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Review existing incentive programs	\$5,000	1 year
Develop options	\$10,000	1 year
Streamline permit process	\$100,000	1 yr for specific measures


# BASIS FOR COST:

NRCS

# POTENTIAL FUNDING SOURCES:

• See Chapter 7, Table 7.4.

# **EVALUATION:**

- Reduced sediment loadings in the Morro Bay watershed.
- Number of incentive programs and users.
- Implementation/adoption of streamlined permit

- CC-2 (Drainage)
- CC-4 (Urban Runoff)
- CC-5 (Stream Geomorphology & WQ)
- BACT-1 (Grazing Management)
- All SED Actions
- NUTR-3 (Agricultural BMPs)
- HAB-8 (Eelgrass)
- STL-1 (Recovery Plan)
- EDU-3 (Agricultural Outreach)
- EDU-11 (CEQA Checklist)



S E D - 8

# SED-8: Improve degraded navigation channels and estuary habitat conditions, and increase circulation patterns.

# BACKGROUND/MAJOR ISSUES:

Maintenance dredging is carried out regularly by the ACOE working with the City of Morro Bay harbor department. The U.S. Army Corps of Engineers has a long history of funding dredging projects in the bay due to its involvement in construction of the navigation channels, revetments, and the breakwaters in the 1930's and 1940's. Additionally, in 1997, the United States Congress authorized ACOE completion of a Reconnaissance study to look into habitat restoration in the Morro Bay estuary. This study was completed in July 1998, and the conclusion was that there was a clear federal interest in proceeding with habitat restoration in the estuary. Federal funds have been made available to conduct a feasibility study to examine alternatives and implement habitat restoration projects in the estuary, but local sponsors are needed for the Army Corps of Engineers to carry out the feasibility study and to construct and implement the project(s). A local sponsor can be a state or tribe that has the legal and financial authority to provide cash and real estate requirements needed for a project.

# EXAMPLE OF SIMILAR IN-PLACE ACTIONS

The ACOE conducted a feasibility study in the Morro Bay area in 1991. At that time, the City of Morro Bay acted as local sponsor as the objective of the project was to provide a safer entrance into the Morro Bay harbor. If a local sponsor can be identified to share costs for the current study, the ACOE is now intending to provide federal funding for habitat restoration in the Morro Bay estuary.

The Corps is currently conducting similar feasibility studies and/or restoration projects in the Newport Harbor area in California, and in Barnegat Bay, New Jersey.

Upper Newport Harbor, Batiquitos Lagoon project to mitigate impacts at the Port of Los Angeles. The Port is currently implementing the Batiquitos Lagoon Enhancement project which includes dredging the lagoon, constructing new inlet jetties to keep the mouth open and permanently restore tidal flows and creating nesting areas for colonial nesting birds including the CA least tern and western snowy plover. Sediment traps and vegetation planting may be useful.

# **BENEFIT OF THIS ACTION:**

Morro Bay serves as commercial, sport, and recreational fishing harbor. The maintenance of the bay entrance and harbor channels as navigable waterways is essential to maintaining a continued viable fishing industry in the bay. Morro Bay also provides essential estuarine habitat for many species of fish and marine organisms that can be negatively impacted by excessive sedimentation. Eelgrass beds are an important habitat in the bay, as they provide food for migrating brant geese and shelter many fish and invertebrate species. This valuable resource can be and has been damaged by an accelerated accumulation of sediments. Habitat restoration projects could decrease the amount of sediment being deposited in the estuary, and also enhance wetland habitats in the bay that may have been damaged from past dredging activities. For example, areas adjacent to Cuesta inlet contain dredge spoils that have made it possible for large populations of the invasive plant pampas grass to become established at the expense of native wetland species. Pampas grass removal could be a potential habitat restoration project. Increased tidal prism and reduced rates of sediment would result from this project.

# IMPLEMENTATION:

- 1. Partners identify local sponsors and a contracting entity for the feasibility study (see Cost info below) which will be managed by the MBNEP.
- 2. Local sponsor enters into feasibility cost-share agreement with Corps.
- 3. Local sponsor works with Corps to identify possible projects based on Corps Reconnaissance Study, MBNEP's technical characterization and action plans, project feasibility, and the effectiveness of the project in reducing erosion and sedimentation, or in meeting other MBNEP/Corps goals.



- 4. Potential projects may include, but are not limited to, the following:
  - Implement pilot dredging project for back bay channels and/or mudflat areas
  - Develop constructed wetlands for improved stormwater quality
  - Develop sediment retention basins
  - Acquire property for sediment retention basins
  - Acquire easements for buffers
  - Floodplain re-establishment
  - Eelgrass restoration
  - Restoration and revegetation of previously-dredged lands (Cuesta inlet)
  - Exotic species removal
- 5. ACOE conducts Environmental Review (EIS/EIR ACOE is lead).
- 6. Congress authorizes construction.
- 7. Pre-construction engineering and design is initiated.
- 8. Construction phase occurs.
- 9. Operation and Maintenance is funded entirely by local entity.
- 10. Local entity/MBNEP monitors the effectiveness of implemented project(s).

#### WHEN:

- Short Term: Local sponsor enters into feasibility cost-share agreement with Corps. Local sponsor works with Corps to identify possible projects based on Corps Reconnaissance Study.
- Medium Term: Project alternatives are analyzed. ACOE conducts Environmental Review. Congress authorizes construction.
- Long Term: Pre-construction engineering and design is initiated. Construction phase occurs.

#### WHO:

Primary:

ACOE, with non-federal sponsors (project lead)

#### Support:

- MBNEP (coordination)
- BF (funding)
- CDPR (funding)
- CDFG (technical assistance)
- SCC (technical assistance)
- CCC (advisory)

#### WHERE:

Estuary and throughout the watershed

# COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Feasibility Study Phase	\$1,600,000*	1-3 years
Environmental Review and Design	\$1,000,000*	1-3 years
Construction	\$8,000,000*	2-5 years
Operation and Maintenance	\$25,000*	1-5 years

\*one time cost only

# BASIS FOR COST:

• ACOE Study Plan; other similar projects in progress

# POTENTIAL FUNDING SOURCES:

- MBERF
- Congressional appropriations for ACOE
- CA Coastal Conservancy Grants
- CDPR Habitat Conservation Fund grants and Mitigation Funds



# SED-8

- DWR Urban Stream grants
- See Chapter 7, Figure 7.4.

# EVALUATION:

- Implementation of project(s)
- Reduction in accelerated sediment loading
- Reduction in accelerated (need to define measurable target) sedimentation in the back bay
- Maintenance of a navigable harbor

- EDU-11 (CEQA Checklist)
- CC-2 (Drainage)
- CC-5 (Stream Geomorphology & WQ)
- SED-2 (Sediment Traps)
- SED-4 (Landowner BMPs)
- SED-5 (Creek Restoration)
- SED-7 (BMP Incentives)
- HAB-5 (Restore Habitat)
- HAB-8 (Eelgrass)
- STL-1 (Recovery Plan)

# BACTERIA



# 4.3 BACTERIA

Human illness can result from eating seafood contaminated by bacteria and swimming in contaminated waters. Elevated levels of bacteria are an indication that other pollutants, such as bacterial or viral pathogens may be present. To protect public health, state and local governments sometimes have to restrict seafood harvesting and/or bathing beaches while long term solutions to these problems are being developed. The California Department of Health Services (CDHS) requires the Morro Bay oyster grower to shut down for many days after significant rainfall and will not allow harvesting in portions of the lease area. Elevated levels of fecal coliforms are an indication that the bay may not be safe for swimming and other forms of water contact activities.

Morro Bay has experienced elevated levels of bacteria, which present a potential health threat to those who utilize the bay for recreational purposes and economic threats to those who depend upon the resources of the bay for their livelihood. Recently, portions of the bay's oyster beds were closed or restricted for harvest because of high fecal coliform levels. In addition, bacteria levels have been found at times to exceed water-contact standards as defined by the Regional Water Quality Control Board (CCRWQCB).

Contributors to high bacteria levels include: discharged effluent, failing septic systems, domestic animal waste, waste from wildlife, boats with inadequate waste disposal capabilities, urban runoff, agricultural runoff, and others.

# MBNEP GOALS SUPPORTED BY BACTERIA ACTION PLANS:

- Ensure that bay water remains of sufficient quality to support a viable commercial shellfish mariculture industry, safe recreational uses, healthy eelgrass beds, and thriving fish and shellfish populations.
- Protect social, economic, and environmental benefits provided by the bay and watershed through comprehensive resource management planning.
- Promote public awareness and involvement in estuarine management issues through outreach, educational programs, and the use of volunteers in ongoing bay monitoring and other programs.

# BACTERIA OBJECTIVES AND SUMMARY OF ACTIONS:

**BACT OBJECTIVE 1:** Reduce the length of rainfall- and non-rainfall-related closures of restricted shellfish lease areas, and meet standards for water contact recreation.

- Action BACT-1: Implement grazing management measures that are successful at reducing bacteria levels.
- Action BACT-2: Upgrade existing pump-out facilities (where needed), improve accessibility, and provide new pump-out facilities at additional locations where feasible, to minimize the impacts of waste discharges and improperly functioning marine sanitation devices (MSDs – vessel restrooms).
- > Action BACT-3: Remove illegal moorings (and prevent future illegal occurrences) in the backbay to reduce the potential for high-concentrations of bacterial pollution in the vicinity of shellfish harvest areas.
- Action BACT-4: Remove abandoned, derelict boats, and vessels in the backbay to reduce the potential for high-concentrations of bacterial pollution in the vicinity of shellfish harvest areas.



**BACT OBJECTIVE 2:** Decrease levels of bacteria originating from live-aboard boats (both within and outside the Morro Bay City limits).

- Action BACT-5: Decrease levels of bacteria from liveaboard boats (both within and outside the City of Morro Bay limits).
- Action BACT-6: Explore the bio-filtration potential of the Pacific Oyster (Crassostrea gigas) to decrease bacterial levels and increase the overall water quality of the bay.

BACT OBJECTIVE 3: Decrease bacterial pollution from wildlife, domestic pets, and horses as feasible.

- Action BACT-7: Install and maintain bird-deterrent floats in shellfish-growing areas to reduce the potential for avian fecal contamination of harvestable shellfish.
- Action BACT-8: Support the establishment of an off-leash dog park and provide supplies around high use recreational areas for the pick-up of pet waste, and promote protection of creekbeds from horse trails during low flow periods.

**BACT OBJECTIVE 4:** Promote consistent and comprehensive water quality standards and monitoring efforts region-wide.

Action BACT-9: Coordinate state and local bacteriological water quality standards and monitoring efforts so they are consistent and comprehensive.

Table 4.6	Increased Bacterial Concentration Actions—Implementing
	Organizations

	Bact-1	Bact-2	Bact-3	Bact-4	Bact-5	Bact-6	Bact-7	Bact-8	Bact-9
	Grzing	Pump-	Illegal	Aband.	Live-	Bio-	Bird	Pet	WQ Stnd
Agency/Organization	Mgmt	outs	Moorg	Boats	aboard	filtrtn	Deter	Waste	
ACOE	S	· · · ·					l	1	1
Assoc Const.			S	S					
BF	S	S	S						
Boat owners		S						1	
Cal Poly	S					Р			
Cattlemen Assoc.	S								
CCC	S	S	S	S	S	S	S	S	S
CCCorps	S						S		
CCRWQCB	S			S.					P
CDBW			S	S	S				
CDFG	S	Р	Р	P	Р				
CCDHS									P
CDPR	S			S				1	
CMB			S		Р			S	S
CMC	S						1		
CSLCNG	S								
CSLRCD	Р								
Cuesta College	S								
Farm Bureau	P								
FOE			S	S					
Fuel Dock Op.		S			S				
Local Residents								P	
MBHD		P	S	S	S				
MBNEP	S	S	S	S	S	S	S	P	S
NRCS	<u>P</u>								L
Private Industry					S				
Public/Private	P						1		S
Landowners								ļ	<u> </u>
Sheriff Dive			<u> </u>	S		[			<u> </u>
SLC			S						
SLOCo.	S	S			S			S	<u>P</u>
SWRCB	S			ļ	L				<u> </u>
UCCE	S			ļ				ļ	
USCG		S	S	S	P	L		ļ	
USEPA	S	S		ļ	S		 	<b> </b>	<u> </u>
USFS	S							ļ	l
USFWS	S								ļ
USNMFS	S			L		 	ļ	<u></u>	ļ
W. Shellfish			S	S	l	S	P		1

P = Primary role in implementation and monitoring project outcomes and effectiveness. S = Supporting role in implementation.

1----



# BACT-1: Implement grazing management measures that are successful at reducing bacteria levels.

# Priority Action

# BACKGROUND/MAJOR ISSUES:

Over the past nine years, the NRCS has implemented, through cooperative agreements with public and private landowners in the watershed, grazing management practices that are geared toward reducing agricultural nonpoint sources of pollution. On Chumash Creek, smaller riparian pastures have been created. On Chorro Creek and Dairy Creek, cattle exclusion fencing has been installed in an effort to improve water and habitat quality. Management measures have also been installed on Pennington Creek and Walters Creek. The National Monitoring Program suggests that these practices are effective in decreasing bacteria levels in the creeks that feed Morro Bay.

Many landowners (public and private) in the watershed recognize that water quality degradation is an issue on their land and are voluntarily using effective management measures. They desire to reduce the amount of impact on their property. Some landowners need technical assistance and others need financial assistance; many landowners need both types of assistance (See SED-4).

# EXAMPLE OF SIMILAR IN-PLACE ACTIONS

- Management measures are being implemented throughout the watershed with the assistance of cost-sharing programs on both private ranches and public lands.
- The CSLRCD and the NRCS) have been leading the Morro Bay Watershed Enhancement Project (MBWEP) for the last nine years. Working with their partners in the UCCE, the SCC, the CCRWQCB and watershed landowners the MBWEP has implemented more than 235 best management practices in the watershed.
- Some agricultural landowners are independently contributing to the solution by utilizing effective management practices.

#### **BENEFITS OF THIS ACTION:**

- Reduced bacteria levels in runoff from watershed grazing lands.
- Reduced bacterial levels in the estuary.
- Possible changes in oyster lease classifications and fewer shellfish bed closures.

# **IMPLEMENTATION:**

- 1. Prioritize projects based on the MBNEP's technical characterization, project's feasibility, and the effectiveness of the project in reducing bacteria levels in the creeks. Identify ranchers and farmers who are willing to voluntarily implement conservation practices on their land.
- 2. MBNEP contract with CSLRCD, Farm Bureau, and/or other entities to carry out cost sharing programs. Identify additional funding sources to implement project cost sharing.
- 3. Implement projects
- 4. Monitor the effectiveness of implemented actions.
- 5. Conduct technical transfer to share the knowledge and experience of those landowners who have independently and voluntarily implemented effective management measures on their land.

#### WHEN:

- Short Term: Identify ranchers and farmers who are willing to voluntarily implement conservation
  practices on their land. MBNEP contract with CSLRCD, Farm Bureau, and/or other entities to carry out
  cost sharing programs. Identify additional funding sources to implement project cost sharing.
- Medium Term: Implement projects and monitor the effectiveness of implemented actions.



# WHO:

# Primary:

- CSLRCD (cost sharing)
- Farm Bureau (advisory)
- NRCS (technical assistance; watershed permit)
- Public & private landowners (implementers)

# Support:

- MBNEP (coordinator; set priority of projects and seek funding)
- UCCE (technical assistance)
- BF (funding)
- Public & private landowners (CSLCNG, USFS, Cal Poly, SLOCo., CDPR, Cuesta College, CMC) (implementers)
- USEPA (technical assistance)
- Permitting Agencies (SLOCo., USFWS, ACOE, CCRWQCB, USNMFS, CDFG) (regulators)
- California Cattlemen's Association (advisory)
- CCCorps (work crew on fencing effort)
- CCC (advisory)
- SWRCB (advisory)

# WHERE:

Properties with grazing activities

# COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Technical assistance	\$30,000	1-5 years
Financial assistance (cost- sharing) to landowners	\$200,000	1-5 years
Maintenance	\$50,000	1-5 years

# BASIS FOR COST:

- Existing Program costs
- Estimate of cost share potential

# POTENTIAL FUNDING SOURCES:

- MBERF
- EQIP
- NRCS
- USEPA 319h Non-Point Source Grant Program
- ACOE (WRP)
- CCC
- UCCE (technical assistance)
- USFWS (possible funding through ESA)
- ACOE (Watershed Restoration Program)
- See Chapter 7, Figure 7.5.

# EVALUATION:

- Numbers of ranches implementing grazing management practices
- Measured reduction in fecal coliform levels using a pre and post implementation, upstream/downstream study design



- CC-7 (Watershed Crew) .
- SED-4 (Landowner BMPs) SED-5 (Creek Restoration) .
- .
- SED-7 (BMP Incentives) .
- NUTR-1 (Los Osos Wastewater) EDU-3 (Agricultural Outreach)

# BACT-2: Upgrade existing pump-out facilities (where needed), improve accessibility, and provide new pump-out facilities at additional locations where feasible, to minimize the impacts of waste discharges and improperly functioning marine sanitation devices (MSDs—vessel restrooms).

# BACKGROUND/MAJOR ISSUES:

It is illegal to discharge untreated sewage into any of California's lakes, rivers, reservoirs, or coastal waters within the three-mile U.S. territorial limit. The U.S. Coast Guard can issue fines of up to \$2,000 for the illegal discharge of sewage. Illegal discharge of untreated sewage can increase the risk of sewage-related pathogens associated with shellfish consumption, recreational activities, and human health. The untreated human wastes of a single boater can contribute the same amount of bacterial pollution as the sewage from 10,000 people whose sewage passes through a municipal sewage treatment system.

During 1993-1997, San Luis Obispo County experienced a vessel growth rate that outpaced the state average. In 1997, more than 14,000 boats were registered county-wide, with many more transient boaters passing through. While some of these boats are used exclusively in lakes or stored on land and launched periodically, there is still a need for improved and additional pump-out facilities. Guidelines proposed by the U.S. Clean Vessel Act call for one pump-out stations for every 300-600 boats. Pump-out facilities currently exist on Morro Bay at Tideland's Park (the most accessible), the Beacon Fuel Dock, Marina Square, and the South T-Pier. These facilities are used by many commercial and recreational boaters and by liveaboards on the bay, and there is a need to upgrade some facilities and provide new facilities at easily accessible locations.

Upgrading existing pump-out facilities and installing new pump-outs at additional accessible locations will make it easier for boat-owners to use the facilities, thereby minimizing impacts of waste discharges and improperly functioning marine sanitation devices on the water quality in Morro Bay. Educating boaters about legal disposal sites for the collection of sewage will reduce amounts being illegally released into the bay.

# EXAMPLE OF SIMILAR IN-PLACE ACTIONS

- The Monterey National Marine Sanctuary secured a grant from the California Integrated Waste Management Program to establish pump-out stations in the major harbors of Moss Landing, Santa Cruz, and Pillar Point Harbors within the sanctuary.
- The City of Morro Bay installed an upgraded pump-out facility at the Morro Bay Tidelands Dock funded by California Integrated Waste Management Program.

# BENEFITS OF THIS ACTION:

 This action will minimize the bacteria loading from waste discharges and improperly functioning MSDs, and help to ensure a viable shellfish industry and healthy recreation areas within the bay.

# IMPLEMENTATION:

- 1. Coordinate, fund, and construct new sewage pump-out facilities.
- 2. Upgrade existing pump-out facilities as new technology is developed.
- 3. Improve the accessibility of pump-out facilities and locations to boat owners.
- 4. Provide educational materials (e.g., Boater's Guide) regarding pump-out locations, impacts to beneficial uses from waste discharges, MSDs, laws regarding waste discharge, etc. (See EDU-2)

# WHEN:

- Short Term: Provide educational materials (e.g., Boater's Guide) regarding pump-out locations, impacts to beneficial uses from waste discharges, MSDs, laws regarding waste discharge, etc. (See EDU-2)
- Medium Term: Coordinate, fund, and construct new sewage pump-out facilities. Upgrade existing pump-out facilities as new technology is developed. Improve the accessibility of pump-out facilities and locations to boat owners



# WHO:

#### **Primary:**

- MBHD (Coordinate, fund, construct, upgrade, and improve accessibility to sewage pump-out facilities, education)
- CDFG (Coordinate, fund, construct, upgrade, and improve accessibility to sewage pump-out facilities, education)

# Support:

- Fuel Dock Operators (improve accessibility to sewage pump-out facilities, education)
- USEPA (technical assistance)
- USCG (improve accessibility to sewage pump-out facilities, education)
- SLOCo. Environmental Health (improve accessibility to sewage pump-out facilities, education)
- MBNEP (coordinate)
- BF (funding)
- Boat owners (use new facilities and guides)
- CCC (advisory)

#### WHERE:

Morro Bay harbor and marina areas

# COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Example cost per pump-out unit	\$10,000	1-2 years
Example cost for a portable toilet waste station	\$1,100-\$1,800	1-2 years
Boating Guide	*	1 year

\*Cost of Boating Guide is accounted for in EDU-2

NOTE: Installation and construction costs vary depending on the type of equipment selected.

# BASIS FOR COST:

- Tampa Bay CCMP
- Indian River Lagoon CCMP
- Lower Columbia River CCMP

# POTENTIAL FUNDING SOURCES:

- MBERF
- U.S. Clean Vessel Act grants
- CDBW
- See Chapter 7, Figure 7.5.

# **EVALUATION:**

- Use of the pump-out facilities can be tracked to determine effectiveness by installing usage meters to gauge pump-out use. Success can be evaluated by the annual number of gallons of sewage metered at pump-outs from baseline conditions.
- Boaters can be surveyed to ascertain if they are using pump-out facilities and how they can be improved.
- Number of Boater's Guides distributed.



- RELATED ACTIONS: BACT-3 (Illegal Moorings) BACT-5 (Liveaboards) BACT-7 (Bird Deterrents) NUTR-1 (Los Osos Wastewater) HMT-2 (Marina BMPs) HMT-4 (Hazardous Waste Network) EDU-2 (Boater Outreach)



# BACT-3: Remove illegal moorings (and prevent future illegal occurrences) in the backbay to reduce the potential for high-concentrations of bacterial pollution in the vicinity of shellfish harvest areas.

# > Priority Action

# BACKGROUND/MAJOR ISSUES:

On May 5, 1992, the State Lands Commission (SLC) entered into a lease with the California Department of Fish and Game (CDFG) and the California Department of Parks and Recreation (CDPR) for the management of two adjacent shellfish tracts in south Morro Bay. One of the issues the agencies were to resolve was that of illegal moorings. One concern is that many illegally moored vessels are occupied (liveaboards) and may dispose of their waste at anchorage. Given the proximity to the shellfish lease, this may be contributing to the fecal coliform problem that the Department of Health Services is monitoring. There is currently no temporary mooring facility in the backbay, so boaters leave their vessels in areas where they can find an unoccupied mooring.

# EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

 Redwood City and Contra Costa County have established programs for abatement of illegal moorings and abandoned boats.

# **BENEFITS OF THIS ACTION:**

 Reducing the number of illegal moorings would reduce the potential for illegal disposal of waste discharge adjacent to a shellfish tract.

# **IMPLEMENTATION:**

- 1. Complete inventory and engage in continuous monitoring of buoys. An inventory by CDFG of the buoys that are located in the DFG lease area needs to be maintained in order to track changes in these unauthorized uses. This will determine if vacated buoys are being reoccupied and if new buoys are being installed.
- 2. Remove illegal moorings. There is a need to begin removal of illegal buoys and vessels. Buoys that are unoccupied and abandoned as identified above should be removed in order to clean up the bay, and also to insure that additional boats do not re-occupy these sites. [Note: DFG has been removing these illegal moorings.] Anchor types must be identified via diver survey, and concrete blocks that have settled below the mudline can probably be left in place. Old engine blocks, whether they have settled below the mudline or not, must be removed. Some buoys will be easier to remove than others. If the anchor can be left in place, the chain can simply be cut at the mudline and the chain and buoy removed. A larger vessel will be required if the anchors must be removed. DFG staff may be able to dive the buoys to identify which ones require anchor removal and which do not. Various volunteers might be available to accomplish the buoy removal over time. Local shops have offered free equipment for volunteers.
- 3. Identify alternative locations and designs for a temporary mooring facility in the backbay, with proper shoreside facilities at the State Park marina to provide increased capacity.
- 4. Develop a plan to shift vessels from temporary moorings to permanent sites within established mooring areas in the bay.

It is worth noting that, while there is not a direct tie between this clean up and the various problems (unauthorized mooring/fecal coliform impacts on the shellfish operation), there is an important message that these actions would send. It would indicate clearly that the agencies responsible do care about the condition of the bay and are willing and able to take steps to improve and maintain it. Such a message should help to convince some of the owners of the unauthorized vessels of our resolve, and could lead to some of them removing their boats from the moorings.



# WHEN:

- Short Term: Complete inventory and engage in continuous monitoring of buoys.
- Medium Term: Remove illegal moorings and identify alternative locations and designs for a temporary mooring facility.
- Long Term: Develop a plan to shift vessels from temporary moorings to permanent sites within established mooring areas in the bay

#### WHO:

Primary:

• CDFG (manage lease area, take inventory, and carry out legal authority)

Support:

- State Lands Commission (leases land to CDFG)
- MBNEP (coordinate)
- CDBW (technical assistance; funding)
- MBHD (city) (removal of moorings, man power, vessel power, and technical assistance)
- USCG (technical assistance)
- Sheriff's Dive Team (implementer/removal)
- Associated Pacific Constructors (implementer/construction)
- BF (funding)
- FOE (monitoring)
- Williams Shellfish Farm (advisory)
- CMB (technical assistance)
- CCC (advisory)

# WHERE:

Back bay area of Morro Bay

# COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Inventory	\$5,000*	2-5 years
Remove illegal moorings	\$8,000	2-5 years
Develop temporary mooring facility and shoreside support (dockside pump-out with parking spaces)	\$30,000- \$40,000*	2-5 years

#### \*one time cost only

# BASIS FOR COST:

Morro Bay Harbor Department

# POTENTIAL FUNDING SOURCES:

- MBERF
- See Chapter 7, Figure 7.5.

# **EVALUATION**

- An annual tally of buoys should be conducted.
- Illegal moorings removed.
- " Creation of a temporary mooring facility at the California State Park Marina.

- BACT-2 (Pump-outs)
- BACT-4 (Abandoned Boats)
- NUTR-1 (Los Osos Wastewater)



# BACT-4: Remove abandoned, derelict boats and vessels in the backbay to reduce the potential for high-concentrations of bacterial pollution in the vicinity of shellfish harvest areas.

# Priority Action

# BACKGROUND/MAJOR ISSUES:

One of the issues associated with illegal moorings is the presence of derelict, or abandoned boats tied to the illegal moorings. A concern is that many illegally moored vessels are occupied (liveaboards) and probably dispose of their waste at anchorage.

# EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

Redwood City established the Aqua Terra Project through an innovative public and private partnership to remove derelict boats. The program has since been expanded through the support of the California Legislature with an annual grant program to provide funding for the removal of derelict boats.

# **BENEFITS OF THIS ACTION:**

Reducing the number of abandoned vessels would reduce the potential for illegal disposal of waste discharge adjacent to a shellfish tract. A joint effort by the agencies involved in bay management to actively clean up the unauthorized boats and vessels in the south bay would send an important and very visible message about the need to treat this resource differently from the way it has been treated in the past.

# IMPLEMENTATION:

- 1. **Complete inventory and monitoring of boats**. An inventory by CDFG of the vessels that are located in the CDFG lease area will be conducted and maintained in order to track changes in these unauthorized uses. This inventory will aid in determining the number of boats and will help identify newly moored boats.
- 2. Conduct public education and outreach campaign. The MBNEP can provide educational materials to the boating community, as well as to the general public. (See EDU-2).
- 3. **Remove abandoned vessels**. Currently, there are about six abandoned/derelict vessels that need removal. The following phased approach should be undertaken:

# Phase 1—Planning:

- Step 1: Confirm ownership of boats via CF number or USCG Documentation Number.
- Step 2: Confirm that permits are not necessary from the CCRWQCB or the CCC.
- Step 3: Post vessels for 45 days prior to removal.
- Step 4: Determine the potential for oil/gas leaks.
- Step 5: Develop coordinated plan to implement and respond to oil/gas spills should they occur.

# Phase 2—Implementation:

- Step 1: Float vessels that have sunk.
- Step 2: Tow vessels to a dock area.
- Step 3: Clean and remove hazardous material.
- Step 4: Initiate salvage operation, if appropriate.
- Step 5: Dispose of vessel.
- 4. Enforcement. Steps must be taken to remove the last of the unauthorized vessels. These steps could include press releases, public information, letters informing them of trespass, pursuit of legal action based on absence of a valid lease from SLC/CDFG or a valid Coastal Development Permit, and removal of buoys. This is clearly the most difficult portion of the program. It will require universal support of the agencies involved. It will take time to implement and must be carried out with attention to a variety of details. Establish a qualified contractor to pursue liens and demolition of derelict vessels to ensure that abandoned vessels are monitored and removed in a timely manner.
- 5. Education and Outreach. Encourage boat owners in Morro Bay City limits to register their boats every year. Request that local advocacy groups encourage the State Legislature to pass a law requiring boats to be registered every year. Registration fees should be based on value, not \$5 per boat regardless of value or

size. Monies collected by the Department of Motor Vehicles should be placed in a fund for future derelict boat removal.

Logistically, the abandoned/derelict vessel removals will be more complicated and require a higher degree of organization than the buoy removals (BACT-4). NEP staff has previously identified the following sources of assistance: a crane operator who would hoist the vessels for little or no cost; disposal service volunteered by PG&E; dive clubs that would volunteer time; Harbor or Coast Guard vessels that could be used for towing and transport; and Coast Guard, OSPR or Clean Seas assistance with potential oil spills.

#### WHEN:

- Short-term: Complete inventory and monitoring of boats. Conduct public education and outreach campaign
- Medium Term: Remove abandoned vessels
- Long Term: Enforcement

WHO:

#### **Primary:**

CDFG (manage inventory lease area, take inventory, and carry out legal authority)

Support:

- CDPR (technical assistance)
- USCG (technical assistance; towing; transportation)
- Sheriff's Dive Team (implementer)
- Associated Pacific Constructors (implementer)
- FOE (monitoring)
- CCC (advisory; permitting oversight)
- CDBW (technical assistance)
- MBHD (will assist other agencies by searching Department of Motor Vehicle records and arranging lien sales and removal of boats)
- Williams Shellfish Farm (bi-monthly monitoring of buoys and boats in the CDFG lease area)
- MBNEP (coordinate local support, develop educational outreach)
- CCRWQCB (advisory, permitting oversight)

#### WHERE:

Waters of Morro Bay

# COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Complete inventory & monitoring of boats	\$5,000*	1-2 years
Conduct public education	\$5,000	1-5 years
Remove Abandoned Vessels	\$25,000	1-3 years
Enforcement	\$5,000	1-5 years

\*one time cost only

# BASIS FOR COST:

• Costs have averaged between \$1,000 and \$10,000 per boat.

# POTENTIAL FUNDING SOURCES:

- Reimbursement grants available through the State of California (\$1 million per year available for derelict boat removal)
- Other grants through the State of California
- CDBW
- MBERF
- California Legislature
- DCDFG (possible funding through their legal authority as lease area manager)



See Chapter 7, Table 7.5. .

# **EVALUATION**

• An annual tally of boats should be conducted.

- BACT-3 (Illegal Moorings)
  EDU-2 (Boater Outreach)
  NUTR-1 (Los Osos Wastewater)



# BACT-5: Decrease levels of bacteria from liveaboard boats (both within and outside the City of Morro Bay limits).

# BACKGROUND/MAJOR ISSUES:

The City of Morro Bay Harbor Director issues and enforces live-aboard permits under the City's Liveaboard Ordinance (Chapter 15.40, Vessel Habitation). The Liveaboard Ordinance is a public health and safety ordinance designed to regulate persons who live on boats anchored or moored on tidelands granted to the city. While many liveaboards comply with existing regulations, increased enforcement regarding illegal discharges and encouraging the use of pump-out facilities will promote continued beneficial uses of the bay.

# EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

 The Monterey Bay National Marine Sanctuary is working with Monterey, Moss Landing, Santa Cruz, and Pillar Point Harbors to eliminate nonpoint source pollution from boats and the MBNEP will seek assistance and guidance regarding implementation details.

# BENEFITS OF THIS ACTION:

This action will minimize the bacteria loading from illegal waste discharges and improperly functioning
marine sanitation devices (MSDs), and help to ensure a viable shellfish industry and healthy recreation
areas within the bay.

# **IMPLEMENTATION:**

- 1. Improve existing enforcement of regulations regarding illegal discharges.
- 2. Develop outreach materials (brochures/signage) on the impacts of illegal discharges on beneficial uses, laws regarding illegal discharges, and MSDs and coordinate with publishers of boating guides and boater registrations to include information on pump-out locations. (See EDU-2)
- 3. Coordinate with the U.S. Coast Guard City Harbor Office to publicize the impacts of illegal discharges on beneficial uses, laws regarding illegal discharges, and MSDs.
- 4. Need to develop regulations that apply outside Morro Bay city limits.

#### WHEN:

- Short Term: Improve existing enforcement of regulations regarding illegal discharges. Develop outreach materials (brochures/signage) on the impacts of illegal discharges on beneficial uses.
- Medium Term: Coordinate with the U.S. Coast Guard City Harbor Office to publicize the impacts of illegal discharges on beneficial uses, laws regarding illegal discharges, and MSDs
- Long Term: Need to develop regulations that apply outside Morro Bay city limits.

# WHO:

Primary:

- CMB (Enforcement regulation and Public Outreach)
- USCG (Enforcement regulation and Public Outreach)
- CDFG (Enforcement regulation and Public Outreach)

Support:

- MBNEP (coordinate)
- Fuel dock operators (educate; monitor)
- Private industry (funding)
- USEPA (technical assistance)
- CDBW (technical support; funding)
- SLOCo. Environmental Health (technical assistance)
- MBHD (enforcement; monitoring, technical assistance)
- CCC (advisory)

# WHERE:

Waters of Morro Bay



# COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Education and outreach regarding impacts	\$5,000	1-5 yrs
Improve Enforcement	\$5,000	1-5 yrs

# BASIS FOR COST:

Monterey Bay National Marine Sanctuary Action Plan

# POTENTIAL FUNDING SOURCES:

• See Chapter 7, Table 7.5.

# **EVALUATION:**

- Use of the pump-out facilities can be tracked to determine effectiveness by installing usage meters to gauge pump-out use. Success can be evaluated by the annual number of gallons of sewage metered at pump-outs.
- Boaters can be surveyed to ascertain if they are using pump-out facilities and how they can be improved.
- Number of educational brochures distributed.
- Decrease in discharge violations.

- BACT-2 (Pump-outs)
- EDU-2 (Boater Outreach)
- NUTR-1 (Los Osos Wastewater)



# BACT-6: Explore the bio-filtration potential of the Pacific Oyster (*Crassostrea gigas*) to decrease bacterial levels and increase the overall water quality of the bay.

# BACKGROUND/MAJOR ISSUES:

High fecal coliform bacteria levels in the estuary have resulted in multiple closures of the local shellfish fishery, and in extreme cases, violations of safe water contact codes. Other pollutants, such as heavy metals and algal bloom promoting nutrients, in conjunction with high levels of bacteria can have negative effects on the local economy, but more importantly, negative effects on the fragile ecology of the estuary. According to recent literature, *C. gigas* has been successfully used to remove pollutants from the water column such as fecal coliform bacteria, bloom forming algae, and heavy metals.

# EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

No similar in-place actions exist; however, many studies have documented the beneficial affects of bi-valves, such as *C. gigas*, on water quality and the aquatic ecosystem as a whole. Currently, the Chesapeake Bay Program Office is considering the introduction of *C. gigas* to improve the marine ecology of the bay. This consideration is in light of research done by Gottlieb, Schweighofer, and Newell.

# **BENEFITS OF THIS ACTION:**

This pilot study is designed to test the bio-filtration abilities of C. gigas under conditions found in Morro Bay. It will serve as "proof of concept" to a literature study considering the mechanisms, capabilities, and effects of using C. gigas as a bio-filter in the Morro bay estuary. Data collected from this action will demonstrate the pollutant removal capabilities of C. gigas in Morro Bay, and will better estimate the numbers of C. gigas needed to filter the estuary than the mathematical models currently used. The results of this action will dictate the future of the proposed large-scale implementation of C. gigas as a cost effective, interim solution to bacterial, and heavy metal pollution, as well as improving the overall water quality of the estuary.

# IMPLEMENTATION:

- 1. Holding tanks containing *C. gigas* will be constructed on donated dock space. Estuary water will be pumped into the tanks allowing the oysters to filter a known volume of water.
- 2. During the course of 15-20 weeks, 12 experiments will be conducted in which decreased bacterial and chlorophyll levels in the holding tanks containing the oysters, and a control tank, will be measured over time.
- 3. Each experiment will consist of eight data points, which will be measured in triplicate to ensure accuracy.

· · · · · · · · · · · · · · · · · · ·	Data Points/Run	Measurements/Data Point	Number of Runs	Total
MPN Measurements	8	3	12	288

- 4. MPN Quality assurance will be done by sending samples (±10 percent) to a certified lab.
- 5. Statistical analysis of the data will be conducted to provide information about the overall efficiency of biofiltration of *C. gigas*.

# WHEN:

• Short-term: The entire action will be completed within one year of initiation.

# WHO:

**Primary:** 

- Cal Poly SLO (All phases of the Oyster Study)
- Biological Sciences, Cal Poly (All phases of the Oyster Study)
- Microbiology Club, Cal Poly (All phases of the Oyster Study)

#### Support:

- MBNEP (coordinate)
- Williams Shellfish (participate in study as reviewer)
- CCC (advisory)



# WHERE:

Waters of Morro Bay

# COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Complete pilot study of bio- filtration capabilities	\$35,000	1 year

# BASIS FOR COST:

• Estimation of costs provided by personal communications with experimental designers, and craftsmen working in the aquaculture and aquarium industry.

# POTENTIAL FUNDING SOURCES:

- MBERF
- See Chapter 7, Figure 7.5.

# **EVALUATION:**

• Evaluation of the project will be through statistical analysis of the bacterial and chlorophyll data in the oyster tank and the control tank.

- BACT-7 (Bird Deterrents)
- NUTR-1 (Los Osos Wastewater)



# BACT-7: Install and maintain bird deterrent floats in shellfish growing areas to reduce the potential for avian fecal contamination of harvestable shellfish.

# BACKGROUND/MAJOR ISSUES:

Commercial shellfish growing areas have been routinely closed to harvesting due to elevated fecal coliform concentrations in estuary waters. Although the relative contribution of specific fecal coliform sources to the contamination in the estuary are still unknown, preliminary efforts to control contamination in and around the shellfish growing areas are of economic and ecological importance. Preliminary observations by local MBNEP and CDHS officials along with local shellfish growers suggest that a significant portion of the fecal contaminants in shellfish growing areas may be avian in nature. Because the technique of shellfish culture in Morro Bay has changed from a bottom to an off-bottom culture using floats, birds tend to aggregate in that area. Although complete elimination of avian influence on the shellfish harvestable areas is improbable, the installation of bird-deterrent floats will reduce avian loitering, in the vicinity of harvest areas.

# EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

No similar in-place actions exist, however, birds have been directly associated with fecal coliform levels in aquatic systems (Panicker and Ravindran, 1997 Indian Journal of Microbiology. 37 pp. 133-137). The lack of similar in-place actions in other shellfish growing estuaries may be due to the lack of off-bottom style shellfish growing techniques in other aquatic systems.

# **BENEFITS OF THIS ACTION:**

The installation of bird deterrent floats is aimed at reducing the number of birds roosting on the floats in shellfish harvesting areas. This will directly affect the concentration of fecal coliform contamination in the harvesting areas, therefore improving water quality in that area and possibly reducing the period of time that shellfish beds are closed to harvest.

# **IMPLEMENTATION:**

- 1. Project lead will monitor avian loitering and water quality over a given time period prior to installation of bird deterrent floats to provide a reference value for the effectiveness of this action working with supporting implementers.
- 2. Replace floatation devices in and around shellfish growing areas with bird deterrent floats.
- 3. Monitor avian activity and water quality following bird deterrent float installation.

#### WHEN:

**Short-term:** Project lead will monitor avian loitering and water quality over a given time period prior to installation of bird deterrent floats to provide a reference value for the effectiveness of this action working with supporting implementers. Replace floatation devices in and around shellfish growing areas with bird deterrent floats

Medium Term: Monitor avian activity and water quality following bird deterrent float installation

WHO:

Primary:

• Williams Shellfish (prepare proposal for funding, let contract, monitor, report to MBNEP on progress) **Support:** 

- MBNEP (funding)
  - CCCorps (work crew)
  - CCC (advisory)

#### WHERE:

Waters of Morro Bay adjacent to shellfish lease sites



# COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Pre-project Monitoring	\$2,000	1 year
Install bird-deterrent floats	\$10,000	1 year
Post-project Monitoring	\$2,000	1-3 years

# BASIS FOR COST:

Price estimates based on Williams Shellfish labor and material costs

# POTENTIAL FUNDING SOURCES:

- MBERF
- See Chapter 7, Figure 7.5.

# **EVALUATION:**

The evaluation of this action will be through analysis of pre and post avian action and water quality monitoring sessions. Successful implementation of this action should reduce avian activity on the shellfish floats, and increase water quality in the vicinity of the shellfish growing areas. Further evaluation of this action will be done though the DNA typing action.

- CC-7 (Watershed Crew)
- BACT-2 (Pump-outs)
- BACT-6 (Biofiltration)
- NUTR-1 (Los Osos Wastewater)

# BACT-8: Support the establishment of an off-leash dog park and provide supplies around high use recreational areas for the pick-up of pet waste, and promote protection of creekbeds from horse trails during low flow periods.

# BACKGROUND/MAJOR ISSUES:

Water quality degradation from fecal coliform pollution has had significant impacts on economical and ecological resources in the estuary. Although the relative contributions of specific fecal coliform sources to the contamination in the estuary are still unknown, preliminary efforts to control water quality in the estuary are of economical and ecological importance. Local citizens have expressed concern about the increasing number of dogs, and their contribution to pollution in estuarine areas. This statement is not entirely unfounded, as in the United States alone, 50 million dogs drop 12,000 tones of feces per year. In places were similar dog pollution problems are an issue, dispensers with supplies for the pick-up of pet waste have been installed to alleviate the problem. There is wide public acceptance in areas where these dispensers have been installed. Although the relationship of pet waste supplies dispenser installation and water quality has not been studied, it stands to reason that the reduction in pet excrement in estuarine areas will reduce the relative contribution of pets to fecal contamination in the estuary.

# EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

Successful implementation of similar programs has been demonstrated by the Colorado State Park system and in many other systems.

# BENEFITS OF THIS ACTION:

The installation of dispensers and use supplies for the pick-up of pet waste will decrease the relative contribution of fecal contamination to the estuary. In addition, this action will improve the aesthetic qualities of the estuary.

# **IMPLEMENTATION:**

- 1. Create a committee of domestic pet owners, including horse owners, to work with the Habitat Committee to develop a list of appropriate potential sites for use by owners of domestic animals.
- Based on criteria developed by the committee, install pet waste pick-up supplies dispensers in, but not limited to, estuarine recreational areas such as Tidelands Park, Pasadena Access, and Coleman Beach (future off-leash dog park).
- 3. Remove used pet waste pick-up supplies on a regular basis at all dispensers.
- 4. Investigate bridge crossing opportunities for equestrian use.

# WHEN:

- Short-term: Create a committee of domestic pet owners, including horse owners, to work with the Habitat Committee to develop a list of appropriate potential sites for use by owners of domestic animals. Install dispensers containing supplies for the pick-up of pet waste. Remove used pet waste pick-up supplies on a
- dispensers containing supplies for the pick-up of pet waste. Remove used pet waste pick-up supplies on a regular basis at all dispensers.
- Medium Term: Investigate bridge crossing opportunities for equestrian use.

# WHO:

#### Primary:

- MBNEP and local dog owner group (installation)
- Local Residents (committee)

# Support:

- CMB (maintenance)
- SLOCo. (maintenance)
- CCC (advisory)

# WHERE:

Recreational areas; off-leash dog park site would be located away from major drainage areas



# COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Install pet waste pick-up dispensers	\$5000	1 year
Remove and dispose of waste	\$5,000	1-5 years
Develop bridge crossing opportunities	\$3,000	1-2 years

NOTE: There is no cost associated with maintenance hours because it will be incorporated into pre-existing maintenance routes.

#### BASIS FOR COST:

Estimations of materials are from a price list of pet waste pick-up supplies.

# POTENTIAL FUNDING SOURCES:

- MBERF
- See Chapter 7, Table 7.5.

#### **EVALUATION:**

- Evaluation of this action will be conducted through a public acceptance poll, and by the number of dispensers installed and maintained.
- Number of people using pet waste control system.
- Establishment of an off-leash dog park.

#### **RELATED ACTIONS:**

• NUTR-1 (Los Osos Wastewater)



# BACT-9: Coordinate state and local bacteriological water quality standards and monitoring efforts so they are consistent and comprehensive.

# BACKGROUND/MAJOR ISSUES:

The Central Coast Regional Water Quality Control Board (CCRWQCB), the CDHS, and the San Luis Obispo County Department of Environmental Health (DEH) all have water quality standards, sampling protocols, and compliance requirements that are being used in the Morro Bay estuary and watershed. These standards and sampling protocols are different due to the varying purposes of the respective agencies.

Because each agency is conducting different monitoring programs, it is often difficult to coordinate efforts due to the variances caused by different protocols. For example, the DEH uses the presence of total coliform, fecal coliform (specifically *E.coli*), and *Enterococcus* in water quality samples to assess recreational waters. These are usually collected via grab sample and analyzed immediately. The CCRWQCB uses the presence of total and fecal coliform in water quality samples taken at five consecutive times within a 30-day period, and uses the data to assess recreational water quality and shellfish lease area water quality. The CDHS uses yet another set of numerical standards for shellfish growing waters. If standards were expressed consistently, sampling efforts could be more easily coordinated and results could be more easily shared and used by other agencies.

The USEPA recently made funds available to the MBNEP to be used for the analysis and implementation of actions addressing public health issues. The MBNEP is working with the CCRWQCB, CDHS, and the DEH to develop a comprehensive monitoring plan for the protection of recreational activities and shellfish harvesting in the bay. This action would provide funding for a coordinated and in-depth analysis and examination of each agency standard to explore areas of overlap, seek ways to establish consistency, and ensure that the agency's and the public's interests and mandates are still met.

# EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

 Efforts are occurring statewide to coordinate agency standards in response to new legislation requiring water quality monitoring at beaches.

# BENEFITS OF THIS ACTION:

- Reduced monitoring costs due to consolidated data collection and analysis efforts;
- Increased abilities to accurately determine and report trends in data

# **IMPLEMENTATION:**

- 1. Inventory: Inventory all local and state water quality standards for bacteria. Organize by beneficial use. Compare and analyze to determine the underlying reasons for the differences in expression.
- Meeting: Convene a meeting of all appropriate local and state agency personnel working on water quality standards for the purpose of discussing the reasons for the differences and the expressions of compliance. Seek agreement on appropriate standards for the protection of each beneficial use. Seek agreement on expressions of compliance to be included in the water quality standard.
- 3. Communicate with public and private landowners, the agricultural community, and the community-at-large regarding the meeting recommendations and incorporate their input.
- 4. Recommend changes to decision makers. Each local and state agency should take the recommendations of the group to their agency decision-makers for adoption. Upon adoption, agencies should revise their monitoring plan as appropriate.

#### WHEN:

- Short Term: Inventory and Meeting
- Medium Term: Recommendation and Implementation
- Long Term: Joint agency data collection and sharing



# WHO:

# Primary:

- CCRWQCB (lead group of agencies in discussion of consistent standards and monitoring)
- SLOCo. (participate in group discussion)
- CCDHS (participate in group discussion)

# Support:

- USEPA (technical assistance)
- MBNEP (coordinate)
- Public & private landowners (receive and comment on changes to standards and monitoring)
- CMB WWTP (testing)
- CCC (advisory)

# WHERE:

Standards would apply to Los Osos, Chorro Creeks, and Morro Bay

# COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Inventory and organize meeting (5 hours)	\$250	1-5 years
Meetings (100 hours)	\$5000	1-5 years
Recommendations and Implementation (400 hours)	\$20,000	1-5 years

# BASIS FOR COST:

• Estimated primary implementer staff time at \$50 an hour

# POTENTIAL FUNDING SOURCES:

- Existing agency staff budgets or grants
- See Chapter 7, Figure 7.5.

# **EVALUATION:**

- Resources saved by sharing data; and
- Revised consistent monitoring guidelines and requirements

- EDU-1 (General PEO)
- NUTR-1 (Los Osos Wastewater)



# 4.4 NUTRIENTS

Excess nutrients, primarily nitrogen and phosphorus, is one of the major problems in many of the Nation's estuaries. The effects of nutrient enrichment can include depletion of dissolved oxygen in the water resulting in fish kills and losses of aquatic vegetation. Nutrient enrichment can impact the drinking water supply, commercial and sport fishing, shellfish harvesting, and wildlife habitat.

Nutrient enrichment is a concern in Morro Bay and its watershed. Algal blooms have been documented in the backbay and high levels of nutrients are entering Morro Bay from its tributary creeks. The potential sources of these excess nutrients include urban runoff, leaking or failing septic systems, animal waste, wastewater discharges, fertilizer application, wildlife, and other natural processes. Factors affecting the causes include population levels, agricultural practices and changes in wastewater treatment facilities.

# MBNEP GOALS SUPPORTED BY NUTRIENT ACTION PLANS:

- Ensure that bay water remains of sufficient quality to support a viable commercial shellfish mariculture industry, safe recreational uses, healthy eelgrass beds, and thriving fish and shellfish populations.
- Maintain watershed functional integrity through appropriate riparian corridor management, impervious surface management, fire management, and grazing management.
- Protect social, economic, and environmental benefits provided by the bay and watershed through comprehensive resource management planning.
- Promote public awareness and involvement in estuarine management issues through outreach, educational programs, and the use of volunteers in ongoing bay monitoring and other programs.

# NUTRIENT OBJECTIVES AND SUMMARY OF ACTIONS:

**NUTR OBJECTIVE 1:** Reduce the concentrations of nitrates in watershed creeks, streams, and groundwater. (NOTE: Nitrates not yet proven to cause algal blooms.)

- Action NUTR-1: Support the efforts of the Los Osos Community Services District to increase and improve the level of wastewater treatment in the community of Los Osos.
- Action NUTR-2: Develop nitrogen-control measures for wastewater effluent at the California Men's Colony (CMC).
- Action NUTR-3: Implement agricultural management measures that are successful at reducing nitrate levels.

NUTR OBJECTIVE 2: Decrease fertilizer runoff from residential and golf course areas.

Action NUTR-4: Implement Best Management Practices (BMPs) to decrease fertilizer runoff from residential and other urban areas.



#### Nutrient Actions—Implementing Organizations Table 4.7

	NUTR-1	NUTR-2	NUTR-3	NUTR-4
	Los Osos	CMC	Agricultural	Residential
Agency/Organizations	Wastewater	Wastewater	BMPs	BMPs
ACOE			S	
BF			S	
CA Cattlemen's Assoc.			S	
Cal Poly			P	
CCC			S	S
CCCorps			S	
CCRWQCB	Р	S	S	
CDFG		S	S	
CDPR			Р	S
СМВ				Р
СМС		Р	Р	
CSLRCD			Р	
CSLCNG			Р	
Cuesta College			Р	
Farm Bureau			Р	
FOE				Р
Public/Private Landowners			P	Р
LOCSD	Р			P
MBNEP	S	S	S	S
NRCS			Р	
SLOCo.	S		S	S
SWRCB	S	S	S	S
UCCE			S	
USEPA			S	S
USFS			S	
USFWS			S	
USNMFS		1	S	

P = Primary role in implementation and monitoring project outcomes and effectiveness. S = Supporting role in implementation.



# NUTR-1: Support the efforts of the Los Osos Community Services District to increase and improve the level of wastewater treatment in the community of Los Osos.

# Priority Action

NOTE TO REVIEWERS: This action plan touches on one of the most controversial issues that the Los Osos community has ever had to address. There is an extensive body of scientific literature, government reports, data, and public hearing testimony developed over the last twenty years pertaining to this issue. Due to time constraints, the MBNEP has not conducted a thorough review of this literature, nor has it taken a particular stand on what option might be the best for the community. This action plan should be viewed as a DRAFT that frames the issue, seeks common ground, and focuses on maximizing the highest quality effluent – one that will sustain the community's water supply over the long-term.

# BACKGROUND/MAJOR ISSUES:

On site septic disposal systems have been implicated as sources of pollution of surface waters throughout the nation. State Basin plan water quality objectives are currently exceeded. Soil permeability, water table characteristics, density of septic systems, septic system failures, and flooding, are all factors affecting septic system performance in the Los Osos community. Poorly maintained, failing, or substandard septic systems present a threat to public health as well as a threat to water quality in both groundwater and surface waters.

Additionally, there are several "standpipes" installed at various locations in the community as an interim emergency measure to alleviate flooding in nearby homes. Sampling indicates that significant amounts of coliform bacteria and nitrogen are discharged from this system into the estuary. This subsurface water is currently not treated nor is it permitted by an NPDES permit. This source of contaminated water is covered under the regulatory action currently in place to address violations of water quality standards for nitrates.

The LOCSD, which was recently created by local enabling legislation (Measure K), has indicated a commitment to developing a wastewater project for the protection of water quality and beneficial uses. Maintaining the quality of the effluent at a level that supports the long-range water supply is important for the community. The LOCSD preliminary project engineering and management are currently underway, and plans for the wastewater project show construction being initiated within the next two years (G. Hensley, LOCSD pers. comm., 1999). Most residents in the Los Osos area also recognize that water quality degradation is an important issue, and there appears to be a desire to reduce the amount of impact from the community. However, the issues associated with the development of the wastewater system controversial. A coordinated wastewater education program would help the Los Osos community understand the issues, and the need for the project. A wastewater system needs to be developed, funds need to be obtained, incentives need to be developed in light of current regulatory actions (CCCCRWQCB Cease and Desist Orders, Resolutions, and Complaints for Administrative Civil Liability), and educational activities need to be undertaken to resolve this long-standing issue.

#### **EXAMPLES OF SIMILAR IN-PLACE ACTIONS:**

In Sarasota Bay, Florida, wastewater is a regionally significant source of nitrogen. The Sarasota Bay National Estuary Program (SBNEP) included in their CCMP a policy to guide wastewater treatment and reclamation to reduce nitrogen loading to the bay (Sarasota Bay CCMP, 1995). The SBNEP's intent is to encourage an "even handed" approach to the costs of wastewater treatment while retaining a number of treatment options (e.g., Phillippi Creek).

More than 120,000 on-site septic systems are located in the Indian River Lagoon drainage basin, also located in the state of Florida. Seventy percent of these systems are located in areas that have been identified as "problem" or "potential problem" areas due to soil and water conditions. The Indian River Lagoon CCMP includes an "Onsite Sewage Disposal System Action Plan" that seeks to determine the impacts of on-site



sewage disposal on the resources of the IRL and to develop and implement strategies to address these impacts (Indian River Lagoon, Final Draft CCMP, 1996).

# BENEFITS OF THIS ACTION:

- Reduced nitrogen loadings and improvement of water quality in the estuary.
- Reduced bacterial contamination from septic systems.
- Treatment or elimination of the Los Osos "standpipes" wastewater discharge.

#### **IMPLEMENTATION:**

- 1. LOCSD will develop an interim plan with options for treatment of water discharged at Los Osos standpipes to reduce nutrients and bacteria during the design and construction of the Los Osos Wastewater Treatment Facility.
- 2. LOCSD and CCRWQCB will develop a wastewater system that ensures that the wastewater effluent is treated to a level that protects beneficial uses, supports the community's long-range water supply, and is in accordance with Basin Plan standards.
- 3. MBNEP and LOCSD will develop an incentive program for residents to check operation of their septic system and correct failures.
- 4. MBNEP will assist with technical studies and analysis.
- 5. MBNEP and LOCSD will assist with funds to defer cost to Los Osos residents for new wastewater treatment.

#### WHEN:

- Short Term: LOCSD will develop an interim plan with options for treatment of water discharged at Los Osos standpipes to reduce nutrients and bacteria during the design and construction of the Los Osos Wastewater Treatment Facility.
- Medium Term: LOCSD and CCRWQCB will develop a wastewater system that ensures that the wastewater effluent is treated to a level that protects beneficial uses, supports the community's long-range water supply, and is in accordance with Basin Plan standards. MBNEP and LOCSD will develop an incentive program for residents to check operation of their septic system and correct failure
- Long Term: MBNEP will assist with technical studies and analysis. MBNEP and LOCSD will assist with funds to defer cost to Los Osos residents for new wastewater treatment.

# WHO:

Primary:

- LOCSD (develop, implement, and monitor results of an improved level of wastewater treatment)
- CCRWQCB (technical assistance)

#### Support:

- MBNEP (educational forums, technical assistance)
- SLOCo. (technical assistance)
- SWRCB (advisory)

#### WHERE:

Los Osos and Baywood Park

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Education	\$35,000	2-3 years
Construction of the Los Osos WWTP	\$40-70 million	3-5 years
Develop plan for treating discharge from standpipes	\$30,000	1-2 years



# BASIS FOR COST:

- Sarasota Bay NEP for education and assistance with fund seeking
- CCRWQCB, SLOCo., LOCSD facility cost

# POTENTIAL FUNDING SOURCES:

- State Revolving Fund Loans (wastewater system)
- MBERF
- See Chapter 7, Figure 7.6.

# **EVALUATION:**

Improved quality of groundwater and freshwater seeps

- CC-2 (Drainage)
- CC-3 (TMDLs)
- CC-5 (Stream Geomorphology & WQ)
- All BACT Actions
- All NUTR Actions
- HAB-8 (Eelgrass)
- EDU-1 (General PEO)



# NUTR-2: Develop nitrogen-control measures for wastewater effluent at the California Men's Colony (CMC).

# Priority Action

# BACKGROUND/MAJOR ISSUES:

Originally constructed in 1940 by the Department of the Army, the California Men's Colony (CMC) wastewater treatment plant (WWTP) is now owned and operated by the State of California, California Department of Corrections. The plant was upgraded in the late 1970s, and again in the early 1980s, and is designed to handle 1.2 mgd of wastewater. This facility is subject to NPDES permitting.

The source of water for the plant is 1) Whale Rock Reservoir, 2) state water, and 3) Chorro Creek surface streamflow that is diverted and/or stored at Chorro Reservoir. Wastewater entering the plant receives standard pre-treatment, primary, and secondary treatment. Nitrified effluent is filtered, chlorinated, and dechlorinated prior to being discharged into Chorro Creek. An effluent control structure at the end of the process chain is designed to route 0.70 cfs of effluent into Chorro Creek at all times. The discharge to Chorro Creek is beneficial in that it increases flow in Chorro Creek, and actually provides the majority of flow in the creek in the summer months, thus maintaining and enhancing fishery, wildlife, recreational, and other instream beneficial uses. However, chlorine discharges occasionally occur, and data show that nitrogen and phosphorous levels increase downstream of the discharge. Measures for controlling spills and nutrients are needed.

The CMC has recently completed an independent evaluation of the performance factors and the overall oversight and maintenance practices at the WWTP. The current secondary treatment process does not adequately deal with denitrification. Plans for upgrading the treatment and collection system have been developed.

# EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

Tertiary treatment is in place at many wastewater treatment facilities throughout the United States. Denitrofication is a form of tertiary treatment at the Reno/Sparks wastewater treatment facility.

# **BENEFITS OF THIS ACTION:**

- Decreased number of chlorine spills and reduced impacts on instream beneficial uses.
- Reduced nitrogen loading in effluent.

# **IMPLEMENTATION:**

- 1. MBNEP will work with CMC on current plans to revise treatment levels and methods and explore options and implement spill and nutrient control measures.
- 2. MBNEP will provide technical assistance and monitoring data.
- 3. CMC will continue upstream and downstream monitoring of flow and nutrients per December 17, 1996 MOA between CMC and CDFG.

# WHEN:

- Short Term: Design of new facilities
- Medium Term: Construction of new plant and collection system.

# WHO:

Primary:

• CMC (will revise treatment levels and monitor flow and nutrients)

Support:

- MBNEP (assistance with data collection)
- CDFG (monitoring flow and nutrients)
- CCRWQCB (assistance with data collection)
- SWRCB (advisory)



# WHERE:

California Men's Colony wastewater treatment facility

# COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Treatment upgrade	\$17,000,000*	1 year
Collection system upgrade	\$7,000,000*	1 year
*one time cost only		

#### BASIS FOR COST:

Preliminary estimate.

# POTENTIAL FUNDING SOURCES:

- CDC Special Repair Budget (FY 1999/2000)
- See Chapter 7, Figure 7.6.

# **EVALUATION:**

- Collection and analysis of effluent samples, receiving surface waters, and groundwater.
- Revise treatment level and methods.

- NUTR-1 (Los Osos Wastewater)
- CC-5 (Stream Geomorphology & WQ)
- FLOW- 1 (Water Reclamation)
- FLOW-4 (CMC Effluent)
- HAB-8 (Eelgrass)



# NUTR-3: Implement agricultural management measures that are successful at reducing nutrient levels.

# BACKGROUND/MAJOR ISSUES:

Studies conducted in the watershed have shown that elevated levels of nitrates are present in areas draining agricultural lands (CCRWQCB, 1998). Management measures on croplands have been successfully demonstrated in a "paired watershed" design to reduce nutrient levels in runoff The Natural Resources Conservation Service through cooperative agreements with public and private landowners in the Morro Bay watershed, has already implemented management practices, including but not limited to planting vegetative filter strips and applying fertilizer in a manner that maximizes plant utilization to reduce entry into water ways.

Many landowners (public and private) in the watershed recognize that water quality degradation is an issue on their land. They desire to reduce the amount of impact on their property. Some landowners need technical assistance and others need financial assistance, many landowners need both types of assistance (See SED-2). Implementing and highlighting projects that are geared towards reducing nonpoint sources of pollution from rangeland is a highly effective educational tool in reaching out to the agricultural community.

# EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

Management measures are being implemented throughout the watershed with the assistance of cost-sharing programs on both private ranches and public lands. A demonstration project that evaluates the effectiveness of row crop management measures in reducing nutrient loading to Chorro and Los Osos Creeks would provide a foundation for implementing further projects in the watershed.

The Coastal San Luis Resource Conservation District (CSLRCD) and the Natural Resources Conservation Service (NRCS) have been leading the Morro Bay Watershed Enhancement Project (MBWEP) for the last nine years. Working with their partners in the University of California Cooperative Extension (UCCE), the State Coastal Conservancy (SCC), the Regional Water Quality Control Board (CCRWQCB) and watershed landowners, the MBWEP has resulted in the implementation of more than 235 best management practices in the watershed.

# BENEFITS OF THIS ACTION:

- Reduced nutrient levels in Morro Bay streams and the estuary. Higher dissolved oxygen levels in the creeks that feed Morro Bay.
- Increased public and private landowner awareness of land stewardship responsibilities.

# **IMPLEMENTATION:**

- 1. The CSLRCD, Farm Bureau, and public and private landowners will prioritize projects based on NEP's technical characterization, project's feasibility, effectiveness of the project in reducing nutrients in streams and the bay, and the need to include a wide range of effective practices.
- 2. MBNEP contract with CSLRCD, Farm Bureau and/or other entities to carry-out additional cost-sharing programs
- 3. Identify ranchers and farmers who are willing to voluntarily implement conservation practices on their land, and showcase successful projects.
- 4. Identify additional funding sources for cost-sharing and incentives for landowners.
- 5. Implement projects
- 6. Monitor the effectiveness of implemented actions

# WHEN:

- Short Term: The CSLRCD, Farm Bureau, and public and private landowners will prioritize projects based on NEP's technical characterization, project's feasibility, effectiveness of the project in reducing nutrients in streams and the bay, and the need to include a wide range of effective practices. MBNEP contract with CSLRCD, Farm Bureau and/or other entities to carry-out additional cost-sharing programs. Identify ranchers and farmers who are willing to voluntarily implement conservation practices on their land, and showcase successful projects.
- Medium Term: Identify additional funding sources for cost-sharing and incentives for landowners. Implement projects and monitor the effectiveness of implemented actions.


#### WHO:

#### Primary:

- CSLRCD (cost-share program)
- Farm Bureau (technical assistance)
- NRCS (streamlined permit, technical assistance, cost-share)
- Public & private landowners (implement voluntary conservation practices)

#### Support:

- MBNEP (prioritize projects, contracts with cost-sharing entities, coordinate)
- UCCE (technical assistance)
- BF (funding)
- USEPA (technical assistance)
- Permitting Agencies (SLOCo., USFWS, ACOE, CCRWQCB, USNMFS, CDFG) (regulatory)
- California Cattlemen's Association (advisory)
- CCCorps (work crew on planting filter strips)
- CCC (advisory)
- SWRCB (advisory)

#### WHERE:

Properties with agricultural activities

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Technical assistance	\$30,000	1-5 years
Financial assistance (cost-sharing) to landowners	\$200,000	1-5 years
Maintenance	\$50,000	1-5 years

#### BASIS FOR COST:

- Existing Program costs
- Estimate of cost share potential

#### POTENTIAL FUNDING SOURCES:

- EQIP
- NRCS
- MBERF
- USEPA 319h Non-Point Source Grant Program
- Wetland Reserve Program
- CA Coastal Conservancy
- See Chapter 7, Figure 7.6.

#### **EVALUATION:**

- Numbers of ranches implementing cropland management practices.
- Measured reduction in nutrient levels using a pre and post implementation, upstream/downstream study design.

- SED-7 (BMP Incentives)
- EDU-3 (Agricultural Outreach)
- EDU-4 (Pesticide Workshops)
- CC-5 (Stream Geomorphology & WQ)
- CC-7 (Watershed Crew)
- SED-2 (Sediment Traps)
- SED-4 (Landowner BMPs)
- SED-5 (Creek Restoration)
- NUTR-1 (Los Osos Wastewater)
- HAB-8 (Eelgrass)



# NUTR-4: Implement Best Management Practices (BMPs) to decrease fertilizer runoff from residential and other urban areas.

#### BACKGROUND/MAJOR ISSUES:

Rainfall can wash pollutants like excessive fertilizers from residential yards, golf courses, and other urban landscaping into Morro Bay. The City of Morro Bay and the community of Los Osos are both located adjacent to the Morro Bay Estuary. During rainfall events, Morro Bay receives the storm water runoff from these city and community streets. Fertilizer may be responsible for about one-third of the excess nitrogen that is polluting the bay. Fertilizers can cause algae blooms, which block the light from aquatic plants like eelgrass. They can also deplete oxygen levels, possibly resulting in fish kills.

Approximately 35 percent of Morro Bay City and Los Osos/Baywood Park residents already have bay-friendly gardens that conserve water, reduce fertilizer runoff, and provide habitat for birds and wildlife (Yards and Neighbors, February 1999). The purpose of this action plan is to expand these bay-friendly practices to other residences and businesses with landscaped areas.

The widespread nature of the storm water runoff problem requires a comprehensive strategy that combines regulation with community-wide education, participation, and outreach, incentive-based and volunteer programs; and practical, cost-effective implementation mechanisms. One of the key features of such a strategy are BMPs—practical methods for controlling, preventing, reducing, or removing pollutants in urban runoff.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

A Yards and Neighbors Brochure for California's Central Coastal Morro Bay Area—Action Plan Demonstration Project (APDP) funded by MBNEP to decrease urban pollutants that flow to Morro Bay through storm water runoff sources by offering residents model landscape plans, a drought tolerant plant list, and tips on how to reduce pollutant discharge and conserve water. This also contributes to freshwater flow improvements.

Model Urban Runoff Program (MURP)—A How To Guide for Developing Urban Runoff Programs for Small Municipalities.

Florida Yards and Neighbors Program created a handbook to guide residents toward environmentally friendly landscaping to decrease urban runoff of nutrients and fertilizers into waterways.

#### **BENEFITS OF THIS ACTION:**

Actions to reduce non-point source fertilizer from entering the estuary are necessary to insure a continued viable fishing and shellfish growing industry, safe recreation, and a healthy marine ecosystem. Implementing BMPs would improve the quality of storm water runoff, in turn supporting continued beneficial uses for the estuary and greater public awareness.

#### IMPLEMENTATION:

- 1. Expand distribution and application of the existing "A Yards and Neighbors Brochure for California's Central Coastal Morro Bay Area" to residential communities and businesses with landscaped areas and update existing Yards and Neighbors Brochure as appropriate.
- 2. Gather information and research to identify resources, problems, opportunities, and priorities for implementing BMPs.
- 3. Identify appropriate BMPs for designing and maintaining low-maintenance, environmentally beneficial yards and landscaped areas, which minimize fertilizer and water use.
- 4. Educate the community about the problem as a means to promote public participation in the proposed BMPs.
- 5. Identify nutrient loadings from Black Hills, Dairy Creek, and Los Osos golf courses and implement BMPs.
- 6. Provide technical assistance and funding to local governments in developing and implementing MURP.



#### WHEN:

- **Short Term:** Expand distribution of existing brochures. Gather information and research to identify resources, problems, opportunities, and priorities for implementing BMPs. Identify appropriate BMPs for designing and maintaining low-maintenance, environmentally beneficial yards and landscaped areas, which minimize fertilizer and water use. Educate the community about the problem as a means to promote public participation in the proposed BMPs.
- Medium Term: Identify nutrient loadings from Black Hills, Dairy Creek, and Los Osos golf courses and implement BMPs. Implement/install identified BMPs in the City of Morro Bay and the community of Los Osos. Provide technical assistance and funding to local governments in developing and implementing MURP.

#### WHERE:

Urban residential commercial and recreational areas adjacent to the estuary or its tributaries

#### WHO:

Primary:

- FOE (Public Education, Implementing BMPs, Nutrient Loadings, Technical Assistance, and Funding)
- LOCSD (technical assistance)
- CMB (technical assistance)
- Public & private landowners (Nutrient Loadings)

Support:

- MBNEP (Public Education, Implementing BMPs, Nutrient Loadings, Technical Assistance, and Funding).
- USEPA (technical assistance)
- SWRCB (advisory)
- CCC (advisory)
- SLOCo. (Nutrient Loadings)
- CDPR (Nutrient Loadings)

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Update "Yards and Neighbors" brochure	\$3,000	l yr.
Continue distribution of "Yards and Neighbors"	\$1,000	l yr.
Identify additional fertilizer BMPs	Within existing resources	1 yr.
Provide Education re use of BMPs	Within existing resources	1-5 yrs.
Technical Assistance	Within existing resources	1-5 yrs.

#### BASIS FOR COST:

APDP

#### POTENTIAL FUNDING SOURCES:

- MBERF
- USEPA Environmental Education's Grant Program
- USEPA Sustainable Development Challenge Grants Program
- See Chapter 7, Table 7.6.

#### EVALUATION:

- BMP installation and maintenance.
- Improved stormwater runoff quality at sites where BMPs have been installed.



#### N U T R - 4

- CC-3 (TMDLs)
- CC-4 (Urban Runoff)
- FLOW-2 (Chorro Water Workgroup)
- NUTR-1 (Los Osos Wastewater)
- SED-1 (Road Management)
- SED-2 (Sediment Traps)
- SED-4 (Landowner BMPs)
- SED-5 (Creek Restoration)
- HAB-8 (Eelgrass)
- EDU-1 (General PEO)



# 4.5 FRESHWATER FLOW

The Morro Bay Estuary's ecosystem is dependent on a balance of salt water and freshwater, and significant reductions in freshwater flow threaten habitat and living resources. Reductions to freshwater flows in the watershed and to the bay have a direct impact on a wide variety of designated beneficial uses of water and on social and economic conditions in the region, including water supply, flooding, habitat, recreation, and fishing. In addition, these decreases in summer water flow reduce the flushing that takes place in the Morro Bay and contribute to the accumulation of pollutants.

There are several sources of freshwater flows into Morro Bay, largely dependent upon the season. These include surface, subsurface, and groundwater flows. The differences in the processes and sources that provide freshwater flow to the bay require different ways of evaluating the issues and specific solutions.

The potential causes of reductions in freshwater flows to Morro Bay include water usage and poor water management. For much of the year, several of the creeks are "fully appropriated"—meaning that extractions of freshwater by users can equal or even exceed the amount of water flow. Poor management can include the number of well permits and the amount and timing of water extractions. During drought years in Los Osos Creek, extractions of water may exceed the total groundwater and surface flow of the creek. The SWQCB has listed the Los Osos drainage as "fully-appropriated" and believes the drainage cannot support further appropriative extractions from the area.

#### MBNEP GOALS SUPPORTED BY FRESHWATER FLOW ACTION PLANS:

- Reestablish healthy steelhead trout habitat in Chorro and Los Osos creeks through measures including reduction of sediment loading in gravels, stabilization of riparian corridors, removal or mitigation of migration barriers, improvement of water quality, and restoration and maintenance of adequate fresh water flow.
- Ensure that bay water remains of sufficient quality to support a viable commercial shellfish mariculture industry, safe recreational uses, healthy eelgrass beds, and thriving fish and shellfish populations.
- Ensure the integrity of the broad diversity of natural habitats and associated native wildlife species in the bay and watershed.
- Maintain watershed functional integrity through appropriate riparian corridor management, impervious surface management, fire management, and grazing management.
- Protect social, economic, and environmental benefits provided by the bay and watershed through comprehensive resource management planning.
- Promote public awareness and involvement in estuarine management issues through outreach, educational programs, and the use of volunteers in ongoing bay monitoring and other programs.

#### FRESHWATER FLOW OBJECTIVES AND SUMMARY OF ACTIONS:

FLOW OBJECTIVE 1: Increase and maintain freshwater flow in the Chorro and Los Osos basins.

- Action FLOW-1: Support City of Morro Bay efforts to reclaim water for the support of instream resources by providing technical assistance for construction of a new reclamation treatment plant in Chorro Valley that would discharge effluent to Chorro Creek and reclaim water from the new Los Osos Wastewater Treatment Facility.
- Action FLOW-2: Maintain a Chorro Valley Water Users Workgroup and continue to seek agreements, such as the County of San Luis Obispo agreement to work with other Chorro Valley water users, to maintain minimum stream flows in Chorro Creek at or above 1.5 cubic feet per second (as stated in the County Board of Supervisors action related to the Dairy Creek Golf Course).
- Action FLOW-3: (See CC-3) Promote water conservation and reuse among all water users with a focus on Los Osos groundwater.



Action FLOW-4: Support and abide by the terms of existing agreements between the California Men's Colony, California Department of Fish and Game, CCRWQCB, and County of San Luis Obispo to maintain and dedicate wastewater treatment plant releases to Chorro Creek to prevent the reduction of present Chorro Creek streamflows, and where possible, enhance the fishery, wildlife and other instream uses of Chorro Creek.

### Table 4.8 Freshwater Flow Actions—Implementing Organizations

	FLO-1	FLO-2	FLO-3	FLO-4
	СМВ	Chorro Water	Water	WWTP
Agency/Organizations	WWTP	Workgroup	Conservation	Releases
ACOE	S			
Bureau of Reclamation	Р			
Cal Poly		S		
CCC	S	S	S	S
CCRWQCB	S			P
CDFG	S	S		Р
CDWR			S	
СМВ	P	S	S	
СМС		S		Р
CSLCNG		S		
CSLRCD		S	S	- 41
ECA			S	
FOE	S	S		S
MBNEP	S	Р	Р	S
MEGA			S	
Public/Private Landowners		S	P	
SLOCo.		S	S	Р
SWRCB		S	S	S
USEPA	S			
Water purveyors			S	
Water Supply Districts			S	

**P** = Primary role in implementation and monitoring project outcomes and effectiveness.

 $\mathbf{S}$  = Supporting role in implementation.



FLOW-1: Support City of Morro Bay efforts to reclaim water for the support of instream resources by providing technical assistance for construction of a new reclamation treatment plant in Chorro Valley that would discharge effluent to Chorro Creek and reclaim water from the new Los Osos Wastewater Treatment Facility.

#### BACKGROUND/MAJOR ISSUES:

The City of Morro Bay (CMB) has conducted a feasibility study for construction of a new wastewater treatment facility to be located in Chorro Valley and discharge treated effluent in the vicinity of the confluence of Chorro and San Bernardo Creeks. A Phase II study was completed and accepted by the City Council; however, the project is currently not moving forward. This study was funded with Community Development Block Grants. The design of this facility involves the discharge of highly treated water to the creek for the purpose of maintaining surface flow in the stream reach near one of the CMB's domestic well fields. A further study of wastewater reclamation is currently underway. Secondary impacts, such as those associated with increasing the potential for development in the watershed will need to be addressed during implementation of this action. The Carollo comprehensive reclamation project is currently ongoing.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

San Diego, California has promoted water reclamation facilities as a means to increase the amount of water available to support beneficial uses.

#### BENEFITS OF THIS ACTION:

If discharge water could be maintained at sufficient levels of quality, this project could provide a number of significant benefits:

- Provide a source of year round, sustainable, dedicated surface flow from the confluence of San Bernardo and Chorro Creeks across the Resource Conservation District's Chorro Flats Floodplain Enhancement Project and Morro Bay State Park.
- Potentially relieve the City of problems associated with conditions of their well permits, which require minimum surface flow in Chorro Creek.
- Conserve freshwater currently being discharged to the ocean.
- Reduce, for at least some period of time, discharges of lower quality water from the CMB's ocean outfall currently being operated under a 301(h) waiver of treatment level requirements.

#### IMPLEMENTATION:

- 1. ACOE will assist the CMB in obtaining funding, coordination, and permit applications to construct a new facility, including annual operations an maintenance costs.
- 2. ACOE will work with the CCRWQCB, USEPA, CDFG, and CMB on plans to provide treatment appropriate for instream discharge.
- 3. MBNEP will provide education for local citizens and others regarding water quantity, quality and beneficial use impacts.

#### WHEN:

- Short Term: MBNEP will provide education for local citizens and others regarding water quantity, quality and beneficial use impacts.
- Medium Term: ACOE will assist the CMB in obtaining funding, coordination, and permit applications to construct a new facility, including annual operations an maintenance costs ACOE will assist the CMB in obtaining funding, coordination, and permit applications to construct a new facility, including annual operations an maintenance costs. ACOE will work with the CCRWQCB, USEPA, CDFG, and CMB on plans to provide treatment appropriate for instream discharge.



F L O W - 1

#### WHO:

Primary:

- CMB (establish a facility to reclaim water, Funding, coordination, permit applications, treatment)
- Bureau of Reclamation (USDI) (determination of appropriate treatment levels for instream discharge)

Support:

- MBNEP (Funding, coordination, permit applications, treatment, education)
- FOE (monitoring)
- CCC (advisory)
- CCRWQCB (determination of appropriate treatment levels for instream discharge)
- USEPA (determination of appropriate treatment levels for instream discharge)
- CDFG (determination of appropriate treatment levels for instream discharge)
- ACOE (Funding, coordination, permit applications, treatment)

#### WHERE:

Chorro Creek and its tributaries

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Construction of new CMB Wastewater Treatment Facility	\$8,000,000 - \$13,000,000*	1-3 years
Education	\$10,000	1-5 years

\*one-time cost only

#### BASIS FOR COST:

Boyle Feasibility Study

#### POTENTIAL FUNDING SOURCES:

- ACOE
- MBERF
- See Chapter 7, Figure 7.7.

#### **EVALUATION:**

- Monitor upstream and downstream flows and effluent at discharge site to determine either positive (increase in flow) or negative (decrease in flow).
- Evaluate the possibility of increasing the treatment capacity of the CMC Treatment Plant to include wastewater from the CMB. If water extractions between the CMC treatment plant outfall were formally apportioned and dedicated to the various uses this might provide an opportunity to have just one treatment plant and increased flow over a longer reach of the creek.

- CC-3 (TMDLs)
- CC-4 (Urban Runoff)
- CC-5 (Stream Geomorphology & WQ)
- NUTR-2 (CMC Wastewater)
- STL-1 (Recovery Plan)
- STL-2 (Habitat Access)
- EDU-1 (General PEO)
- EDU-11 (CEQA Checklist)



FLOW-2: Maintain a Chorro Valley Water Users Workgroup and continue to seek agreements, such as the County of San Luis Obispo agreement to work with other Chorro Valley water users, to maintain minimum stream flows in Chorro Creek at or above 1.5 cubic feet per second (as stated in the County Board of Supervisors action related to the Dairy Creek Golf Course).

#### BACKGROUND/MAJOR ISSUES:

Water resource issues in the Chorro Valley must be managed on a watershed scale. In order to prevent the need for a costly adjudication of water rights in the valley, a local set of guiding principals for water extractions could be established. A basin wide source water protection area, as defined by the State and Federal Source Water Protection Program, and a groundwater management area, as defined by California AB3030, should be considered as methods of managing the water quality and quantity in the valley. Planning within the intent of these two pieces of legislation could also provide potential funding sources for future water management activities in the valley.

All the beneficial uses of water should be taken into account when decisions are made. The requirements of the Public Trust Resources should be taken into account at the outset in any water budgeting and management plan.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

Previous work in the Chorro Basin by the City, County, and State regarding water rights and allocations.

#### BENEFITS OF THIS ACTION:

Maintenance of minimum stream flows in Chorro Creek at or above 1.5 cfs.

#### **IMPLEMENTATION:**

- 1. Reconvene the Chorro Valley Water Users Workgroup to develop a long-range water budget for the Chorro Valley
- 2. Work with CMC, CSLCNG, CDFG, and other landowners and water users to manage the quality and quantity of water resources in the Chorro Valley by sponsoring water conservation forms, expanding Yards and Neighbors effort, etc.

#### WHEN:

**Medium Term:** Reconvene the Chorro Valley Water Users Workgroup to develop a long-range water budget for the Chorro Valley. Work with CMC, CSLCNG, CDFG, and other landowners and water users to manage the quality and quantity of water resources in the Chorro Valley by sponsoring water conservation forms, expanding Yards and Neighbors effort, etc

#### WHO:

Primary:

• MBNEP (coordinate User Workgroup to develop water management plan)

#### Support:

- CDFG (participate in User Workgroup)
- SLOCo. (participate in User Workgroup)
- CMB (participate in User Workgroup)
- CMC (participate in User Workgroup)
- Cal Poly (participate in User Workgroup)
- CSLCNG (participate in User Workgroup)



- Chorro Valley public and private Landowners (participate in User Workgroup)
- CSLRCD (participate in User Workgroup)
- FOE (monitoring)
- CCC (advisory)
- SWRCB (advisory)

#### WHERE:

Chorro Creek Watershed

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Reconvene Workgroup	\$2,000	1-5 years
Work with agencies and landowners	\$5,000	1-5 years

Costs for this action will be minimal based on utilization of existing resources of the primary implementer.

#### BASIS FOR COST:

• Experience with other work groups.

#### POTENTIAL FUNDING SOURCES:

- Within existing resources.
- See Chapter 7, Figure 7.7.

#### **EVALUATION:**

- Monitor upstream and downstream flows from the discharge site.
- Convene workgroup.
- New agreements to maintain minimum flows of 1.5 cfs.

- EDU-11 (CEQA Checklist)
- CC-5 (Stream Geomorphology & WQ)
- NUTR-4 (Residential BMPs)
- STL-1 (Recovery Plan)
- STL-2 (Habitat Access)



# FLOW-3: Promote water conservation and reuse among all water users with a focus on Los Osos groundwater.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

The San Luis Obispo County draft Estero Area Plan (Program A1 in Chapter 3) calls for preparation of a water management program for the Los Osos groundwater basin. One of the items to be addressed in the program is how water purveyors can help reduce water demand by 20 percent.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- The CMB implements BMPs for water conservation, which has resulted in a reduction in the water demand rate from 154 gpd to 115 gpd.
- Many communities have water conservation programs in place. Santa Clara offers rebates for old flush toilets and other heavy-water use, older appliances. Water reclamation efforts are common throughout the arid eastern portion of SLOCo.

#### BENEFITS OF THIS ACTION:

 Increased water supply for aquatic life and other uses, maintain groundwater quantity, and promote stewardship among users.

#### IMPLEMENTATION:

- 1. Report to the community on the results of streamflow monitoring to educate them on water usage and existing conservation measures.
- Develop a water conservation program that targets specific audiences based on streamflow and well data (including a review of water rights applications and existing water rights usage to target appropriate audiences).
- 3. Work with all water users to conserve and/or reuse water.
- 4. Work with water purveyors to implement retrofit and leak detection programs.
- 5. Assist with funding for Los Osos Groundwater Basin Water Management Plan to measure groundwater use, status and trends, and impacts to surface water streamflow, and to develop options and mechanisms for reducing water use conflicts.
- 6. Implement voluntary actions addressing water storage management.
- 7. Recommended streamflow gages for monitoring plan.

#### WHEN:

**Short Term:** Report to the community on the results of streamflow monitoring to educate them on water usage and existing conservation measures. Develop a water conservation program that targets specific audiences based on streamflow and well data (including a review of water rights applications and existing water rights usage to target appropriate audiences). Work with all water users to conserve and/or reuse water. **Medium Term:** Work with water purveyors to implement retrofit and leak detection programs. Assist with funding for Los Osos Groundwater Basin Water Management Plan to measure groundwater use, status and trends, and impacts to surface water streamflow, and to develop options and mechanisms for reducing water use conflicts. Implement voluntary actions addressing water storage management. Recommended streamflow gages for monitoring plan.

#### WHO:

Primary:

- MBNEP (Education, conservation, leak detection programs, funding, monitoring)
- Public & private landowners (receive information, participate in planning projects, implement actions)

#### Support:

- MEGA (Funding)
- SLOCo. (Education, conservation, leak detection programs, funding,)



#### FLOW-3

- CMB (Education, conservation, leak detection programs, funding,)
- Water Supply Districts (Education, conservation, leak detection programs, funding,)
- CDWR (Education, conservation, leak detection programs, funding,)
- CSLRCD (Education, conservation, leak detection programs, funding,)
- All water purveyors (Education, conservation, leak detection programs, funding,)
- ECA (Education, conservation, leak detection programs, funding,)
- CCC (advisory)
- SWRCB (advisory)

#### WHERE:

Los Osos Creek watershed

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Develop and implement water conservation program	\$15,000	1 year
Develop retro-fit and leak detection program	\$10,000	1-2 years
Assist Los Osos GBWMP	\$10,000	1-5 years

Costs for this action will be minimal based on utilization of existing resources of the primary implementers.

#### BASIS FOR COST:

Meetings of local citizens and agencies

#### POTENTIAL FUNDING SOURCES:

- Within existing resources
- See Chapter 7, Figure 7.7.

#### **EVALUATION:**

Survey of water usage indicating reduced water demand.

- CC-5 (Stream Geomorphology & WQ)
- STL-1 (Recovery Plan)
- STL-2 (Habitat Access)
- EDU-11 (CEQA Checklist)



FLOW-4: Support and abide by the terms of existing agreements between the California Men's Colony, California Department of Fish and Game, Central Coast Regional Water Quality Control Board, and County of San Luis Obispo to maintain and dedicate wastewater treatment plant releases to Chorro Creek to prevent the reduction of present Chorro Creek streamflows, and where possible, enhance the fishery, wildlife and other instream uses of Chorro Creek.

#### BACKGROUND/MAJOR ISSUES:

Flows from the CMC wastewater treatment plan (see NUTR-4) are regulated by agreements between the California Department of Fish and Game, CCRWQCB, California Men's Colony of the California Department of Corrections, and County of San Luis Obispo. An agreement signed in December 1996 between these three parties sets terms and conditions relating to CMC discharge amounts that the County can use to irrigate Morro Bay golf course and El Chorro Regional Park; timeframes and amounts for importation of water; timing for release into the creek; intent of the discharge; and monitoring. Another agreement between CMC and CDFG establishes that CMC shall discharge a continuous minimum release of 0.75 cfs of effluent from the wastewater treatment plant for the intention of maintaining and enhancing fishery, wildlife, recreational, and other instream beneficial uses. The CMC facility is also subject to NPDES permitting by the CCRWQCB.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

Trukee River, Nevada. The urban areas of Reno, Sparks, and Washoe County agreed to acquire water rights and discharge minimum flows into the river to support water quality standards and aquatic life requirement.

#### BENEFITS OF THIS ACTION:

Directly supports the goals and objectives of maintaining adequate flow in the creek.

#### IMPLEMENTATION:

- 1. All parties to the agreement will enforce and abide by the terms of the existing agreements.
- 2. MBNEP will conduct independent monitoring of stream flow.

#### WHEN:

Short Term: All parties to the agreement will enforce and abide by the terms of the existing agreements. Medium Term: MBNEP will coordinate independent monitoring

#### WHO:

Primary:

- CDFG (Advisory, oversees permitting, abide by current agreements)
- CCCCRWQCB (oversees permitting, abide by current agreements)
- SLOCo. (abide by current agreements)
- CMC (oversees permitting, abide by current agreements))

#### Support:

- MBNEP (coordinate meetings, monitoring)
- FOE (monitoring)
- CCC (advisory)
- SWRCB (advisory)

#### WHERE:

Chorro Creek



#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Abide by existing agreement	\$0	1-5 years
MBNEP monitoring	SeeCC-6	1-5 years

Costs for this action will be minimal based on utilization of existing resources of the primary implementers.

#### BASIS FOR COST:

Meetings of interested parties

#### POTENTIAL FUNDING SOURCES:

- Within existing resources (CMC, CDFG, SLOCo.).
- See Chapter 7, Figure 7.7.

#### **EVALUATION:**

- The MBNEP will evaluate the flow monitoring requirements contained in the agreements for adherence to minimum flow requirements.
- The CMB will assess well level and stream flow monitoring for maintenance of groundwater levels and instream flow levels.
- FOE will monitor weekly stream flow.
- The CCRWQCB will evaluate compliance with NPDES permit.

- NUTR-2 (CMC Wastewater)
- CC-5 (Stream Geomorphology & WQ)
- EDU-11 (CEQA Checklist)
- STL-1 (Recovery Plan)
- STL-2 (Habitat Access)



# 4.6 HEAVY METALS & TOXICS

Heavy metals can be a serious water quality concern because of their toxicity, persistence, and potency. Metals can accumulate in sediments and concentrate in fish and biological receptor tissue. Other toxic substances can also pose a threat to aquatic organisms. Sources of heavy metals and toxic substances include storm water runoff, vehicle brake pad dust, mine runoff, solid waste disposal areas, household and industrial uses, agriculture, and wastewater discharges (See Chapter 2, Section 2.5.5, Heavy Metals & Toxic Pollutants).

Although currently not a significant water quality problem, a variety of toxic substances and heavy metals are reaching Morro Bay in small amounts. The CCRWQCB has identified metals as potentially affecting aquatic life in Morro Bay, however, except for isolated cases, measured levels are still within acceptable limits. If these concentrations were to exceed the CCRWQCB standards, they could impair beneficial uses including commercial and sport fishing, water contact recreation, other recreation, wildlife and marine habitat, shellfish harvesting, and fish migrations.

#### MBNEP GOALS SUPPORTED BY HEAVY METALS & TOXICS ACTION PLANS:

- Ensure that bay water remains of sufficient quality to support a viable commercial shellfish mariculture industry, safe recreational uses, healthy eelgrass beds, and thriving fish and shellfish populations.
- Reestablish healthy steelhead trout habitat in Chorro and Los Osos creeks through measures including
  reduction of sediment loading in gravels, stabilization of riparian corridors, removal or mitigation of
  migration barriers, improvement of water quality, and restoration and maintenance of adequate fresh water
  flow.
- Promote public awareness and involvement in estuarine management issues through outreach, educational programs, and the use of volunteers in ongoing bay monitoring and other programs.

#### HEAVY METALS & TOXICS OBJECTIVES AND SUMMARY OF ACTIONS:

HMT OBJECTIVE 1: Reduce the introduction of heavy metals and other toxic pollutants to watershed streams, estuary waters and estuary sediments.

- Action HMT-1: Remediate inactive/abandoned chromium and nickel mines in the upper Chorro Creek watershed to reduce heavy metals and sediment loading to the estuary and creeks.
- > Action HMT-2: Implement marina (harbor and waterfront) Best Management Practices (BMPs).
- Action HMT-3: Support the City of Morro Bay's development and design of a new environmentallyfriendly boat haulout and maintenance facility for large vessels (generally over 30 feet).
- Action HMT-4: Establish a network of easily accessible hazardous waste facilities, including bayside locations near pump-out facilities, fuel docks, shower facilities, marinas, and launch facilities, in the City of Morro Bay and the community of Los Osos.

# Table 4.9Heavy Metals & Toxics Actions—

# Implementing Organizations

	HMT-1	HMT-2	HMT-3	HMT-4
	Mine	Marina	Boat	Hazardous
Agency/Organizations	Remediation	BMPs	Haulout	Waste
				Network
Boat Owners		S		
CCC	S	S	S	S
CCCorps	S			
CCRWQCB	Р			
CDBW		S	Р	
CDFG		S		
CDPR		S		
CEC				Р
CMB			Р	
CSLCNG	Р			
Dock Operators		S		S
Fishing Industry			S	
IWMA				Р
MBHD		P		Р
MBNEP	S	S	S	S
Private Industry		S		
Public/Private Landowners	Р			
SLOCo.	S	S		Р
SLOCo. Envir. Health Dept.				S
SWRCB	S			
USCG		S	S	S
USEPA	S	S	S	S
USFS	P			

 $\mathbf{P} = \mathbf{Primary}$  role in implementation and monitoring project outcomes and effectiveness.

S = Supporting role in implementation.



# HMT-1: Remediate inactive/abandoned chromium and nickel mines in the upper Chorro Creek watershed to reduce heavy metals and sediment loading to the estuary and creeks.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

San Luis Obispo County in general has an extensive mining history in many areas, with activity at some locations dating back to the latter half of the 19<sup>th</sup> century. A wide variety of metals were mined, including chromium, mercury, and nickel in several locations along the Santa Lucia mountain range fronting the Chorro valley. Most of the inactive/abandoned mines in the Chorro Creek watershed have been documented to be a source of heavy metals. Most of these mines were operated as open pits, with tailings and overburden piled adjacent to the pit or hauled downslope with the ore-bearing materials.

Four mining operations were located on or near property along the Cuesta ridge owned and operated by the CSLCNG as a field training site. These are the La Trinidad, Primera, and Pick and Shovel mines, and an unnamed excavation, which may have been a large prospecting pit. Several smaller "prospects" are scattered along both sides of the ridge, both on and outside of CSLCNG property. Additional mines are located on USFS property in the Dairy, San Bernardo, and San Luisito Creek watersheds (Hilltop, Norcross, and Castro mines). According to the CCRWQCB, San Luisito Creek is more impacted by mines that most of the other tributaries in the Chorro Creek watershed.

Chromium and nickel are two of the elements listed under federal and state law as "heavy metals," all of which exhibit toxicity at relatively low levels (40 CFR Part 261 and CAC Title 26, Section 66699). As such, these metals pose a threat to the health of organisms and natural communities with which they come into contact. In the case of these mines, riparian zones of Chorro Creek which receive runoff and sediments washed out of the mine pits can be adversely affected, perhaps significantly, by accumulations of heavy metals.

In sediments from the Chorro reservoir, the primary constituents found were chromium (262-474 ppm) and nickel (543-2139 ppm). Nickel was found to be over the hazardous waste level of 2000 ppm, exceeding Hazardous Waste standards. These elevated levels are most likely the result of sediment from inactive/abandoned nickel mines located within the upper watershed.

#### BENEFITS OF THIS ACTION:

Restoration/mitigation of the open mine pits throughout the ridge will have three significant direct effects: improvement of water quality by elimination of accumulations of heavy metals and sediments, improvement of the health of the aquatic life and riparian zones within Chorro creek, and restoration of the natural communities present at the mine sites prior to their operation. All of these effects are consistent with the overall MBNEP goals, and may also indirectly benefit other MBNEP goals and actions, such as restoration of steelhead runs in Chorro creek.

#### **EXAMPLE OF SIMILAR ACTIONS:**

No direct precedents for this action are known to exist in the watershed. However, formal closure of the sanitary landfill at CSLCNG provides a parallel example both in the nature or the problem and the proposed restoration action. This landfill had been previously operated by the SCLCNG, was inactive for several years, and was beginning to exhibit leaching of toxics into groundwater.

Formal closure of landfills under current regulation involves deposition of final waste materials to bring the filled area to near final grade, installation of an impervious cover over the filled area, and installation of a final grade vegetative layer over the impervious cover. Additional work to provide for proper drainage and to blend in the edges to meet the surrounding "natural" grade, and for water quality monitoring generally completes the restoration action.



A modified version of the above procedure may be employed to effect restoration or mitigation of the inactive mine pits in and around Camp San Luis Obispo. The general plan would be to fill in the open pits with tailing/overburden piles present on or near the pit, supplemented with materials dredged from Chorro reservoir and its associated catch basins, to bring the pit contours back to near original grade and contour. Depending upon the scope of the site and potential for leaching, an impervious cover layer may or may not be installed. This would be followed by a vegetative soil layer filled and shaped to achieve final grade and contour. Reestablishment of the pre-mine plant community and restoration of natural drainage completes the action. Follow-up tasks include periodic inspection of the restored sites, and water quality monitoring.

#### **IMPLEMENTATION:**

- 1. Conduct a thorough survey of the existing mine sites to fully define the size and scope of the restoration projects prior to implementing any actions at these sites. This survey will fully describe the nature and scope of the actions to be accomplished at each site, and calculate the volume of materials to be moved, new materials required, and other work necessary to complete the restoration.
- 2. Develop an accurate cost estimate for each site individually, or for all sites as a phased action.
- 3. Prioritize sites.
- 4. Seek funding to implement these actions. Based upon past experience with landfill closure, the costs to close the identified pits at CSLCNG may exceed \$1,000,000. Ideally, funding may be solicited from more than one source, including cooperative agreements with other state and Federal agencies, providing in-kind materials and labor, or performing restoration work in phases.
- 5. Consult with agencies and obtain permits.
- 6. Begin restoration work. As described above, these actions may be accomplished as a comprehensive project, or may be performed in phases. One option would be to perform initial restoration on one small site, using that action as a means of evaluating restoration methods and techniques to determine the most effective means of site restoration, re-vegetation, etc. which then may be employed on larger sites. A monitoring program to evaluate the effectiveness of restoration efforts shall be developed concurrently with the site work.

#### WHEN:

- Short Term: Conduct a survey to define the size, scope, and costs of the project(s).
- Medium Term: Prioritize sites and seek funding to implement these projects. Obtain permits and begin restoration work

Many factors will determine when this action will commence and how much time will be required for completion. The project may logically commence when the necessary funding has been obligated, contracts awarded, and any and all permits have been obtained. If performed as a single action, all sites could be restored within two (2) years. If effected in phases, completion could require up to six (6) years from commencement of the initial contract.

#### WHO:

- Primary:
  - CSLCNG (Survey, Funding, Permits, Restoration)
  - USFS (Survey, Funding, Permits, Restoration)
  - CCRWQCB (Survey, Funding)
  - Public & private landowners (Survey, Funding, Permits, Restoration)

#### Support:

- As the current owner of the land in which the mine pits are located, the CSLCNG is the primary party for effecting restoration/mitigation actions. However, the scope of this action is well beyond the available resources of the CSLCNG to complete as a sole source of funding. Completion of this work will require cooperative effort among the Department of the Army, National Guard Bureau, the USEPA, various state and local agencies, and the MBNEP.
- MBNEP (coordinate)
- CCC (advisory)
- CCCorps
- SLOCo. (approval of grading permits)
- SWRCB (advisory)



#### WHERE:

Upper Chorro Creek Watershed

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Costs to restore mine sites on CSLCNG property	\$350,000	1-5 years
Costs to restore mine sites on USFS property	\$100,000	1-5 years
Costs to restore other mine sites on private lands	\$100,000	1-5 years

#### POTENTIAL FUNDING SOURCES:

As indicated above, funding and other forms of support for these actions will be derived from several sources, including USEPA 319h Non-Point Source Grant Program and the MBNEP. The CSLCNG, through National Guard Bureau, will allocate some level of funding for each fiscal year in which the project(s) are active. While limited, this source can be programmed at a constant level annually, and may be especially useful in supporting phased actions.

Cooperative agreements for funding and allocation of resources may also be effected by interagency agreements between federal and state agencies, and between state agencies to accomplish specific tasks or sections of the overall restoration effort. Resources such as staff time, equipment, fuel, and materials may all be counted as contributions to the restoration efforts. Funding from several agencies may be combined to implement a contract or action, which would otherwise be beyond the resources of any one of the participants.

See Chapter 7, Table 7.8

#### **EVALUATION:**

- Elimination of heavy metal loadings from the Chorro Creek watershed.
- Restoration of natural habitat along creek

- CC-5 (Stream Geomorphology & WQ)
- CC-7 (watershed crew)
- SED-2 (sediment traps)
- SED-4 (landowner BMPs)
- SED-5 (creek restoration)



## HMT-2: Implement marina (harbor and waterfront) Best Management Practices (BMPs).

#### BACKGROUND/MAJOR ISSUES:

Vessel owners are not always aware of the potentially harmful effects of materials and maintenance practices. Potentially harmful cleaners and solvents are often used as part of routine boat maintenance, and toxic paints and other treatments are commonly used on marine vessels. However, less harmful methods are often not as effective and environmentally friendly alternatives are not always feasible. The best method of preventing pollution from marinas and boating activities is to educate the public about the causes and effects of pollution and methods to prevent it (Coastal Zone Act Reauthorization Amendments, 1990).

Many practices employed by boat owners and workers, such as sanding, can be altered or modified to reduce discharge without enormous cost or inconvenience. Other practices require extensive changes, such as hydrowashing marine growth off of boat hulls. The APDP funded by the MBNEP at Coastal Boatworks (a bay-front boatyard and marina) aims at addressing such practices through BMPs. Harbor and waterfront BMPs are measures, which prevent materials that may contain heavy metals and other potential toxics from entering the bay through stormwater runoff or other water generated from boating activities and maintenance.

Boat maintenance operations have shown the ability to limit the entry of harmful paints and solvents into surface waters (Coastal Zone Act Reauthorization Amendments, 1990). Adequate and available disposal facilities and measures used to capture wash-water runoff can prevent the introduction of these materials into the waters of Morro Bay.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- Coastal Boatworks—This APDP implements BMPs for the reduction of heavy metal and other potential toxic pollutants entering the bay. The primary goal of this APDP is pollution prevention and environmental education. Coastal Boatworks is seeking to develop BMPs for a business that directly supports recreational boating and fishing as beneficial uses for the bay, while protecting bay water quality. However, Coastal Boatworks has limited space and can only service approximately two-thirds of the vessels using Morro Bay.
- Association of Monterey Bay Area Governments (AMBAG) has developed topside and haul-out vessel maintenance BMPs and underwater hull maintenance BMPs.

#### **BENEFITS OF THIS ACTION:**

Improved water quality through use of management measures to minimize entry of potentially harmful
materials to estuary waters and marine organisms, while still allowing boat maintenance operators to
maintain the boats (Coastal Zone Act Reauthorization Amendments, 1990).

#### **IMPLEMENTATION:**

- 1. Using the results of the Coastal Boatworks APDP, transfer use of successful BMPs to other existing and future marina operations, other boat repair facilities, and similar bay-front industries, in addition to individual boat owners working on vessels near or on bay waters.
- 2. Implement cleaning operations that minimize, to the extent practicable, the release of a) harmful cleaners and solvents and b) paints from in-water hull cleaning to surface waters.
- 3. Provide cost-sharing opportunities for implementing management measures.
- 4. Develop educational materials that explain the impacts to beneficial uses and promote the following management measures:
  - Where feasible, remove the boat from the water and perform cleaning where debris can be captured and properly disposed of.
  - Use safe marine products, such as phosphate free and biodegradable detergents instead of those that contain ammonia, sodium hypochlorite, chlorinated solvents, petroleum distillates, or lye, for vessel maintenance (topside and underwater).



- Prevent wash-water from entering the bay through the use of devices such as a vacuum filter boom system at vessel haul-out locations.
- Use dustless sanders to prevent paint chips from entering the bay.
- Provide appropriate storage for hazardous materials.
- Use oil spill clean-up materials including absorbents.
- 5. Implement and showcase demonstration projects.
- 6. Research anti-fouling paints that are less harmful, but that are still effective and feasible for marine operations, and develop outreach materials that promote their use.
- 7. Sponsor a forum to address controversial issues, such as restrictions on the use of fossil fuel motors and dye requirements in holding tanks.
- 8. Conduct a survey of the boating community to assess the attitude of boaters and boat repairers toward practices that support boating and fishing while protecting water quality in the bay.

#### WHEN:

- Short Term: Develop educational materials and conduct survey.
- Medium Term: Implement BMP's and provide cost sharing. Sponsor a forum to address controversial issues.

#### WHO:

**Primary:** 

MBHD (BMPs, Implement Cleaning Operations, Cost-sharing, Education)

Support:

- Boat Owners (follow guidelines and BMP practices)
- Boat Dock Operators (follow guidelines and BMP practices)
- Private Industry (follow guidelines and BMP practices)
- USEPA (technical assistance)
- USCG (technical assistance)
- CDBW (funding, advisory)
- CDFG (advisory)
- CDPR
- SLOCo. (oversight authority for Stormwater II Regulations, Local Coastal Plan)
- MBNEP (coordinate)
- CCC (advisory)

#### WHERE:

Marinas in Morro Bay

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Survey and education	\$10,000	1-2 years
Implement BMP's	\$5,000-\$25,000	1-2 years
Identification of less harmful, yet effective and feasible bottom paints	\$5,000	1 year

#### BASIS FOR COST:

Coastal Boatworks APDP

#### POTENTIAL FUNDING SOURCES:

- APDP
- MBERF
- Clean Vessel Act Grants
- CDBW Loans



• See Chapter 7, Table 7.8

#### **EVALUATION:**

- Improvement in quality of storm water runoff samples (See Monitoring Plan). The more extensive BMPs
  may yield measurable results, reduced metals in storm runoff for example, while results from other BMPs
  are more difficult to quantify.
- Bay water and/or sediment quality samples.
- Wash-water filtration system usage.
- Number of educational materials.
- Number of demonstration projects.

- BACT-2 (Pump-outs)
- HMT-3 (Boat Haulout)
- EDU-2 (Boater Outreach)
- CC-4 (Urban Run-off)
- HAB-9 (Nonindigenous Species)



# HMT-3: Support the City of Morro Bay's development and design of a new environmentally-friendly boat haulout and maintenance facility for large vessels (generally over 30 feet).

#### BACKGROUND/MAJOR ISSUES:

Many products boaters use to clean, maintain, and repair boats are particularly harmful to the environment and typically more toxic than most household cleaners. They contain potent caustics and corrosives, which are harmful to the marine environment. Products containing phosphates, such as soaps and detergents, can cause excessive algae growth which depletes the oxygen necessary to sustain marine life. A high concentration of phosphate soaps can also cause fish to suffocate by destroying the natural oil on fish gills that helps them take in oxygen. In addition, many detergents contain heavy metals which bioaccumulate through the food chain.

A total of 438 vessels have been identified as calling Morro Bay as their homeport. Approximately 146 vessels can be expected to haul-out for repair and maintenance services annually. The only operating boatyard in Morro Bay has the capacity to haul-out only 64 percent of the local vessels. Therefore, 36 percent of the vessels that homeport in Morro Bay are unable to haulout. While there definitely is a need for a haul-out facility capable of hauling out larger vessels (generally over 30 feet) in Morro Bay, there is an insufficient market to financially support such an operation.

In April 1997, the Morro Bay City Council appointed a four member Boating Access Facilities Committee to review existing launch facilities, repair yards, and boat storage areas. This Committee consisted of representatives of the Parks and Recreation Commission, Planning Commission, Public Works Advisory Board and the Harbor Advisory Board, with assistance from the Harbor and Parks and Recreation Departments. The findings of this Committee included:

- Existing launch capacity is presently over-crowed and there is no room for expansion. The existing active boatyard (Coastal Boatworks), while adequate, is constrained in physical size and haul-out capacity and may not be able to serve future needs. There is little or no dry storage for boats that is adjacent or close to a launch facility.
- After reviewing existing data and probable future needs, a new site would be required.

Based on a needs assessment by the committee, site requirements for this new facility should include: deepwater access to a depth of between 12-20 feet; roadway accesses; ease of hauling, launching, parking, and storage; and access to utilities, such as water, power, and sewer. The following uses should be included within the project site: (1) boat hauling and launch facility for large vessels (generally over 30 feet); (2) boat repair yard; (3) trailer boat storage; (4) commercial buildings; and (5) parking for cars and car/trailer units.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

 Ventura Harbor Yard recently upgraded their boat haulout and maintenance facility for large vessels. Sanding contaminant and dust control facilities were installed to prevent contaminants from entering the coastal waters.

#### BENEFITS OF THIS ACTION:

• Any work conducted on or near the water greatly increases the threat to the marine environment. An additional boat haul-out and maintenance facility would improve the accessibility and convenience to boat owners for conducting boat maintenance out of the water, thus reducing the chance of toxic pollution into Morro Bay.



#### IMPLEMENTATION:

1. Design and construct a new environmentally-friendly boat haulout and maintenance facility based on market data, future permitted uses, needs assessment, and zoning requirements.

#### WHEN:

Medium Term: Design and construct new boat haul-out facility.

#### WHO:

Primary:

- CMB (secure funding, design and construction plans)
- CDBW (technical assistance)

#### Support:

- MBNEP (coordinate)
- USCG (technical assistance)
- Fishing industry (advisory)
- USEPA (technical assistance)
- CCC (advisory)

#### WHERE:

Morro Bay Harbor

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Design & Construction of new facility	\$2,000,000*	1-2years

#### \*one-time cost only

#### BASIS FOR COST:

Engineering Feasibility Study (1997)

#### POTENTIAL FUNDING SOURCES:

- Sustainable Development Challenge Grant
- Coastal Resources Grants
- Saltonstall/Kennedy Grants
- Private
- See Chapter 7, Table 7.8

#### **EVALUATION:**

- HMT-2 (Marina BMPs)
- HMT-4 (Hazardous Waste Network)
- EDU-2 (Boater Outreach)



HMT-4: Establish a network of easily accessible hazardous waste facilities, including bayside locations near pump-out facilities, fuel docks, shower facilities, marinas, and launch facilities, in the City of Morro Bay and the community of Los Osos.

#### BACKGROUND/MAJOR ISSUES:

To provide opportunities for citizens to properly dispose of unwanted household hazardous materials, the San Luis Obispo Integrated Waste Management Authority (IWMA) proposed and was granted funding for two permanent household hazardous waste collection facilities—one to serve North County and the other, South County. While there is currently no permanent disposal site within the City of Morro Bay, it has been identified as a possible applicant for the Household Hazardous Waste Discretionary Grant Program.

While the need for permanent disposal locations for household hazardous materials has been identified and is in the process of being addressed, the accessibility of the disposal or drop-off sites also needs to be improved. In addition, there are currently no bayside disposal locations for the hazardous wastes generated by the boating community.

Hazardous and toxic materials generated by boaters include cleaners, batteries, paints, solvents, antifreeze, detergents, waste oil, and contaminated fuels. All of these materials can be toxic to marine life. In addition, the water that sometimes collects in the boat bilge can become contaminated with oil, fuel, engine coolant, or bilge cleaners, and create a toxic mixture. Disposal of bilge water is difficult due to the large volume of water and the challenge of separating the seawater from the toxic substances. A site for collection of bilge water presently exists at the South T. Pier, but additional sites are needed at Coastal Boatworks and at the Beacon Fuel Dock.

The Santa Barbara Community Environmental Council (CEC) is currently developing a comprehensive boater education program for the San Luis Obispo County region. This program has three objectives: (1) conduct a boater education and oil collection facilities needs assessment; (2) assist local government jurisdictions in improving oil collection facilities for boaters; and (3) develop a boater education and awareness outreach program.

This action plan proposes to build on the current efforts to develop a network of easily accessible drop-off locations for household and boating hazardous wastes, including oils that collect in boat bilges (the inside of a boat hull), that are linked to permanent disposal facilities.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- Monterey Bay National Marine Sanctuary Monterey, Moss Landing, Santa Cruz, and Pillar Point Harbors—is implementing a Hazardous and Toxic Materials Management Plan which includes: (1) periodic waste collection and pickup events, (2) development of sites, and (3) establishment of procedures for handling materials and education.
- City of Morro Bay has a bilge pump-out facility on the south T-pier and a vessel waste oil disposal site, both implemented through cooperation and funding through the IWMA.

#### BENEFITS OF THIS ACTION:

- Providing accessible and permanent sites and opportunities for the proper disposal of household and boating hazardous materials will reduce contamination and improve the quality of the waters of Morro Bay. Illegal disposal of hazardous wastes will decrease.
- Reduced oil waste being released into the bay by providing a legal disposal site (or sump tank) for collection of oil waste convenient for boat owners.

#### **IMPLEMENTATION:**

1. Monitor status and assist in promoting the IWMA's proposed site of a permanent hazardous waste disposal for the residential, business, and boater community.



- 2. Using information collected through the Santa Barbara Community Environmental Council (CEC) boater education and oil collection facilities needs assessment, develop a network of hazardous materials drop-off sites at convenient, easily accessible locations within the communities of Morro Bay and Los Osos, and bayside locations near pump-out facilities, fuel docks, bathing areas, marinas, and launch facilities.
- Distribute information on CEC's efforts to assist local government jurisdictions in San Luis Obispo County by improving oil collection facilities for boaters by providing legal disposal sites for bilge water at bayside locations.
- 4. Coordinate with and support the CEC's boater education and awareness outreach program to publicize disposal locations and promote responsible behavior locally. (See EDU-2)
- 5. Boost enforcement of penalties for illegal hazardous material disposal in residential and boating communities by encouraging interagency budget increases.

#### WHEN:

Medium Term: Develop a network of hazardous materials drop-off sites at convenient, easily accessible locations within the communities of Morro Bay and Los Osos. Coordinate with and support the CEC's boater education and awareness outreach program to publicize disposal locations and promote responsible behavior locally.

#### WHO:

#### Primary:

- MBHD (identify sites and prepare funding proposal)
- IWMA (funding)
- CEC (advisory)
- SLOCo. (advisory)

#### Support:

- MBNEP (coordinate)
- Fuel dock operators (educate)
- USEPA (technical advisory)
- USCG (advisory)
- DHE (oversight)
- CCC (advisory)

#### WHERE:

Marinas and other bayside locations

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Cost of developing hazardous waste drop off sites	\$125,000*	1-3 years
Cost of annual ongoing program	\$5,000	1-5 years

#### \*one-time cost only

#### BASIS FOR COST:

Various regional Hazardous and Toxic Materials Management Plans.

#### POTENTIAL FUNDING SOURCES:

- IWMA
- Household Hazardous Waste Discretionary Grant Program
- MBERF
- CDBW Clean Vessel Act Grants
- California Waste Oil Grant Program
- SLOCo. Engineering Department (Solid Waste Management)
- Donations from private oil suppliers, recycling companies.



See Chapter 7, Table 7.8 

**EVALUATION:** 

- Tons of hazardous waste brought to facility annually from the City of Morro Bay and Los Osos residents • and boaters.
- Annual number of boats serviced and gallons of bilge water processed.
- Establishment of network of drop-off locations, including Coastal Boatworks and Beacon Fuel Dock.

- EDU-1 (General PEO)
- EDU-2 (Boater Outreach) BACT-2 (Pump-outs) HMT-3 (Boat Haulout) .
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# 4.7 HABITAT

Habitat loss and degradation occur as a result of the other priority problems—sedimentation, nutrients, bacteria, heavy metals and toxics, and freshwater flows. Because of the interdependency of ecosystem components, habitat loss has become a significant priority problem in Morro Bay and its watershed. Habitats to be protected include, but are not limited to: coastal dunes, grasslands, chaparral, open water/channels, eelgrass, mudflats, rocky shore, sandy beaches, coastal salt marsh, freshwater marsh, brackish marsh, and riparian.

Virtually all living things, including humans, who use the Morro Bay estuary and its watershed will be impacted by habitat loss. Some of these impacts include decreased waterfowl populations, reduction of recreational and commercial value, decrease of pollutant buffers, and loss of biodiversity.

#### MBNEP GOALS SUPPORTED BY HABITAT ACTION PLANS:

- Ensure the integrity of the broad diversity of natural habitats and associated native wildlife species in the bay and watershed.
- Reestablish healthy steelhead trout habitat in Chorro and Los Osos creeks through measures including
  reduction of sediment loading in gravels, stabilization of riparian corridors, removal or mitigation of
  migration barriers, improvement of water quality, and restoration and maintenance of adequate fresh water
  flow.
- Ensure that bay water remains of sufficient quality to support a viable commercial shellfish mariculture industry, safe recreational uses, healthy eelgrass beds, and thriving fish and shellfish populations.
- Protect social, economic, and environmental benefits provided by the bay and watershed through comprehensive resource management planning.
- Promote public awareness and involvement in estuarine management issues through outreach, educational programs, and the use of volunteers in ongoing bay monitoring and other programs.

#### HABITAT OBJECTIVES AND SUMMARY OF ACTIONS:

HAB OBJECTIVE 1: Support and strengthen actions by public agencies and private parties to protect habitat and habitat function.

- Action HAB-1: Develop planning overlay maps for sensitive habitat and listed species within the watershed, based on habitat functions and values, particularly wetlands and dune habitat in and near the bay.
- Action HAB-2: Inventory and protect ecologically significant upland habitat required by bay and wetland species.
- Action HAB-3: Map shoreline, near shoreline wetlands, upland vernal pools, and riparian vegetation along all creeks and their tributaries in conjunction with San Luis Obispo County (currently a proposed Combining Designation Program within the draft Estero Area Plan).
- Action HAB-4: Implement appropriate actions in existing and future species recovery plans, in alignment with MBNEP goals and objectives.
- Action HAB-5: Implement policies and projects to protect, restore, and create habitats, including wetlands, in connection with dredging activities.

HAB OBJECTIVE 2: Increase the quality and quantity of riparian corridors and wetland habitats within the Morro Bay watershed.

Action HAB-6: Maintain and promote adequate wetland resources and riparian vegetation through identification and implementation of proven management techniques.



- Action HAB-7: Develop methods, including voluntary and incentive programs, and possibly standards, to provide additional protection to riparian and wetland resources
- > Action HAB-8: Implement restoration activities to improve the quality and quantity of eelgrass habitat.

HAB OBJECTIVE 3: Reduce the rate of habitat loss to invasive species.

- Action HAB-9: Implement management measures to control the impacts of nonindigenous species on wetland and upland habitats.
- > Action HAB-10: Implement a pilot project to remove *A. donax* from riparian vegetation corridors along Chorro Creek and its tributaries, and continue treatment based on monitoring.

### Table 4.10 Habitat Actions—Implementing Organizations

	HAB-1	HAB-2	HAB-3	HAB-4	HAB-5	HAB-6	HAB -7	HAB 8	HAB -9	HAB-10
	Overlay	Upland	Mapng	Species	Bneficl	Ripar.	Ripar/	Eelgrass	Non-	(A.
Agency/Organizations	Maps	Habitat		Recvry	Dredg	Veg.	WetInd	이는 동안 이상한 동생은 이 이는	indignous	donax
				Plans			Policies		Species	Removi
ACOE					P			Р		
Audubon Society		S								
BF			S	S	S					
CCC	S	S	S	S	S	S	S	S	S	
CalPoly	S		P							
CCCorps	S	S	S			S			S	Р
CCNHA		S								
CCRWQCB					Р					
CDFG	S	S		P	S	S				
CDPR					P	S		S		
CMB	S		S		S			P		
Contractors			S							
CSLCNG			S	S		P			Р	S
CSLRCD						Р				
Farm Bureau						S				
FOE	S	S	S	S	S	S	S	S	S	S
LOCSD										
MBNEP	P	P	P	S	S	S	P	S	S	
MEGA	P									
NRCS						Р				
Public/Private	S	P	S	P		P	P		P	S
Landowners										
SCC					S					
SLOCo.	<u>P</u>	S	S				S		P	<u> </u>
UCCE		S		<u>S</u>		S			<u> </u>	
USEPA					S					
USFS						S				
USFWS		S		P		S				
USNMFS				P				S		

**P** = Primary role in implementation and monitoring project outcomes and effectiveness.

S = Supporting role in implementation.



# HAB-1: Develop planning overlay maps for sensitive habitat and listed species within the watershed, based on habitat functions and values, particularly wetlands and dune habitat in and near the bay.

#### > Priority Action

#### BACKGROUND/MAJOR ISSUES:

Local government agencies and private stakeholders (particularly large landowners) have the ability to make a positive impact on the quality and quantity of habitats in the Morro Bay watershed. However this potential is not fully realized because of a lack of information, competing priorities, interests, and resources.

San Luis Obispo County currently has zoning overlays called Sensitive Resource Areas (SRA), which combine designations for sensitive habitat. The Draft Estero Area Plan expands the extent of those SRA combining designations in Los Osos and vicinity in order to reflect the findings of the U.S. Fish and Wildlife Service's *Recovery Plan for the Morro Shoulderband Snail and Four Plants from San Luis Obispo County, California* and Revised Recovery Plan for the Morro Bay Kangaroo Rat. The Plan also includes proposed planning area standards that would apply protective measures to a variety of sensitive habitat—whether mapped or not—that could be affected by proposed development. In addition, the Baywood and Los Osos Conservation Plan (1998) includes an inventory and GIS overlay maps of vegetation communities and sensitive species for the rural landscape surrounding Baywood and Los Osos that can be utilized to support this effort.

#### EXAMPLE OF SIMILAR/IN PLACE ACTIONS:

The City of Morro Bay has designated criteria habitat areas within its city limits. Planners use these areas to guide them as they work with the community and local officials in developing land use recommendations.

#### **BENEFITS OF THIS ACTION:**

Local government actions would serve to strengthen the conservation of critical habitats. Consistent, accurate habitat resource information would support conservation based land use decisions.

#### **IMPLEMENTATION:**

- 1. The MBNEP will convene a Habitat Committee comprised of local government representatives, resource specialists, and representatives from local advisory councils and the agricultural community to review and refine the locations of existing SRA combining designations and accompanying standards in the Coastal Zone Land Use Ordinance (CZLUO). The committee would make recommendations to the County, and as appropriate, would develop appropriate planning overlay maps based on habitat functions and values as determined by existing information and confirmed with field sampling. The committee would select a chair and establish operating procedures, a work plan, and a reporting mechanism measuring success. The committee would meet monthly until the overlays were developed and adopted by appropriate local planning entities, and probably less frequently thereafter. Committee members will serve without compensation.
- 2. The Habitat Committee will determine the appropriate criteria to use in defining each overlay to ensure that definitions are useful and consistent to the needs of each governmental entity as well as appropriate for private landowners.
- 3. The Habitat Committee will produce overlays and/or other documents to communicate to local decision officials, internal government planning and other related staff, and private landowners periodically to apply the information into the positive actions to protect habitats. Update LCP maps in coordination with appropriate agencies.
- 4. The Habitat Committee will review, comment, and actively participate in local land use planning efforts providing guidance concerning habitat resource functions, impacts, and alternative options. The committee will work with the county to establish or maintain land use permitting constraints within the local coastal



plan that will conserve biological resources while safeguarding private property rights, and providing incentives to landowners such as the Transfer of Development Credits and land exchange programs.

5. The Habitat Committee will periodically update overlays, as needed, to reflect changing in the habitat landscape in the Morro Bay watershed and advising landowners regarding the biological resource values and water quality functions on their property.

#### WHEN:

- Short-term: Establish a committee soon after the completion of the CCMP. Development of a work plan, selection of committee positions and operating procedures would require an additional three months. By the first year, criteria would be developed. The committee will also produce a tracking system to report on progress to the community/NEP.
- Medium-term: Collect and review appropriate data, field test verify, and produce overlays. Finally six
  months is needed to incorporate the overlays into each agency organization. Concurrent to these activities,
  the committee will report periodic highlights of progress to the community/NEP.
- Long-term: Participate in the local planning process, working with elected officials, agency staff, private landowners, and the public. Also, overlays will be updated, as needed.

#### WHO:

#### Primary:

- MBNEP (coordination)
- MEGA (provide leadership)
- SLOCo (technical assistance)

#### Support:

- MBNEP (convene the committee)
- SLOCo. (technical assistance)
- CMB (technical assistance)
- CDFG (technical assistance)
- Public & private landowners (technical assistance)
- Other resource agencies (technical assistance)
- Nonprofit organizations and others to provide information and services (technical assistance)
- FOE (monitoring)
- CCC (mapping sensitive habitats)
- CCCorps (assist with mapping activities)
- CalPoly (advisory)
- CMB (technical assistance)

#### WHERE:

Throughout the watershed

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Miscellaneous committee needs	\$75,000*	1-3 years
*one-time cost only		

#### **BASIS FOR COST:**

- Committee: Room rental, office supplies, printing, mailing, etc.
- Overlays: Cost of Tetra Tech Habitat Study plus an additional \$30,000 to produce multiple copies of overlays.

#### POTENTIAL FUNDING SOURCES:

- MBERF
- USEPA Section 320 Funds
- Grants



See Chapter 7, Table 7.9. .

#### **EVALUATION:**

- Identification of land acres of critical habitat. .
- Overlays developed. Annual report of change in land acres by habitat.

- CC-1 (Land acquisition) (particularly the development of criteria for prioritization) CC-7 (Watershed Crew) H
- .
- All HAB Actions



# HAB-2: Inventory and protect ecologically significant upland habitat required by bay and wetland species.

#### BACKGROUND/MAJOR ISSUES:

The Morro Bay Watershed is home to several bird species that forage in upland habitat, particularly grasslands, but spend a significant amount of time in the tidal wetlands. The critical amount of upland habitat that is needed for these species is not known, nor is the degree to which the habitat is utilized. This action will protect, through conservation easements or other methods, upland habitats that are used by bay species.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- The Baywood and Los Osos Conservation Plan (1998) developed an inventory and GIS overlay maps of vegetation communities and sensitive species for the rural landscape surrounding Baywood and Los Osos.
- The protection of old growth coastal forest to protect marbled murrelet is an example from the Pacific Northwest. A vineyard owner in Sonoma County found an increase of birds at his constructed wetland site after creating an upland nesting area. Although this example is different from the action, it does document the need for upland habitat for aquatic dependent species.
- MEGA and MBNEP recently entered into partnership to acquire 15 acres of coastal dune scrub as part of the larger Greenbelt Plan.

#### **BENEFITS OF THIS ACTION:**

• The survival of certain species may depend on continued existence of upland habitat.

#### **IMPLEMENTATION:**

- 1. A scientific committee, working with the Audubon Society and other natural history organizations and landowners, shall develop an inventory of species that utilize Morro Bay estuary and upland habitats, and the amount and type of habitat that is required to sustain that species. In comparison with the existing inventory of habitats in the watersheds, the committee shall determine if there is any probability that the foraging and other needs of these species is likely to be at risk.
- 2. Working with landowners, identify and implement management measures, such as revegetating habitat and restricting off-road vehicle use and monitor success through increase or stabilization of community diversity.
- 3. Conduct an outreach program, led by willing landowners, to educate other landowners about threatened habitats and recommendations for preservation.

#### WHEN:

Short Term: Establish committee, and identify management measures. Medium Term: Conduct an outreach program and implement measures.

#### WHO:

(The committee will be coordinated through the MBNEP Office, it is suggested that an organization such Audubon Society, Central Coast Natural History Association, or agricultural community take a lead role.) **Primary:** 

- Public & private landowners (provide easements for protected species and/or sell or dedicate property for habitat)
- MBNEP (coordinate)



#### Support:

- MBNEP (coordinate)
- UCCE (technical assistance)
- Audubon Society (advocacy)
- SLOCo. (protection through county planning)
- CDFG (technical assistance)
- USFWS (technical assistance)
- FOE (monitoring)
- CCC (advisory)
- CCNHA
- CCCorps (inventory habitat resources; restore upland habitats and conduct outreach programs)

#### WHERE:

Upland area throughout the watershed

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Implement management measures	\$5,000*	1-5 years
Conduct outreach	\$1,000*	1-5 years
*See also CC-1, 6		

#### BASIS FOR COST:

 The costs will include room rent, time needed by the NEP director to compose and mail out notices and minutes, and incidental costs of meetings.

#### POTENTIAL FUNDING SOURCES:

- Small grants from local government (to be determined by Financial Work Group)
- State and federal species protection programs (CDFG, USFWS, USNMFS)
- Species recovery programs (existing agency resources plus CRA's new funding from President Clinton's Pacific West Funding—Alaska, Washington, Oregon, and California)
- Donated services from committee members (committee members and landowners have expressed interest in working with MBNEP to volunteer time, access, and other resources to implement this action)
- See Chapter 7, Table 7.9.

#### EVALUATION:

- Establishment of a fully functioning committee.
- Identification and reporting of priority upland foraging habitats to community.
- Development of management measures for protection of habitat.
- The protection of upland habitat.

- CC-1 (Land acquisition)
- CC-7 (Watershed Crew)
- HAB-1 (Overlay Maps)
- HAB-3 (Mapping)
- HAB-4 (Species Recovery Plans)



# HAB-3: Map shoreline, near shoreline wetlands, upland vernal pools, and riparian vegetation along all creeks and their tributaries in conjunction with San Luis Obispo County (currently a proposed Combining Designation Program within the draft Estero Area Plan).

#### BACKGROUND/MAJOR ISSUES:

Riparian and wetland habitats provide valuable functions to water quality, aquatic life, wildlife, and visual enjoyment by people. A presidential executive order identified a national goal of "no net loss of wetlands." The President's Clean Water Action Plan calls for an increase in wetlands across the country. Morro Bay estuary riparian and wetland habitats have not been thoroughly inventoried and mapped. Consequently, it is difficult to track wetland losses or gains.

NOTE: The Combining Designation Program in the draft Estero Area Plan does not include the extensive mapping described in this action plan; rather it is limited to checking the accuracy of wetlands designations along the Morro Bay shoreline.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

The San Francisco Bay NEP recently completed a three-year project to map and establish wetland habitat goals. Their recently released document has been well received and serves to document historic wetland acres, current wetland areas, and a goal to increase wetland habitat by 40,000 acres.

#### **BENEFITS OF THIS ACTION:**

Mapping these resources will establish a baseline upon which the program can measure compliance with the national goal of "no net loss," as well as support other actions to strengthen the estuary's wetland, riparian, and biological resources.

#### **IMPLEMENTATION:**

- 1. The MBNEP will establish a committee of local scientists, county and city officials, state and federal agencies, landowners, GIS mapping professions, and interested stakeholders to oversee this project. The committee will establish its operating procedures, select officers, etc. and meet monthly through the duration of the mapping effort. A work plan and budget will be developed.
- 2. The committee will review historical records and maps to establish pre-1850 wetland conditions. Sediment coring and/or other sampling techniques may be necessary to confirm pre-1850 conditions. A map will be produced that reflects historic baseline conditions.
- 3. The committee will review current aerial photographs, existing records and other data to document to initiate current condition mapping. Additional data collection requirements will be identified and a work plan and budget will be developed to secure the additional information.
- 4. GIS maps of riparian vegetation, wetlands, vernal pools, and other critical species sensitive habitat will be mapped, distributed to appropriate agencies, scientists, nonprofit organizations, private landowners, and others. Presentations on the GIS maps will be made and the NEP will list availability on their Internet site.

#### WHEN:

- Short-term: Establish committee, identify positions, operating procedures, develop work plan and budget, compile existing information, begin to develop pre-1850 map, identify field sampling needs.
- Medium-term: Let contracts for additional sampling and conduct sampling, review existing data for current habitats, identify additional sampling needs, and initiate procurement.
- Long-term: Finalize pre-1850 maps, conduct field sampling, compile maps, and disseminate information.

NOTE: Mapping might need to be done for each season or for dry, average, and wet years.


#### WHO:

#### **Primary:**

- MBNEP (establish a committee)
- Cal Poly (technical assistance)

#### Support:

- SLOCo. (technical assistance)
- CMB (technical assistance) .
- Resource agencies (technical assistance) .
- BF (funding) .
- Public & private landowners (technical assistance, access to land) .
- . Contractors
- FOE (monitoring) .
- . CCC (advisory)
- CSLCNG (access to riparian areas, advisory) .
- CCCorps (assist with mapping)

#### WHERE:

Near shoreline areas, upland areas, and riparian creek areas

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Sampling and data analysis (HAB-2 costs will support this effort—maps will also be used by the Habitat Committee under CC-1)	\$100,000 - \$200,000* (see CC-6)	1-5 years

\*one-time cost only

#### BASIS FOR COST:

San Francisco Bay NEP Habitat Goals project cost \$600,000 

#### POTENTIAL FUNDING SOURCES:

- MBERF
- Grants
- See Chapter 7, Table 7.9.

#### **EVALUATION:**

- Completed maps of pre-1850 conditions .
- Completed maps of current habitats

- .
- CC-1 (Land acquisition) CC-7 (Watershed Crew)
- All HAB Actions 11



### HAB-4: Implement appropriate actions in existing and future species recovery plans, in alignment with MBNEP goals and objectives.

#### BACKGROUND/MAJOR ISSUES:

The Morro Estuary supports habitat for 14 federally listed species, some of them found nowhere else in the world. The Federal Endangered Species Act of 1973, as amended (Act), directs the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (USNMFS) to prepare recovery plans for all federally listed species for which they have responsibility. The following table contains a list of listed species found in the watershed, Federal status, and stage of recovery plan development.

Species	Federal Status	Reco
Morro Bay kangaroo rat	endangered *	Final
Morro shoulderband snail	endangered *	1997
California sea-blite	endangered *	Publi
Morro manzanita	threatened *	1997
Indian Knob mountainbalm	endangered *	1997
Chorro Creek bog thistle	endangered *	1997
Least Bell's vireo	endangered	1988
Western snowy plover	threatened	Publi
American peregrine falcon	endangered	Final
Brown pelican	endangered	Final
Salt marsh bird's-beak	endangered	Final
Southern sea otter	threatened	Final
California red-legged frog	threatened	Publi
Central Coast steelhead trout	threatened	Cont

Recovery Plan Status Final, 1982; under revision 1997 public draft, final in progress Public draft under development 1997 public draft, final in progress 1997 public draft, final in progress 1997 public draft, final in progress 1988 public draft, final in progress Public draft under development Final, 1983 Final, 1983 Final, 1985 Final, 1982; revised public draft, 1996 Public draft under development Contact USNMFS

\*Endemic to the vicinity of the Morro Bay Watershed.

The Los Osos Habitat Conservation Policy (8) in the Draft Estero Area Plan calls for the implementation of the USFWS recovery plan for the Morro shoulderband snail, Morro manzanita, and Indian Knob mountainbalm.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

The Land Conservancy of San Luis Obispo County coordinated the development of the Los Osos/Baywood Park Greenbelt and Conservation Plan (Greenbelt Plan) with the Coastal Conservancy, USFWS, CDFG, SLOCo., private landowners and other interested parties. The Greenbelt Plan describes biological resources in Los Osos and potential conservation solutions, such as permanent habitat conservation, and features a map of plant communities in Los Osos. The conservation of Greenbelt lands is a priority one task in the USFWS's recovery plans for the Morro Bay kangaroo rat, Morro shoulderband snail, Morro manzanita, and the Indian Knob mountainbalm. The Greenbelt Plan is primarily a planning rather than implementation document.

Following the development of the Greenbelt Plan, the Morro Estuary Greenbelt Alliance (MEGA) was formed to work with state, Federal, and local agencies, non-profit conservation organizations, and interested individuals to conserve remaining habitat surrounding Los Osos. MEGA has identified lands for protection within the Land Conservancy's Greenbelt Plan and the USFWS recovery plans for the Morro Bay kangaroo rat, Morro shoulderband snail, Morro manzanita, and Indian Knob mountainbalm. This project began in 1997 will require continued support and dedication.

The SLOCo., Cal Poly, the Land Conservancy, and local consulting firms possess various types of GIS information on all or portions of the watershed.

#### **BENEFIT OF THE ACTION:**

The development and implementation of recovery plans is intended to promote species recovery. The ultimate goal of the Act is to recover species to the point where additional protections are no longer needed and they can be removed from the list of threatened and endangered species. Actions to conserve and restore lands that

support listed species would also help to protect water quality in the Morro Bay estuary through reduced erosion and run-off as a result of less urban development and other activities that can degrade water quality.

Although the USFWS, USNMFS, and CDFG are charged with preparing species recovery plans, funding for their implementation is never assured. Therefore, the support and participation by interested agencies, non-profit conservation groups and private citizens is critical to a successful recovery program. The MBNEP has the potential to play a vital role to promote the recovery of several listed species in the watershed.

#### IMPLEMENTATION:

- 1. Establish a working group to examine existing recovery plans and work with the USFWS, USNMFS, CDFG, and others to identify, design, and implement tasks in alignment with MBNEP goals and objectives.
- 2. Identify species-specific recovery tasks.
- 3. Develop opportunities with state and Federal agencies, local jurisdictions, and conservation groups to identify and implement recovery actions for species without existing recovery plans, including the Morro Estuary Greenbelt.

Each recovery plan identifies specific recovery actions, potential implementation partners, and estimated costs. Information is not split out by watershed. Therefore, additional work will be required to identify the above information for the Morro Bay watershed. For species with no recovery plans, recovery actions would be developed on a case-by-case basis and in consultation with appropriate agencies and individuals. For those recovery plans, which are to be issued in 1999, delaying the design and implementation of recovery actions may be prudent until release of the final recovery plan. In addition, the Baywood and Los Osos Conservation Plan (1998) has developed protocols to support recovery plan goals for sensitive species in the surrounding rural area.

#### WHEN:

**Short Term:** Convening a group and identifying potential recovery tasks for possible implementation and identification of mapping needs and resource.

**Medium Term:** Identify species-specific recovery tasks. Develop opportunities with state and Federal agencies, local jurisdictions, and conservation groups to identify and implement recovery actions for species without existing recovery plans.

#### WHERE:

Throughout the watershed

#### WHO:

Primary:

- USFWS (technical assistance/recovery plans)
- USNMFS (technical assistance/recovery plans)
- CDFG (technical assistance/recovery plans)
- Public & private landowners

#### Support:

- MBNEP (establishes working group)
- BF (funding)
- UCCE (technical assistance)
- FOE (monitoring)
- CCC (mapping of sensitive habitat areas)
- CSLCNG (advisory)



#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Convene workgroup and	\$1,000	1-5 years
identify recovery actions		

#### POTENTIAL FUNDING SOURCES:

The MBNEP would take the lead on establishing the work group(s) to identify recovery actions, mapping needs, and resources. Funding may be available from the MBERF. Technical assistance would be sought from the USFWS, USNMFS and CDFG and other appropriate parties. Opportunities would be sought for agencies to cover staff time and travel expenses.

To the extent feasible, species and habitat mapping data should be assembled from that which exists in the public domain or is available at nominal costs.

See Chapter 7, Table 7.9.

#### **EVALUATION:**

- Criteria for evaluating the successful implementation of the objectives should be established by the work group.
- Implementation of actions in recovery plans.

- EDU-1 (General PEO)
- CC-1 (Land acquisition)
- HAB-1 (Overlay Maps)
- HAB-2 (Upland Habitats)
- HAB-3 (Mapping)



## HAB-5: Implement policies and projects to protect, restore, and create habitats, including wetlands, in connection with dredging activities.

#### BACKGROUND/MAJOR ISSUES:

Morro Bay is an important harbor of refuge for commercial and recreational fishing boats. Shoaling, which results from excessive sediment supply, causes a need for increased dredging. The channel that is regularly dredged by the U.S. Army Corps of Engineers (ACOE) is impacted primarily by sediment brought in by tides (littoral drift). The continuing loss of tidal prism has a direct impact on tidal flow velocity in the channels of the bay. Tidally driven currents affect the deposition and scouring of sediment in all the channels of the bay. Sedimentation affects navigation through shoaling and causes changes to the circulation patterns in the bay. Shoaling can lead to breaking waves in the entrance area of the bay.

ACOE conducts regular dredging at the mouth of Morro Bay to maintain the channel in a passable and safe state. Proposed dredging activities in Morro Bay may include possible expansion by the Department of Parks and Recreation of the small boat marina in Morro Bay, and incidental dredging associated with proposed construction of new waterfront buildings in the City of Morro Bay. At various times, there has been discussion of dredging portions of the back bay and channels, but due to the potential for significant environmental impacts, this is not considered likely. MBNEP workgroups have favored restoration to the extent that it is not disruptive to the habitats of the bay.

Section 204 of the Federal Water Resources Development Act authorizes projects to protect, restore, and create aquatic and ecologically related habitats, including wetlands, in connection with dredging an authorized federal navigation project.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- In 1995, the San Francisco Joint Venture Wetlands Restoration Project developed a partnership program with 28 government agencies, environmental organizations, and recreational groups. The project successfully restored 871 acres of wetlands.
- Batiquitos Lagoon project to mitigate impacts at the Port of Los Angeles. The Port is currently
  implementing the Batiquitos Lagoon Enhancement project which includes dredging the lagoon,
  constructing new inlet jetties to keep the mouth open and permanently restore tidal flows and creating
  nesting areas for colonial nesting birds including the CA least tern and western snowy plover. Sediment
  traps and vegetation planting may be useful..

#### BENEFITS OF THIS ACTION:

- Reduced environmental impacts from dredging.
- Protection, restoration, and creation of habitat.
- Increased tidal prism.

#### **IMPLEMENTATION:**

- 1. The MBNEP will support Federal maintenance of the harbor entrance and navigation channels.
- 2. The CMB will continue to use environmental correct dredging techniques and dredged material management practices to maintain the harbor while minimizing damage to the Morro Bay estuary.
- 3. Identify potential sites for restoration using dredged fill.
- 4. Implement restoration projects at identified sites.
- 5. Protect, restore, and create aquatic and ecologically related habitats, including wetlands through the reuse of dredged material by working with the MBNEP Habitat Committee to identify areas needing additional sediment or sand, and coordinating with ACOE, landowners, and other stakeholders to implement restoration projects using dredged materials. The MBNEP Habitat Committee will develop a restoration site plan to ensure the successful outcome for long-term habitat restoration.

#### WHEN:

Short Term: Identify potential sites for restoration using dredged fill. Medium Term: Implement restoration projects at identified sites

#### WHO:

#### Primary:

- ACOE (funding/maintenance dredging)
- CDPR (expand small boat marina/promote wetlands)
- CCRWQCB (401 certification)

#### Support:

- MBNEP (coordinate action with other actions)
- BF (funding)
- SCC (technical assistance/funding)
- USEPA (technical support)
- CDFG (technical assistance)
- FOE (monitoring)
- CCC (permitting/environmental oversight)
- CMB (technical assistance)

#### WHERE:

Morro Bay and potential wetland sites

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Identify restoration sites	\$25,000	1 year
Implement restoration projects	\$100,000- \$500,000*	1-3 years

\*one-time cost only

#### BASIS FOR COST:

Past dredging operations

#### POTENTIAL FUNDING SOURCES:

- MBERF
- Section 204 of the Water Resources Development Act authorizes projects to protect, restore, and create aquatic and ecologically related habitats, including wetlands, in connection with dredging an authorized federal navigation project. Non-federal sponsors pay 25 percent of the project cost and 100 percent of operation, maintenance, replacement, and rehabilitation costs. ACOE divisions have approval authority for individual projects with an estimated cost of less than \$5 million; larger projects are approved by ACOE headquarters.
- See Chapter 7, Table 7.9.

#### **EVALUATION:**

• Number of acres of habitat protected, restored, or created.

- CC-1 (Land Acquisition)
- SED-8 (Estuary Restoration Project)
- HAB-1 (Overlay Maps)
- HAB-3 (Mapping)
- HAB-8 (Eelgrass)





# HAB-6: Maintain and promote adequate wetland resources and riparian vegetation through identification and implementation of proven management techniques.

#### BACKGROUND/MAJOR ISSUES:

In temperate climates, healthy riparian habitat can support a higher diversity of species than any other terrestrial habitat. This diversity is due to a number of factors: 1) presence of water; 2) vertical complexity of the vegetation creating increased foraging opportunities and protection cover for wildlife; and 3) riparian vegetation that provides migratory corridors through and between plant communities. These factors support both migratory and resident wildlife species. Current funding levels are presently inadequate to identify, implement, maintain, and promote adequate vegetation management techniques in the watershed to meet water quality standards and support threatened and endangered species.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- Morro Bay Watershed Enhancement Project (see Chapter 2)
- The UCCE Rancher Short Course is offered to private landowners in the Morro Bay watershed to educate landowners on techniques to improve the riparian corridor and water quality. The Napa River watershed has also developed a similar program.
- The Napa Creek Flood Reduction Project provides flood protection by reconnecting the Napa River to its flood plain, creating wetlands throughout the area.

#### BENEFITS OF THIS ACTION:

• Enhanced riparian corridors, both in terms of diversity and connectivity, will directly increase the habitat value in the watershed.

#### IMPLEMENTATION:

- 1. The MBNEP will sponsor workshops among agency representatives, wildlife specialists and landowners to identify proven management techniques, such as re-vegetation and corridors, for enhancing riparian areas for wildlife and come to consensus on management techniques, such as incentive based programs. Efforts will focus on supporting the Natural Resource Conservation Service, University of California Cooperative Extension, and Coastal San Luis Resource Conservation District in their work with willing landowners to implement recommended management measures, in conjunction with management measures in Sediment and Nutrient action plans to economize efforts.
- 2. Fund cost-sharing program(s) will be developed by MBNEP staff and/or a steering committee. Application, selection, and award processes will be defined to support existing programs already implementing proven management techniques and acquisition of available desirable properties and easements.
- 3. The steering committee (developed from the sponsored workshops in #1 above) will develop and use existing landowner incentive programs to encourage full participation by local landowners.
- 4. The CCCorps and will be used for installation of projects.

#### WHEN:

- Short-term: Identification of methods, establishing cost-share program process, announcement of funds, application, and selection process.
- Long-term: Funding of existing programs and implementation of identified expanded management practices.

#### WHO:

Primary:

- NRCS (work with landowners)
- CSLRCD (work with landowners)
- Public & private landowners (receive technical assistance/implement management measures)
- CSLCNG (advisory)



#### Support:

- CCCorps (installation of projects/work crew; assist with riparian management)
- MBNEP (coordinate meetings)
- CDFG (technical assistance)
- USFS (technical assistance)
- USFWS (technical assistance)
- UCCE (technical assistance)
- CDPR (technical assistance)
- SLO Farm Bureau (advisory)
- FOE (monitoring)
- CCC (mapping of sensitive habitat areas)

#### WHERE:

Wetland and riparian areas throughout the watershed

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Planning effort	\$35,000*	1-2 years
Implementation	\$200,000	1-3 years
¥ 111		

\*one-time cost only

#### BASIS FOR COST:

- MBNEP budget
- Morro Bay Watershed Enhancement Projects 1997 annual progress report

#### POTENTIAL FUNDING SOURCES:

#### For planning effort:

USEPA Section 320 Funds

#### For implementation:

- Create flood control zone through zoning
- CDFG Fines Commission
- SWRCB (USEPA 319h Non-Point Source Grant Program)
- Stewardship Incentive Program
- Wildlife Habitat Improvement
- EQIP
- Wildlife Conservation Board
- CCC
- MBERF
- CDFG (AB2925/Fish-related Incentives for Sustainable Habitat -FISH)
- USFWS (Environmental Enhancement Mitigation Program, National Coastal Wetlands Conservation Act, Partners for Fish & Wildlife Program, North American Wetlands Conservation Act, AB2925/Fish-related Incentives for Sustainable Habitat -FISH)
- See Chapter 7, Table 7.9.

#### **EVALUATION:**

- Annual reports from implementing agencies and projects.
- Workshops.
- Ongoing wildlife and water quality monitoring on a portion of treated streams.
- Improved health and abundance of wetlands.



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- FED ACTIONS: STL-4 (Riparian Corridors) SED-2 (Sediment Traps) SED-4 (Landowner BMPs) SED-5 (Creek Restoration) CC-1 (Land acquisition) CC-5 (Stream Geomorphology and WQ) CC-7 (Watershed Crew) HAB-1 (Overlay Maps) HAB-3 (Mapping)
- •
- .
- . HAB-3 (Mapping)



# HAB-7: Develop methods, including voluntary and incentive programs, and possibly standards, to provide additional protection to riparian and wetland resources.

#### BACKGROUND/MAJOR ISSUES:

The San Luis Obispo County General Plan, a collection of policies, is organized into Land Use, Circulation, and Agriculture and Open Space Elements, among others. The countywide Land Use element consists of a "Framework for Planning" describing the land uses and policies, and 15 area plans (11 inland and four coastal). The County is currently in the process of revising the Estero Area Plan, a coastal zone area plan, which includes the western portion of the Morro Bay watershed. While the Estero Planning Area encompasses the coastal zone within the watershed, the inland areas of the watershed fall into the County's San Luis Obispo and Salinas River Planning Areas. These planning areas have different policies due to their inland nature. For some time now, there has been a desire to have all resource protection policies and ordinances consistent within the watershed. The Draft Estero Area Plan currently includes a Watershed Protection and Management Program related to the Morro Bay Estuary. The program includes, among other things, a recommendation that the County change planning area boundaries of the Estero and adjacent planning areas so that they correspond to the boundaries of the Morro Bay watershed, The program also contains a recommendation to the county to request that the State expand the coastal zone to encompass the entire watershed (Estero Area Plan Update, Public Hearing Draft 1999, pg. 6-28).

Coastal plan policies limit grading for development to slopes of less than 20 percent (Policy 7), call for avoiding grading during the rainy season (Policy 8), require the use of appropriate erosion control (Policy 9), and require minimization of erosion and sedimentation through the use of accepted management practices (Policy 12). Coastal plan policies also protect sensitive resource areas (SRA - defined in "Framework for Planning"), which include wetlands, coastal streams and riparian areas, and environmentally sensitive habitats (ESH) by including requirements for development setbacks, or buffer areas.

The County's Agriculture and Open Space Element was adopted on December 15, 1998, after a long public review process. This document acknowledges the significance of the Morro Bay Estuary and its watershed, along with the many land uses such as Agriculture, tourism, and recreation. It also includes open space policies that address protection and conservation of natural and scenic resources. While the new agriculture and open space element includes policies that go further toward protecting sensitive resources in the watershed than they ever have before, it is important to note that even within the coastal zone, nonstructural agricultural uses are allowed within riparian setbacks (although there are limitations on removal of riparian vegetation).

#### **EXAMPLES OF SIMILAR IN-PLACE ACTIONS:**

The Santa Cruz County LCP Major Amendment proposal of 3-98 includes the addition of a new County Code which would prohibit all timber harvesting within 50 feet of the banks of perennial streams and 30 feet from the banks of intermittent streams. The chapter on Riparian Corridor Standards prohibits development in defined riparian corridors, unless an exception is granted. The defined riparian corridor would in some cases be wider than the proposed 50-foot buffer (e.g. it covers the entire width of riparian vegetation and a 100 foot wetland buffer). LCP provisions requiring protection of riparian areas and wetlands which are defined as environmentally sensitive habitats.

#### **BENEFITS OF THIS ACTION:**

- Consistent land use protection policies for riparian and wetland habitat throughout the watershed.
- Reduced delivery of sediment and pollutants to the estuary.



#### IMPLEMENTATION:

- 1. Assess criteria and protection standards (inland and coastal) in upper watersheds for wetland and riparian resources.
- 2. Convene a forum of the general public, including public and private landowners and government resource managers to identify and evaluate the significance of the differences in standards.
- 3. Develop recommendations to resolve differences as appropriate.
- 4. Implement recommendations through appropriate authorities and/or programs.

#### WHEN:

- Short-term: Assess criteria and protection standards. Convene a forum of the general public.
- Medium-term: Develop recommendations to resolve differences as appropriate. Implement recommendations through appropriate authorities and/or programs.

#### WHERE:

Wetland and riparian areas throughout the watershed

#### WHO:

Primary:

- MBNEP (coordinate subcommittee or work group, assess criteria and protection standards, public education, recommendations)
- Public & private landowners (technical assistance, recommendations)
- Support: CCC (assess criteria and protection standards, public education, recommendations, Local Planning Development, mapping of sensitive habitat areas)
- SLOCo. (assess criteria and protection standards, public education, recommendations)
- Management Conference members to attend public meetings for support of proposed changes (technical assistance)
- FOE (monitoring)

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Assess criteria and standards	\$3,000	1 year
Develop recommendations	\$5,000	1-2 years
Implement recommendations	\$10,000	1-3 years

Costs for this action will be minimal based on utilization of existing resources of the primary implementers.

#### BASIS FOR COST:

Staff resources over two year period

#### POTENTIAL FUNDING SOURCES:

- USEPA Section 320 Funds
- County In-kind Services (within existing resources)
- Grants
- See Chapter 7, Table 7.9.

#### **EVALUATION:**

- Identification of areas subject to new policies.
- Increased protection of coastal streams, wetlands, and sensitive habitat due to new policies.
- New incentive programs and new protection policies.

- CC-1 (Land acquisition)
- HAB-1 (Overlay Maps)
- HAB-3 (Mapping)



### HAB-8: Implement restoration activities to improve the quality and quantity of eelgrass habitat.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

Dense stands of eelgrass, *Zostera marina*, form meadow-like beds in the lower intertidal zone of the Morro Bay estuary. The eelgrass beds are a complex and highly productive environment, serving as a spawning ground and nursery habitat for many species of fish. The density and diversity of benthic fauna are several times greater within the eelgrass beds than in other Morro Bay habitats.

Eelgrass is the preferred food resource for the wintering populations of Black Brant—comprising over 75 percent of its food intake. Since Morro Bay is the largest significant eelgrass habitat available in Southern California, the future health of the Pacific Flyway Brant population is dependent on the continued preservation of this resource.

Eelgrass is a carefully regulated resource. Activities directly impacting eelgrass habitat are required by federal regulations to be fully mitigated. Impacts are additionally subject to state coastal review. However, the indirect cumulative effects associated with the urbanization of the watershed are not directly addressed by regulations.

Eelgrass in Morro Bay has undergone a catastrophic decline first observed in the 1994-1995 winter season and continuing to for subsequent years, reaching an historic low of less than 50 total acres in the spring of 1997. Whether this decline represents an acute, but transitory, event or represents a chronic reduction has not been resolved.

Eelgrass is not robust in the face of environmental stresses. Eelgrass is quickly and profoundly influenced by the same stresses identified to the bay's broader ecosystem—sedimentation and water quality—and can best be managed with policies which reduce the quantity of storm deposited fine sediments introduced into the bay. The reduction in excessive nutrient load in the estuary will also encourage recovery. Since eelgrass is easily monitored by low-cost survey techniques, its condition serves an ideal bio-indicator of the health of the Morro Bay estuary.

Restoration should only be undertaken in areas, which can sustain eelgrass. The disappearance of intertidal eelgrass from major portions of the backbay may be the result of chronic changes in the estuary. It is not known whether recovery will occur naturally in de-vegetated zones or if restoration efforts would prove futile because of continued degraded water quality.

#### **EXAMPLES OF SIMILAR IN-PLACE ACTIONS:**

- Mitigation plantings have been successfully established in Morro Bay near the harbor mouth.
- Rapid re-colonization has been observed in North Carolina and British Columbia.
- The City of Morro Bay has been permitted for a mitigation bank planting in the harbor to accommodate impacts from mooring zone maintenance dredging and other potential projects which impact eelgrass if the transplanting program is successful after five years. This mitigation project would be the largest eelgrass planting attempted in the Nation to date. The project would provide important scientific information both locally and nationally on large-scale eelgrass transplants.

#### BENEFITS OF THIS ACTION:

- Preservation of vital habitat for the Black Brant and other migratory species.
- Preservation of productive spawning and nursery habitat critical to ecosystem health.



#### **IMPLEMENTATION:**

- Develop options for eelgrass mitigation and restoration, such as the City of Morro Bay "Eelgrass Mitigation Bank" project, in Morro Bay using the Southern California Eelgrass Mitigation Policy as guidance. This policy contains procedures for onsite mitigation to compensate for adverse impacts caused by projects addressed in Clean Water Act, Section 404 Permits. Options developed should also include mitigation for the indirect effects of urbanization.
- 2. Design and implement a pilot project for eelgrass habitat restoration. The purpose of this pilot is to evaluate the effectiveness of various restoration techniques (i.e., direct seeding, planting) in restoring eelgrass in historic sites in Morro Bay.
- 3. Develop an eelgrass mitigation bank to address the direct effects of development on eelgrass beds, as well as the indirect effects of urbanization. This action should build on the effort underway by the City of Morro Bay to establish an eelgrass mitigation bank.
- 4. Implement other CCMP action plans such as CC-1 (Land acquisition), SED-2 (Sediment Traps), SED-3 (Fire Management), SED-4 (Landowner BMPs), and SED-5 (Creek Restoration), to increase water clarity, which is important to eelgrass.

#### WHEN:

- Short-term: Develop and implement a pilot project.
- Medium-term: Develop eelgrasss mitigation bank.

#### WHO:

**Primary:** 

- ACOE (technical assistance)
- CMB (lead effort through proposals, reviewing mitigation plans, and overseeing implementation)

#### Support:

- MBNEP (coordination)
- CDPR (technical assistance)
- USNMFS (technical assistance)
- FOE (monitoring)
- CCC (advisory)

#### WHERE:

Morro Bay Estuary

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Develop and implement a pilot project	\$75,000	1-2 years
Develop eelgrass mitigation bank	\$100,000	1-3 years

#### BASIS FOR COST:

• Costs are taken from a feasibility study prepared for the CMB by Battelle on establishing an eelgrass mitigation bank.

#### POTENTIAL FUNDING SOURCES:

- MBERF
- CMB (mitigation funds)
- ACOE (watershed restoration funds)
- See Chapter 7, Table 7.9.



#### **EVALUATION:**

- Monitoring of eelgrass habitat—bed width fluctuations, shoot density, turbidity, aerial coverage.
  Increased acres of eelgrass.

- All SED Actions
- All NUTR Actions
- CC-1 (Land acquisition) HAB-1 (Overlay Maps) .
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- HAB-3 (Mapping) HAB-5 (Restore Habitat)



## HAB-9: Implement management measures to control the impacts of nonindigenous species on wetland and upland habitats.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

Several nonindigenous species in the vicinity of Morro Bay are rapidly expanding their range. Invasive nonindigenous species consume and compete for nutrients, water, and space often resulting in the reduction of native species. Nonindigenous plants may respond to different strategies in different places, but in many cases the actions that must be taken have been validated by the work of others throughout the nation. Certain species, such as veldt grass, are relatively new problems and will require some experimentation to validate the best manner in which to eliminate the pest, maximize efficiency, and minimize costs. Other species, such as Cape Ivy within riparian corridors, European beach grass on coastal dunes, and yellow star thistle in fields and along roadways, are well-recognized and widespread ecological menaces. Unless they are removed or restricted, major ecological damage or even ecosystem collapse may take place.

Because the issue of nonindigenous species crosses political and jurisdictional boundaries, it is critical that agencies, local governments, non-governmental organizations, and landowners work in concert and coordination. To this end, an interagency Weed Management District could serve as the much needed coordinator of control efforts, and would facilitate weed removal actions, including permitting if required. The Resource Conservation District or the Office of the Agriculture Commissioner could manage the district. The proposed district would also monitor any bio-control experiments that might threaten local native species. A focus on prevention, considering recovery time of systems, potential harm to systems, ease of prevention, correction costs, and overall priorities is critical.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- Monterey County has set up in interagency weed management committee that is being coordinated by the USFS, but involves cooperative action between several jurisdictions. The program is currently limited to the Big Sur coast. BLM is developing a cooperative program with landowners throughout the nation.
- The Puget Sound Action Team in Washington State developed an Aquatic Nuisance species Management Plan in 1998, and has established an Exotic Species Workgroup.
- Local pilot experiments include work on veldt grass control by Land Conservancy of San Luis Obispo, CDPR, MEGA, CNPS and others. There is an *Arundo donax* elimination program in San Luis Creek drainage. The California Exotic Pest Plant Council is a source of information of a very large-scale exotics abatement programs throughout the state, including *Arundo donax* removal programs in the Santa Ana River watershed.
- MBNEP early Action Plan Demonstration Projects focused on veldt grass, Arundo donax, and sea slug removal.

#### **BENEFITS OF THIS ACTION:**

- Healthy ecosystems due to removal of ecosystem disruptive factors.
- Establishing priority nonindigenous species control actions will target limited resources to the most appropriate sites. The NEP will then direct efforts to achieve the greatest benefits to native, biodiverse ecosystems.
- Prevention of introductions before they happen can save economic and environmental resources in the long-term.



#### **IMPLEMENTATION:**

- 1. Establish an interagency Weed Management District/Committee for the Morro Bay watershed. The director of MBNEP shall convene a meeting for the purposes of forming the committee, to include but not to be limited to the County Agricultural Commissioner's Office, all local state and federal agencies with interests in the watershed, representatives of agricultural and conservation organizations and interested landowners. The committee will elect a chair, define its structure and bylaws, and establish guiding principles at the first meeting.
- 2. Prioritize nonindigenous species control actions for wetland and upland species on the basis of most critical threats to habitat (particularly endangered species habitat), difficulty, cost and long term management. The committee will identify and rank known problems, and prioritize control actions. These actions may include maintenance programs to control re-infestation in areas previously cleared on invasive species.
- 3. Identify known problems, introduction pathways, prevention technologies, and removal techniques, and estimate level of effort needed to control exotics. The committee will identify known problems and estimate the time and effort, together with estimated costs, that would be needed to either control or completely eliminate ecological and agricultural pests. Particular attention will be paid to nonindigenous species that degrade habitat for species listed under the state and federal endangered species acts, including steelhead, banded dune snail, Morro manzanita, and salt marsh bird's beak.
- 4. Develop detailed actions plans for specific nonindigenous species. The committee will, in cases where the scientific literature does not provide sufficient basis to develop a detailed action plan for a particular species, develop a series of experiments to determine the best method to remove or control an invasive exotic species on the basis of ecological soundness, cost, and other issues. To this end the committee will seek funding from within and without the MBNEP program. The Committee will utilize local resources such as the California Native Plant Society and the California Exotic Pest Plant Council, as well as other programs and associations.
- 5. Conduct pilot studies on weed removal. The purpose of these studies will be to determine the most efficient methodologies and best institutional structures for attaining nonindigenous species control, seek funding, and conduct large scale and sustained nonindigenous species removal programs.
- 6. Monitor species populations and locations. Monitor populations and their geographic extent in the estuary and watershed.

#### WHEN:

- Short-term: Convene committee, prioritize species, and identify problems.
- Medium Term: Develop action plans for specific species, conduct pilot studies, and monitor.

#### WHERE:

Wetland and upland habitats throughout the watershed

#### WHO:

#### Primary:

- SLOCo. Agricultural Commissioner's Office (technical assistance)
- CSLRCD (work on pilot projects to remove weeds)
- Public & private landowners (implement vegetation removal projects)
- CSLCNG (implement vegetation removal projects)

#### Support:

- State and local watershed agencies (technical assistance)
- Agricultural and conservation organizations (technical assistance)
- UCCE (technical assistance)
- MBNEP (form a committee)
- FOE (monitoring)
- CCC (advisory)
- CCCorps (assist with removing non-indigenous species)



#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Trial	\$10,000- \$20,000*	1-2 years
Implementation	\$50,000- \$200,000	2-5 years
*		

\*one-time cost only

NOTE: Costs to conduct experiments will vary on the type of experiment. Small patch control experiments might utilize the human resources of the agencies and groups on the committee, and could be limited to costs of a few hundred dollars.

#### BASIS FOR COST:

• Experience in the cost of similar programs.

#### POTENTIAL FUNDING SOURCES:

Small grants from local government, state and federal species protection programs, species recovery programs, and donated services from committee members may pay for small experiments, but large projects will require substantial grants such as the MBNEP Restoration Fund and mixing of funding sources through cost-share.

See Chapter 7, Table 7.9.

#### EVALUATION:

- Establishment of a Weed Management Committee.
- No new introductions of nonindigenous species.
- Reduced acreage of current nonindigenous species.

- HAB-1 (Overlay Maps)
- HAB-3 (Mapping)
- HAB-10 (A. donax Removal)
- HMT-2 (Marina BMPs)
- CC-1 (Land acquisition)
- CC-7 (Watershed Crew)



# HAB-10: Implement a pilot project to remove *A. donax* from riparian vegetation corridors along Chorro Creek and its tributaries and continue treatment based on monitoring.

#### BACKGROUND/MAJOR ISSUES:

In Southern California as much as 90 percent of the riparian habitat has been lost to human-caused impacts related to agriculture, urban development, and flood control. A formidable threat to the remaining riparian habitat is the invasion of nonindigenous plant species such as the Giant Reed, <u>Arundo donax</u>. <u>A. donax</u> was originally introduced to the Los Angeles basin from the Mediterranean in the 1820s to deter erosion in drainage canals. The species has subsequently invaded riparian habitat over a wide area in coastal Southern California and in the north, has established itself in the tributaries of Chorro Creek in the Morro Bay Watershed. Though labor intensive, the preferred control methodology—the cut stem treatment—results in a near surgical application to specific isolated stands of <u>Arundo donax</u> followed by herbicide treatment. Collateral affects to adjacent vegetation are avoided as is the chance of direct herbicide application to the aquatic habitat.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- Effective <u>A</u>. <u>donax</u> control programs are in place along the Santa Ana River in Southern California (Team Arundo) and in the Sonoma Creek watershed in Northern California (Team Arundo Norte).
- Implementation of nonindigenous species plant control on Chorro Creek by CSLCNG.

#### **BENEFITS OF THIS ACTION:**

- Development and refinement of control methods.
- Eradication of an aggressive nonindigenous plant species considered by many to be the single greatest threat to remaining riparian habitat in Southern California.
- Protection of the established and recovering riparian vegetative corridors along Chorro Creek and its tributaries.

#### **IMPLEMENTATION:**

1. Conduct a pilot project to remove *A.dondx* from riparian vegetative corridors along Chorro Creek and its tributaries.

#### Phase 1:

- Pilot Project to determine distribution of <u>Arundo donax</u> in the Chorro Creek watershed.
- Testing and validation of the Cut-Stem treatment method specific for the scattered distribution of individual stands of the plants.
- Removal, transport, and disposal of cut plants tissue.

Phase 2:

- Systematic treatment of <u>A. donax</u> stands within the Chorro Creek watershed beginning with the most upstream locations and tributaries and working progressively downstream.
- Continued mapping of distribution of new stands and documentation of the effectiveness of control strategies.

Phase 3:

- Follow up treatment of <u>Arundo donax</u> stands within the Chorro Creek watershed.
- Continued mapping of distribution of new stands and documentation of the effectiveness of control strategies.
- Assessment of the effectiveness of control strategies and completion of a final report documenting results.

#### WHEN:

- Short Term: Phase I & II
- Medium Term: Phase III

#### WHO:

Primary:

CCCorps (Field Crew Support)

SLOCo. (Program Design and Management, Technical Support)

#### Support:

- CSLCNG (Program Design and Management)
- FOE (Monitoring)
- Public and Private Landowners (Program Design and Management)

#### WHERE:

Chorro Creek and its tributaries

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Pilot Project Phase 1	\$900.00	1-2 years
Pilot Project Phase 2	\$12,000	1-2 years
Pilot Project Phase 3	\$12,000	1-2 years

#### BASIS FOR COST:

- Pilot Project Phase 1: Approved and awarded MBNEP APDP Early Action funding.
- Pilot Project Phase 2: Based on SLOCo. Agriculture Department labor costs x 2 employees, CCCorps Work Crew costs at \$300 per day for 10 days, and materials estimate. NOTE: Estimate assumes four days of reconnaissance/mapping and ten days of eradication/control using CCCorps Work Crews.
- Pilot Project Phase 3: Based on SLOCo. Agriculture Department labor cost, CCCorps Work Crew costs, and materials estimate. NOTE: Estimate assumes four days of reconnaissance/mapping and ten days of eradication/control using CCCorps Work Crews.

#### POTENTIAL FUNDING SOURCES:

- Pilot Project Phase 1: Approved and awarded MBNEP APDP Early Action funding.
- Pilot Project Phase 2: Grant proposal approval pending.
- Pilot Project Phase 3: Grant proposal approval pending.
- See Chapter 7, Table 7.9.

#### **EVALUATION:**

• Third year comparisons of data depicting occurrence of individual stands of *A. donax* within the Chorro Creek watershed before and after control treatment.

- EDU-4 (PesticideWorkshops)
- CC-1 (Land acquisition)
- CC-5 (Stream Geomorphology and WQ)
- HAB-1 (Overlay Maps)
- HAB-3 (Mapping)
- HAB-9 (Non-indigenous Species)





### 4.8 STEELHEAD

Southern steelhead populations have been listed as federally threatened by the National Marine Fisheries Service because of declining habitat quality throughout the species range. This species is an anadromous fish, migrating from coastal streams to the ocean and back to the same stream to spawn. Although both Chorro and Los Osos Creeks support populations of this species, water diversion projects, migration barriers, drought and siltation upstream have greatly reduced the viability of local steelhead populations in these two streams. Historically, the southern steelhead trout populations once numbered in the ten thousands. Presently, the population has declined to less than one percent of their historic levels.

#### MBNEP GOALS SUPPORTED BY STEELHEAD ACTION PLANS:

- Reestablish healthy steelhead trout habitat in Chorro and Los Osos Creeks and tributaries through measures including reduction of sediment loading in gravels, stabilization of riparian corridors, removal or mitigation of migration barriers, improvement of water quality, and restoration and maintenance of adequate fresh water flow.
- Ensure the integrity of the broad diversity of natural habitats and associated native wildlife species in the bay and watershed.
- Protect social, economic, and environmental benefits provided by the bay and watershed through comprehensive resource management planning.
- Promote public awareness and involvement in estuarine management issues through outreach, educational programs, and the use of volunteers in ongoing bay monitoring and other programs.

#### STEELHEAD OBJECTIVES AND SUMMARY OF ACTIONS:

STL OBJECTIVE 1: Protect and enhance steelhead populations and habitat.

- Action STL-1: Implement agency-decision-making in the Morro Bay watershed consistent with steelhead trout recovery goals, and support the implementation of the National Marine Fisheries Service (USNMFS) Recovery Plan
- > Action STL-2: Restore and enhance access to critical habitat for steelhead trout.
- Action STL-3: Maintain and enhance pool/riffle structure and other aspects of instream habitat in trout bearing waters.
- Action STL-4: Maintain and enhance riparian corridors adjacent to trout bearing waters to improve bank stability and structure, creek shading, and biological productivity.



### Table 4.11 Steelhead Actions—Implementing Organizations

	STL-1	STL-2	STL-3	STL-4
	Recovery	Habitat	Pool/Riffle	Riparian
Agency/Organizations	Plan	Access	Structure	Corridors
BF	S	S	S	S
CA Trout	S			
CDOT		S		
CCC	S	S	S	S
CCCorps		S	S	S
CDFG	Р	P	Р	
CDOC		S		
CDWR		S		
CMB	S	S		
CSLCNG	S	S	S	S
CSLRCD	S	Ś	S	Р
FOE	S	S	S	S
MBNEP	Р			
NRCS	S	S	S	Р
Public/Private Landowners	S	Р	Р	Р
Santa Lucia Flyfishers	S	S		
SLO Land Conservancy		S		
SLOCo.	S	S	S	S
Sports Fish Alliance	S			
SSRCSCCC	S	S	S	S
SWRCB		S		
USNMFS	Р	S	S	S

P = Primary role in implementation and monitoring project outcomes and effectiveness. S = Supporting role in implementation.



#### STL-1: Implement agency decision-making in the Morro Bay watershed consistent with steelhead trout recovery goals, and support the implementation of the National Marine Fisheries Service (USNMFS) Recovery Plan.

#### BACKGROUND/MAJOR ISSUES:

At one time the Morro Bay watershed supported a large and healthy population of ocean-run steelhead trout. Both California Department of Fish and Game records and anecdotal observations by long-time residents confirm this. In order to restore steelhead trout to their former abundance in the Morro Bay watershed, it is important that agencies at the local, state, and federal levels make decisions regarding land use activities with a foundation of knowledge regarding the needs of this species. In addition, resource agencies should be proactive in implementation of recovery actions in this watershed.

Every agency, which permits activities in the watershed should be doing so with full knowledge of the types of activities which can result in impact to steelhead or their habitat. For example, development of structures within the flood plain of the creek ultimately can result in removal of riparian vegetation, channelization, or riprapping of banks in order to protect the structure from flood flows. All of these activities impact steelhead habitat. Permitting activities, which generate a large amount of erosion and sedimentation during spawning and migration is tremendously destructive. For example, undertaking of large grading projects during the winter season inevitably results in sedimentation of creeks and subsequent impacts to spawning habitat, feeding habitat, and overall water quality. One way to ensure that these impacts are fully addressed through the environmental review process is to revise the CEQA checklist (see EDU-13) used by the County and other agencies to specifically reflect concerns regarding steelhead habitat. It is also important that agencies actively implement recommendations in the MBNEP Base Program Analysis related to erosion control, riparian habitat protection, and other related issues.

The National Marine Fisheries Service is charged with development and implementation of a recovery plan for steelhead trout. The USNMFS Recovery Plan for steelhead has not yet been developed. The guidelines (Section 4D Rules) for protecting habitat for endangered species exist, but have not been developed for threatened species. Until these guidelines are in place for steelhead trout, federal review and oversight of projects harmful to steelhead habitat will be impaired. When the Recovery Plan becomes available every effort should be made in the Morro Bay watershed to support its implementation.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

Steelhead trout and related coho salmon restoration efforts are resulting in changes in institutional infrastructure throughout the pacific coast. However, limited resources and agency staff limit the attention that smaller watersheds can receive. Species which have been listed as federally endangered, including several salmon populations, benefit from implementation of recovery plans in northern parts of the state.

#### BENEFITS OF THIS ACTION:

- The beneficial uses affected by this action include: cold water habitat, warm water habitat, spawning habitat, wildlife, agriculture, municipal water supply, endangered species, and commercial and sport fishing. The areas of interest most affected by this action are grazing, crops, open space, recreation, and fishing.
- This action plan will promote resource agency activities in the Morro Bay watershed related to protection and enhancement of steelhead populations and habitat. Restoration of steelhead to non-threatened status could ultimately result in reestablishment of a sport fishery in the watershed.

#### **IMPLEMENTATION:**

1. The MBNEP will, based on the fact that both major tributaries to Morro Bay are fully appropriated, formally evaluate proposals for new development or new water use in the watershed for potential impact to steelhead trout, and other aquatic species, and we will comment and make a recommendation to the appropriate agency. This is then recognizing that the MBNEP has no regulatory authority over water right decisions.



- 2. The MBNEP and other Management Conference members will ensure that recommendations identified in the Base Program Analysis related to steelhead habitat protection are implemented by local, state, and federal agencies. These may include recommendations related to maintenance of adequate buffers between stream corridors and development activities, protections related to large-scale grading activities during winter and early spring months, implementation of environmentally sensitive flood control activities, long term land use planning to avoid the need for flood control activities, elimination of creekbeds as horse trail corridors, etc. Each of these actions is associated with different lead agencies and costs.
- 3. The MBNEP Implementation Committee (with landowner participation) will work to ensure that local, state, and federal agencies are taking appropriate action related to steelhead recovery activities in the watershed (invitees include all supporting organizations listed in this action plan).
- 4. The supporters of this action will facilitate USNMFS adoption of guidelines for development of Recovery Plan for steelhead trout through discussion and dialogue and technical assistance. The Federal consistency report should recommend improved staffing and funding of Steelhead recovery project efforts for the USNMFS, to facilitate development of guidelines to apply to this important resource. In the interim, USNMFS should apply guidelines developed for endangered anadromous species to Recovery Plan development.
- 5. The MBNEP and supporters of this action will provide monetary and institutional support for implementation of the USNMFS Steelhead Recovery Plan in the Morro Bay Watershed as soon as it has been developed.

**NOTE:** Potential obstacles to implementation include: funding, private sector reluctance, and institutional reluctance. In addition, not having a Recovery Plan in place for steelhead trout is a major obstacle.

#### WHEN:

- Short Term: Develop support for implementation of steelhead protection and enhancement.
- Medium Term: Implementation of the USNMFS Recovery Plan.

#### WHO:

Primary:

- CDFG (advisory)
- MBNEP (review proposals for impacts)
- USNMFS (advisory/complete recovery plans)

Support:

- Public & private landowners (Evaluate Proposals, Ensure Implementation and Appropriate Actions, Facilitate USNMFS guidelines, Funding)
- SLOCo. (Evaluate Proposals, Ensure Implementation and Appropriate Actions, Facilitate USNMFS guidelines, Funding)
- CMB (Evaluate Proposals, Ensure Implementation and Appropriate Actions, Facilitate USNMFS guidelines, Funding)
- FOE (Evaluate Proposals, Ensure Implementation and Appropriate Actions, Facilitate USNMFS guidelines, Funding)
- BF (Evaluate Proposals, Ensure Implementation and Appropriate Actions, Facilitate USNMFS guidelines, Funding)
- Santa Lucia Flyfishers (Evaluate Proposals, Ensure Implementation and Appropriate Actions, Facilitate USNMFS guidelines, Funding)
- Sport Fishing Protective Alliance (Evaluate Proposals, Ensure Implementation and Appropriate Actions, Facilitate USNMFS guidelines, Funding)
- California Trout (Evaluate Proposals, Ensure Implementation and Appropriate Actions, Facilitate USNMFS guidelines, Funding)
- SSRCSCCC (Evaluate Proposals, Ensure Implementation and Appropriate Actions, Facilitate USNMFS guidelines, Funding)
- CCC (advisory)



- CSLCNG (Ensure Appropriate Actions, Facilitate USNMFS guidelines)
- NRCS (Evaluate Proposals, Ensure Implementation and Appropriate Actions, Facilitate USNMFS guidelines)
- CSLRCD (Evaluate Proposals, Ensure Implementation and Appropriate Actions, Facilitate USNMFS guidelines)

#### WHERE:

Throughout the watershed

#### COST:

Task/Step	Cost/yr.	Duration of Project
		(once initiated)
Implementation of Recover Plan	\$50,000	1-5 years

Costs for this action will be minimal based on utilization of existing resources of the primary implementers.

**NOTE:** Cost of implementing actions related to institutional protections will vary greatly. Many will primarily constitute additional work and attention on the part of agency personnel. Other actions may result in costs to permitees seeking to implement projects.

#### BASIS FOR COST:

• Costs do not include direct cost of implementing species recovery plans.

#### POTENTIAL FUNDING SOURCES:

- MBERF
- Trout Unlimited
- California Wildlife Conservation Fund
- USNMFS (within existing resources)
- CDFG (within existing resources)
- SB 271
- See Chapter 7, Table 7.10.

#### **EVALUATION:**

Successful attainment of the goals of the USNMFS Recovery Plan in the Morro Bay Watershed.

- All SED Actions
- All FLOW Actions
- EDU-11 (CEQA Checklist)
- CC-5 (Stream Geomorphology & WQ



#### STL-2: Restore and enhance access to critical habitat for steelhead trout.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

A primary impact to steelhead trout is lack of access to most desirable spawning areas, which tend to be in upper tributary streams where spawning gravel beds are abundant and shade is deep. Steelhead are opportunistic spawners and can utilize marginalized habitat, if they can access it. Many human activities, including development of road crossings, reservoirs, culverts, and other structures, have the effect of blocking passage. These structures can result in excessive elevational changes, can eliminate pools above and below jumps, can create overly shallow "sheet flow" over flat surfaces, or can excessively increase flow velocities through restricted cross-sections of the stream. Reservoirs can block passage entirely, eliminating all upstream habitat from use. Another way that passage can be obstructed is through reduction of surface flows. Water can become so shallow over "critical riffle" areas that fish are unable to migrate up or downstream. This is particularly true in the spring and summer, when fish seek to make their way downstream to the ocean. However, some winter diversion activities can restrict flow in drier years to the point that upstream migration for adult fish is impaired.

In the Morro Bay watershed, many obstructions to steelhead passage are still present, often as a result of abandoned agricultural diversions or poorly designed road crossings. Chorro Reservoir presents a major obstruction to steelhead which can only be mitigated through development of a fish ladder on the dam itself, or through capture and transport of fish around the dam (a less desirable alternative, but utilized elsewhere in some difficult circumstances). Many opportunities exist for enhancement activities related to fish passage.

In considering alternatives for passage enhancement it is important to consider maintenance requirements of any structures. Too often fish ladders become barriers in themselves when lack of maintenance results in blockage through debris buildups. Best solutions result in restoration of a natural stream gradient and channel bottom, requiring no further maintenance and allowing the channel elevation to adjust as necessary over time.

#### **BENEFITS OF THIS ACTION:**

This action plan will ensure that steelhead trout are able to gain access to areas of suitable habitat for spawning and other activities, so that they can fully utilize all available creek habitat. This action plan can result in positive benefits to various species dependent on in-stream flows. Restoration of steelhead to non-threatened status could ultimately result in reestablishment of a sport fishery in the watershed, with its associated economic, social, and cultural benefits.

The beneficial uses which could be impacted by this action are cold water habitat, water habitat, spawning habitat, wildlife, agriculture, municipal water supply, endangered species, and commercial and sport fishing.

#### **EXAMPLES OF SIMILAR IN-PLACE ACTIONS:**

The California Department of Fish and Game conducts barrier removals throughout the state. Some barriers have already been removed from the streams of the Morro Bay Watershed. Particularly, several have been removed on Pennington Creek watershed, by baffling culverts, reconfiguring bedrock falls, creating series of jump pools, etc. Barrier removal can potentially result in down-cutting of the streambed and needs to be undertaken with care.



#### **IMPLEMENTATION:**

- 1. Identify barriers to steelhead migration. The Department of Fish and Game has done a preliminary assessment of barriers present on Chorro Creek which may impede steelhead passage and which should be considered for removal. The CDFG has not yet surveyed Los Osos Creek. Identified barriers, in priority order, include:
  - 1. San Luisito Creek: Culvert and grouted rock spillway at Highway 1
  - 2. San Luisito Creek: Culvert at Adobe Road
  - 3. Dairy Creek: Culvert at Highway 1
  - 4. Chorro Creek: Chorro Reservoir and upstream settling basins
  - 5. Dairy Creek: Culvert at El Chorro Regional Park
  - 6. Chorro Creek: Bedrock falls at Camp San Luis Obispo
  - 7. Chorro Creek: Abandoned bridge pilings at Camp San Luis Obispo
  - 8. Chorro Creek: Pipe crossing at California Men's Colony
  - 9. San Bernardo Creek: Culvert crossing at Rancho San Bernardo
  - 10. San Bernardo Creek: Bridge at Domenghini Brothers Ranch
  - 11. San Luisito Creek: Dam on Turri Ranch
  - 12. Dairy Creek: Rock dam at El Chorro Regional Park
  - 13. Chorro Creek: Culvert at Canet Road
- 2. Remove barriers to steelhead migration that are financially feasible and reasonable for landowners to implement.
  - Placement of baffles, jump pools, fish ladders or other structures where needed.
  - Removal or alteration of existing structures which result in barriers, such as waterfalls, road crossings, old instream dams, etc.
  - Removal of major log jams from the main channel, which may obstruct passage and divert water into the banks.
  - Management of land use adjacent to creeks to ensure that channels do not become braided (or split).
  - Design of new structures, which cross the channel so that fish passage barriers are not created.
- 3. Maintain adequate flows for migration to and from spawning habitat.
- 4. Maintain adequate water levels and flows to support juvenile rearing and smolting habitat.
  - Implementation of Instream Flow Incremental Methodology (IFIM). This is a flow modeling study, which results in recommended flows necessary to protect various life stages of steelhead trout.
  - Assessment of reaches of creek which support valuable habitat and which currently are being stressed due to low flows resulting from water diversion
  - Addressing water use issues in areas of critical habitat through various approaches, including
    acquisition of land with high intensity water use for redevelopment for lower water use purposes.
  - Implementation of flow-related action plans
- 5. Survey Los Osos Creek to identify and prioritize impediments to access for steelhead.

**NOTE:** Potential obstacles to implementation include: funding, permit acquisition, potential impacts to culvert flow carrying capacity, potential reduction of dry season water available for diversion, private sector reluctance, and institutional reluctance.

#### WHEN:

**Short Term:** Identify barriers to steelhead migration. Survey Los Osos Creek to identify and prioritize impediments to access for steelhead.

Medium Term: Remove barriers to steelhead migration. Maintain adequate flows for migration to and from spawning habitat

#### WHO:

Primary:

- CDFG (Survey Los Osos Creek, Identify and Remove Barriers to trout migration, Maintain adequate water levels and flow)
- Public & private landowners (provide access to sites)

#### Support:

- SWRCB (technical assistance)
- SLOCo. (provide access to sites)
- CMB (provide access to sites)
- CDOC (provide access to sites)
- CDOT (remove road barriers)
- BF (funding)
- SLO Land Conservancy (technical assistance)
- CCCorps (work crew, assist with instream structures, fish barrier removal, log jams, etc.
- Santa Lucia Flyfishers (technical assistance)
- CSLRCD (advisory to landowners)
- NRCS (advisory to landowners/technical assistance)
- FOE (monitoring)
- CCC (advisory)
- CSLCNG (Identify and Remove Barriers to trout migration, Maintain adequate water levels and flow)
- SSRCSCCC (advocacy, grant-writing)
- USNMFS (technical assistance)
- CDWR (Maintain adequate water levels and flow)

#### WHERE:

San Luisito Creek, Dairy Creek, Chorro Creek, San Bernardo Creek, possibly other sites in the Los Osos Watershed, and additional sites on the Chorro Creek watershed.

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Identify and survey barriers	\$10,000*	1 year
Barrier removal	\$75,000	5 years
Conduct IFIM model	\$20,000-50,000*	1-2 years

\*one-time cost only

NOTE: For barrier removal, costs will depend on the required changes. These may be as simple as labor costs, or may include complex redesign of highway culverts.

#### BASIS FOR COST:

• CDFG habitat restoration experience.

#### POTENTIAL FUNDING SOURCES:

- California Wildlife Conservation Fund
- Trout Unlimited
- MBERF
- California Wildlife Conservation Fund
- USNMFS
- CDFG (resources from permit fees, state tax contributions, and automobile license plates)
- SB 271
- CRA
- See Chapter 7, Table 7.10.

#### EVALUATION:

- Mileage of stream habitat accessible by steelhead.
- Number of barriers removed
- Depth of water at critical riffle areas.
- Surface area and depth of critical rearing and smolting habitat areas.

- All FLOW Actions
- CC-5 (Stream Geomorphology and WQ)





- RELATED ACTIONS:
  All FLOW Actions
  CC-5 (Stream Geomorphology and WQ)
  CC-7 (Watershed Crew)



### STL-3: Maintain and enhance pool/riffle structure and other aspects of instream habitat in trout bearing waters.

#### > Priority Action

#### BACKGROUND/MAJOR ISSUES:

Complexity of instream habitat, that is, a variety of cobble and gravel sizes, woody debris, overhanging banks, deep scour pools, shallow riffle areas, etc., is key in providing quality trout habitat. Complex habitat has better shelter and food resources, and better addresses the needs of various life stages of trout. A uniform, flat-bottomed creek bed provides little protection from predators and very poor habitat in low flow conditions. As flows decline in the summer, a well-structured channel can continue to provide cool pool habitat for young fish, even when flows become intermittent.

Often, when creeks and people coexist in close proximity, creeks are managed to reduce flooding of adjacent lands. Creeks are generally "cleaned out" on a regular basis, to remove debris, which might clog culverts and result in flooding of roads. Flood control agencies typically remove vegetation from the bottom of the channel to increase channel capacity and to provide a clear passage for water. Protection of roads and other structures is important, and washout of roads or agricultural fields can result in deposition of large amounts of sediment in the channel. Maintenance of an adequate flood plain adjacent to the creek and use of bridges rather than culverts are the best solution to this problem. However, when channel clearing becomes a necessity, it should be done so with an eye toward maintaining and where possible enhancing instream habitat. Removal of all woody debris greatly reduces habitat value for fish and other aquatic resources.

In some stretches of creek in the Morro Bay watershed, land use activities or catastrophic events have resulted in reduced overall habitat value. In some locations, creeks can benefit from careful placement of rootwads or other material, which results in pool scouring. This should be done with attention toward the geomorphology of the channel, however, since channel gradient and other features can greatly affect the success of these efforts. Onstream "check dams" should be avoided, as they usually result in more problems for creek habitat than they solve.

#### **BENEFITS OF THIS ACTION:**

- This action plan will ensure that steelhead trout are provided with adequate habitat, food, and cover.
- This action plan will also result in positive benefits to other aquatic life, including threatened and endangered species. Restoration of steelhead to non-threatened status could ultimately result in reestablishment of a sport fishery in the watershed, with its associated economic, social, and cultural benefits.
- The beneficial uses affected by this action include cold water habitat, warm water habitat, spawning habitat, wildlife, non-contact recreation, endangered species, and commercial and sport fishing. The areas of interest most affected by this action are open space, recreation, and fishing.

#### **EXAMPLES OF SIMILAR IN-PLACE ACTIONS:**

- Stream restoration activities, which result in enhanced instream structure, are being undertaken throughout the United States.
- Stream geomorphologists (e.g. D. Rosgen, 1998) have developed a number of restoration techniques that have been successfully applied in very disrupted systems.
- Several projects have been undertaken in the Morro Bay watershed by the NRCS, through a Wildlife Conservation Board grant to enhance trout habitat.



#### IMPLEMENTATION:

- 1. Evaluate creeks for habitat restoration potential through habitat assessment monitoring.
- 2. Improve in-stream diversity of habitat through appropriate application of enhancement structures (such as root wads for enhancement of pool scour.) that are economically feasible and reasonable for the landowner to implement.
- 3. Instream structural enhancements should be considered as a potential component of all instream restoration projects.
- 4. Based on habitat surveys, areas in the creek which have appropriate geomorphological structure for successful placement of structures, and which have obvious potential for improved steelhead habitat will be prioritized for action
- 5. Retain sufficient in-stream cover for fish (woody debris, etc.).
- 6. Through permit streamlining processes (see Permit Streamlining Action Plan) educate individuals involved in channel clearing activities regarding environmentally sensitive removal of debris jams.
- 7. Provide training for County and City Flood Control and Public Works agencies related to steelhead habitat needs and debris clearing approaches that minimize environmental impacts.

**NOTE:** Possible obstacles to implementation include: (1) structural enhancements will not be equally effective in all channel types and in some cases can result in habitat degradation, and (2) maintenance of in-stream woody debris etc., can have an actual and perceived impact on flood control objectives.

#### WHEN:

- Short Term: Habitat "typing" evaluation should be done first and undertaken once every 5 years as part of the Morro Bay volunteer monitoring program.
- Medium Term: Placement of instream structures should continue as part of ongoing enhancement activities in the watershed. Training of individuals involved in stream clearing activities should be undertaken as soon as possible, and concurrently with any permit streamlining efforts.

#### WHO:

#### **Primary:**

- CDFG (provide information on steelhead habitat) (Evaluate Creeks, Improve in-stream diversity and enhancements)
- Public & private landowners (provide access)

#### Support:

- CSLRCD (assist landowners)
- NRCS (assist landowners)
- SLOCo. Flood Control Districts (technical assistance)
- CSLCNG (provide access)
- CCCorps (work crew; habitat typing, placement of instream structures)
- BF (funding)
- FOE (monitoring)
- SSRCSCCC (advocacy/grant writing)
- USNMFS (technical assistance)
- CCC (advisory)

#### WHERE:

Chorro and Los Osos Creeks and the tributaries that support steelhead trout

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Habitat "typing" assessment	\$10,000-20,000	1 year
Habitat structure installation	\$3,000-10,000/ea.	1year



**NOTE:** Enhancement of instream structure can be conducted in a very "low tech" fashion, using materials available at the site. Primary costs are associated with heavy equipment needed to correctly place rootwads. If site design and major earth moving is required, large-scale projects can cost hundreds of thousands of dollars.

#### BASIS FOR COST:

CDFG habitat restoration experience and staffing costs.

#### POTENTIAL FUNDING SOURCES:

- California Wildlife Conservation Fund
- Trout Unlimited
- MBERF
- CDFG
- USEPA (USEPA 319h Non-Point Source Grant Program)
- SB 271
- CRA
- See Chapter 7, Table 7.10.

#### **EVALUATION:**

- Mileage of stream habitat evaluated.
- Habitat scoring over time.
- Number of individuals trained in appropriate instream habitat maintenance.

- STL-4 (Riparian Corridors)
- CC-5 (Stream Geomorphology & WQ)
- CC-6 (VMP)
- CC-7 (Watershed Crew)



## STL-4: Maintain and enhance riparian corridors adjacent to trout bearing waters to improve bank stability and structure, creek shading, and biological productivity.

#### BACKGROUND/MAJOR ISSUES:

Well-developed riparian corridors are an important component in the healthy habitat of steelhead trout and other creek species. Riparian corridors maintain bank stability, provide critical shade for the creek channel, and provide a food base for diverse insect fauna. They also are an extremely important resource for terrestrial animals and birds.

Riparian corridors have been degraded through a number of human activities. In some locations in the watershed the entire channel has been moved, channelized or otherwise greatly altered. This results in loss of mature riparian trees and frequently in trapezoidal shaped channels with inadequate bank vegetation. In some cases downcutting of the channel has resulting in sheer vertical walls prone to massive bank failure.

To stabilize banks adjacent to bridges and other structures, material such as rip rap or concrete is often used. If these materials will not support subsequent plant growth, alternative methods can still stabilize the bank while permitting re-growth of riparian shade plants.

In other locations many years of grazing has degraded the corridor. The Morro Bay National Monitoring Program is documenting the recovery of several riparian corridors following fencing, and the changes have been dramatic. Not only do the creek-side shrubs and trees rapidly respond, the shape of the channel bottom improves through better definition of the low flow channel and pool-riffle structure. As an added benefit, fencing has been shown to significantly reduce bacteria levels in creek water.

Agricultural roads are often placed along the top of the creek bank, and in some cases fields are tilled to the top of bank. These activities can exacerbate erosion to the creek, reduce shading and reduce the overall habitat value of the riparian vegetation. Providing a buffer between human activities and the riparian corridor will ensure that the corridor can adequate serve its important function of stabilizing the bank, filtering out pollutants, shading the channel, and providing wildlife habitat.

#### BENEFITS OF THIS ACTION:

This action plan will ensure that steelhead trout are provided with adequate habitat, shading, food, and cover. Leaves from riparian vegetation form the basis of the food chain in freshwater streams. The vegetation also stabilizes stream banks and helps in the formation of diverse cover such as undercut banks and in-stream root systems. Shading of the stream is critical for maintenance of appropriate oxygen and temperature regimes. The benefits of riparian fencing used for cattle exclusion or rotational grazing has been documented in the Morro Bay Watershed.

This action plan will also result in positive benefits to other aquatic life, including threatened and endangered species. Terrestrial wildlife will also benefit from healthy riparian corridors. Riparian corridors provide important transportation pathways as well as habitat for many terrestrial species.

Restoration of steelhead to non-threatened status could ultimately result in reestablishment of a sport fishery in the watershed, with its associated economic, social, and cultural benefits. Economic benefits of this action plan include immediate and or scheduled tax benefits for private landowners and reduced property and crop losses due to flood damage.

The beneficial uses affected by this action include cold water habitat, warm water habitat, spawning habitat, wildlife, non-contact recreation, endangered species, agriculture and commercial and sport fishing.



#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

- Dairy Creek, SLOCo.
- Chumash Creek, Cal Poly
- Chorro Creek, CSLCNG
- Walters Creek, Cal Poly
- Pennington Creek, pubic & private landowners
- Chorro Flats

#### **IMPLEMENTATION:**

- 1. Implement management measures, such as fencing riparian corridors from livestock, alternative grazing management, designing smaller pastures, and building alternative stock watering facilities, to improve stream bank morphology and stability, enhance riparian vegetation and improve water quality.
- 2. Design projects to include livestock watering facilities
- 3. Design projects to include riparian pasture use, if managed for low impacts to riparian vegetation.
- 4. Design projects to be economically feasible and reasonable for the landowner to implement.
- 5. Develop riparian conservation easements and acquire critical riparian habitat areas for long term protection and enhancement (see CC-1)
- 6. Conduct CEQA, CWA 404 and 401, and California 1601 and 1603 permitting processes if required.

#### WHEN:

- Short Term: Implement Management measures.
- Medium Term: Develop riparian conservation easements and acquire critical riparian habitat areas for long term protection and enhancement

#### WHO:

#### Primary:

- CSLRCD (work with landowners to identify management measures and enhance riparian corridors)
- Public & private landowners (work with CSLRCD to implement enhancements management measures on property)
- NRCS (technical assistance/watershed permit)

#### Support:

- SLOCo. Flood Control Districts (technical assistance)
- CSLCNG
- CCCorps (work crew; implement erosion control methods, riparian planting and bank stabilization projects)
- BF (funding)
- FOE (monitoring)
- SSRCSCCC (advocacy/implement projects)
- USNMFS (technical assistance)
- CCC (advisory)

#### WHERE:

Riparian corridors adjacent to trout bearing waters

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Average cost estimate per mile of fencing (electric, 5-strand barbed wire)	\$5,000	1-2 years
Project estimate based on installing 100 miles	\$400,000*	1-2 years
Develop easements and acquire land (see CC-1)	see CC-1 for cost estimates	1-5 years

\*one-time cost only



NOTE: Fencing projects require development of water if livestock are excluded from using the creek. Depending on water resources available at the site cost will vary considerably, and can include development of spring boxes, water lines, watering troughs, and other structural improvements. Troughs alone cost \$0.25 to \$1.00/gallon of water capacity.

The cost to acquire riparian easements along creeks will vary dramatically, depending on current land use, property location, flooding status and other factors. Typically, wetland easements can cost as much as 75 percent of the appraised land value.

#### BASIS FOR COST:

• NRCS restoration experience.

#### POTENTIAL FUNDING SOURCES:

- SCC
- Trust for Public Lands
- Nature Conservancy
- Trout Unlimited
- MBERF
- CDFG
- USEPA (104b3 Wetland Grant Program and the 319h Non-Point Source Grant Program
- Better America Bonds
- NRCS (Wetlands Preserve Program, Environmental Quality Incentives Program, Wildlife Habitat Improvement, CREP)
- See Chapter 7, Table 7.10.

#### EVALUATION:

- Miles of riparian corridor fenced.
- Stream channel profile measurements.
- Riparian shading measurements.
- Miles of levee removed.

- STL-3 (Pool/Riffle Structure)
- HAB-6 (Riparian Vegetation)
- CC-1 (Land acquisition)
- CC-5 (Stream Geomorphology & WQ)
- CC-7 (Watershed Crew)
- SED-2 (Sediment Traps)
- SED-4 (Landowner BMPs)
- SED-5 (Creek Restoration)


## 4.9 PUBLIC EDUCATION & OUTREACH

"In the end, we will conserve only what we love, we will love only what we understand, we will understand only what we are taught" –Baba Dioum, Senegal

# MBNEP GOAL SUPPORTED BY PUBLIC EDUCATION AND OUTREACH ACTION PLANS:

 Promote public awareness and involvement in estuarine management issues through outreach, educational programs, and the use of volunteers in ongoing bay monitoring and other programs.

PUBLIC EDUCATION & OUTREACH OBJECTIVES AND ACTIONS:

#### > All EDU Actions are 2-Year Priority Actions

EDU OBJECTIVE 1: Increase public awareness of resources, processes, and priority problems within estuarine, stream, riparian, upland, and wetland habitats.

- > Action EDU-1: Conduct general public outreach and education focused on the value of a healthy environment and the role of individuals in protecting the natural resources of the Morro Bay watershed.
- Action EDU-2: Develop educational materials regarding marine pollution and habitat issues geared toward the commercial and recreational boating community of Morro Bay.
- Action EDU-3: Develop educational materials and programs regarding erosion, sedimentation, sensitive resources, fertilizers, and habitats within the watershed geared toward agricultural and ranch landowners and various public agencies to improve partnering, lessen impacts and educate all parties of pressing issues.
- Action EDU-4: Conduct cross-educational workshops and individual orientations on the positive and negative uses of pesticides.
- Action EDU-5: Coordinate and seek funding for a biennial "State of the Estuary" conference to support the biennial review process, share progress reports, address challenges, showcase successes and innovations, recognize environmentally responsible citizens and businesses, and provide public education.
- Action EDU-6: Develop an interactive monitoring display for the Natural History Museum Morro Bay State Park and support other Central Coast Natural History Association education projects.
- Action EDU-7: Increase communication to the public through media [i.e., graphic/text, television, continuation of "Turning the Tide," MBNEP newsletter, and website] to spotlight collaborative efforts, forums, ongoing status, and informational messages.
- Action EDU-8: Improve existing locations of public access to the estuary within the community of Los Osos by balancing various user needs and protection of sensitive species.

EDU OBJECTIVE 2: Increase children's awareness of resources, processes and priority problems within estuarine, stream, riparian, upland and wetland habitats.

Action EDU-9: Develop a strategic education plan to provide educational opportunities focusing on natural resources and watershed enhancement for K-12 schools.

EDU OBJECTIVE 3: Improve cooperative efforts and understanding of issues for partnering agencies, organizations and stakeholders during implementation of actions.

- > Action EDU-10: Develop a mini-grants program for community organizations and students to assist in implementation of the CCMP.
- Action EDU-11: Review and refine the CEQA/NEPA initial study environmental checklist to increase awareness of beneficial uses of water and estuarine resources.

	EDU-1	EDU-2	EDU-3	EDU-4	EDU-5	EDU-6	EDU-7	EDU-8	EDU- 9	EDU- 10	EDU- 11
	General	Boater	Ag	Pest.	Estuary	CCNHA	Media	Public	K-12	Mini-	CEQA
Agency/	PEO	Out-	Out-	Work-	Conf.	Exhibit		Access		grants	Chielst
Organization	2012-03	reach	reach	shops		· · · · · · · · · · · · · · · · · · ·			1990 - 1990 -	한 것을 가 있는	
BF	S				P	S	S			S	S
CalPoly					S						
CCC				S				<u> </u>			S
CCCorp									P		
CCNHA	S				S	<b>P</b>			P		
CCRWQCB			S		S	S					P
CDFG		S									
CMB					S						P
CSLRCD			S								
Developers								Р			
ECA	S				S	S	S	S	S		
Farm Bureau			S								
Fishing Industry		S									
FOE	S				S	S	S		S		
Kern County									S		
Pub/Priv Landowners				P							
MEGA							P		P		
MBHD		S									
MBNEP	Р	Р	S	S	P	S	P	S	S	P	S
Morro Group					S						
NRCS			S								
Sierra Club					S						
Rancho El Chorro	S								S		
SWRCB											S
SLC											P
SLOCo.	S		S	Р				Р	S		Р
UCCE			P	S	S				S		
USCG									S		
USEPA									Γ		Р

# Table 4.12Public Education & Outreach Actions—ImplementingOrganizations

**P** = Primary role in implementation and monitoring project outcomes and effectiveness.

S = Supporting role in implementation.

# EDU-1: Conduct general public outreach and education focused on the value of a healthy environment and the role of individuals in protecting the natural resources of the Morro Bay watershed.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

Morro Bay supports one of the most significant estuaries in California. However, the area has experienced an intense population increase, and much development has occurred in sensitive habitat areas of Los Osos and Baywood Park. These habitats include wetlands or seasonal drainages that provide significant runoff during storm events. Pollutants found in stormwater runoff in the urban areas that include Los Osos, Baywood, and Morro Bay may be significantly impacting the estuary. This action would increase community involvement and awareness of the basic priority problems within the watershed and the basis for the actions contained within the CCMP.

#### BENEFITS OF THIS ACTION:

Increased public awareness of resources and issues, as well as a better understanding of individual contributions to the watershed; decreased non-point source runoff from urban areas; and partnering within the community on habitat conservation issues.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

The Indian River Lagoon National Estuary Program as well as many other NEPs have similar public outreach actions addressing priority problems.

#### IMPLEMENTATION:

- 1. Develop and maintain public education displays regarding focused issues relating to the importance of different habitats (i.e. impacts of: unleashed dogs to snow plover habitat; feral cats to wildlife; and exotic species used in landscaping which can degrade native plant communities).
- 2. Provide periodic public forums to assess community input and assess needs, as well as provide educational opportunities on focused topics.
- 3. Stencil storm drains in all urban areas using students and volunteers.
- 4. Implement programs about priority issues to provide information to the public regarding fertilizer, herbicide, and pesticide use, as well as the potential impacts on endangered or threatened species (i.e., shoulderband snail).
- 5. Establish a speaker's bureau consisting of volunteers available to provide outreach to the community at large.
- 6. Annually support the establishment of "Salmon and Steelhead Awareness Month" for October.
- 7. Sponsor public opinion polls to identify public concerns and comprehension of bay issues, as well as to gauge community support for bay restoration and initiatives.
- 8. Develop a "Watershed Resident's Guide" to inform public about their impact within the watershed, as well as addressing particular solutions the reader can take part in.
- 9. Sponsor dune-focused education for general audience.
- 10. Sponsor bird-friendly signs to address recreational impacts around the perimeter of the estuary.
- 11. Form a "Volunteer Patrol Program" to encourage community members to systematically observe and report problems impacting the bay and surrounding wildlife habitat that include invasive plants, runoff and litter, clogged drainage filters, pipes and ditches, etc.

#### WHEN:

- Short Term: Develop and maintain public education displays regarding focused issues relating to the importance of different habitats. Provide periodic public forums to assess community input and assess needs. Stencil storm drains in all urban areas using students and volunteers. Sponsor public opinion polls to identify public concerns and comprehension of bay issues
- Medium Term: Implement programs about priority issues to provide information to the public regarding fertilizer, herbicide, and pesticide use. Form a "Volunteer Patrol Program" to encourage community members to systematically observe and report problems impacting the bay and surrounding wildlife habitat.

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#### WHO:

Primary:

 MBNEP (Displays, public forums, education, volunteers, stencil storm drains, information regarding fertilizer, speaker's bureau, steelhead awareness month, public polls, "Watershed Resident's Guide", signs)

#### Support:

- BF (participate in Displays, public forums, information regarding fertilizer, speaker's bureau)
- CCNHA (Displays, information regarding fertilizer, speaker's bureau, steelhead awareness month)
- SLOCo. (Public forums, information regarding fertilizer, speaker's bureau, steelhead awareness month, "Watershed Resident's Guide")
- Rancho El Chorro (Displays, public forums, stencil storm drains, information regarding fertilizer)
- ECA (advisory)
- FOE (Displays, public forums, education, stencil storm drains, information regarding fertilizer, speaker's bureau, steelhead awareness month, public polls, "Watershed Resident's Guide", signs)

#### WHERE:

Throughout the watershed

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Annual cost without Watershed Resident Guide	\$30,000	1-5 years
Annual cost with Watershed Resident Guide (depending on content)	\$32,000-35,000*	1-5 years
Signage	\$10,000	1-5 years

\$ 2,400

\$ 7,000

\*one-time cost only

#### BASIS FOR COST:

- Part-time staff time for coordination (including overhead): \$25,920
- Supplies (display materials, room fees, etc.):
- Watershed guide (upper limit/one time project):

#### POTENTIAL FUNDING SOURCES:

- USEPA Section 320 Funds
- See Chapter 7, Table 7.11.

#### **EVALUATION:**

- Significant changes in public survey polls in understanding of local issues.
- Attendance at forums and public displays.
- Decreased nonpoint source runoff from urban areas, as measured by catch basins and stream monitoring.
- Number of public forums held and attendance rates.
- Number of public educational displays exhibited in the community.
- Number of storm drains stenciled in urban areas.

- EDU-2 (Boater Outreach)
- EDU-3 (Agricultural Outreach)
- EDU-5 (Estuary Conference)
- EDU-7 (Media)
- EDU-8 (Public Access)
- EDU-9 (K-12)
- EDU-10 (Mini Grants)

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- CC-4 (Urban Runoff) CC-5 (Stream Geomorphology and WQ) SED-4 (Landowner BMPs) SED-5 (Creek Restoration) NUTR-1 (Los Osos Wastewater) NUTR-4 (Residential BMPs) BACT-9 (Coordinate Monitoring WQ Standards) FLOW-1 (Water Reclamation) HMT-1 (Hazardous Waste Network)

.

- HMT-1 (Hazardous Waste Network)
- HAB-4 (Species Recovery Plans) .



# EDU-2: Develop educational materials and programs regarding marine pollution and habitat issues geared toward the commercial and recreational boating community of Morro Bay.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

The boating community of the Morro Bay area is a diverse group consisting of recreational and commercial boaters who enjoy one of the most pristine bays on the California Coast. The marine life of the area varies from microscopic plankton to marine plants to large marine mammals. Inadvertent destruction of habitat such as wetlands, eelgrass beds, or spawning grounds, and degradation of water quality or food supply, can result from various boating activities. Examples include illegal pollutant discharge, maintenance products, oil, and fuel, as well as direct degradation of habitat and intrusion upon sensitive feeding grounds for particular species. Outreach to the marine user can minimize their impacts to assure future resource use and boost ecological integrity of the Morro Bay estuary.

#### **BENEFITS OF THIS ACTION:**

This action will increase boater awareness of estuary issues; reduce discharges of non-point source pollutants; and minimize impacts to commercial marine industry and risk to recreational users. Closer working relationships with the Morro Bay boating community and local organizations can help identify concerns and practical strategies for a healthier bay.

#### **EXAMPLES OF SIMILAR IN-PLACE ACTIONS:**

Monterey Bay National Marine Sanctuary and the Santa Monica Restoration Project have proactive public boater education actions in place which have been very successful.

#### **IMPLEMENTATION:**

- 1. Promote the California Department of Fish and Game "Small Craft Refueling Dock Outreach Program."
- 2. Expand and advertise the Bay Watch Hotline for reporting discharge violations and pollution sightings by adding the hotline to the MBNEP newsletter and promoting it at public MBNEP events.
- 3. Create and post signage indicating sensitive eelgrass beds. Develop and distribute supporting educational pamphlets at docks, fueling stations, marinas, etc.
- 4. Develop a Boater's Guide addressing touring highlights of the Estero Bay community; the fragile nature of the Morro Bay estuary; "Clean and Green" facts such as: where to dump sewage, heavy metals, oils, plastics and trash; legal discharge limits; effects of plastic and trash debris on wildlife; impacts of common maintenance products and activities on the estuary; and the importance of pump-out stations (See HMT-4).
- 5. Maintain and support local forums for the commercial and recreational boating community to identify concern, and inform of new guidelines or strategies for a healthier bay.
- 6. Create educational tools which will be determined by the Education and Public Outreach Work Group (with advisement from the boating community) informing ways to avoid activities that disturb fragile wildlife and plant communities within the estuary.

#### WHEN:

- Short Term: Promote the California Department of Fish and Game "Small Craft Refueling Dock Outreach Program. Expand and advertise the Bay Watch Hotline for reporting discharge violations and pollution sightings. Create and post signage indicating sensitive eelgrass beds. Develop and distribute supporting educational pamphlets at docks, fueling stations, marinas.
- Medium Term: Develop a Boater's Guide addressing touring highlights of the Estero Bay community. Maintain and support local forums for the commercial and recreational boating community to identify concern.

#### WHO:

Primary:

MBNEP ("Small Craft Refueling Dock Outreach Program", Bay Watch Hotline, Signage, Boater's Guide, Local Forums, Education)

Support:

- MBHD ("Small Craft Refueling Dock Outreach Program", Signage, Boater's Guide, Local Forums)
- Fishing Industry—Commercial Fishing Representatives (coordination)
- CDFG ("Small Craft Refueling Dock Outreach Program")

#### WHERE:

Recreational and commercial fishing areas

COST:

| Task/Step             | Cost/yr.                    | Duration of Project<br>(once initiated) |
|-----------------------|-----------------------------|-----------------------------------------|
| CDFG Outreach Program | \$1,000                     | 1-5 years                               |
| Baywatch Hotline      | \$1,000                     | 1-5 years                               |
| Signage               | \$5,000-10,000<br>(grants)  | 1-5 years                               |
| Boating Guide         | \$10,000-30,000<br>(grants) | 1-5 years                               |
| Forums                | \$1,000                     | 1-5 years                               |
| Educational materials | \$15,000 (grants)           | 1-5 years                               |

#### BASIS FOR COST:

• Experience with producing publications and making signs.

#### POTENTIAL FUNDING SOURCES:

- USEPA Section 320 Funds
- Clean Vessel Act grants
- CDBW
- See Chapter 7, Table 7.11.

#### EVALUATION:

- Number of Boater's Guides distributed
- Increased use of pump-out facilities
- Feedback through periodic roundtable forums
- Results of public use surveys

- HMT-2 (Marina BMPs)
- HMT-3 (Boat Haulout)
- HMT-4 (Hazardous Waste Network)
- BACT-2 (Pump-outs)
- BACT-3 (Illegal Moorings)
- BACT-4 (Abandoned Boats)
- BACT-5 (Liveaboards)
- EDU-1 (General PEO)
- EDU-5 (Estuary Conference)
- EDU-7 (Media)
- EDU-8 (Public Access)
- EDU-9 (K-12)
- EDU-10 (Mini-Grants)

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EDU-3: Develop educational materials regarding erosion, sedimentation, sensitive resources, fertilizers, and habitats within the watershed geared toward agricultural and ranch landowners and various public agencies to improve partnering, lessen impacts and educate all parties of pressing issues.

Priority Action

#### BACKGROUND/MAJOR ISSUES:

- Sedimentation of Morro Bay, as well as the high nutrient load of the creeks has been identified as primary problems for the estuary. Upland erosion is causing loss of agricultural land and habitat loss for steelhead trout. It also results in higher maintenance costs for roadways impacted by high flows.
- The UCCE provides extensive technical and assistance and training to landowners, publishes "Fact Sheets," conducts Ranch Planning short courses, and coordinates 4-H activities for K-12 schoolchildren. There is a need for additional short courses and increased assistance in developing and implementing Ranch Management Plans.

#### **BENEFITS OF THIS ACTION:**

This action will increase communication and cooperation between public agencies and the agricultural/ranch community. Ultimately, this action will help reduce erosion and trap sediment before it reaches the bay, save invaluable topsoil, and possibly reduce costs for road maintenance. Reductions in sediment can result in reduced nutrient and bacteria loadings, thus improving the overall water quality of Morro Bay estuary.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

The UCCE agricultural outreach program.

#### **IMPLEMENTATION:**

- 1. Implement an educational outreach tool geared to common agricultural audiences in the watershed regarding impacts of fertilizer, herbicide, and pesticide use as well as alternative solutions.
- 2. Develop a video to educate landowners and decision-makers about the processes that impact stream flows and the consequences of mismanagement.
- 3. Develop a yearly stream flow status (based on data from volunteer monitoring program) and trends report and distribute to local landowners and decision-makers.
- 4. Maintain and support the UCCE's short courses for land managers on alternative strategies and funding measures that reduce priority pollutants. These would include upland watering systems, riparian pasturing, and riparian exclusions. It would also address permitting questions and the importance of ag/ranch planning.
- 5. Provide landowners with test kits and technical assistance for self-monitoring at individual sites.
- 6. Develop and maintain periodic forums to work with agricultural/ranch community to help identify and meet TMDL guidelines.
- 7. Develop a guide to literature on erosion control practices, focusing on measures that work well in the Morro Bay watershed.

#### WHEN:

- Short Term: Implement an educational outreach tool geared to common agricultural audiences in the watershed regarding impacts of fertilizer, herbicide, and pesticide use as well as alternative solutions. Develop a video to educate landowners and decision-makers about the processes that impact stream flows and the consequences of mismanagement. Maintain and support the UCCE's short courses for land managers on alternative strategies and funding measures that reduce priority pollutants
- Medium Term: Provide landowners with test kits and technical assistance for self-monitoring at individual sites. Develop and maintain periodic forums to work with agricultural/ranch community to help identify and meet TMDL guidelines. Develop a guide to literature on erosion control practices, focusing on measures that work well in the Morro Bay watershed.

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#### WHO:

Primary:

 UCCE (Education, Yearly Stream Flow Status, Short Courses, Provide Land Owners with test kitts, Forums, Guides, and Literature)

#### Support:

- CCRWQCB (advisory)
- Farm Bureau (advisory)
- MBNEP (coordinate)
- SLOCo. Agriculture Commissioner's Office (advisory)
- CSLRCD (advisory)
- NRCS (advisory)

#### WHERE:

Properties throughout the watershed that engage in agricultural activities

#### COST:

| Task/Step                                               | Cost/yr.  | Duration of Project<br>(once initiated) |
|---------------------------------------------------------|-----------|-----------------------------------------|
| 15 projects on a variety of subjects at \$5,000/project | \$75,000* | 1-5 years                               |
| One video                                               | \$20,000* | 1-5 years                               |
| Other educational tools                                 | \$30,000* | 1-5 years                               |
| * and there and and                                     |           |                                         |

#### \*one-time cost only

#### BASIS FOR COST:

Previous costs incurred by MBNEP for similar items

#### POTENTIAL FUNDING SOURCES:

- USEPA Section 320 Funds
- USEPA Environmental Education Grants
- USEPA Sustainable Development Challenge Grants
- See Chapter 7, Table 7.11.

#### **EVALUATION:**

- Attendance at workshops
- Feedback via written comments
- Reduction of measured dissolved oxygen and/or bacteria/nutrient loads in creeks by water quality sampling (long term).

- BACT-2 (Grazing Management)
- SED-4 (Landowners BMPs)
- SED-7 (BMP Incentives)
- NUTR-3 (Agricultural BMPs)
- CC-5 (Stream Geomorphology and WQ)
- EDU-1 (General PEO)
- EDU-5 (Estuary Conference)
- EDU-7 (Media)
- EDU-9 (K-12)
- EDU-10 (Mini-Grants)



# EDU-4: Conduct cross-educational workshops and individual orientations on the positive and negative uses of pesticides.

#### > Priority Action

#### BACKGROUND/MAJOR ISSUES:

To date, agricultural chemical manufacturers have not concentrated on producing reduced-risk alternatives to traditional pesticides. The cost of product development and registration simply outweigh the potential for profits to be derived by niche market demand for "minor crops." Thus, the wide scale use of *Reduced Risk Pesticide Alternatives* has not been widely accepted by producers engaged in large-scale production farming.

Reduced-Risk Pest Management Products include pest resistant genetically improved crop cultivars (varieties), biological products, such as beneficial insects which feed on pest species, and biological pesticides, such as viruses, bacteria, and fungi.

The Food Quality Protection Act of 1996 (FQPA-HR 16227) mandates a single health-based standard for all pesticides in all foods; it expedites registration of safer pesticides; and creates incentives for development of new crop protection tools. Another major change provided by the FQPA is substantial civil penalties for moving food with violative pesticide residues into interstate commerce.

The California Department of Pesticide Regulation projects that the FQPA may result in advancing the following technologies:

- Precision-enhanced pesticide application equipment.
- Environmental monitoring and detection instrumentation for measuring pesticide residuals on produce in packing facilities.
- Reduced-risk pest management products providing alternatives to traditional pesticides.

Depending on how the act is implemented by USEPA, these changes should benefit California in the areas of minor crop pesticide use and reduced-risk product availability. For the first time, economic incentives are being linked to the use of Reduced-Risk Pesticide Alternatives.

A Grower Education workshop is proposed to inform San Luis Obispo County growers farming within the Morro Bay Watershed about the Food Quality Protection Act of 1996 and its implications and incentives.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

 University of California Cooperative Extension outreach and education workshops and short courses addressing non-point source water pollution control measures for ranchers.

#### **BENEFITS OF THIS ACTION:**

Increasing grower awareness of the Federal Food Quality Protection Act of 1996 will position farmers within the Morro Bay Watershed to take advantage of the expected decreases in the cost of the emerging technologies, which promote Reduced-Risk Pesticide Alternatives.

#### **IMPLEMENTATION:**

- 1. San Luis County Agriculture Commissioner staff working in Integrated Pest Management Programs and Pesticide Use Enforcement will provide one-on-one grower education/awareness orientations on the FQPA during the growers' annual visits to the SLO County Agriculture Commissioner for renewal of the Pesticide Use Permits.
- 2. Agricultural landowners will provide orientations on their current pesticide usages.
- 3. The MBNEP will sponsor pesticide reduction workshops for agricultural users and urban resident users.

#### WHEN:

- Short Term: Provide one-on-one grower education/awareness orientations coincident with grower renewal of annual Pesticide Use Permits. Agricultural landowners will provide orientations on their current pesticide usages.
- Medium Term: The MBNEP will sponsor pesticide reduction workshops for agricultural users and urban resident users.

#### WHO:

Primary:

- SLOCo. Agriculture Commissioner's Office (Grower Education and Awareness)
- Public & private landowners (Orientations)

#### Support:

- Various user groups (Pesticide Reduction Workshops)
- CCC (advisory)
- MBNEP (Pesticide Reduction Workshops)
- UCCE (Grower Education and Awareness, Pesticide Reduction Workshops)

#### WHERE:

Throughout the watershed

#### COST:

| Task/Step  | Cost/yr. | Duration of Project<br>(once initiated) |
|------------|----------|-----------------------------------------|
| Staff Time | \$2,000  | 1-5 years                               |
| Materials  | \$1,000  | 1-5 years                               |
| Workshops  | \$500/yr | 1-5 years                               |

#### BASIS FOR COST:

- Based on SLOCo. Agriculture Department labor costs.
- Educational materials costs.

#### POTENTIAL FUNDING SOURCES:

- California Department of Pesticide Regulation
- California Department of Agriculture
- See Chapter 7, Table 7.11.

#### **EVALUATION:**

California Department of Pesticide Regulation tracks annual trends in total pesticide use in SLO County from data submitted by growers on monthly Pesticide Use Reports. Examination of this data, adjusted for the number of growers, their commodities, and acreage in production, can give and indication of trends in pesticide use, which may be related to FQPA initiatives.

- HAB-10 (A. donax Removal)
- SED-4 (Landowner BMPs)
- NUTR-3 (Agricultural BMPs)
- CC-5 (Stream Geomorphology and WQ)
- EDU-7 (Media)
- EDU-9 (K-12)
- EDU-10 (Mini-Grants)



# EDU-5: Coordinate and seek funding for a biennial "State of the Estuary" conference to support the biennial review process, share progress reports, address challenges, recognize environmentally responsible citizens and businesses, and provide public education.

#### > Priority Action

#### BACKGROUND/MAJOR ISSUES:

The sharing of information to educate and to avoid duplication is a vital part of the MBNEP process. In 1991, a State of the Bay Conference was held in Morro Bay celebrating accomplishments within the watershed which was well attended and generated much renewed interest in the estuary and its priority problems. A follow up conference would help benchmark past efforts, as well as future plans for the study area.

#### **BENEFITS OF THIS ACTION:**

This action would improve communication between jurisdictional agencies, the scientific community and local public. Additionally it would recognize efforts within the watershed at both the professional and volunteer level. This summarization of efforts would also be useful for preparation of the biennial review process.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

A successful State of the Bay conference was held October 1991.

#### **IMPLEMENTATION:**

- 1. Create a Conference Steering Committee comprised of local organizations (based on previous steering committee membership) to coordinate conference proceedings. This committee would be charged with responsibility as well as all "housekeeping" items, such as advertising and funding, necessary to run the conference.
- 2. Design registration materials and coordinate with speakers, etc.
- 3. Develop an awards program for environmentally responsible citizens and businesses.

#### WHEN:

- **Short Term:** Create a Conference Steering Committee comprised of local organizations. Design registration materials and coordinate with speakers.
- Medium Term: Develop an awards program for environmentally responsible citizens and businesses.

#### WHO:

- Primary:
- MBNEP (Steering Committee, Registration Materials, Awards Program)
- BF (Steering Committee, Registration Materials, Awards Program)

#### Support:

- CCNHA (assist in sponsoring the event)
- CCCCRWQCB (assist in sponsoring the event)
- CMB (assist in sponsoring the event)
- UCCE (participate on Steering Committee)
- The Morro Group
- Sierra Club
- Cal Poly (assist in sponsoring the event)
- ECA (participate on Steering Committee)
- FOE (participate on Steering Committee)

#### WHERE:

Morro Bay

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COST:

| Task/Step                 | Cost/yr. | Duration of Project<br>(once initiated) |
|---------------------------|----------|-----------------------------------------|
| Cost for 3-day conference | \$30,000 | 1-2 years                               |

#### BASIS FOR COST:

National Monitoring Program Nonpoint Source Conference Budget 

#### POTENTIAL FUNDING SOURCES:

- USEPA Section 320 Funds
- Conference registration fees
- See Chapter 7, Table 7.11. .

#### **EVALUATION:**

Attendance at conference. 

- EDU-1 (General PEO) .
- R EDU-2 (Boater Outreach)
- EDU-3 (Agricultural Outreach) EDU-7 (Media)
- EDU-9 (K-12) .
- EDU-10 (Mini-Grants) .
- CC-5 (Stream Geomorphology and WQ) .
- CC-6 (VMP)



## EDU-6: Develop an interactive monitoring display for the Natural History Museum Morro Bay State Park and support other Central Coast Natural History Association education projects.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

The Morro Bay Natural History Museum provides the Morro Bay National Estuary Program with an opportunity not available to many NEPs. This museum, located on the shores of the Bay, provides a setting for tremendous educational opportunities. Between 50,000 and 80,000 visitors come to the museum each year. Of these, approximately 14,000 are school students. Docent-led walks and admission to the museum are provided to school groups free of cost. The Museum is currently undertaking a large-scale renovation project of its exhibits. This represents a remarkable opportunity for the MBNEP to provide educational outreach on a broad scale through an interactive interpretive center. This action plan will address dissemination of scientific information, volunteer monitoring data, and other NEP related information in a dynamic exhibit.

#### **BENEFITS OF THIS ACTION:**

Benefits of this action plan include providing feedback, presentation, and interpretation of data collected by the Friends of the Estuary Volunteer Monitoring Program. It will enable the user to directly query the database on water and habitat quality in the bay and watershed, will provide historical records, satellite imagery and photographs of changes in the watershed, and will enable real time connections to data gathering equipment in the field. It will provide dissemination of data and interpretive information for diverse users, and will support broad public education.

#### **EXAMPLES OF SIMILAR IN-PLACE ACTIONS:**

The Morro Bay Natural History Museum already has a real time display of weather and seismographic data. Other museums, like the Monterey Bay Aquarium, provide real-time information and other interactive opportunities.

#### **IMPLEMENTATION:**

- 1. CCNHA will contract with a consultant to develop the exhibit.
- 2. Data management tools being developed by the Central Coast Ambient Monitoring Program will be modified for interactive exhibit use. The extensive database already being developed as part of the Morro Bay National Monitoring Program and Friends of the Estuary Volunteer Monitoring Program will provide the foundation for the program. This includes water quality, flow, habitat and biological information. Touch-screen driven computers at the display will provide access to GIS map products, satellite imagery, digitized photographs, and other information of note. The system will permit the user to obtain electronic copies of selected information.
- 3. Develop an interactive website with pictures, downloadable images of volunteer actions, and information about future plans for the estuary. The Museum of Natural History Morro Bay State Park will house and maintain the interactive site as part of the museum's exhibits and displays on priority problems of the bay.

#### WHEN:

- Short Term: CCNHA will contract with a consultant to develop the exhibit. Data management tools being developed by the Central Coast Ambient Monitoring Program will be modified for interactive exhibit use.
- Medium Term: Develop an interactive website with pictures, downloadable images of volunteer actions, and information about future plans for the estuary.

#### WHO:

Primary:

CCNHA (Develop the exhibit, CCAMP, Interactive Website)



#### Support:

- MBNEP (coordinate)
- FOE (assistance)
- BF (technical assistance)
- CCRWQCB
- ECA (advisory)

#### WHERE:

Natural History Museum Morro Bay State Park

#### COST:

| Task/Step                      | Cost/yr.         | Duration of Project<br>(once initiated) |
|--------------------------------|------------------|-----------------------------------------|
| Interactive monitoring display | \$25,000-75,000* | 1 year                                  |
| Annual maintenance cost        | \$2,000          | 1-5 years                               |
| *one-time cost only            | ,,,,,,,,,,,,     |                                         |

#### BASIS FOR COST:

 Costs include equipment acquisition, exhibit design, and fabrication. Cost estimates are based on rough quotes for comparable system hardware and programming. High cost includes real time connections and remote monitoring devices.

#### POTENTIAL FUNDING SOURCES:

- CCNHA renovation funds
- See Chapter 7, Table 7.11.

#### **EVALUATION:**

- Number of system "sign-ons" per year
- Suggestion box comments

- CC-6 (VMP)
- EDU-7 (Media)
- EDU-9 (K-12)
- EDU-10 (Mini-Grants)



## EDU-7: Increase communication to the public through media [i.e., graphic/text, television, continuation of "Turning the Tide," MBNEP newsletter, and website] to spotlight collaborative efforts, forums, ongoing status, and informational messages.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

Successful education programs consider target audiences and have a stable platform from which to consistently deliver information to the public. With recent advances in multi-media technology, many of the complex issues can be quickly synthesized and presented in a wide range of formats. With an aggressive multi-media campaign, information, once relegated to formal government documents, can be clearly presented to anyone with media access. The importance of public awareness and support is paramount to the success of the CCMP, as many of the problems identified in the estuary cannot be solved without community involvement.

#### **EXAMPLES OF SIMILAR IN-PLACE ACTIONS:**

Most NEPs have similar public media actions in place.

#### **BENEFITS OF THIS ACTION:**

Successful implementation of this action will result in a significant portion of the local population becoming aware of the issues surrounding the estuary, thus mobilizing public support for CCMP implementation. Media actions can result in an enhanced, respected and credible public profile for MBNEP conference participants, and positively affect the recruitment rate of volunteers. Although initial costs can be high, the effects of multimedia presentations on the public's psyche, and therefore support for the program, can be long lasting.

#### **IMPLEMENTATION:**

- 1. Maintain a watershed resident mailing database to support outreach projects, such as FOE's <u>Common Good</u> multi-organizational watershed newsletter.
- 2. Develop 30-second spots for local television regarding impact of storm water runoff to the estuary, and other such focused non-point source pollution issues.
- 3. Maintain and expand upon MBNEP public outreach committee, focusing on single projects such as fundraisers, contests, K-12 field trips, and informational talks.
- 4. Input a monthly column into local papers to update and recognize successes of MBNEP.
- 5. Maintain a good working basis with local media, and update them regularly on volunteer success stories and events within the MBNEP framework.
- 6. Maintain a MBNEP website with information on implementation actions, advisory committee and work group activities, ongoing research and monitoring, volunteer opportunities, event announcements, and other related information on the Morro Bay watershed.
- 7. Publish and mail the MBNEP newsletter, "Turning the Tide" on a quarterly basis. Publish monthly newsletter updates electronically on the MBNEP website.

#### WHEN:

Short Term: Develop 30-second spots for local television regarding impact of storm water runoff to the estuary, and other such focused non-point source pollution issues. Input a monthly column into local papers to update and recognize successes of MBNEP. Maintain a good working basis with local media, and update them regularly on volunteer success stories and events within the MBNEP framework. Maintain a MBNEP website with information on implementation actions, etc. Publish and mail the MBNEP newsletter, "Turning the Tide" on a quarterly basis. Publish monthly newsletter updates electronically on the MBNEP website.

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#### WHO:

# Primary:

MBNEP (Mailing Database, Public Outreach through local media, MBNEP Website, "Turning the Tide")

Support:

- FOE (assist in Mailing Database, Public Outreach through local media, MBNEP Website, "Turning the Tide")
- BF (assist in Mailing Database, Public Outreach through local media, MBNEP Website, "Turning the Tide")
- ECA (assist in Mailing Database, Public Outreach through local media, MBNEP Website, "Turning the Tide")
- MEGA (Mailing Database, Public Outreach through local media)

#### WHERE:

Throughout the watershed

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
Watershed resident database	\$500	1 year
30-second spots	\$5,000 (grants)	1-5 years
Public Outreach Committee	\$500	1-5 years
Monthly newspaper column	\$1,000	1-5 years
Maintain media relations	\$1,000	1-5 years
Maintain interactive website	\$5,000 (USEPA 320g)	1-5 years
Quarterly MBNEP newsletter	\$1,000 (USEPA 320g)	1-5 years

#### BASIS FOR COST:

Previous costs for similar products and activities incurred by MBNEP

#### POTENTIAL FUNDING SOURCES:

- USEPA Cooperative Agreement
- USEPA Section 320 Funds
- USEPA Environmental Education Grants
- See Chapter 7, Table 7.11.

#### **EVALUATION:**

- Direct evaluation of this action will be difficult, however, increased volunteer activity and public awareness
  can be indirectly linked to the success of this action.
- Newsletters published, number of lectures given, etc.

#### **RELATED ACTIONS:**

All EDU Actions

EDU-8

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# EDU-8: Improve existing locations of public access to the estuary within the community of Los Osos by balancing various user needs and protection of sensitive species.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

The circulation element (Chapter 5) of the draft Estero Area Plan shows many locations for public access to the estuary. These locations are shown for planning purposes only, and do not imply that legal or physical access exists. Many such access locations are at street ends in the Baywood Park and Cuesta-by-the-Sea neighborhoods. Some of those street ends are to be protected or developed for public access and habitat value.

One additional coastal access location included in the draft Estero Area Plan is at the south end of 1<sup>st</sup> Street, where the plan proposes a small parking area, a boat launch ramp for hand-trailered boats, passive recreation, and access to the bay. Another additional access to the estuary is along a planned pedestrian/equestrian trail corridor above Highland Drive that connects Bayview Heights Drive with the Army Road vicinity.

#### **BENEFITS OF THIS ACTION:**

This action would improve access to the coast, consistent with protection of sensitive habitat in accordance with the Coastal Act, and would help provide a more pedestrian-friendly environment in Los Osos.

#### **IMPLEMENTATION:**

- 1. Participate in discussion of how to balance beach access, various user needs, and protection of sensitive species.
- 2. The proposed pedestrian/equestrian trail could be incrementally improved in connection with major development projects, where the appropriate connection exists between the impacts of the development and the planned trail.
- 3. The County Department of General Services has received funding for a plan to make improvements at the south end of 1<sup>st</sup> Street.
- 4. Create signs to encourage people to deposit refuse in trash receptacles.
- 5. Add bike racks for use by people to reduce the number of automobiles parked near access areas.
- 6. Design and install trash receptacles that are wind, dog, and bird proof.

#### WHEN:

- Short Term: The pedestrian/equestrian trail would be incrementally improved over the long-term after a thorough discussion among resource managers regarding the best approach to increased access and resource protection. Create signs to encourage people to deposit refuse in trash receptacles. Add bike racks for use by people to reduce the number of automobiles parked near access areas. Design and install trash receptacles that are wind, dog, and bird proof.
- Medium Term: The County has applied for, and received, grant funding for the 1<sup>st</sup> Street project. The project for the 1<sup>st</sup> Street boat launch project could be constructed starting in 2002.

#### WHO:

Primary:

- Pedestrian/equestrian trail: developers and public (Beach Access, Trails, Improvements on 1<sup>st</sup> Street)
- 1st Street: SLOCo. Department of General Services (Beach Access, Trails, Improvements on 1<sup>st</sup> Street)
   Support:
  - ECA (Beach Access, Trails, Improvements on 1<sup>st</sup> Street)
  - MBNEP (Beach Access, Trails, Improvements on 1<sup>st</sup> Street)
  - CCC (advisory)

#### WHERE:

Areas adjacent to the estuary with potential for public access

#### E D U - 8

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
County's 1st Street project	\$110,000*	1 year
Design and install signage, bike racks, and trash receptacles	\$10,000-25,000	1-2 years
*one-time cost only		

NOTE: Pedestrian/equestrian trail: little or no public cost, except for future maintenance.

#### BASIS FOR COST:

• The cost for the 1<sup>st</sup> Street project was determined by a county cost estimate.

#### POTENTIAL FUNDING SOURCES:

- The SLOCo. has obtained funding for the 1<sup>st</sup> Street project from the State of CDBW.
- See Chapter 7, Table 7.11.

#### **EVALUATION:**

- Number of bike racks installed.
- Number of trash receptacles installed.
- Improved, ecologically-friendly, small craft launch ramp.

- EDU-1 (General PEO)
- EDU-2 (Boater Outreach)
- EDU-7 (Media)
- EDU-9 (K-12)
- EDU-10 (Mini-Grants)



# EDU-9: Develop a strategic education plan to provide educational opportunities focusing on natural resources and watershed enhancement for K-12 schools.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

The Morro Bay estuary provides an excellent learning ground for all ages, especially for K-12. Children can volunteer for special projects that demonstrate community involvement as well as an appreciation for processes within our watershed. These lessons are then carried into the home to parents and siblings, thus enhancing the NEP goals and objectives. Some personal habits, such as recycling, reducing waste, and lessening one's impact on the watershed, are learned young.

#### **EXAMPLES OF SIMILAR IN-PLACE ACTIONS:**

- Chico West High School, Chico, CA—service learning program is partnered with community garden development and watershed enhancement efforts.
- Lake Tahoe, CA—USGS and CCC partner with local schools focusing on restoration of Lake Tahoe and its watershed.

#### **BENEFITS OF THIS ACTION:**

Early education regarding environmental issues, as well as reinforced appreciation for natural habitats, is the main benefit of this action. Teachers preparing science units can apply lessons learned to the dynamic nature of the Morro Bay watershed. Education is then shared for a lifetime with family and friends, increasing awareness of the fragile processes that shape our community.

#### **IMPLEMENTATION:**

- 1. Provide matching grants to fund interns from AmeriCorp (Learn and Serve Grants) to assist in achieving shared educational goals through developing a strategic education plan. These personnel would also be instrumental in carrying out identified goals, and strengthening ties of localized outreach efforts.
- 2. Create an educational packet for county schoolteachers that addresses priority problems within the watershed as well as focusing on processes within estuarine, stream, riparian, upland and wetland habitats.
- 3. Sponsor special events, such as the poster contest and hands-on restoration projects to encourage interest from children and their parents.
- 4. Partner with other agencies with assistance of AmeriCorp interns to develop an after school monitoring program such as Plankton Pullers (through UCCE and the USCG).
- 5. Partner with the UCCE 4H SLO Scientists Youth Development Program to provide training for teachers and volunteers in utilizing the "Ridges to Rivers: Watershed Exploration" curriculum.
- 6. Partner with MEGA, AmeriCorp, and the Los Osos Middle School Earth Club to create a native plant seed bank to support revegetation projects.

#### WHEN:

- Short Term: Provide matching grants to fund interns from AmeriCorp (Learn and Serve Grants) to assist in achieving shared educational goals through developing a strategic education plan. Create an educational packet for county school teachers that addresses priority problems within the watershed as well as focusing on processes within estuarine, stream, riparian, upland and wetland habitats. Sponsor special events, such as the poster contest and hands-on restoration projects to encourage interest from children and their parents.
- Medium Term: Partner with MEGA, AmeriCorp, and the Los Osos Middle School Earth Club to create a native plant seed bank to support revegetation projects.

#### WHO:

Primary:

CCNHA (Matching grants, education, special events, monitoring, training for teachers and volunteers, revegetation)

- CCCorps (Matching grants, education, special events, monitoring, training for teachers and volunteers, revegetation)
- MEGA (Matching grants, education, special events, monitoring, training for teachers and volunteers, revegetation)

Support:

- MBNEP (coordinate)
- Kern County, Camp Keep (provide assistance)
- FOE (provide assistance)
- USCG (provide assistance)
- UCCE/4H Youth Development Program (provide assistance)
- SLOCo. Office of Education (provide assistance)
- ECA (provide assistance)
- Rancho El Chorro (provide facilities and expertise)

#### WHERE:

Throughout the watershed

#### COST:

Task/Step	Cost/yr.	Duration of Project (once initiated)
AmeriCorp interns (depending on number of personnel funded).	\$5,000-\$10,000	1-5 years
Other costs (i.e., Teacher's Guide to Morro Bay) are variable, depending on scope of project	\$500-2,500*	1-5 years

### \*one-time cost only

#### BASIS FOR COST:

 CCCorps estimates of needed matching funds for "Learn and Serve" AmeriCorp grant. This amount would fund 1-2 staff.

#### POTENTIAL FUNDING SOURCES:

- UCCE Grants
- Various educational grants
- AmeriCorp Learn and Serve Grants
- See Chapter 7, Table 7.11.

#### **EVALUATION:**

- Number of educational guides used within five years of distribution.
- Attendance at special workshops.
- Attendance at after school projects
- Identification of educational goals.

#### **RELATED ACTIONS:**

- All EDU Actions
- CC-5 (Stream Geomorphology and WQ)
- CC-7 (Watershed Crew)

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EDU-9



# EDU-10: Develop a mini-grants program for community organizations and students to assist in the implementation of the CCMP.

#### Priority Action

#### BACKGROUND/MAJOR ISSUES:

The ultimate goal of the Morro Bay NEP is the protection and restoration of the unique natural resources of Morro Bay. Through a cooperative effort of federal, state, and local interests, the program is aimed at promoting environmentally sound management of a productive and biologically diverse estuary. This cannot be accomplished without broad-based public involvement and support. Implementing the CCMP and encouraging the community and young citizens to participate as stewards of Morro Bay are important objectives of the Morro Bay NEP. One direct way to accomplish those goals is to provide resources to expand stewardship opportunities. Providing funds for the community implementation of the CCMP will help ensure on-going public involvement.

Through the mini-grants program, public education and participation activities will be funded that focus on the major environmental problems facing Morro Bay, including ecosystem health and sustainability. These projects will seek to increase public awareness and education; emphasize that the ecosystem is a living environmental and social resource; demonstrate that the public can help to protect the estuary; motivate people to actively participate in its restoration; and utilize innovative activities which involve the community and lead to local action.

#### EXAMPLES OF SIMILAR IN-PLACE ACTIONS:

 The Indian River Lagoon NEP, Barnegat Bay NEP, as well as many other NEPs have developed similar small grants programs to support public outreach actions addressing community education on priority problems.

#### **BENEFITS OF THIS ACTION:**

- Increased community stewardship of Morro Bay.
- On-going public involvement in the MBNEP.
- Potential improvements in estuary ecosystem health.

#### **IMPLEMENTATION:**

- 1. Develop a mini-grants program, including securing funds, identifying target audiences, determining criteria and objectives, establishing an award process, soliciting or identifying potential recipients, and evaluating the effectiveness of the program. The mini-grants program will include small capped grants for student research projects for Cuesta College and Cal Poly students that can be reviewed and approved by the TAC in a streamlined process.
- 2. Provide educational materials and technical assistance, including facilitation, coordination and collaboration to support the grants program.

#### WHEN:

• Short-term: Develop a mini-grants program. Provide educational materials and technical assistance, including facilitation, coordination and collaboration to support the grants program.

#### WHO:

- Primary:
  - MBNEP (Mini-grants, education)
- Support:
  - BF (funding)



#### WHERE:

Throughout the watershed

#### COST:

| Task/Step                                                  | Cost/yr. | Duration of Project<br>(once initiated) |
|------------------------------------------------------------|----------|-----------------------------------------|
| Annual staffing to administer the program plus grant funds | \$20,000 | 1-5 years                               |
| MBNEP Mini-Grant Fund (7-10 projects)                      | \$50,000 | 1-5 years                               |

#### BASIS FOR COST:

• Other NEP small grants programs.

#### POTENTIAL FUNDING SOURCES:

- Morro Bay Estuary Restoration Fund (assist in implementation actions only)
- USEPA Section 320 Funds
- USEPA Environmental Education Grants
- See Chapter 7, Table 7.11.

#### EVALUATION:

• Number of grants disbursed.

- EDU-1 (General Outreach)
- EDU-2 (Boater Outreach)
- EDU-3 (Agricultural Outreach)
- EDU-5 (Estuary Conference)
- EDU-7 (Media)
- EDU-9 (K-12)
- CC-6 (VMP)<sup>'</sup>



# EDU-11: Review and refine the CEQA/NEPA initial study environmental checklist to increase awareness of beneficial uses of water and estuarine resources.

#### > Priority Action

#### BACKGROUND/MAJOR ISSUES:

One way to ensure that cumulative environmental impacts are fully addressed through the environmental review process is to revise the CEQA checklist used by the County and other agencies. The development of a CEQA/NEPA environmental checklist to be used by various agencies and individuals, as recommended by the Base Program Analysis, would make decision makers more aware of the issues at hand regarding beneficial uses of water. In the case of zoning considerations, the proposed expanded environmental checklist should include provisions that recognize the competition between beneficial uses of water at a sufficient level of detail.

#### **EXAMPLES OF SIMILAR IN-PLACE ACTIONS:**

The CCC, with the assistance of the CCRWQCB, has developed a revised checklist for water quality that may be appropriate for use as a draft for this action.

#### **BENEFITS OF THIS ACTION:**

- Will help make decision-makers more aware of beneficial uses of water.
- This action would update the CEQA/NEPA checklist to better address the protection of beneficial uses throughout the watershed.

#### **IMPLEMENTATION:**

- 1. Work with SLOCo. and the CMB to review and revise, as needed, the CEQA/NEPA initial study environmental checklist. The purpose of this checklist is to provide advisory information to the agencies charged with land use regulatory responsibility. The Checklist text should include:
  - Evaluation of project for impacts to migratory fish passage and flows
  - Evaluation of project for impacts to summer low flows
  - Evaluation of project for sedimentation of potential spawning and rearing areas
  - Evaluation of project for impacts on water temperature and oxygen levels
  - Evaluation of project for changes to stream geomorphology (bank stability, flood plain, channel depth, width, slope, etc.) and riparian shading.
  - Evaluation of project for impacts to water quality (chemical, physical, and biological).

#### WHEN:

• Short Term: Modifications to the CEQA checklist overlays for city and county governments.

#### WHO:

Primary:

- CCRWQCB (Review and revise CEQA/ NEPA initial study)
- SLOCo. (provide local city input, Review and revise CEQA/ NEPA initial study)
- CMB (provide local city input, Review and revise CEQA/ NEPA initial study)
- USEPÀ (advisory)
- SLC (provide state input)

Support:

- MBNEP (coordinate meetings)
- SWRCB (advisory)
- CCC (advisory)
- BF (technical assistance)

#### WHERE:

Throughout the watershed

COST:

| Task/Step                            | Cost/yr.     | Duration of Project<br>(once initiated) |
|--------------------------------------|--------------|-----------------------------------------|
| CEQA/NEPA checklist<br>modifications | \$500-2,500* | 1-2 years                               |
| - mounications                       | l            |                                         |

\*one-time cost only

Costs for this action will be minimal based on utilization of existing resources of the primary implementers.

#### BASIS FOR COST:

The update of the CEQA/NEPA checklist by Monterey County, CA

#### POTENTIAL FUNDING SOURCE:

- USEPA (320g) See Chapter 7, Table 7.11.

#### **EVALUATION:**

Timely Adoption of new CEQA checklist by city and county. 

- All SED Action ۰.
- All FLOW Actions
- STL-1 (Recovery Plan)
- EDU-7 (Media)
- EDU-9 (K-12)
- EDU-10 (Mini-Grants)

EDU-11



# 5.1 INTRODUCTION

## What is Monitoring?

According to the National Oceanic and Atmospheric Administration (1979), monitoring is defined as the:

"...continued systematic time-series observation of predetermined pollutants or pertinent components of the ecosystem over a period of time sufficient to determine 1) the existing levels, 2) trends, and 3) natural variations of measured components."

The MBNEP CCMP and companion documents address all three of the items stated in NOAA's monitoring definition above. Volume II of the CCMP includes the Characterization that summarizes existing levels and trends, whereas the MBNEP Environmental Monitoring Plan (EMP) will describe measuring future trends and "natural variations of measured components."

### Overview

The National Estuary Program (NEP), established in 1987 under Section 320 of the Clean Water Act, was created to address long term planning and management in nationally significant estuaries that are impacted by human activities. A CCMP is developed by each designated NEP, outlining the strategy for action by the community. The Clean Water Act also requires the effectiveness of implemented actions to be tracked by programmatic and environmental monitoring.

Efforts to monitor the Morro Bay estuary and watershed are essential components to the success of the implementation strategy of the MBNEP as well as tracking the health of the ecosystem. These two different aspects of monitoring used in the EMP are *programmatic and environmental monitoring*. Monitoring provides the community as well as resource and land managers a mechanism to assess the performance of actions taken and to reevaluate the effectiveness of existing strategies. Feedback of interpreted monitoring data creates more informed management decisions that may lead to revisions or new management strategies. Data collected to answer new management needs can then be reduced and analyzed, so that predictive models can be developed and management options are created and implemented. Programmatic monitoring is detailed further in Chapter 6 of this document and in Volume II: The Environmental Monitoring Plan.

To better understand how programmatic and environmental monitoring fit together while assessing the performance of the CCMP as well as the health of the ecosystem, please reference Figure 5.1 (which is modified from the Galveston Bay NEP). Programmatic monitoring is the initial driver, as the action plan, such as a urban stormwater runoff plan, must have targets and goals to recognize success. Once targets are established and the plan is implemented, then the community responds according, following critical measures to lessen pollutant loads in storm water runoff. From the community's action, changes are reported in pollutant discharge to the estuary. To understand the changes made by the stormwater runoff plan, assessments must be made by recording environmental change in the field. Long-term environmental monitors then can record not only changes in ambient conditions, such as water quality, but the effects of those conditions to the function of the entire ecosystem.

Both programmatic and environmental monitoring data will be available to the public, MBNEP participants, and others through the internet. Annual assessments on the health of the estuary and progress on implementing the CCMP will be available and distributed from the MBNEP office.









# 5.2 GUIDING PRINCIPALS

Primarily, the objective of the EMP is to assess implementation of the MBNEP CCMP. To achieve this goal, the EMP will provide strategy on how to provide critical long-term data to assess changing ambient trends in the estuary. The various principals which have guided the framework of this strategy are listed below.

#### 1. Measure the status of actions

This principal is the basis for the EMP. An Implementation Tracking System (ITS), indicating *action summary, percentage complete, and identified roadblocks to implementation,* will be the consolidation of all action monitoring data, and will be available to the public through the MBNEP website, as well as at the central office location. Further information of the ITS system can be found in Chapter 12: Information Tracking System, of Volume II: The Environmental Monitoring Plan.

#### 2. Characterize trends

All data resulting from programmatic tracking as well as direct environmental sampling efforts will be tested for meaningful correlations to better refine management strategy and decisions. Further information on past trends can be found in Volume II of the MBNEP CCMP: The Characterization.

#### 3. Integrate ongoing efforts

To avoid duplication, reduce overlap and minimize costs, existing efforts are the basis of the EMP. Where essential monitoring gaps have been identified, efforts have been made to work with existing agencies and/or organizations to provide need information. Detailed information regarding ongoing monitoring efforts can be referenced in Chapter 3: Current Monitoring in Morro Bay, of Volume II: The Environmental Monitoring Plan.

#### 4. Utilize bioindicators

Monitoring of all variables in an ecosystem to assess change and overall health is not feasible. Therefore it is valuable to utilize indicators to evaluate specific resource quality to reduce costs and assessment time. The EMP will make use of various bioindicators, depending on habitat, possible stressor, and timeframe in question. Further information on bioindicators that will be utilized can be found in Chapter 10: Habitat Health of Volume II: The Environmental Monitoring Plan.

#### 5. Utilize stakeholder-based Technical Advisory Committee (TAC)

Success of the EMP is based upon integrated efforts throughout the Morro Bay estuary and watershed. Without constant feedback of monitoring status, exchange of data, and refinements in the monitoring strategy, success will not be measure. To carry out these functions, it is necessary a stakeholder-based TAC be convened on a quarterly basis. For more information on roles and timelines of this TAC, please refer to page 5-22 of this chapter.

#### 6. Utilize CCAMP data management strategy

Management of such a wealth of information requires a centralized data management strategy. Such a database exists, CCAMP (of the CCRWQCB), which will house data and metadata for all programs. This database and selected analytic tools will be available on the Internet as well as linked to the MBNEP website. Individual programs can input data directly into the CCAMP software to facilitate quarterly data reviews and annual reports. The analyses from this database will provide feedback to the MBNEP to evaluate action effectiveness and long-term trends. Further information of CCAMP can be found in Chapter 12: Information Tracking System, of Volume II: The Environmental Monitoring Plan.



#### A 10-year Integrated Regional Plan

The MBNEP CCMP calls for implementation of its Action Plans within five years. In order to evaluate actions based on a five-year time period, the Environmental Monitoring Plan (EMP) is envisioned as a ten-year effort at minimum. Where geographic information on priority problems is sparse, pre-implementation data will be continually gathered to establish baseline, (up to three years into the Implementation period, depending on sample size). Tracking will continue during the active implementation period (tentatively five years to assess apparent trends) and then continue for succeeding years to gather statistically significantly sample size and assess lasting effects of implemented CCMP actions. In order to reduce overlap and fill in monitoring gaps, the EMP will assist in coordinating various organizations and agencies to not only evaluate the Comprehensive Conservation Management Plan (CCMP) overall, but give a fuller ecological picture of the Morro Bay watershed and its estuary.

As the Morro Bay watershed is a part of the Central Coast Ambient Monitoring Program (CCAMP), it is the intention of the EMP to integrate data into a larger, regional monitoring framework. This region ranges from Santa Cruz south to Ventura, and the Salinas basin to the east. With consistent protocols and parameters measured region wide, Morro Bay can contribute an intensive data source for other watersheds to draw upon as they build their comprehensive monitoring programs. Data comparisons available in a region-wide program are invaluable to assessing the overall health of the Morro Bay watershed in a biogeographical context.

## 5.3 MONITORING GOALS AND OBJECTIVES

The MBNEP Environmental Monitoring Plan is based upon the following goal and eight objectives that are consistent with overall program goals. The objectives listed are in reference to evaluation and research needs of the CCMP. These public concerns, targets and method of measurement are described in Volume II: The Environmental Monitoring Plan, Project Management Chapters 5-13. Further information on targets can be found in the CCRWQCB Basin Plan and in CCRWQCB's Technical TMDL's for Morro Bay watershed.

# GOAL: Track the implementation of CCMP actions and monitor the health of the Morro Bay ecosystem.

In addition to identifying priority problems, the Management Conference began formulating objectives for the program. The topics each objective was identified under, i.e. geomorphological, human use, etc., are used as the basis of organization for Project Management Chapters 5-13 of Volume II: Environmental Monitoring Plan. An additional topic was added in 1999, Data Tracking and Management, which is outlined in Chapter 13 of this document. The objectives are categorized as follows:

#### Geomorphological:

- Slow sedimentation by implementing management measures that address erosion and sediment transport.
  - Sustain no net loss of existing wetlands (baseline 2001 Wetland Delineation). Related CCMP Action Plan: All HAB, CC-1, All SED
  - Reduction of average annual suspended loads sediment by 15% by 2010 in stream and estuary waters, as to comply with water quality standards (waters should not contain suspended material in concentrations that cause nuisance or adversely effect beneficial uses, as stated in the CCRWQCB Basin Plan) and will comply with Sediment TMDL's set forth by the CCRWQCB in 2001. Related CCMP Action Plan: CC-3, All SED
  - Waters should not contain settable material in concentrations that result in deposition that causes nuisance or adversely affects beneficial uses, as depicted by bay bathymetry and wetland



acreage assessments (as stated in the CCRWQCB Basin Plan) and will comply with Sediment TMDL's set forth by the CCRWQCB in 2001.

Related CCMP Action Plan: CC-3, All SED

• One hundred percent of publicly owned creeks will be fenced (conducive to wildlife access) and revegetated by year 2010.

Related CCMP Action Plan: CC-3, BACT-1, SED-4, 5, EDU-1

 No net increase in mudflat geographic acreage, relative to past 10 years baseline (as stated in the CCRWQCB Basin Plan) and will comply with Sediment TMDL's set forth by the CCRWQCB in 2001.

Related CCMP Action Plan: CC-3, All SED

#### Human Use:

- Ensure that bay water remains of sufficient quality to support a viable commercial shellfish industry, and safe recreational uses.
  - Levels of bacteria will comply with Department of Health Services, CCRWQCB, and County Environmental Health standards for beneficial uses including shellfish harvesting and water contact recreation at all times. These measurable standards are listed in detail in Volume II: The Environmental Monitoring Plan.
    - Related CCMP Action Plan: ALL BACT, CC-3
  - For those waters with drinking water as a beneficial use, bacterial and other pollutant levels must comply with drinking water standards (as stated in the CCRWQCB Basin Plan). Related CCMP Action Plan: ALL BACT, CC-3
  - Ensure that bay water remains of sufficient quality to support a viable commercial shellfish industry, and safe recreational uses
    - Related CCMP Action Plan: ALL BACT, CC-3
    - No closures of shellfish beds except for first flush rain event by year 2010. Related CCMP Action Plan:
- Protect social, economic, and environmental benefits provided by the bay and watershed through comprehensive resource management planning.
  - Improve public access points to increase environmental and educational benefits.
    - Related CCMP Action Plan: All EDU, HAB-1, 3
- Assess impacts and geographic area of environmentally sensitive habitats in the estuary that provide nursery rearing for commercial fish.
  - Related CCMP Action Plan: CC-5, All FLOW, HAB-, EDU 3
- Freshwater flow sufficient at all times to maintain water quality by flushing and diluting pollutants. Related CCMP Action Plan: All FLOW
- For those waters with drinking water as a beneficial use, bacterial and other pollutant levels must comply with drinking water standards (as stated in the CCRWQCB Basin Plan). Related CCMP Action Plan: All BACT, CC-3
- Ensure that bay water remains of sufficient quality to support a viable commercial shellfish industry, and safe recreational uses
  - Related CCMP Action Plan: All BACT, CC-3
- No closures of shellfish beds except for first flush rain event by year 2010.
  - Related CCMP Action Plan: All BACT, CC-3
- Promote public awareness and involvement in estuarine management issues through education outreach and use of volunteers.
- Promote public awareness and involvement in human health management issues through education outreach and use of volunteers
  - Related CCMP Action Plan: CC-6, All EDU, All BACT
- Continue estuarine management education to K-12, general public and stakeholder groups. Related CCMP Action Plan: All EDU
- Maintain accurate data displays to public at local museums and events to promote involvement in estuarine management issues and recruit volunteers. Related CCMP Action Plan: All EDU



#### Water Quality

- Ensure that bay water remains of sufficient quality to support a viable commercial shellfish industry, safe recreational uses, healthy eelgrass beds, habitats for listed species, cold water aquatic habitat, and thriving fish and shellfish populations.
  - Sustain no net loss of existing wetlands (baseline 2001 Wetland Delineation). Related CCMP Action Plan: CC-1, All HAB, All SED
  - Freshwater flow sufficient at all times for dilution of pollutants and flushing to maintain water quality. Related CCMP Action Plan: All FLOW
  - Levels of bacteria will comply with Department of Health Services, CCRWQCB, and County Environmental Health standards for beneficial uses including shellfish harvesting and water contact recreation at all times. These measurable standards are listed in detail in Volume II: The Environmental Monitoring Plan.
    - Related CCMP Action Plan: CC-3, All BACT
  - For those waters with drinking water as a beneficial use, bacterial levels must comply with drinking water standards (as stated in the CCRWQCB Basin Plan).
    - Related CCMP Action Plan: CC-3, All BACT
  - Ensure that bay water remains of sufficient quality to support a viable commercial shellfish industry, and safe recreational uses
    - Related CCMP Action Plan: CC-3, All BACT
  - Decrease average annual nutrient inputs (loading) by 25% from urban and agricultural runoff by the year 2010. Levels of nutrients shall not cause nuisance aquatic growth or adversely affect beneficial uses (as listed in CCRWQCB Basin Plan Standards).

Related CCMP Action Plan: All NUTR, CC-3 Levels of nutrients shall not be present in creek and bay waters at levels which cause toxic effects to aquatic organisms and plants. These measurable standards are listed in detail in Volume II: The

Environmental Monitoring Plan.

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Related CCMP Action Plan: All NUTR, CC-3
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Water column dissolved oxygen concentrations shall remain above 5.0 mg/1 at all times. Median values shall be maintained above 85 percent saturation. In cold freshwater habitats, dissolved oxygen concentrations shall not be reduced below 7.0 mg/1 at any time (as listed in CCRWQCB Basin Plan Standards).

Related CCMP Action Plan: CC-5,6

 Decrease levels of heavy metals (such as copper) and toxics (such as organophosphorous pesticides) to be in compliance with EPA Toxic rules in creeks and bay waters to natural background levels (which will be established by the year 2002), and shall not cause impacts to beneficial uses, such as cold water aquatic organisms, endangered species, drinking water or recreational use (as stated in CCRWQCB Basin Plan Standards)

Related CCMP Action Plan: All HMT, CC-3

- Decrease metals and toxics in sediments to satisfy NOAA chronic/acute standards (i.e. the geometric mean copper levels in marine sediment shall not be over 25,000 ppb) for marine and freshwater sediment, and shall not cause impacts to beneficial uses, such as cold water aquatic organisms, endangered species, drinking water or recreational use (as stated in CCRWQCB Basin Plan Standards). Related CCMP Action Plan: All SED, All HMT
- To reduce urban NPS loads to comply with Storm Water Phase II rulings (see EPA Storm Water Phase II Final Rule document).

Related CCMP Action Plan: CC-3,4

- To reduce agricultural NPS loads to satisfy applicable water quality standards within five years (see CCRWQCB Basin Plan).
  - Related CCMP Action Plan: EDU-3,4, CC-3, SED-4-7, BACT-1, NUTR-3
- Reduce urban NPS loading by 20% from new and existing development by establishing residential load reduction programs within the next 10 years.
  - Related CCMP Action Plan: All NPS actions
- Support regional efforts to improve advance land use and development planning measures consistent with CZARA and Storm Water II Final Ruling. Related CCMP Action Plan: CC-7



- Support regional actions to obtain compensation for environmental injuries are directed to the Morro Bay ecosystem.
  - Related CCMP Action Plan:
- Eliminate the release of harmful materials (paints, solvents, etc.) from marinas and docksides within 10 years.
  - Related CCMP Action Plan: CC-3, BACT-2,4,5, HMT 2-4, EDU-2
- Decrease illegal dumping and discharges (solid waste, toxics and hazardous waste) within 10 years. Related CCMP Action Plan: BACT-3

#### Living Resources:

- Ensure integrity of the broad diversity of natural habitats and associated native wildlife species in the bay and watershed
  - Sustain no net loss of existing wetlands comparisons being results from 2001 Wetland Delineation... Related CCMP Action Plan: CC-1, All HAB, All SED
  - Assess the status and trends of the quality and quantity of selected habitats (open channel, mudflat, salt marsh (low and high), freshwater marsh, riparian, coastal dune scrub, maritime chaparral, grassland, and oak woodland) to assist in evaluating the CCMP.
    - Related CCMP Action Plan: All HAB
  - Maintain freshwater flow during low flow seasons sufficient to support nursery habitat for steelhead trout Related CCMP Action Plan: CC-5, All STL, All FLOW, HAB-1
  - Maintain freshwater flow during high flow seasons sufficient to support steelhead migration Related CCMP Action Plan: CC-5, All STL, All FLOW, HAB-1
  - Increase and/or enhance habitats for species of special concern in the watershed and estuary by 15% of year 2001 acreages.
    - Related CCMP Action Plan: All HAB, ALL STL
  - Increase a minimum of 20% of eelgrass acreage from year 2000 levels to support of brant and other species.
    - Related CCMP Action Plan: HAB-8
  - Assess the intensity of selected human activities that impact the resources of Morro Bay and establish activity carrying capacity to advise habitat management decisions.
    - Related CCMP Action Plan: CC-6, All HAB
  - Increase populations of Federally/State listed and special concern species (such as eelgrass, redlegged frogs, steelhead trout, overall wintering bird migrants and Morro Manzanita) in the watershed and estuary from year 2000 inventory estimates.
    - Related CCMP Action Plan: EDU-8, HAB-1,2,4,9
  - Maintain benthic community indices at established baseline levels, based upon National Monitoring Program Final Report 2001 mean indices.
    - Related CCMP Action Plan: All HAB, All STL
  - Decreased coverage of prominent exotic species (veldt grass, hoary cress, Giant reed, Cape ivy) by 15% in sensitive areas (such as riparian corridor, coastal dune scrub, and Morro Estuary Natural Preserve) by year 2010.
    - Related CCMP Action Plan: HAB-9

#### Reestablish healthy steelhead trout habitat in Chorro and Los Osos Creeks

- Restore 50 % of stream geomorphological processes in Chorro and Los Osos Creeks to provide the minimum physical, chemical, and biological habitat requirements (for south-central coast ESU) steelhead as described by CDFG and NMFS (spawning, rearing and migration). Related CCMP Action Plan: CC-3,5, All STL
- Remove all fish barriers to stream habitat for spawning and rearing by 2010.
  - Related CCMP Action Plan: STL-2, CC-5
- Increased population of steelhead fish in Los Osos and Chorro Creeks by the year 2010. Related CCMP Action Plan: All STL, CC-5
- Successful attainment of the goals of the Steelhead Recovery Plan (anticipated 2001) as listed by NMFS and CDFG in Morro Bay watershed.
  - Related CCMP Action Plan: All STL



# 5.4 CURRENT MONITORING IN MORRO BAY

Existing monitoring efforts in the Morro Bay estuary and watershed are the foundation of the MBNEP Environmental Monitoring Plan (EMP). The wide array of natural communities interacting with a relatively small amount of anthropomorphic impacts, creates a noiseless framework to test hypothesis and detect change from the Comprehensive Conservation Management Plan. Coordinating with the many stakeholders monitoring in the study area, a comprehensive long-term monitoring plan can be established.

## Stakeholder Monitoring Base

Stakeholders involved in the EMP include many local organizations and agencies. In many cases, the stakeholders will work closely together, sharing program resources and collaborating to develop strategies to ensure the most appropriate approach to use to collect data. For example, CCAMP will be sampling the confluences of Chorro and Los Osos Creek and the estuary as part of their program. In addition, Friends of the Estuary will be monitoring those locations monthly as well, collaborating on labor, lab timing and coordination for mutual benefit. Stakeholder involvement is outlined in Volume II: The Environmental Monitoring Plan, listing primary and secondary implementers crucial to the evaluation of the CCMP. Asterisks indicate parameters that will not initially be measured, yet will be phased in when funding becomes available.

The MBNEP staff, to insure consistency in evaluating monitoring questions will track the data collected by these groups. The data will be tracked via Internet through CCAMP and SLO Logic data streams for the entire county. The MBNEP will electronically house all MBNEP/Friends of the Estuary (FOE) information gathered to evaluate specific actions as well trend data. The data collected will be utilized to develop quarterly monitoring summaries and annual reports to assist in biennial review. Below is a highlighted list of major existing monitoring agencies and organizations active in the Morro Bay estuary and watershed.

## **Current Information Gaps**

Tables 5-1 and 5-2 illustrates that a more intensive focus has existed primarily on conventional water quality and various physical and chemical monitoring of Morro Bay and it's watershed, versus biological and ecological parameters. Table 5-3 below summarizes the weaknesses existing in physical and chemical information on Morro Bay. The greatest weaknesses are as follows:

- Long-term and geographical organic pollutant monitoring
- Temporal variability within settleable and suspended metals
- Wide-spread benthic organism monitoring information
- Bioaccumulation of metals and other toxics on a geographic and temporal scale
- Toxicity and chemical effects on biological organisms
- Overall lack of temporal monitoring among ongoing efforts

Table 5-4 below summarizes the weaknesses existing in biological and ecological information on Morro Bay. The greatest weaknesses are as follows:

- Little overall information on toxicity/chemical effects and bioaccumulation and its effect on a wide range of indicators.
- General wildlife information is sparse, especially concerning long-term trends, quality assurance and level of detail.
- Ecological data on benthos and plankton is primarily short duration studies, with little temporal and companion data to create hypothesis.
- Little high quality geographic coverage and temporal variability of wetlands.
- No consistent format of any geographic coverage assessments.



|               | Hydrology<br>/Freshwater<br>Inflow | Circulation | Pollutant<br>Sources | Conventional<br>Water<br>Quality | Pollutant<br>: Metals | Pollutants:<br>Organics | Sediment<br>Quality | Sediment<br>Transport | Dredged<br>Material | Land<br>Use |
|---------------|------------------------------------|-------------|----------------------|----------------------------------|-----------------------|-------------------------|---------------------|-----------------------|---------------------|-------------|
| MBVMP         | ۵                                  |             | 0                    |                                  |                       |                         | •                   |                       |                     |             |
| RWQCB         | ۵                                  |             |                      |                                  |                       |                         |                     |                       |                     |             |
| NMP           | ۵                                  |             | ۵                    |                                  |                       |                         |                     |                       |                     |             |
| CCAMP         |                                    |             | •                    |                                  |                       |                         |                     |                       |                     |             |
| Cal Poly      |                                    |             |                      |                                  |                       |                         | •                   |                       |                     | •           |
| UCCE          |                                    |             |                      |                                  |                       |                         | Ō                   |                       |                     | •           |
| NRCS          |                                    | . 🗆         |                      |                                  |                       |                         |                     |                       |                     |             |
| RCD           | •                                  |             |                      |                                  |                       |                         | ٥                   | ۵                     |                     | Ō           |
| CDPR          |                                    |             |                      |                                  |                       |                         |                     |                       |                     |             |
| CDHS          |                                    |             |                      |                                  |                       |                         |                     |                       |                     |             |
| CDFG          |                                    |             |                      |                                  |                       |                         |                     |                       |                     |             |
| CMC           |                                    |             |                      |                                  |                       |                         |                     |                       |                     |             |
| NMFS          |                                    |             |                      |                                  |                       |                         |                     |                       |                     |             |
| Sea Grant     |                                    |             |                      |                                  |                       |                         |                     |                       |                     |             |
| Cty Eng.      |                                    |             |                      |                                  |                       |                         |                     |                       |                     |             |
| Cty Ag        |                                    |             |                      |                                  |                       |                         |                     |                       |                     |             |
| Cty Hlth      |                                    |             |                      |                                  |                       |                         |                     |                       |                     |             |
| CSLO          |                                    |             |                      |                                  | •                     |                         |                     |                       |                     | 0           |
| Morro Bay     |                                    |             |                      |                                  |                       |                         |                     |                       |                     | 0           |
| ACOE          |                                    |             |                      |                                  |                       |                         | ٥                   |                       |                     |             |
| USFWS         |                                    |             |                      |                                  |                       |                         |                     |                       |                     |             |
| Duke          | ī                                  |             |                      |                                  |                       |                         |                     |                       |                     |             |
| Audubon       |                                    |             |                      |                                  |                       |                         |                     |                       |                     |             |
| Tenera        |                                    |             |                      | •                                | D                     |                         |                     |                       |                     |             |
| MorroGroup    |                                    |             |                      |                                  |                       |                         |                     | •                     |                     | •           |
| Jones/Stoke   |                                    |             |                      |                                  |                       |                         |                     |                       |                     |             |
| Cleath/Assoc. | •                                  |             |                      | L                                |                       |                         |                     |                       |                     |             |

### Table 5-1 Summary Of Existing Physical/Chemical Monitoring Morro Bay

🖬 Extensive Data 🗖 Substantial Data 🖪 Moderate Data 🗌 Minor Data



| Table 5-2 | Summary Of Exis | ting Biological/E | cological Monit | oring on Morro Bay |
|-----------|-----------------|-------------------|-----------------|--------------------|
|-----------|-----------------|-------------------|-----------------|--------------------|

|             | Wetlands | Plankton | Benthos                               | Oyster    | Fish<br>(other) | Herps | Birds    | Mammals | Bioaccum<br>ulation | Toxicity/<br>Chemical<br>Effects |
|-------------|----------|----------|---------------------------------------|-----------|-----------------|-------|----------|---------|---------------------|----------------------------------|
| MBVMP       |          |          | •                                     |           |                 |       |          |         |                     |                                  |
| RWQCB       |          |          |                                       | ·         |                 |       |          |         |                     |                                  |
| NMP         |          |          | ·                                     |           |                 |       |          |         |                     |                                  |
| CCAMP       |          |          |                                       |           |                 |       |          |         |                     |                                  |
| Cal Poly    |          | ē        |                                       |           |                 |       |          |         |                     |                                  |
| UCCE        |          |          |                                       |           |                 |       |          |         |                     |                                  |
| NRCS        |          |          |                                       |           |                 |       |          |         |                     |                                  |
| RCD         |          |          |                                       |           |                 |       |          |         |                     |                                  |
| CDPR        |          |          |                                       |           |                 |       |          |         |                     |                                  |
| CDHS        |          | ۵        | L                                     | 0         |                 |       |          |         |                     |                                  |
| CDFG        | •        | <u> </u> |                                       |           |                 |       | ٥        |         | L                   |                                  |
| CMC         |          |          |                                       |           |                 |       |          |         |                     |                                  |
| NMFS        | ····     |          |                                       |           | Ō               |       |          |         |                     |                                  |
| Sea Grant   |          |          |                                       |           |                 |       |          | •       |                     |                                  |
| Cty Eng.    | ····     |          |                                       | L <u></u> |                 |       | <u> </u> |         |                     |                                  |
| Cty Ag      |          |          |                                       |           |                 |       |          |         |                     |                                  |
| Cty Hlth    |          |          |                                       |           |                 |       |          |         |                     |                                  |
| CSLO        |          |          |                                       |           |                 | l     |          |         | ļ                   |                                  |
| Могто Вау   |          |          |                                       |           |                 |       |          |         | <u> </u>            |                                  |
| ACOE        |          |          |                                       |           | <u> </u>        |       |          |         |                     |                                  |
| USFWS       |          |          | · · · · · · · · · · · · · · · · · · · |           |                 |       |          |         |                     |                                  |
| Duke        |          |          |                                       |           |                 |       |          | ļ       | <u></u>             |                                  |
| Audubon     |          |          |                                       |           | <u> </u>        |       |          |         | <b>_</b>            | L                                |
| Tenera      |          |          |                                       |           |                 |       |          | ļ       | ļ                   |                                  |
| MorroGroup  |          |          |                                       |           |                 |       |          |         |                     |                                  |
| JonesStokes |          | Ļ        |                                       |           |                 |       |          |         | L                   |                                  |
| Cleath/Asso | L        | l        |                                       | 1         | L               | L     | L        | I       | 1                   |                                  |

Extensive Data 🖸 Substantial Data 🖸 Moderate Data 🗔 Minor Data


| Table 5-3 | Summary | Of Physical | And Chem | ical Information | On Morro | ) Bay |
|-----------|---------|-------------|----------|------------------|----------|-------|
|-----------|---------|-------------|----------|------------------|----------|-------|

| <ul> <li>Extensive Data</li> <li>Substantial Data</li> <li>Moderate Data</li> <li>Minor Data</li> </ul> | Geographic<br>Coverage | Temporal<br>Variability | Duration | Level of<br>Detail | Quality<br>Assurance |
|---------------------------------------------------------------------------------------------------------|------------------------|-------------------------|----------|--------------------|----------------------|
| Hydrology/Freshwater Inflow                                                                             | ۵                      |                         |          |                    |                      |
| Circulation                                                                                             | ۵                      | •                       | •        |                    |                      |
| Pollutant Sources                                                                                       | ۵                      | Ŀ                       |          |                    | D                    |
| Conventional Water Quality                                                                              | <b>F</b>               |                         | •        |                    |                      |
| Pollutant: Metals                                                                                       | ×                      |                         |          |                    | Ŀ                    |
| Pollutants: Organics                                                                                    |                        |                         |          |                    |                      |
| Sediment Quality                                                                                        |                        | ۰                       | D        |                    |                      |
| Sediment Transport                                                                                      | •                      |                         |          |                    |                      |
| Dredged Material                                                                                        |                        |                         |          |                    |                      |
| Land Use                                                                                                |                        |                         |          | ·                  |                      |



 Table 5-4
 Summary Of Biological And Ecological Information On Morro Bay

| <ul> <li>Extensive Data</li> <li>Substantial Data</li> <li>Moderate Data</li> <li>Minor Data</li> </ul> | G <del>c</del> ographic<br>Coverage | Temporal<br>Variability | Duration | Level of<br>Detail | Quality<br>Assurance |
|---------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------|----------|--------------------|----------------------|
| Wetlands                                                                                                | ۵                                   |                         |          |                    |                      |
| Plankton                                                                                                | Ū                                   |                         |          |                    |                      |
| Benthos                                                                                                 |                                     |                         | 0        |                    |                      |
| Oyster                                                                                                  |                                     |                         |          |                    |                      |
| Recreational Fish                                                                                       |                                     | ٥                       |          |                    |                      |
| Fish (Other)                                                                                            | Ū                                   |                         |          |                    |                      |
| Herps                                                                                                   |                                     |                         |          |                    |                      |
| Birds                                                                                                   |                                     | •                       | D        |                    | 0                    |
| Mammals                                                                                                 | •                                   |                         |          |                    |                      |
| Bioaccumulation                                                                                         |                                     |                         |          |                    |                      |
| Toxicity/Chemical Effects                                                                               |                                     |                         |          |                    |                      |



#### 5.5 SUMMARY OF MONITORING ACTIVITIES

Currently, ongoing monitoring in the watershed and bay provides the starting point for developing a comprehensive environmental protection program. To achieve its goals the EMP must coordinate a large range of variables including diverse stakeholders, numerous parameters and multiple objectives incorporated into the CCMP. Where essential monitoring gaps have been identified, efforts have been made to work with existing agencies and/or organizations to provide need information. This chapter summarizes how the monitoring effort will be coordinated according to specificity of trend characterization, project-specific success and research needs. Therefore, the three coordinating components are as follows:

1) 2) 3)

TREND Monitoring PROJECT-SPECIFIC Monitoring RESEARCH Monitoring

These three components discussed in this chapter, constitute the strategy that the MBNEP will use to help determine whether the stated CCMP actions and their objectives are being met. Further details of monitoring activities are discussed in Volume II: The Environmental Monitoring Plan, Project Management Chapters 5-13.

TREND monitoring are those activities that will assess trends and track overall watershed and estuarine health and include all environmental monitoring efforts occurring in the watershed and bay. RESEARCH includes activities developed to provide additional information needed to guide long-term planning, implementation, and monitoring. PROJECT'-SPECIFIC monitoring are those activities required to determine whether individual action plans are successful at reaching the goals of the MBNEP. Specific monitoring activities may overlap more than one category and answer more than one question.

# Trend Monitoring Workplan

The following discussion summarizes TREND monitoring to list measurable parameters, frequency of sampling and location of sites. The TREND Monitoring workplan is summarized in two parts, the watershed and the estuarine sampling schemes. The analytes and parameters listed below in Tables 5.5 (watershed components) and Table 5.6 (estuarine components) comprise the basis for the Morro Bay Environmental Monitoring Plan. These parameters will be consistently monitored through the duration of the CCMP's implementation period, and until their respective monitoring questions have been answered. Relative data information needs are listed in Tables 5.5 and 5.6, and are organized by corresponding EMP topic, and monitoring question number, such as Sediment Reduction, SR-7. Further detail of these monitoring questions, parameters and data quality objectives, please see Volume II: The Environmental Monitoring Plan.

The TREND Monitoring workplan will be coordinated primarily by the Friends of the Estuary's (FOE) Volunteer Monitoring Program (MBVMP) with assistance by the Morro Bay National Estuary Program (MBNEP) and the Central Coast Regional Water Quality Control Board (CCRWQCB). Funding for the program coordination will come from Friends of the Estuary's State Water Resource Control Board 319(h) grant through June 2003. Research to identify extramural funding to support the TREND Monitoring workplan will begin in July 2001.



| Watershed<br>Component        | Parameter/ Variables                                                                                                                                                                                           | Implementer<br>*Primary/<br>Secondary   | Frequency | Location                                                                                 | Data Info<br>Need        | Related<br>Action Plan                                                         |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-----------|------------------------------------------------------------------------------------------|--------------------------|--------------------------------------------------------------------------------|
| Conventional<br>Water Quality | Nutrient Series, Chloride,<br>Total Suspended<br>Sediment, Coliform<br>Series, Turbidity,<br>Dissolved Oxygen, pH,<br>Salinity, Conductivity,<br>Temperature, Chlorophyll<br>a                                 | *CCAMP<br>Funding/<br>FOE<br>collection | Monthly   | 2 sites:<br>SYB/TWB<br>Figure 5.3                                                        | SR-5<br>PH-2-5           | CC-3<br>CC-4<br>All SED<br>All BACT<br>All NUTR<br>FLOW-1,4<br>All HMT         |
| Volunteer Water<br>Quality    | Nutrient Series, Total<br>Suspended Sediment,<br>Coliform Series,<br>Turbidity, Dissolved<br>Oxygen, pH, Salinity,<br>Conductivity,<br>Temperature, Chlorophyll<br>a, Flow                                     | *FOE                                    | Monthly   | 15 sites:<br>Tributary/<br>Confluence<br>Figure 5.3<br>Flow sites,<br>Figure 7.4,<br>EMP | SR-5<br>PH-2-5<br>RF-2-5 | CC-3<br>CC-4<br>CC-6<br>All SED<br>All BACT<br>All NUTR<br>All FLOW<br>All HMT |
| Sediment<br>Chemistry         | Title 22 Hazardous waste<br>metals, Organochlorine<br>Pesticides and PCBs,<br>Organophosphorous<br>Pesticides, Carbamate and<br>Urea Pesticides (HPLC),<br>Particle size, Polynuclear<br>Aromatic Hydrocarbons | *CCAMP                                  | Annually  | 2 sites:<br>SYB/TWB<br>Figure 5.3                                                        |                          | CC-3<br>CC-6<br>All HMT<br>EDU-4                                               |
| Bioaccumulation<br>(bivalves) | Trace Organics full scan<br>+PAH Full Scan Metals                                                                                                                                                              | *CCAMP                                  | Annually  | 2 sites:<br>SYB/TWB<br>Figure 5.3                                                        |                          | CC-3<br>CC-6<br>All HMT                                                        |
| Bioaccumulation<br>(fish)     | Trace Organics full scan<br>+PAH Full Scan Metals                                                                                                                                                              | *CCAMP                                  | TBD       | 2 sites:<br>SYB/TWB<br>Figure 5.3                                                        |                          | CC-3<br>CC-6<br>All HMT<br>All STL                                             |
| Freshwater<br>Bioassessment   | Benthic<br>Macroinvertebrates,<br>Harpactacoids, Plankton                                                                                                                                                      | *FOE,<br>*CCAMP                         | Annually  | 10 sites<br>Figure 5.3                                                                   | SR-7                     | CC-6                                                                           |
| Fish Surveys                  | Community<br>Diversity/Density                                                                                                                                                                                 | *FOE/NEP                                | TBD       | 4 sites as<br>coordinate<br>d by<br>CDFG                                                 |                          | CC-5<br>CC-6<br>All HAB<br>All STL                                             |
| Bird Surveys                  | Community<br>Diversity/Density                                                                                                                                                                                 | *FOE                                    | Quarterly | 10 sites<br>Figure 5.3                                                                   |                          | CC-6<br>All HAB<br>SED-6                                                       |
| Geomorphological<br>Suite     | Stream Cross-Sectional<br>and Longitudinal Profiles,<br>Habitat Typing,<br>Photodocumentation                                                                                                                  | *FOE/RCD                                | Annually  | 21 sites<br>on Chorro<br>and Los<br>Osos<br>tributaries                                  | SR-3,4-<br>6             | CC-6<br>All HAB                                                                |
| Habitat<br>Delineation        | Acreage of habitats (listed<br>in Chapter 8/9)<br>Satellite imagery<br>Groundtruthing                                                                                                                          | NEP/FOE                                 | TBD       | All major<br>habitat<br>types                                                            | RF-6                     | All HAB                                                                        |

## Table 5.5 Morro Bay Watershed Monitoring Parameters/Variables



# Table 5.6 Morro Bay Estuarine Monitoring Parameters/Variables

| Estuarine/ Near<br>Shore Component | Parameter/ Variables                                                                                                                                                                | Implementer<br>Primary/<br>Secondary | Frequency                           | Location                                                                               | Data Info<br>Need | Related<br>Action<br>Plan                                         |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------|
| Volunteer Water<br>Quality         | Nutrient Series,<br>Coliform Series,<br>Turbidity, Dissolved<br>Oxygen, pH, Salinity,<br>Conductivity,<br>Temperature,<br>Chloropyll a                                              | FOE                                  | Monthly                             | 16 sites:<br>Figure 5.4                                                                | PH 2-5            | CC-<br>3,4,6<br>All SED<br>All<br>BAC<br>All<br>NUT<br>All<br>FLW |
| Pathogen Indicators                | Total Coliform, Fecal<br>Coliform,<br>Enterococcus, E. coli                                                                                                                         | FOE/DHS,<br>Local<br>Government      | Monthly                             | 10 sites:<br>Figure 2.2                                                                | PH 2-5            | CC-3,6<br>All<br>BAC                                              |
| Sediment Chemistry                 | Title 22 Hazardous<br>waste metals,<br>Organochlorine<br>Pesticides and PCBs,<br>Organophosphorous<br>Pesticides, (HPLC),<br>Particle size,<br>Polynuclear Aromatic<br>Hydrocarbons | CCAMP                                | TBD                                 | At all water<br>quality sites.<br>16 sites:<br>Figure 5.4                              |                   | CC-3,6<br>All<br>HMT<br>EDU-4                                     |
| Bioaccumulation<br>(bivalves)      | Trace Organics full<br>scan +PAH<br>Full Scan Metals                                                                                                                                | RWQCB –<br>TMDL/FOE                  | Initial<br>Screening<br>only        | 5 sites:<br>2 Delta, 1 Bay<br>mouth, 2<br>Mudflat                                      |                   | CC-3,6<br>All<br>HMT                                              |
| Bioaccumulation<br>(fish)          | Trace Organics full<br>scan +PAH Full Scan<br>Metals                                                                                                                                | *CCAMP                               | TBD                                 | 5 sites:<br>2 Delta, 1 Bay<br>mouth, 2<br>Mudflat                                      |                   | CC-3,6<br>All<br>HMT<br>All STL                                   |
| Nutrient Biological<br>Impact      | Nutrient Series,<br>Eelgrass Productivity,<br>Eelgrass Ephiphytic<br>Index, Turbidity,<br>Eelgrass density<br>transects                                                             | NEP/Cal Poly                         | Three Year<br>Monitoring<br>Project | 5 Transects<br>based on J.<br>Chestnut/Tetra<br>Tech transects                         |                   | CC-3<br>CC-6<br>All<br>NUT<br>HAB-8                               |
| Benthic Infauna<br>(Partial RBP)   | Eelgrass Community<br>Diversity Benthic<br>Macroinvertebrates,<br>Plankton                                                                                                          | NEP/Cal Poly                         | Three Year<br>Monitoring<br>Project | 5 Transects<br>based on J.<br>Chestnut/Tetra<br>Tech transects                         | SR-7              | HAB-8<br>CC-6                                                     |
| Brant Surveys                      | Brant Migration /<br>Resident Timeline,<br>Brant Density, Brant<br>Age Composition,<br>Brant Habitat<br>delineation                                                                 | J. Roser,<br>Audobon/<br>NEP         | TBD                                 | 6 Observation<br>points on bay<br>perimeter. 2<br>Front bay, 1<br>delta, 2 back<br>bay |                   | CC-6<br>All<br>HAB                                                |
| Fish Trawls                        | Community Density/<br>Diversity                                                                                                                                                     | CDFG                                 | Annually                            | 4 sites as<br>coordinated<br>by CDFG                                                   |                   | CC-6<br>All STL<br>All<br>HAB                                     |



| Estuarine/ Near<br>Shore Component        | Parameter/ Variables                                                                                                                               | Implementer<br>Primary/<br>Secondary | Frequency                                                                                       | Location                                                                                       | Data Info<br>Need | Related<br>Action<br>Plan                 |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------|
| Shore Bird Survey                         | Community Density/<br>Diversity                                                                                                                    | Pt. Reyes<br>Observatory/<br>Audobon | Annually                                                                                        | 6 Observation<br>points on bay<br>perimeter. 2<br>Front bay, 1<br>delta, 2 back<br>bay         |                   | CC-6<br>SED-6<br>All<br>HAB               |
| Eelgrass Survey                           | Community Density/<br>Distribution                                                                                                                 | NEP/ J.<br>Chestnut &<br>Cal Poly    | Annually                                                                                        | 5 Transects<br>based on J.<br>Chestnut/Tetra<br>Tech transects                                 |                   | CC-6<br>HAB 8                             |
| Plankton Survey                           | Community Density/<br>Diversity Turbidity,<br>Temperature                                                                                          | UCCE, DHS/<br>Coast Guard,<br>FOE    | Monthly                                                                                         | 4 sites:<br>Estero Bay,<br>Harbor<br>Mouth, N. T-<br>Pier, Back<br>Bay Channel                 |                   | CC-6                                      |
| Algal Cover<br>Transects                  | Percent Cover                                                                                                                                      | FOE                                  | Four times<br>a year,<br>during algal<br>growth<br>season. One<br>time in<br>dormant<br>season. | 4 Transect<br>Sites: Chorro<br>Delta, Shark<br>Inlet,<br>Pasadena<br>Point, and<br>Grassy Isl. |                   | CC-6                                      |
| Estuarine<br>Bioassessment                | Plankton,<br>Macroinvertebrates/<br>Harpactacoids                                                                                                  | FOE/NEP                              | Annually<br>for five<br>years                                                                   | 5 sites:<br>2 Delta, 1 Bay<br>mouth, 2<br>Mudflat                                              |                   | CC-6                                      |
| Near Shore Metals/<br>Pathogen Indicators | Title 22 Hazardous<br>waste metals,<br>Coliform series                                                                                             | CCAMP                                | Annually                                                                                        | 3 sites in<br>Estero Bay                                                                       |                   | CC-3<br>CC-6<br>All<br>BACT<br>All<br>HMT |
| Geomorphological<br>Suite                 | Stream Cross-<br>Sectional and<br>Longitudinal Profiles,<br>Habitat Typing,<br>Photodocumentation,<br>Bay Bathymetry,<br>Artifical Depo<br>Markers | *FOE/RCD                             | Annually                                                                                        | 21 sites<br>on Chorro and<br>Los Osos<br>tributaries                                           | SR-3,5,6          | CC-6<br>All<br>HAB                        |
| Habitat Delineation                       | Acreage of habitats<br>(listed in Chapter 8/9)<br>Satellite imagery<br>Groundtruthing                                                              | NEP/FOE                              | Every five<br>years<br>beginning<br>in 2001.                                                    | All major<br>habitat types                                                                     | RF-6              | All<br>HAB                                |



## Time Frame

Time frames for implementing specific monitoring elements are presented in the Table 5.7 below. The parameters indicated are those that will be initiated, or funded through MBNEP CCMP Environmental Monitoring Plan. Initial monitoring activities will be focused upon gathering pre-implementation data to support evaluation following action plan implementation. Watershed data will be based upon the ten-year study of Morro Bay National Monitoring Program (NMP), and will transition from bimonthly sampling to monthly sampling due to the accrued large data set. Number of sites will be decreased to better focus on evaluating BMPs on a tributary basis instead of individual BMPs that have already been proven effective.

## Table 5.7 MBNEP Monitoring TREND Timetable

|                            |                                                | MBNEP Monitoring TREND Timetable 2000-2001 |            |            |            |            |        |         |        |                         |        |              |                                                                                 |
|----------------------------|------------------------------------------------|--------------------------------------------|------------|------------|------------|------------|--------|---------|--------|-------------------------|--------|--------------|---------------------------------------------------------------------------------|
| Related CCMP<br>Action     | Monitoring<br>Component (See<br>Tables 4.1a/b) | Jul-<br>00                                 | Aug<br>-00 | Sep-<br>00 | Oct-<br>00 | Nov<br>-00 | Dec-00 | Jan-01  | Feb-01 | Mar-<br>01              | Apr-01 | May-<br>01   | Jun-01                                                                          |
| All Priority<br>Actions    | Conv./Volunteer<br>Water Quality               |                                            |            |            |            |            |        |         |        |                         |        | a na star    |                                                                                 |
| SED -2,4.5                 | Sediment<br>Chemistry                          |                                            |            |            |            |            |        |         |        |                         |        | r a selvasta |                                                                                 |
| CC-4<br>BACT-1,3,4         | Bioaccumulation<br>(bivalves)                  |                                            |            |            |            |            |        |         |        |                         |        |              |                                                                                 |
| CC-6<br>HAB-1,9            | Freshwater<br>Bioassessment                    |                                            |            |            |            |            |        |         |        |                         |        |              |                                                                                 |
| CC-6, HAB 1,9<br>STL - 2,3 | Fish Surveys                                   |                                            |            |            |            |            |        |         |        |                         |        |              |                                                                                 |
| CC-6<br>HAB - 1,9          | Bird Diversity                                 |                                            |            | 9/15-      | - 9/30     |            | 10/15  | - 10/90 |        | 3/15                    | 3/30   |              | 7/15                                                                            |
| SED -5<br>STL - 3          | Geomorphological<br>Suite                      |                                            | Creek      | sites.     |            |            |        |         |        |                         |        | Aerial       |                                                                                 |
| CC -4,6<br>BACT -1,3,4     | Pathogen<br>Indicators                         |                                            |            |            |            |            |        |         |        | 20 - 20<br>710 - 24 - 4 |        |              | 1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1 |
| NUTR 1,2                   | Nutrient<br>Biological Impact                  |                                            |            |            |            |            |        |         |        |                         |        | i            |                                                                                 |
| HAB - 1<br>STL - 3         | Benthic Infauna                                |                                            |            |            |            |            |        |         |        |                         |        | 18.94<br>19  |                                                                                 |
| CC-6<br>HAB – 1,9          | Brant Surveys                                  |                                            |            |            |            |            |        |         |        |                         |        |              |                                                                                 |
| CC-6, HAB 1,9<br>STL - 2,3 | Fish<br>Trawls/Counts                          |                                            |            |            |            |            |        |         |        |                         |        |              |                                                                                 |
| CC-6<br>HAB 1,9            | Shorebird Surveys                              |                                            |            |            |            |            |        |         |        |                         |        |              |                                                                                 |
| CC -6<br>HAB -8            | Eelgrass Surveys                               |                                            |            |            |            |            |        |         |        |                         |        |              |                                                                                 |
| CC - 6<br>HAB -1           | Plankton Surveys                               |                                            |            |            |            |            |        |         |        |                         |        |              |                                                                                 |
| CC6<br>HAB1                | Algae Cover<br>Transects                       |                                            |            |            |            |            |        |         |        |                         |        |              |                                                                                 |
| CC6<br>HAB -1              | Estuarine<br>Bioassessment                     |                                            |            |            |            |            |        |         |        |                         |        |              |                                                                                 |



# Project-Specific Monitoring Workplan

The data for the PROJECT-SPECIFIC monitoring workplan will be collected by the project proponents and coordinated by the MBNEP. An environmental monitoring plan will accompany each action plan proposal when it is submitted to the MBNEP for funding and approval, and will be based upon either a pre/post or a upstream/downstream study design. The MBNEP staff will be responsible for prescribing monitoring details that will coincide with the consistent TREND monitoring workplan, if applicable. The monitoring results will then be used to determine action effectiveness and to provide a "feed back loop" to each implementer to help them effectively manage and maintain their actions.

Each monitoring plan will contain the following:

- 1. Define the action plan objectives and performance criteria.
- 2. List the questions that the monitoring plan will answer and how the evaluation techniques will be used to answer the questions.
- 3. Identify the qualitative methods (i.e., photo points, video taping, or recording visual observations during storm events) or quantitative methods (i.e. water quality sampling, or cross sections) to be used to determine project performance.
- 4. Identify sampling locations, frequency of sampling, and sampling procedures.
- 5. Provide a schedule for submitting data to the MBNEP in a data format suitable for incorporation into the CCAMP master database.
- 6. Identify how the project is consistent with California Nonpoint Source Pollution Control Program. (Please refer to Volume I: CCMP, Appendix E.)

# **Research Priorities For Morro Bay**

"Research," as reported by the National Research Council, is "referred to [as] measurement and experimental programs undertaken to answer more open-ended questions." Research needs are important to understanding fully the background processes that occur in the Morro Bay estuary and watershed. Fulfilling these needs can also aid in development of techniques that may help answer monitoring and management questions. The research component of the EMP is entirely independent from the TREND or PROJECT SPECIFIC workplan components. Funding for these studies are dependent on outside sources and timing of implementation of these needs is uncertain and based on TAC prioritization, and program needs.

*Research* needs will be prioritized upon action implementation timelines and funding availability. The MBNEP Technical Advisory Committee (TAC) will determine whether these studies will be done by contractor or by the MBNEP when funding becomes available. Some studies will be funded and coordinated through other avenues than the MBNEP, however data from these studies will be an integral part of evaluating success of MBNEP goals.

The technical community developed the identified Research Needs for the MBNEP study areas listed below over the last nine years. In 1991, the Bay Foundation of Morro Bay prepared a list of research needs. The list included specific research needs for the estuary and watershed including, but not limited to, a tidal and bathymetric survey of the estuary, water quality assessments, and habitat inventories. In 1995, a research needs workshop was held to build on the existing list and to identify questions still remaining to effectively manage the watershed and to prioritize actions. Workshop participants identified five primary areas in which research is needed: sedimentation, fresh water inflow, biological resources, toxins, and land use. In the Volume II: The Characterization, the data gaps below are also referenced in the end of each relevant chapter, detailing additional background information.



In 1997, the MBNEP initiated a bathymetric survey and the development of a tidal circulation model, a streamflow and sediment loading study, a nutrient loading study, a bacteria loading study, and a bay habitat characterization. Research Needs listed below are organized by corresponding EMP topic and monitoring question number, such as Sediment Reduction, SR-7. For more information on these topics, please refer to Chapter 4 of Volume II: The Environmental Monitoring Plan. These needs include, but are not limited to:

### Sediment Reduction (SR)

| SR-8  | What are the sediment plume effects on Morro Bay and Estero Bay?                                                   |
|-------|--------------------------------------------------------------------------------------------------------------------|
| SR-9  | What is the effective minimum width for fenced riparian buffer to improve water quality improvement?               |
| SR-10 | Is there a positive correlation between salt and freshwater flow mixing zone and spatial particle size deposition? |
| SR-11 | Is the lack of water clarity positively correlated with decreasing eelgrass productivity?                          |

#### Public Health Issues (PH)

| PH-7 | What other processes are effective at filtering bacteria from surface water? Wetlands? Flood plains, etc? |
|------|-----------------------------------------------------------------------------------------------------------|
| РН-8 | What is the effective minimum width for fenced riparian buffer to improve water quality improvement?      |
|      | XXXI of the theory of the second test of the second Comparison of the second of COD                       |

## PH-9 What is the best pathogen indicator for stormwater runoff?

### Reduction of Freshwater Flow (RF)

| RF-7        | How do changes in wastewater management affect distribution of freshwater wetland habitats?                        |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| RF-8        | What is the effective minimum width for fenced riparian buffer to improve water quality improvement?               |
| RF-9        | Is there a positive correlation between salt and freshwater flow mixing zone and spatial particle size deposition? |
| RF-10       | What are the optimum instream flow allotments for the Chorro Valley Users Group?                                   |
| RF-11       | What are the effects of Morro Bay Power Plant on bay circulation patterns?                                         |
| RF-12       | What are the impacts of changes in freshwater inflow on oligohaline habitats?                                      |
| Water and S | Sediment Quality (WSQ)                                                                                             |
| WSQ-10      | Are nutrients adversely affecting aquatic communities? Eelgrass?                                                   |

- WSQ-11 What is the effective minimum width for fenced riparian buffer to improve water quality improvement?
- WSQ-12 What is the optimum amount of nutrients needed for row croppers of the Los Osos and Chorro Valleys?
- WSQ-13 What function does nutrient variances have on Eelgrass productivity in Morro Bay (Comparison of Instantaneous And Comprehensive Methodologies)?
- WSQ-14 What are the ecological effects of algal blooms (Freshwater And Estuarine)?
- WSQ-15 What are the extent of natural and anthropogenic sources of hypoxia?



| WSQ-16        | What are the limiting nutrients in both freshwater and estuarine environments?                                                                                   |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WSQ-17        | Are marine and freshwater organisms in Chorro and Los Osos Creeks and in the Morro Bay estuary impacted by concentrations of metals or toxic chemicals?          |
| WSQ-18        | Does dredging cause toxic substances to be re-suspended?                                                                                                         |
| WSQ-19        | Do metals degrade any surface water beneficial uses?                                                                                                             |
| Habitat Healt | th (HH)                                                                                                                                                          |
| HH-8          | What are the sediment plume effects on Morro Bay and Estero Bay?                                                                                                 |
| HH-9          | What is the effective minimum width for fenced riparian buffer to improve water quality improvement?                                                             |
| нн-10         | Is there a positive correlation between salt and freshwater flow mixing zone and spatial particle size deposition?                                               |
| HH-11         | Is the lack of water clarity positively correlated with decreasing eelgrass productivity?                                                                        |
| HH-12         | Perform Wetland Delineation using Satellite Imagery Analysis and groundtruthing.                                                                                 |
| HH-13         | What are the most critical habitats impacted by recreation and economic uses?                                                                                    |
| HH-14         | What is the temporal species richness and relative abundance of benthic invertebrates in Morro Bay?                                                              |
| HH-15         | What is the extent of acreage of the most invasive exotic species? What are the trends over time?                                                                |
| HH-16         | What function does nutrient and turbidity variances have on Eelgrass productivity in Morro Bay?<br>(Comparison of Instantaneous And Comprehensive Methodologies) |
| HH-17         | What are the ecological effects of algal blooms (Freshwater And Estuarine)?                                                                                      |
| HH-18         | What is the extent of natural and anthropogenic sources of hypoxia?                                                                                              |
| HH-19         | What are the ecological impacts of Morro Bay Power Plant?<br>Air Deposition, Entrainment, Circulation (Data Stream Tracking)                                     |
| HH-20         | What are the impacts of changes in freshwater inflow on oligohaline habitats?                                                                                    |
| Tracking Spe  | cies Diversity (SD)                                                                                                                                              |
| SD-9          | What habitats are crucial to special species? Are there recreational activities that interfere with their critical habitat needs?                                |
| SD-10         | What exotic species are in the estuary and watershed? Are they increasing or decreasing? what impacts do exotic species have on native species?                  |
| Point Source  | (PS)                                                                                                                                                             |
| PS-8          | How do changes in wastewater management affect distribution of freshwater instream and terrestrial wetland habitats?                                             |
| PS-9          | What are the effects of Morro Bay Power Plant on bay circulation patterns?                                                                                       |
| PS-10         | What are the effects of Morro Bay Power Plant on bay entrainment of larvae?                                                                                      |
| PS-11         | What are the effects of Morro Bay Power Plant on bay air deposition?                                                                                             |



# Budget

The allocation of funds (approximately \$82,000/year) for the laboratory/equipment costs of the TREND monitoring program is illustrated in Figure 5.2. This figure represents only the Trend parameters that will be initiated by the MBNEP EMP and funding sources will need to be continually sought. Satellite imagery provided by MBNEP funding will be on a five-year basis and is not included in the pie chart representation. It also does not represent the cost for coordination of the monitoring activities, which include MBNEP, FOE, and CCRWQCB. The Volume II: MBNEP Environmental Monitoring Plan provides further detailed information regarding cost per parameter, including quality assurance costs and coordination. Potential funding sources are included in CC-6 and Chapter 7.



Figure 5.2 Estimated Annual MBNEP Trend Monitoring Budget, based upon February 2000 Certified Laboratory Costs. This chart represents laboratory analysis and equipment only, and excludes coordination costs.

## 5.6 ASSESSING EMP PERFORMANCE

## **Technical Advisory Committee**

A Technical Advisory Committee, coordinated by MBNEP staff and made up of interagency and stakeholder technical experts, will convene at a minimum of four times a year to review current EMP progress, Quality Assurance standards, exchange pertinent technical knowledge and to prioritize and take action on needed research actions. In addition to these roles, the TAC will also be responsible for communicating outcomes to the Task Force at quarterly meetings as needed. Other possible agenda items may include:



- ✓ Setting topics for biennial State of the Bay conference,
- Regional monitoring workshop agendas,
- ✓ Reviewing technical proposals to the MBNEP,
- ✓ Refining study design,
- Assisting in developing local bioindicators to track implemented actions, and overall health of the ecosystem.
- Assisting in extramural funding to support the EMP and prioritized research needs.

The initial TAC meetings for transition into implementation are scheduled for late September and March. Committee chair, and workgroup chairs must be selected by the January 2001 Task Force meeting to proceed with normal agenda items.

## **Expected Performance of EMP**

Site placement for the Morro Bay watershed monitoring program was based upon historical sites from the NMP. As illustrated by Figure 5.3, seventeen sites have been monitored bimonthly since 1993 for conventional water quality parameters. Of these, ten sites at major confluences with Chorro Creek or Los Osos Creek will be sampled past the NMP ending year of 2001. Phasing down of sample frequency and number of sites will coincide with the FOE's VMP taking over the NMP sites. Additional sites were added on both major drainages to add power of spatial change detection to the data set, which are detailed further in Volume II: The Environmental Monitoring Plan.

Quantitative changes in the watershed that occurs during implementation will be easily detected due to the statistically powerful large data set (n=approximately 272 for any given parameter at a site) from the Morro Bay National Monitoring Program (MBNMP). The large watershed data set also adds to the strength of detecting various changes in the watershed as it has spanned various weather and fire events.

Little consistent sampling efforts have been focused on the Morro Bay estuary. Many limited-term studies have been executed from the Morro Bay Volunteer Monitoring Program (MBVMP), CCRWQCB and County Department of Health. The only long term monitoring has come from regulated economic bases such as NPDES dischargers and shellfish harvesters, with focused data collection not expanded to the entire estuary. The aim of the EMP is to take monthly water quality samples throughout the estuary, and perform annual ecological data collection to evaluate freshwater, saltwater, urban and background wildlife pollutant input.

Site selection for estuarine sites (Figure 5.4) was based upon habitat type (mudflat, fresh/marine inflow channels, salinity gradients), tidal circulation (mid-incoming tide and mid-outgoing tide) and input (urban areas, wildlife, outer bay, watershed). As little data exists in the bay, change detection in the Morro Bay estuary will be reliant upon frequent data collections to increase sample size and pre-implementation trends.



# Figure 5.3 Locations of TREND Workplan Morro Bay Watershed Sampling Sites



These sites will be sampled as part of the MBNEP EMP to evaluate success of the CCMP, and track overall ecosystem health.









# Timetable for Analyzing Data & Assessing Program Performance

Within staff resources, data entry for any data collected will be inputted electronically within 30 days of sample date. This time frame is to prevent disorganization as well as to allow the database to be always available to query or test.

The MBNEP staff will be responsible for the monitoring tasks displayed Table 5.8 below. This table lists deliverable tasks that are identified in the Project Management Chapters 5-13 of Volume II: The Environmental Monitoring Plan, and their relative timeframe. Data reports from monitoring organizations will be summarized quarterly and presented at the quarterly Task Force meetings. Applicable data will then be incorporated into the Morro Bay National Estuary Program Implementation Tracking System, and the quarterly newsletters to be available to the public.

Monitoring adjustments made at the Technical Advisory Committee (TAC) will be incorporated within thirty days, and reported quarterly as well in the Annual Monitoring Reports. Overview reports, such as the Annual Monitoring Reports will serve as the basis for State of the Bay 2002, as well as the biennial review process.

|               | Jan      | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---------------|----------|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|
| TAC           |          |     |     |     |     |      |      |     |      |     |     |     |
| Meetings      |          |     |     |     |     |      |      |     |      |     |     |     |
| Task Force /  |          |     |     |     |     |      |      |     |      |     |     |     |
| Quarterly     |          |     |     |     |     |      |      |     |      |     |     | ł   |
| Summaries     |          |     |     |     |     |      |      |     |      |     |     |     |
| Quarterly     |          |     |     |     |     |      |      |     |      |     |     |     |
| Newsletter    |          |     |     |     | }   |      |      |     |      |     |     |     |
| Annual        | <u> </u> |     |     |     |     |      |      |     |      |     |     |     |
| Data displays |          |     |     |     |     |      |      |     |      |     |     |     |
| Estuary Day   |          |     |     |     |     |      |      |     |      |     |     |     |
| Website       |          |     | 1   |     |     |      |      |     |      |     |     |     |
| Tracking      |          |     | 1   |     |     |      |      |     |      |     |     |     |
| Update (ITS)  | ļ        |     |     |     |     |      |      |     |      |     | l   | ļ   |
| Annual        |          |     |     |     | 1   |      |      |     |      |     | ĺ   | 1   |
| Monitoring    |          |     |     |     |     |      |      |     |      |     |     |     |
| Reports       | <u> </u> | 1   |     |     |     |      |      |     |      |     | l   |     |

## Table 5.8 Timeline for Deliverable Monitoring Tasks and Evaluation



# 5.7 DATA MANAGEMENT STRATEGY

The Central Coast Ambient Monitoring Program (CCAMP of the CCRWQCB) database will house data and metadata for all programs. This database and selected analytic tools will be available on the Internet as well as linked to the MBNEP website (see Figure 5.5). Individual programs can input data directly into the CCAMP software to facilitate quarterly data reviews and annual reports (see Figure 5.6). The analyses from this database will provide feedback to the MBNEP to evaluate action effectiveness and long-term trends. CCAMP also provides basic statistical tools, such as t-tests and Analysis of Variance, which will be available to the MBNEP to detect significant changes in data sets.

CCAMP includes data from projects within the CCRWQCB's jurisdiction (northern Ventura to southern San Mateo counties). The availability of this data provides opportunities for valuable data comparisons between the Morro Bay watershed and other similar areas. The database can also be used to track non-CCMP projects within the Morro Bay watershed and their potential impact on CCMP project evaluation. The data will also be available on the MBNEP website (www. MBNEP.org) for individual implementers and the Morro Bay National Estuary Program to track progress. These tools should prove to be very useful for MBNEP analysis and decision-making, as well as for providing information to the public. Further information can be found in Volume II: The Environmental Monitoring Plan document, Chapter 13: Implementation Tracking System.

## Figure 5.5 CCAMP Web Site Options Menu

| Central Coast Regional Water Quality Control Board<br>Central Coast Ambient Monitoring Program |                                                            |                                                |  |  |
|------------------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------|--|--|
| Ce Ma                                                                                          | Volunteer Data Sereening<br>nter for<br>arine Conservation | Version 1.2 alpha<br>Coastal Watershed Council |  |  |
| Project                                                                                        | Gazos Creek Project 💌                                      | Number of Organisms                            |  |  |
| Analyte                                                                                        | Air Temperature 💌                                          | Benthic Invertebrates                          |  |  |
| Expression                                                                                     | Mean Average 💌                                             |                                                |  |  |
|                                                                                                | Site to Site Comparison Chart                              | Check Spreadsheet Structure                    |  |  |
| Site                                                                                           | Bridge at Hwy 1                                            | Check Sites                                    |  |  |
|                                                                                                | Time to Time Comparison Chart                              | Set up H2OData Sheet                           |  |  |



# Quality Assurance For Sampling And Laboratory Analysis

Quality Assurance (QA)/Quality Control (QC) for the EMP will be based off the existing MBNEP QA/QC which will be amended to the EMP no later than October 10, 2000. All field data will be collected under the MBNEP QA, and all TREND and PROJECT-SPECIFIC monitors will be tested by standards listed. Laboratory data will strictly adhere to the Quality Control procedures detailed in the QA/QC submitted. Data entry will be checked by the protocols listed in the CCMP Data Management Strategy. Metadata will be stored for all data through CCAMP, and can be accessed as read only through the Internet. Passwords will be given to those trained to check or add data to the database.

| ProjId | SiteTag | DateTime       | pН  | Cond_uS | Cond_ppt | Turb_N  | DO_ppm | DO_SA<br>T | H2O<br>Temp |
|--------|---------|----------------|-----|---------|----------|---------|--------|------------|-------------|
| Demol  | NTR     | 12/19/97 15:20 | 7.0 | 342.000 |          | 5.000   | 7.600  |            | 9.000       |
| Demol  | EST     | 4/3/98 14:30   | 6.5 | 200.000 |          | 410.000 | 10.600 |            | 10.000      |
| Demol  | BRI     | 4/3/98 14:45   | 6.5 | 210.000 | -        | 25.000  | 10.200 |            | 10.000      |
| Demo2  | SOQ     | 6/7/01 10:30   | 8.1 | 808.600 | 0.316    | 28.000  | 6.700  | 68.000     | 16.600      |
| Demo2  | APT     | 6/7/02 10:00   | 7.4 | 900.000 | 0.350    | 130.000 | 9.800  | 93.000     | 16.100      |
| Demo2  | SAN     | 6/7/02 10:45   | 7.7 | 921.000 | 1.520    | 168.000 | 8.500  | 87.000     | 16.700      |
| Demo2  | SOQ     | 7/5/02 9:45    | 8.2 | 731.000 | 0.277    | 16.600  | 5.900  | 59.000     | 16.200      |

## Figure 5.6 Data Entry Fields for CCAMP Data Management System

# Reporting Data to the Public

Participants in the MBNEP recognize that the value of monitoring lies in the ability to communicate meaningful results to appropriate managers and the public. The MBNEP will regularly assess progress towards completing the action plans contained in the CCMP. The goal of the MBNEP EMP is to collect data to make informed management decisions and to evaluate implemented actions, and to inform the community. The data tracked by MBNEP staff will be available to the community in various formats to insure accessibility to information as well as further understanding of the current status of the Morro Bay estuary and watershed. Table 5.9 presents a summary overview of the ways that monitoring data can be used to inform and educate the public.

### Table 5.9 Summary of Public Reporting Venues for EMP

|                                                                           | Public Reporting Venues                                                               |  |
|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--|
| Media                                                                     | Quarterly "Turning the Tide" newsletter, articles in local newspapers (EDU-7)         |  |
| Internet Monthly MBNEP webpage update (www.mbnep.org) (EDU-7)             |                                                                                       |  |
|                                                                           | Central Coast Ambient Monitoring Program (CCAMP) data management<br>storehouse (CC-6) |  |
|                                                                           | CCMP Implementation Tracking System (ITS)                                             |  |
| Speakers Bureau                                                           | Public Outreach Group (POW) task (EDU-1)                                              |  |
| Display Natural history Museum interactive estuarine monitoring exhibit ( |                                                                                       |  |
|                                                                           | Creek Day, Baywood Oktoberfest, Harbor Festival, Earth Day, Environmental             |  |
|                                                                           | Education Faire, Estuary Day                                                          |  |
| Conferences                                                               | State of the Bay 2002 (EDU-5)                                                         |  |
| <b>Technical Reporting</b>                                                | Annual EMP status reports and Biennial Reviews                                        |  |





# 6.1 MONITORING PERFORMANCE

Monitoring the performance of the action plans in achieving the Morro Bay National Estuary Program (MBNEP) goals is essential to the long-term success of the program. This chapter describes how the MBNEP will measure the effectiveness and monitor the status of actions implemented under the CCMP. The information in this chapter is an expansion of the evaluation information provided in Chapter 4 for each action.

In order to assess the success of various actions, evaluation methods have been established. In addition, the MBNEP will monitor actions against priority problems to measure success at meeting the program goals (e.g., reduced sediment loading). The Environmental Monitoring Plan (discussed in Chapter 5) identifies measures for determining whether water and habitat quality objectives and MBNEP goals are being met. Tables 6.1 through 6.9 summarize how actions will be evaluated.

# 6.2 EVALUATING PROGRESS

Participants in the MBNEP recognize that the value of monitoring lies in the ability to communicate meaningful results to appropriate managers and the public. The MBNEP will regularly assess progress towards completing the action plans contained in the CCMP.

To better organize and track accomplishments, the MBNEP will develop an implementation tracking system (ITS) that will be available on the MBNEP webpage. The MBNEP will use an approach similar to the San Francisco Bay Estuary Project to document progress towards implementing the CCMP and report results in a consistent manner. Table 6.10 provides an up-to-date progress report on implementing CCMP actions.



# Table 6.1Cross Cutting Action Plan Objectives and Evaluation Methods\*

| Action Plan                                                           | Programmatic Objectives                                                                                                                                                                                                                                                        | Environmental Objectives                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CC-1 Habitat<br>Acquisition                                           | <ul> <li>Establishment of a habitat acquisition<br/>committee</li> <li>Habitat selection &amp; recommendations<br/>identified</li> <li>Acres of land purchased &amp; put into<br/>easement</li> <li>Prioritized list of habitat acquisition<br/>opportunities</li> </ul>       | <ul> <li>Improved and/or maintained high<br/>habitat and water quality (suspended<br/>sediment, bed load; turbidity; stream<br/>profiles and vegetation cover)</li> <li>Buffered non-point source runoff</li> </ul>                                                                                                                                                            |
| CC-2 Drainage                                                         | <ul> <li>Number of projects implemented</li> <li>Acreage of wetland habitat created</li> <li>Community wide drainage plan</li> <li>Reduced frequency of structure and<br/>road flooding in Los Osos</li> <li>Increased volume of stormwater<br/>detention/retention</li> </ul> | <ul> <li>Pre &amp; Post project monitoring using<br/>automatic samplers to determine<br/>pollutant load reduction</li> <li>Pre &amp; Post Photo or video<br/>documentation, especially during<br/>storm events</li> </ul>                                                                                                                                                      |
| CC-3 TMDLs                                                            | <ul> <li>Develop technical components of<br/>TMDL (water quality attainment<br/>strategy)</li> <li>Complete TMDL Implementation and<br/>Monitoring Plan</li> <li>Implement Plans</li> <li>Acreage of marine to terrestrial habitat<br/>alteration</li> </ul>                   | <ul> <li>Will be based upon CCRWQCB's<br/>TMDL monitoring plan and<br/>Numerical Targets</li> <li>Removal of water bodies from the<br/>303(d) listing or documented<br/>improvements to water quality</li> </ul>                                                                                                                                                               |
| CC-4 Urban<br>Runoff                                                  | <ul> <li>Number of BMP's installed and<br/>maintained</li> <li>Annual reports for permit compliance</li> </ul>                                                                                                                                                                 | <ul> <li>Trends in water quality above and<br/>below storm drain filters</li> <li>Pre &amp; Post project monitoring using<br/>automatic samplers to determine<br/>pollutant load reduction</li> </ul>                                                                                                                                                                          |
| CC-5 Stream<br>geomorphology<br>and water<br>quality for<br>steelhead | <ul> <li>Number of projects implemented</li> <li>Periodic channel typing evaluations</li> <li>Periodic Riparian corridor mapping<br/>and GIS update</li> <li>ID maintenance and restoration efforts<br/>at areas of critical habitat and stability</li> </ul>                  | <ul> <li>Measurable improvements in water<br/>quality and habitat over time (VMP)</li> <li>Use Rapid bio-assessment protocols<br/>to measure improvements to species<br/>diversity and stream ecology</li> <li>% increase in critical habitat types</li> <li>Stream cross sections and profiles</li> <li>Changes in stream classifications to<br/>more stable types</li> </ul> |
| CC-6 Volunteer<br>Monitoring<br>Program                               | <ul> <li>Participation in the VMP</li> <li>Annual VMP status reports</li> <li>Public survey polls showing changes<br/>in knowledge of local issues</li> <li>Collection of additional data to fill in<br/>data gaps</li> </ul>                                                  | <ul> <li>Environmental Monitoring is not<br/>applicable for this action</li> </ul>                                                                                                                                                                                                                                                                                             |
| CC-7<br>Watershed<br>Crew                                             | <ul> <li>Feedback from project sponsors on the<br/>Quality and Quantity of work products<br/>completed</li> <li>Number of projects completed</li> </ul>                                                                                                                        | <ul> <li>Environmental Monitoring is not<br/>applicable for this action</li> </ul>                                                                                                                                                                                                                                                                                             |

\*Overall objective is to meet state water quality standards for sediment, bacteria, nutrients, heavy metals and other toxic substances



# Table 6.2Sediment Action Plan Objectives and Evaluation Methods

| Action Plan                               | Programmatic Objectives                                                                                                                                                                                                                                                                                                                                        | Environmental Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SED-1<br>Road<br>Management               | <ul> <li>Inventory of roads and identification of<br/>problem areas</li> <li>Numbers of maintenance and<br/>construction measures implemented</li> <li>Training for maintenance crews and<br/>landowners</li> <li>Incorporate management measures into<br/>city, county, and state practices</li> </ul>                                                        | <ul> <li>Measured reduction in sediment (suspended<br/>sediment, turbidity) from roadways and in<br/>drainage areas to waterbodies</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| SED-2<br>Sediment<br>Traps                | <ul> <li>Numbers of sediment traps (i.e. flood<br/>plain restoration projects, sediment<br/>ponds, filter strips) installed</li> <li>Number of projects completed</li> <li>Number of sediment traps used in road<br/>networks</li> <li>Feasibility study of Warden Lake</li> <li>Increase in land owners using sediment<br/>traps on their property</li> </ul> | <ul> <li>Measured habitat improvements</li> <li>Measured reduction in sediment (suspended sediment, bed load; turbidity) at upstream and downstream sites following implementation</li> <li>NMP and VMP water quality data as a prepost project comparison</li> <li>Measurements of sediment trapped in specific structures</li> </ul>                                                                                                                                                                                                                                                                                                                   |
| SED-3<br>Fire<br>Management               | <ul> <li>Watershed Fire Management Plan<br/>completed</li> <li>Annual Report documenting projects<br/>completed</li> <li>Evaluation of the effects to sensitive<br/>species, habitats, air quality, and impacts<br/>of an escaped fire conducted</li> <li>Action Plan Implementation</li> </ul>                                                                | <ul> <li>Vegetation analysis of age class conducted<br/>using transect data, mapping, and GIS<br/>overlays</li> <li>Estimated reduction in sediment loading to the<br/>bay during peak flows</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| SED-4<br>Landowner<br>BMPs                | <ul> <li>Numbers and acres of BMPs installed</li> <li>Number of landowners provided with opportunities for technical assistance and funding</li> </ul>                                                                                                                                                                                                         | <ul> <li>NMP data on project effectiveness</li> <li>Estimates of sediment captured</li> <li>Measured reduction in suspended sediment<br/>and turbidity at downstream sites following<br/>implementation</li> <li>Estimates of erosion prevented (RUSLE or<br/>WEPP)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                           |
| SED-5<br>Creek<br>Restoration<br>Projects | <ul> <li>Numbers and acres of BMPs installed</li> <li>Technical assistance and funding provided to landowners</li> <li>Miles of stream restored</li> </ul>                                                                                                                                                                                                     | <ul> <li>Entire system evaluated for upstream effects</li> <li>NMP data on project effectiveness</li> <li>Estimates of erosion prevented and/or sediment captured</li> <li>Measured reduction in suspended sediment and turbidity at downstream sites following implementation</li> <li>Improved and/or maintained habitat at BMP sites</li> <li>Specific Monitoring Plans will be developed with each project to determine environmental effectiveness such as:</li> <li>Pre &amp; post photo or video documentation</li> <li>Changes in stream classification to more stable types</li> <li>Improvements to riparian habitat quantity &amp;</li> </ul> |



| Action Plan Programmatic Evaluation             |                                                                                                                                                                                                                                                                 | Environmental Objectives                                                                                                                                                                                                                     |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                 |                                                                                                                                                                                                                                                                 | <ul> <li>Vegetation transects to document<br/>revegetation efforts</li> <li>Cross sections and long profiles to<br/>document streambed and stream bank<br/>adjustments</li> </ul>                                                            |
| SED-6<br>Sandspit<br>Revegetation               | <ul> <li>ESH designation</li> <li>Number of revegetation projects<br/>implemented</li> <li>Number of acres of land revegetated</li> <li>State acquisition of privately owned<br/>sandspit areas</li> </ul>                                                      | <ul> <li>Improved and/or maintained high quality<br/>habitat through transects and GIS/aerial<br/>overlays</li> <li>Measured reduction in sand delivered to<br/>Morro Bay estuary from sandspit using<br/>air photo documentation</li> </ul> |
| SED-7<br>BMP<br>Incentives<br>for<br>Landowners | <ul> <li>Development of incentives</li> <li>Number of incentive programs and users</li> <li>Provide WQ monitoring kits and<br/>training to landowners for self<br/>monitoring evaluations</li> <li>Implementation/adoption of streamlined<br/>permit</li> </ul> | <ul> <li>Reduced sediment loading to receiving<br/>waters</li> <li>Photo or video documentation of BMP<br/>effectiveness during storm events</li> </ul>                                                                                      |
| SED-8<br>Estuary<br>Restoration<br>Project      | <ul> <li>Local sponsors and contracting entities<br/>are selected for the ACOE feasibility<br/>study</li> <li>Implementation of projects</li> <li>Reduced harbor maintenance for<br/>navigation</li> </ul>                                                      | <ul> <li>Environmental monitoring will be<br/>developed as part of the project planning<br/>and implementation phases</li> <li>Measurable improvements to the<br/>hydrodynamics and tidal prism of the<br/>bay</li> </ul>                    |



| tion Plan | Objectives | and                  | Evaluation               | Methods                             |
|-----------|------------|----------------------|--------------------------|-------------------------------------|
|           | tion Plan  | tion Plan Objectives | tion Plan Objectives and | tion Plan Objectives and Evaluation |

| Action Plan                          | Programmatic Evaluation                                                                                                                                                                                                                   | Environmental Objectives                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BACT-1<br>Grazing<br>Management      | <ul> <li>Number of ranches implementing<br/>management Measures</li> </ul>                                                                                                                                                                | <ul> <li>Reduction in fecal coliform % levels<br/>using a pre/post or an<br/>upstream/downstream study design,<br/>targets based off proven Morro Bay<br/>Watershed BMP's</li> <li>Vegetation transects demonstrating<br/>riparian vegetation improvements</li> <li>Use air/satellite photos to document<br/>increases in numbers of acres of riparian<br/>habitat</li> </ul> |
| BACT-2<br>Pump-outs                  | <ul> <li>Number of Boater's Guides<br/>distributed</li> <li>Survey Boaters to determine usage<br/>of pump-out facilities and how to<br/>improve them</li> <li>Use meters to measure number of<br/>gallons of sewage pumped-out</li> </ul> | <ul> <li>Decrease in fecal coliform at high use<br/>areas using pre/post-monitoring design to<br/>meet state water quality standards.</li> </ul>                                                                                                                                                                                                                              |
| BACT-3<br>Illegal<br>Moorings        | <ul> <li>Number of illegal moorings<br/>removed</li> <li>Inventory and map locations of<br/>existing buoys, and track changes<br/>over time</li> <li>Create temporary mooring facility<br/>at CDPR Marina</li> </ul>                      | <ul> <li>Environmental Monitoring is not<br/>applicable for this action</li> </ul>                                                                                                                                                                                                                                                                                            |
| BACT-4<br>Abandoned<br>Boats         | <ul> <li>Number of boats removed</li> <li>Inventory and map locations of<br/>existing boats, and track changes<br/>over time</li> </ul>                                                                                                   | <ul> <li>Environmental Monitoring is not<br/>applicable for this action</li> </ul>                                                                                                                                                                                                                                                                                            |
| BACT-5<br>Liveaboard<br>Boats        | <ul> <li>Survey boaters to determine \usage of pump-out facilities</li> <li>Use meters to measure number of gallons of sewage pumped-out at pump-out facilities</li> </ul>                                                                | <ul> <li>Decrease in fecal coliform at high use<br/>areas using pre/post monitoring design to<br/>meet state water quality standards</li> </ul>                                                                                                                                                                                                                               |
| BACT-6<br>Biofiltration              | Final Project Report                                                                                                                                                                                                                      | <ul> <li>Statistical analysis of bacterial and<br/>chlorophyll data from the oyster tank and<br/>the control tank</li> <li>DNA stadaments</li> </ul>                                                                                                                                                                                                                          |
| BAC1-7<br>Bird Deterrents            | • Evaluate pre & post avian activity                                                                                                                                                                                                      | <ul> <li>DNA study results</li> <li>Document bird use pre &amp; post project</li> </ul>                                                                                                                                                                                                                                                                                       |
| BACT-8<br>Pet Waste                  | <ul> <li>Establishment of an off-leash dog<br/>park</li> <li>Number of people using the pet<br/>waste system</li> <li>Number of dispensers installed and<br/>maintained</li> <li>Public acceptance poll</li> </ul>                        | <ul> <li>DNA study results</li> <li>Overall reduction in fecal coliform loads<br/>in storm water to meet state water quality<br/>standards (based on TMDL)</li> </ul>                                                                                                                                                                                                         |
| BACT-9<br>Water Quality<br>Standards | <ul> <li>Document resources saved by<br/>sharing data, and revising<br/>monitoring guidelines and<br/>requirements</li> </ul>                                                                                                             | <ul> <li>Environmental monitoring is not<br/>applicable for this action</li> </ul>                                                                                                                                                                                                                                                                                            |



# Table 6.4Nutrient Action Plan Objectives and Evaluation Methods

| Action Plan                      | Programmatic Objectives                                                                                                                                                    | Environmental Objectives                                                                                                                                                                                                                             |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NUTR-1<br>Los Osos<br>Wastewater | <ul> <li>Document progress on<br/>wastewater treatment facility<br/>planning and implementation</li> </ul>                                                                 | <ul> <li>Improved quality of groundwater and<br/>freshwater seeps</li> <li>Reduction in nutrient loads from<br/>freshwater seeps using pre/post flow<br/>weighted sampling, based on percentage</li> </ul>                                           |
| NUTR-2<br>CMC<br>Wastewater      | <ul> <li>Compliance with monitoring<br/>requirements</li> <li>Revise treatment level and<br/>methods</li> </ul>                                                            | <ul> <li>Collection and analysis of effluent<br/>samples, receiving surface waters, and<br/>groundwater</li> </ul>                                                                                                                                   |
| NUTR-3<br>Agricultural<br>BMPs   | <ul> <li>Number of farms implementing<br/>mgt. Practices</li> <li>Provide WQ monitoring kits and<br/>training to landowners for self<br/>monitoring evaluations</li> </ul> | <ul> <li>Reduction in nutrient levels using a<br/>pre/post or upstream/downstream study<br/>design, targets are based upon proven<br/>Morro Bay Watershed BMP's, as<br/>measured in percentage</li> </ul>                                            |
| NUTR-4<br>Residential<br>BMPs    | <ul> <li>Number of BMP's installed and<br/>maintained</li> </ul>                                                                                                           | <ul> <li>Improvement in stormwater runoff<br/>quality at sites where BMP's have been<br/>installed, based on percentage</li> <li>Pre &amp; post project monitoring using<br/>automatic samplers to determine pollutant<br/>load reduction</li> </ul> |



| Action Plan                                            | Programmatic Objectives                                                                                                                                                                                                     | Environmental Objectives Evaluation                                                                                                                                                                                                     |  |  |  |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
|                                                        |                                                                                                                                                                                                                             |                                                                                                                                                                                                                                         |  |  |  |
| FLOW-1<br>CMB<br>Wastewater<br>Treatment<br>Plant      | <ul> <li>Construction of new treatment plant</li> <li>Reporting of discharge flows into<br/>Chorro Creek</li> </ul>                                                                                                         | <ul> <li>Quantify upstream and downstream flows<br/>and effluent at discharge site to determine<br/>changes</li> </ul>                                                                                                                  |  |  |  |
| FLOW-2<br>Chorro<br>Valley Water<br>Users<br>Workgroup | <ul> <li>Convene Workgroup</li> <li>New agreements to maintain<br/>minimum flows of 1.5 cubic<br/>feet/second</li> </ul>                                                                                                    | <ul> <li>Monitor upstream and downstream flow<br/>from the site</li> </ul>                                                                                                                                                              |  |  |  |
| FLOW-3<br>Water<br>Conservation                        | <ul> <li>Development of a water<br/>conservation program in<br/>conjunction with all water users and<br/>purveyors</li> <li>Reduced water demand</li> </ul>                                                                 | <ul> <li>Measurable increases in streamflow or<br/>groundwater elevations near water supply<br/>wells, as measured in cf and depth of<br/>water in wells</li> </ul>                                                                     |  |  |  |
| FLOW-4<br>Wastewater<br>Treatment<br>Plant<br>Releases | <ul> <li>MBNEP will evaluate the flow<br/>monitoring requirements contained<br/>in the agreements for adherence to<br/>minimum flow requirements</li> <li>CCRWQCB will evaluate<br/>compliance with NPDES permit</li> </ul> | <ul> <li>Monitor upstream and downstream flow<br/>from the site</li> <li>City of Morro Bay well level and stream<br/>flow monitoring will be assessed for<br/>maintenance of groundwater levels and<br/>instream flow levels</li> </ul> |  |  |  |

| Table 6 5 | <b>Freshwater Flow Action Plan</b> | Objectives and | <b>Evaluation Methods</b> |
|-----------|------------------------------------|----------------|---------------------------|
| laule 0.J | rreshwater riuw Action rian        | Objectives and | Lyaination Methous        |



# Table 6.6Heavy Metals & Toxics Action Plan Objectives and EvaluationMethods

| Action Plan                            | Programmatic Objectives                                                                                                                                                             | Environmental Objectives                                                                                                                                          |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HMT-1<br>Mine<br>Remediation           | <ul> <li>Restoration of natural habitat along<br/>the creek</li> <li>Number of reclaimed mines</li> </ul>                                                                           | <ul> <li>Reduction of heavy metal loadings from<br/>Chorro Creek watershed, will be based<br/>upon CCRWQB's TMDL target, as<br/>measured in percentage</li> </ul> |
| HMT-2<br>Marina<br>BMPs                | <ul> <li>Number of demonstration projects</li> <li>Number of educational materials<br/>distributed</li> <li>Wash-water filtration system usage</li> </ul>                           | <ul> <li>Improvement in stormwater runoff quality,<br/>as measured in percentage</li> <li>Pre &amp; post bay water and/or sediment<br/>quality samples</li> </ul> |
| HMT-3<br>Boat Haul<br>Out              | <ul> <li>Number of local boats using haul-<br/>out facilities</li> <li>Quantity of pollutants diverted to<br/>hazardous waste facilities</li> </ul>                                 | <ul> <li>Decrease of boat yard related pollutants in<br/>high use areas using pre/post monitoring,<br/>as measured in percentage</li> </ul>                       |
| HMT-4<br>Hazardous<br>Waste<br>Network | <ul> <li>Tons of haz. waste delivered to the facilities</li> <li>Number of boats serviced and gallons of bilge water processed</li> <li>Number of facilities established</li> </ul> | <ul> <li>Pre &amp; post bay water and/or sediment<br/>quality samples</li> </ul>                                                                                  |



| Action<br>Plan                                  | Programmatic Objectives                                                                                                                                                                                                                 | Environmental Objectives                                                                                                                                                                                                                                                                               |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HAB-1<br>Overlay<br>Maps                        | <ul> <li>Identify acres of critical habitat</li> <li>Develop overlays</li> <li>Annual change (in acres) by habitat</li> </ul>                                                                                                           | <ul> <li>Increase or stablization of critical habitats.</li> </ul>                                                                                                                                                                                                                                     |
| HAB-2<br>Upland<br>Habitats                     | <ul> <li>Committee establishment</li> <li>ID and report upland habitats to the community</li> <li>Develop management measures for the protection of habitat</li> <li>Establishment of protection measures for upland habitat</li> </ul> | <ul> <li>Increase or stabilization of trends quantified<br/>by community diversity transects at given<br/>upland habitats</li> </ul>                                                                                                                                                                   |
| HAB-3<br>Mapping                                | <ul> <li>Completed maps of pre-1850 conditions</li> <li>Completed maps of current habitats</li> <li>Quantified % change of wetland and riparian habitats</li> </ul>                                                                     | <ul> <li>Environmental monitoring is not applicable<br/>for this action</li> </ul>                                                                                                                                                                                                                     |
| HAB-4<br>Species<br>Recovery<br>Plans           | <ul> <li>Implementation of actions in recovery plans</li> <li>Criteria for evaluating the successful implementation of the objectives should be established by the working group</li> </ul>                                             | <ul> <li>Increase or stabilization of endangered<br/>species in vegetation or animal surveys</li> </ul>                                                                                                                                                                                                |
| HAB-5<br>Beneficial<br>Dredging                 | <ul> <li>Number of acres of habitat protected and restored</li> </ul>                                                                                                                                                                   | <ul> <li>Increase in eelgrass density using transects<br/>number of eelgrass plants per square meter</li> <li>Decrease in turbidity levels in eelgrass<br/>habitat using sechi disk or other measuring<br/>techniques.</li> <li>Increase in eelgrass productivity after<br/>dredging events</li> </ul> |
| HAB-6<br>Riparian<br>Vegetation                 | <ul> <li>Annual reports from implementing agencies and projects</li> <li>Workshops</li> <li>Ongoing wildlife/water quality monitoring on a portion of a treated stream</li> <li>Improved health /abundance of wetlands</li> </ul>       | <ul> <li>Air/satellite photos quantifying increases in<br/>wetland and riparian habitat</li> <li>Vegetation transects quantifying expansion<br/>of wetland and riparian habitat</li> </ul>                                                                                                             |
| HAB-7<br>Riparian<br>and<br>Wetland<br>Policies | <ul> <li>ID areas subject to new policies</li> <li>Increased protection of coastal streams, wetlands, and sensitive habitats due to new policies</li> <li># of new protection programs and policies</li> </ul>                          | <ul> <li>Air/satellite photos quantifying increases in<br/>wetland and riparian habitat</li> <li>Vegetation transects quantifying expansion<br/>of wetland and riparian habitat</li> </ul>                                                                                                             |

# Table 6.7 Habitat Action Plan Objectives and Evaluation Methods



| Action                        | Programmatic Objectives                                                                                                                                                                                                                                                                                       | Environmental Objectives                                                                                                                                                            |  |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Plan                          |                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                     |  |
| HAB-8<br>Eelgrass             |                                                                                                                                                                                                                                                                                                               | <ul> <li>% Change in acreage of eelgrass habitat, as a measure in percentage increase or decrease.</li> <li>Monitor eelgrass for bed width, shoot density, and turbidity</li> </ul> |  |
| HAB-9<br>Exotic<br>Species    | <ul> <li>Establishment of a Weed Mgt. Committee</li> <li>No new introductions of exotic species</li> </ul>                                                                                                                                                                                                    | <ul> <li>Reduced acreage of existing exotic species</li> </ul>                                                                                                                      |  |
| Hab-10<br>A. donax<br>Removal | <ul> <li>Number and location of stands of <u>A</u>.<br/><u>donax</u> before and after control treatment</li> <li>3rd year comparisons of data depicting<br/>occurrence of individual stands of <u>A</u>.<br/><u>donax</u> within the Chorro Creek watershed<br/>before and after control treatment</li> </ul> | <ul> <li>Vegetation surveys in riparian communities</li> </ul>                                                                                                                      |  |

# Table 6.8Steelhead Action Plan Objectives and Evaluation Methods

| Action Plan                       | Programmatic Objectives                                                                                                                                                               | Environmental Objectives                                                                                                                                                                                       |  |  |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| STL-1<br>Recovery Plan            | <ul> <li>Successful attainment of the USNMFS<br/>Recovery Plan (% increase in<br/>population, % increase in habitat?)</li> </ul>                                                      | <ul> <li>Environmental monitoring is not<br/>applicable for this action</li> </ul>                                                                                                                             |  |  |
| STL-2<br>Habitat Access           | <ul> <li>Miles of stream accessible to<br/>steelhead</li> <li>Number of barriers removed</li> </ul>                                                                                   | <ul> <li>Photo or video documentation</li> <li>Habitat typing evaluations</li> <li>Depth of water at critical riffle areas</li> <li>Surface area and depth of critical rearing and smolting habitat</li> </ul> |  |  |
| STL-3<br>Pool/Riffle<br>Structure | <ul> <li>Mileage of stream habitat evaluated</li> <li>Habitat scoring over time</li> <li>Number of individuals trained in<br/>appropriate instream habitat<br/>maintenance</li> </ul> | <ul> <li>Habitat typing evaluations</li> </ul>                                                                                                                                                                 |  |  |
| STL-4<br>Riparian<br>Corridors    | <ul> <li>Miles of riparian corridor fenced</li> <li>Miles of levee removed</li> <li>Stream channel profile measurements</li> <li>Riparian shading measurements</li> </ul>             | <ul> <li>Changes to benthic invertebrate<br/>composition</li> <li>% Increase in riparian vegetation<br/>acreage, as measured in percent<br/>quantity.</li> </ul>                                               |  |  |



| Action Plan                                        | Programmatic Objectives                                                                                                                                                                                                                                                                                                                                                                                         | Environmental Objectives                                                                                            |  |  |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--|--|
| EDU-1<br>General Public<br>Education &<br>Outreach | <ul> <li>Significant changes in the publics<br/>understanding of local issues</li> <li>Attendance at forums and public<br/>displays</li> <li>Screened nonpoint source runoff<br/>from urban areas</li> <li>Number of public forums held and<br/>attendance rates</li> <li>Number of educational displays<br/>exhibited in the community</li> <li>Number of storm drains stenciled in<br/>urban areas</li> </ul> | Environmental monitoring is not<br>applicable for this action                                                       |  |  |
| EDU-2<br>Boater<br>Outreach                        | <ul> <li>Number of boater's Guides<br/>distributed</li> <li>Increased use of pump-out facilities</li> <li>Results of surveys</li> <li>Feedback through periodic<br/>roundtable forums</li> </ul>                                                                                                                                                                                                                | <ul> <li>Environmental monitoring is not<br/>applicable for this action</li> </ul>                                  |  |  |
| EDU-3<br>Agricultural<br>Outreach                  | <ul> <li>Attendance at workshops and<br/>feedback via written comments</li> </ul>                                                                                                                                                                                                                                                                                                                               | <ul> <li>Reduction in bacteria and nutrient<br/>loads in the creeks (VMP), as<br/>measured by percentage</li> </ul> |  |  |
| EDU-4<br>Pesticide<br>Workshops                    |                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul> <li>Environmental monitoring is not<br/>applicable for this action</li> </ul>                                  |  |  |
| EDU-5<br>Estuary<br>Conference                     | Conference attendance                                                                                                                                                                                                                                                                                                                                                                                           | <ul> <li>Environmental monitoring is not<br/>applicable for this action</li> </ul>                                  |  |  |
| EDU-6<br>CCNHA<br>Exhibit                          | <ul> <li>Number of system "sign-ons" per<br/>year</li> </ul>                                                                                                                                                                                                                                                                                                                                                    | <ul> <li>Environmental monitoring is not<br/>applicable for this action</li> </ul>                                  |  |  |
| EDU-7<br>Media                                     | <ul> <li>Number of press releases, articles,<br/>sound bites, newsletters published,<br/>lectures given, etc.</li> </ul>                                                                                                                                                                                                                                                                                        | Environmental monitoring is not<br>applicable for this action                                                       |  |  |
| EDU-8<br>Public Access                             | <ul> <li>Number of trash cans installed</li> <li>Improved small craft launch ramp</li> </ul>                                                                                                                                                                                                                                                                                                                    | <ul> <li>Environmental monitoring is not<br/>applicable for this action</li> </ul>                                  |  |  |
| EDU-9<br>K-12                                      | <ul> <li>Attendance at special workshops</li> <li>Attendance at after school projects</li> <li>Number of educational guides used<br/>within five years of distribution</li> <li>ID educational goals</li> </ul>                                                                                                                                                                                                 | <ul> <li>Environmental monitoring is not<br/>applicable for this action</li> </ul>                                  |  |  |
| EDU-10<br>Mini-Grants                              | <ul> <li>Number of grants disbursed</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  | <ul> <li>Environmental monitoring is not<br/>applicable for this action</li> </ul>                                  |  |  |
| EDU-11<br>CEQA<br>Checklist                        | <ul> <li>Timely adoption of new CEQA<br/>checklist by City and County</li> </ul>                                                                                                                                                                                                                                                                                                                                | <ul> <li>Environmental monitoring is not<br/>applicable for this action</li> </ul>                                  |  |  |

# Table 6.9 Education Action Plan Objectives and Evaluation Methods



# Table 6.10 Implementation Tracking System (ITS)Current Implementation Status

| CCMP ACTION                                                     | Government &<br>Private Initiatives<br>(Public, private and<br>cooperative programs)          | Examples of specific<br>local completed or in<br>progress projects                                                                          | Current Gaps &<br>Roadblocks                                                                      | Total %<br>Complete of<br>the Action<br>(Estimate) |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------|
| CC-1 Land<br>Acquisition<br>(Related HAB –<br>1.3.5; STL – 2,4) | Trust for Public Lands,<br>MEGA, and MBNEP<br>partnership                                     | <ul> <li>Acquistion of 15<br/>acre coastal dune<br/>scrub parcel (in<br/>progress)</li> </ul>                                               | Priorities among<br>parcels; willing<br>sellers; land costs                                       | 5%                                                 |
| CC-6 Volunteer<br>Monitoring<br>Program                         | Multi-agency<br>participation, Friends<br>of the Estuary grant<br>proposal submitted          | <ul> <li>Volunteer<br/>Monitoring<br/>Program (APDP in<br/>progress since<br/>1995)</li> </ul>                                              | Maintain volunteer<br>participation.<br>Expand monitoring<br>program                              | 75%                                                |
| SED – 7 BMP<br>Incentives<br>(Related: EDU – 3)                 | Cooperation of<br>permitting agencies,<br>participation of<br>landowners in short<br>courses. | <ul> <li>Sustainable<br/>Conservation<br/>Permit streamlining<br/>project (APDP in<br/>progress)</li> </ul>                                 | Time needed for agency reviews.                                                                   | 60%                                                |
| BACT –1 Grazing<br>Management                                   | Multi-agency and<br>landowner<br>coordination, National<br>Monitoring Program<br>(RWQCB)      | <ul> <li>Riparian fencing<br/>projects (APDP in<br/>progress)</li> </ul>                                                                    | Prioritization of<br>problem areas<br>needed. Willing<br>landowner<br>involvement<br>needed       | 20%                                                |
| BACT – 3 Illegal<br>Moorings                                    | Agreement with oyster<br>grower to monitor<br>boats and mooring                               | Harbor debris<br>removal (APDP in<br>progress)                                                                                              | Agency<br>coordination<br>needed                                                                  | 80%                                                |
| NUTR – 4<br>Residential BMPs<br>(Related: EDU – 1)              | 35% of urban residents<br>already have bay-<br>friendly gardens                               | Development of<br>Yards and<br>Neighbors<br>Brochure project<br>(APDP)                                                                      | Action complete                                                                                   | 100%                                               |
| HMT – 2 Marina<br>BMPs (Related:<br>EDU –2)                     | Coordination with bay front businesses.                                                       | <ul> <li>Boatyard BMPs</li> <li>Boat rinse station<br/>project</li> </ul>                                                                   | Action complete                                                                                   | 100%                                               |
| HAB –10<br>Nonindigenous<br>Species                             | Coordination with<br>public landowners and<br>permitting agencies                             | <ul> <li>Restoring Los Osos<br/>(veldt grass<br/>removal<br/>project)(APDP)</li> <li>A. donax<br/>eradication project<br/>(APDP)</li> </ul> | On-going – permit<br>delays and costs<br>and cooperation<br>between<br>landowners and<br>agencies | 5%                                                 |



# FINANCE AND IMPLEMENTATION

The representatives of the Local Policy Committee (LPC) and the Watershed Committee (WC) of the Morro Bay National Estuary Program (MBNEP) and The Bay Foundation of Morro Bay (BF) have worked hard during the preparation of this document to develop a structure for the most effective implementation of the CCMP. To date, these committees have reached agreement in several areas. The following section presents preliminary guiding principles for implementing the CCMP, along with a proposed organization structure and a rough draft of the possible roles and responsibilities of the various entities during the implementation phase. Please note that timeframes are estimates used for planning purposes, dependent upon many variables that are not currently within the MBNEP's control such as, funding, jurisdiction, and competing interests.

# 7.1 INTRODUCTION

The LPC and WC recognize that there are four basic functions involved in CCMP implementation. These functions are governance, identifying and securing resources and funding, ongoing planning, and overall administration. All of these functions overlap in the area of CCMP implementation. They are discussed further below.

# 7.2 GUIDING PRINCIPLES FOR IMPLEMENTING THE CCMP

The LPC and the WC generally agreed that the following principles should guide the implementation of the CCMP:

- 1. Continuous federal/state/local/private/public partnership in technically-sound protection and restoration activities.
- 2. Effective public involvement in decision-making.
- 3. Efficient process for decision-making.
- 4. Efficient coordination of CCMP implementation.
- 5. Scientific Credibility.
- 6. High-level political/governmental commitment.

# 7.3 EARLY IMPLEMENTATION EFFORTS

The MBNEP has already initiated fourteen early action projects. These projects include:

- Veldt grass eradication in coastal dune habitat in Los Osos;
- Development of a watershed model to teach children the dynamics of watershed processes;
- Development of a "Yards and Neighbors" model landscaping brochure;
- Implementation of boatyard management measures;
- Permit streamlining for agriculturalists and farmers who wish to implement conservation practices;
- Installation of a "pollution-free" boat wash-down station in the City of Morro Bay; and
- Creek fencing in the watershed.

Implementation of these projects has allowed the MBNEP to look ahead to the opportunities and challenges that implementation may hold, and to develop new ways to collaborate on projects. The projects and the lessons learned both individually and collectively as a process, are further described in Appendix C. This information will help others who may want to do similar projects.



# 7.4 MBNEP IMPLEMENTATION STRUCTURE

Although there are multiple components necessary for the successful implementation of the CCMP, one important component is having an organizational structure that ensures multi-stakeholder involvement in implementation. Although the specific details of the MBNEP's organizational structure are still being developed, a preliminary organization that has been agreed upon by the MBNEP committees is presented below.

## 7.4.1 HOW STRUCTURE WAS DEVELOPED

The WC, LPC and MBNEP staff evaluated the existing MBNEP structure and reviewed other NEP implementing structures. The LPC Executive Committee, LPC, and WC held meetings to brainstorm guiding principles, assumptions, key functions and decisions to be made during implementation in order to direct or determine the best structural arrangement for the Management Conference. A small steering committee consisting of individuals from the BF, LPC, and WC, in addition to the Program Director and an organizational development consultant, was established to develop a preliminary structure that the larger group could then review and refine. The existing WC and LPC will determine the composition of the new Executive Committee (EC) and Work Groups (WGs) based on criteria to be established from the existing committee members/implementers, and other entities.

The new organizational structure will ensure public involvement by: 1) holding public quarterly Task Force meetings; 2) creating an Education and Outreach Work Group; 2) updating the MBNEP Public Participation Strategy (see Appendix D); and implementing the Public Education and Outreach Action Plans contained in Chapter 4 of this CCMP.

## 7.4.2 STRUCTURE FOR THE MANAGEMENT CONFERENCE

What is the Management Conference? Currently, the MBNEP Management Conference refers to the collection of stakeholders, organizations, agencies, and individuals that have been involved in developing the CCMP. The present Management Conference includes a Local Policy Committee, an Ex-Officio Policy Committee, the Watershed Committee, and a Technical Advisory Committee. This organization was set up in the summer of 1997, and the roles and responsibilities are summarized in the Revised Management Conference Agreement that was approved by USEPA in February 1998 (see Volume II of this CCMP). The entire Management Conference will participate on some level in the decision-making process during implementation.

Upon approval of the CCMP, implementation will begin. This implementation will be under a slightly new organizational structure that is shown in Figure 7.1. Representation should be balanced such that no one organization holds leadership positions on more than one group. As presently envisioned, the basic subsets or operating bodies of the Management Conference during implementation will include: MBNEP staff; a *Task Force* that is open to all interested parties, but also includes primary and supporting implementers; a standing *Scientific and Technical Work Group*; standing *Finance Work Group*; standing *Education and Outreach Work Group*; other *Work Groups* that may be convened depending on the needs of the management conference; and an *Executive Committee*. The MBNEP will continue to be hosted by both the BF and the CCRWQCB who serve as bursars for the program. The Bay Foundation provides an efficient mechanism for contracting with the variety of implementers and for managing the MBERF. The CCRWQCB provides technical staff and a network to state environmental agencies and forums. The office will remain in the watershed.

#### NEP Staff Responsibilities

- 1. Develop Program workplans and budgets for EC approval.
- 2. Implement Program workplans and budgets including:
  - Coordinate implementation activities of responsible entities;
  - Obtain commitments from all sectors implementing CCMP actions;
  - Identify barriers to CCMP implementation;
  - Develop remedies that remove barriers to implementing the actions;
  - Assure that plans identified in the CCMP are developed by responsible entities;
  - Recommend changes to the CCMP to the working groups, Forum, and the EC through joint meetings;
  - Monitor, track, and report on progress on action plans;
  - Conduct Quarterly Meetings with Forum;
  - Interact with Working Groups;
  - Coordinate monitoring;
  - Administer Clean Water Act 320 and other Program grants;
  - Develop and oversee data and information management;
  - Educate the public on issues;
  - Foster support from stakeholders;
  - Undertake EPA-required biennial review; and
  - Track legislative issues and initiatives and bring policy or legislative recommendations to the EC.

MBNEP staff would be accountable to the EC for administration and personnel.

#### **Task Force Responsibilities**

- 1. The purpose of the Task Force will be to exchange information and concepts, conduct dialogue, and to continually assess action plans and implementing organization progress.
- 2. The Task Force will meet quarterly and will be open to the public. It is hoped that all implementing organizations, whether primary or supporting, will participate.

The Task Force may create a Work Group(s) that report directly to the Task Force or to MBNEP staff.

#### Implementation Committee—Work Group Responsibilities

The most important responsibility of the Work Groups is to report on implementation progress. The responsibilities of the Finance Work Group and the Education and Outreach Work Group will be determined during implementation. The Implementation Committee will be advisory to the Executive Committee. The Committee will be composed of the Work Groups.

- 1. Prepare and collaborate on grant applications, other implementer's work plans, and make recommendations to the Executive Committee.
- 2. Investigate technical issues.
- 3. Oversee monitoring and educational activities.
- 4. Recommend changes to the CCMP.
- 5. Track and report on implementation.
- 6. Advocate for implementation of the CCMP.
- 7. Ensure that the public involvement and education portion of the CCMP is carried out, and recommend legislative changes to the executive committee.

Chapter

7



# Figure 7.1 MBNEP Organizational Structure for CCMP Implementation





## Scientific/Technical Review Work Group Responsibilities

- 1. Coordinate and Implement the Research and Monitoring portions of the CCMP.
- 2. Provide technical support for CCMP implementation activities.
- 3. Alert the MBNEP staff and representatives at the Forum to new scientific data related to CCMP implementation.
- 4. Recommend changes to regional monitoring strategies.

## **Executive Committee Responsibilities**

The Executive Committee (EC), meeting quarterly, will be the key decision-making body, and will provide the following functions:

- 1. Approve requests for funding through the Morro Bay Estuary Restoration Fund.
- 2. Release staff resources to assist other organizations in grant development as needed.
- 3. Supervise the Program Director, through the BF representative or their designee.
- 4. Monitor and evaluate (1) its own performance; (2) the Program Director; and (3) the Program with the Director to determine if the mission is being furthered as intended.
- 5. Provide leadership and overall direction, as well as resolve disputes.
- 6. Chair Work Groups.

The EC will also provide broad policy direction, approve priorities for CCMP implementation, seek and develop funding sources to carry out the CCMP, assist the Program Director with obtaining internal resources for CCMP implementation, seek changes in legal authorities as necessary for implementation, and approve CCMP changes that further the goals of the CCMP. The EC will hold regular meetings open to the public.

The EC will be voluntarily staffed to represent a balance of interests in the estuary and watershed. These interests include the following:

- The Bay Foundation (grantee)
- Central Coast Regional Water Quality Control Board (grantee)
- U.S. Environmental Protection Agency
- Environmental
- Agricultural
- Commercial Fishing (including shellfish)
- Los Osos Community Services District
- City of Morro Bay
- San Luis Obispo County
- A State Representative
- At-Large Representative

Terms of three years would be staggered to provide continuity. Qualifications for the EC will be defined based on the anticipated roles, and determined by the existing WC, as discussed above. The EC will periodically assess the effectiveness of the Implementation Structure and initiate changes as appropriate for a productive organization. Once the new organization is established, all parties will sign a Memorandum of Agreement (MOA) that outlines their understanding of the new structure, common operating ground rules, as well as roles and responsibilities.

Decision-making by the EC will occur by consensus and by vote. All actions receiving a majority vote ("Regular Vote") in favor are approved with the exception of actions involving Consent Decree (Morro Bay Estuary Restoration Fund) funds. A Consent Decree was created out of a settlement agreement between Pacific Gas and Electric Company, the State of California, and the USEPA, which provided the MBNEP with several million dollars to implement action plans in the CCMP. It sets forth the decision making process for awarding funds from MBERF to implementers. Specifically, the Consent Decree states:



The BF shall use or disburse moneys received pursuant to the Consent Decree (the "Consent Decree Implementation und") only to carry out projects that implement the final Plan and/or Early Action Items. If (as expected) the final Plan calls for the implementation of more projects than can be financed by the Consent Decree Implementation Fund, the projects to be funded by the Consent Decree Implementation Fund shall be selected, if possible, by a consensus of the LPC (or any successor to the LPC), the BF, and the CCRWQCB. If a consensus cannot e reached, the vote of the CCRWQCB plus either the Foundation or the LPC (or any successor to the LPC) shall determine what projects on the final Plan shall be funded with the moneys from the Consent Decree Implementation Fund (referred to as the MBERF for Morro Bay Estuary Restoration Fund elsewhere in this document).

The BF shall not use or disburse money in the Consent Decree Implementation Fund for the preparation of the Plan, public education or environmental awareness projects, or for the office expenses, staff salaries, overhead costs, or administrative costs of the BF, the LPC, the WC, the CCRWQCB, the SWRCB, or the MBNEP staff.

# 7.5 STRATEGIES AND MECHANISMS FOR IMPLEMENTING THE CCMP

The MBNEP may use the following mechanisms to implementing the CCMP:

- Non-binding Memoranda of Understanding between MBNEP organizations;
- Binding Contracts between The BF and MBNEP organizations;
- Mini-grants from The BF to others (cost limitation; no contract negotiation);
- Grants from the BF to others (with accompanying contracts);
- New legislation;
- Integration of actions into local and regional ordinances, rules, and programs;
- ACOE feasibility and habitat restoration projects (using MBERF funds);
- USEPA and CCRWQCB Total Maximum Daily Loadings (TMDL) program (using other agency funds), and
- Grants from state and federal agencies to the MBNEP.

## 7.6 DECISION-MAKING GUIDELINES

#### The principal objectives guiding decision-making are as follows:

- Develop projects consistent with the CCMP;
- Involve a broad group in the review and understanding of projects for the bay; promote communication;
- Keep the process simple, expedient and attractive to participants;
- Have a strong program with a pro-active director;
- Leverage funding to bring in other resources;
- Minimize conflicts of interest;
- Fund a variety of priority projects.


#### **Decision - Making Process for Different Types of Project Action:**

A. Requests for Endorsements: An organization may want no more than the endorsement of the MBNEP for their project, perhaps to help them with grant funding or notoriety. The endorsement should be strictly within the province of the director, providing it is believed the project in not inconsistent with the goals of the program. The director may on rare occasion wish to refer a complex or controversial project to the new Executive Committee (EC) for their opinion.

**B.** Requests for Projects Less Than \$5,000: The director will have a discretionary fund of \$50,000 annually that can be used to fund small projects or small portions of larger projects without any further review, providing only that the project is consistent with the goals of the program, there is a 50 percent in-kind match, and that the applicant complete a one page final project summary upon completion. The director will report quarterly at the joint meeting on the status of these projects.

C. Requests for Projects Greater Than \$5,000: larger funding requests, or projects that involve considerable effort on the part of the program, will follow the path below (see Figure 7.2):

**Step 1**. Applicants (agencies or organizations interested in implementing action plans) submit project proposals to, or develop them with the assistance of, the director. The process, instructions, and application for submitted proposals will be posted on the MBNEP website which is currently www.mbnep.org. The director will promote the implementation of actions and otherwise provide leadership working closely with stakeholders.

**Step 2.** The director will evaluate proposals to determine if they are complete, eligible, and meet match requirements. The director will then forward a copy of the proposals to assigned Work Groups for technical review and evaluation as well as send a summary of the proposals to the EC. Proposals received after the quarterly deadline will be reviewed during the next quarterly review cycle and incomplete proposals will be returned with a checklist of deficiencies and guidance regarding resubmission.

**Step 3**. Work Groups will review proposals seeking additional information as needed. Working independently, through meetings, and comparing each proposal to consistent review criteria, the Work Groups will summarize their findings and rank proposals. They will send their findings to the director no later than three weeks before the next quarterly joint MBNEP meeting. Persons with a perceived conflict of interest will be asked to recuse themselves from the review process.

**Step 4**. The director will forward Work Group findings to the EC and list the proposals on the agenda for the Quarterly MBNEP Meeting, i.e. Task Force (TF) and All Committee Quarterly Meeting (comprised of any interested people). The director and work groups will summarize the review and findings of the technical evaluation and request public discussion and comment. The Executive Committee (formerly the LPC) will meet immediately following the Joint Meeting (on the same day), to vote on fundable projects. The EC will vote to approve projects based on a full quorum and a majority in favor of the each project. Persons with a perceived conflict of interest will be asked to recuse themselves from the review process.

**Step 5**. From the EC, projects return to the director for implementation, funding or monitoring. The director will make quarterly status reports on projects at the quarterly meeting, prepare grant/contract award documents, and send letters notifying applicants regarding the outcome of their request for funding. This information will include an outline of concerns regarding unfunded projects.

**Step 6**. If Consent Decree Implementation Funds (CDIF) are requested for all or part of a project, an additional step is required pursuant to the Consent Decree. Approval is required by the CCRWQCB and (EC and/or BF). Specific reasons for disapproval will be developed to de-emphasize the role of the CDIF approval. CCRWQCB approval requires executive officer recommendation in the executive summary to the Board. EC approval requires projects complete the process described above. BF approval requires a majority vote of a quorum of members at a regular meeting of the Board of Directors of the BF. The BF and CCRWQCB will notify the director regarding final funding decisions within one week of the decision, which will then be announced at the next quarterly MBNEP meeting.

Figure 7.2 MBNEP Decision-Making Process



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7 - 8

Step 7. Appeal Process. Unfunded project proposals may be revised and resubmitted quarterly for funding.

**D.** Requests for MBNEP Staff Assistance in Obtaining Funds, Implementing a Project, or Otherwise Acting as a Cooperating Organization: The MBNEP will sponsor an annual, public meeting to develop the annual MBNEP work plan. The primary role of the MBNEP is to facilitate implementation of the CCMP, and the annual meeting will identify MBNEP staff resources to the needs of implementing agencies. MBNEP annual resources will be matched with needs such as monitoring, reporting and documenting, communicating, collaborating, developing proposals, and reducing barriers to implementation, etc.

#### Moving from Planning into Implementation:

**Implementation Committee**: will create their own by-laws and operating procedures working with the director. The existing LPC and WC will continue to meet until the new groups are formed and ready to function. To minimize MBNEP staff resources and facilitate communication, the program calls for joint quarterly meetings. The program will assess the effectiveness of the new implementation structure on an annual basis and make changes as appropriate.

Work Groups: Three standing Work Groups (WGs) with the Implementation Committee have been recommended by the WC to serve an advisory role to advise EC concerning MBNEP matters. Local citizens not presently members in the management conference are eligible to apply. The WGs will represent a balance of interests in the watershed. WGs will meet quarterly, at a minimum, following the TF and All Committee Quarterly Meeting.

**Executive Committee:** The WC has recommended the basic composition for an 11 member Executive Committee: USEPA, CCRWQCB, BF, LOCSD, City, County, and five other major stakeholder groups in the watershed. EC members will serve as the chairs of WGs to ensure good communication. The EC will present a balance of interests in the watershed. The purpose of the EC is to make final decisions and set policy for the MBNEP and is limited in membership to keep quorum requirements manageable. The EC will meet quarterly in the afternoon, following the TF and All Committee Quarterly Meeting.

**Task Force:** The TF will be reconstituted as a non-membership, non-advisory, public forum to exchange technical and non-technical information, report on progress, and identify issues and opportunities. The group will honor the task force that existed before the MBNEP and will invite everyone to meet together in the same room. One focus of these meetings will be to openly discuss project proposals. It will meet quarterly in the morning with interested parties invited to attend subsequent WG and EC meetings in the afternoon.

**Proposed Calendar of Quarterly Meetings**: All committees will meet on a quarterly schedule on the second Wednesday of January, April, July, and October. Moving from planning to implementation is estimated to occur during the next six months, with a goal of the first meetings in summer and the first round of proposals in November.

## 7.7 FINANCE PLAN

## 7.7.1 DEVELOPING ACTION PLAN COSTS

A summary of preliminary cost estimates for the actions contained in the public draft CCMP is presented in Table 7.1. Figure 7.3 shows the percentage of total costs by priority action category based on the figures in Table 7.1.

#### Preliminary Summary of Costs by Action Category<sup>1</sup> Table 7.1

| Action Category                                     | No. of<br>Actions | Preliminary 5 yr.<br>Cost Estimate – all<br>actions <sup>2</sup> | No. of high<br>priority Actions | Preliminary 5 yr. Cost<br>Estimate - high priority<br>actions |
|-----------------------------------------------------|-------------------|------------------------------------------------------------------|---------------------------------|---------------------------------------------------------------|
| CC-1 Habitat Acquisition                            | 1                 | \$20,000,000                                                     | 1                               | \$20,000,000                                                  |
| CC-2 Drainage                                       | 1                 | \$9,800,000                                                      | 1                               | \$9,800,000                                                   |
| CC-3 TMDL                                           | 1                 | \$185,000                                                        |                                 |                                                               |
| CC-4 Stormwater Runoff                              | 1                 | \$635,000                                                        | 1                               | \$600,000                                                     |
| CC-5 Stream Geo/WQ                                  | 1                 | (included in sediment)                                           |                                 |                                                               |
| CC-6 VMP                                            | 1                 | \$400,000                                                        | 1                               | \$400,000                                                     |
| CC-7 Watershed Crew                                 | 1                 | \$250,000                                                        |                                 |                                                               |
| Sediment                                            | 8                 | \$13,5000,000                                                    | 4                               | \$7,100,000                                                   |
| Bacteria                                            | 9                 | \$1,800,000                                                      | 3                               | \$1,500,000                                                   |
| Nutrients                                           | 4                 | \$95,400,000                                                     | 2                               | \$94,000,000                                                  |
| Freshwater Flow                                     | 4                 | \$13,100,000                                                     |                                 |                                                               |
| Metals/Toxics                                       | 4                 | \$4,900,000                                                      | 1                               | \$2,750,000                                                   |
| Habitat                                             | 10                | \$2,600,000                                                      | 3                               | \$1,000,000                                                   |
| Steelhead                                           | 4                 | \$1,300,000                                                      | 2                               | \$650,000                                                     |
| Education                                           | 11                | \$1,400,000                                                      | 11                              | \$1,400,000                                                   |
| MBNEP Environmental<br>Monitoring Plan <sup>3</sup> |                   | \$480,000                                                        |                                 |                                                               |
| Totals                                              | 61                | \$165,700,000                                                    | 30                              | \$139,200,000                                                 |

 <sup>&</sup>lt;sup>1</sup> Cost estimates are very preliminary and are presented for broad comparison purposes only.
 <sup>2</sup> For some actions, costs are not yet available.
 <sup>3</sup> Includes estimated costs for the Trend Monitoring Program only, and does not include costs associated with program coordination.

# Table 7.2 Priority Actions and Primary Implementers

| Action # | Description              | Duration of task | Primary Implementers                                                                                      |
|----------|--------------------------|------------------|-----------------------------------------------------------------------------------------------------------|
| CC-1     | Habitat Acq.             | 2-5 year         | SCC: MEGA: TPL: BF                                                                                        |
| CC-2     | Drainage                 | 5 year           | LOCSD and Drainage Sub-committee; SLOCo.                                                                  |
| CC-4     | U. Runoff                | 2 year           | CMB Public Services Dept; SLOCo. Engineering;<br>CCRWOCB; LOCSD; USCG                                     |
| CC-6     | VMP                      | 2 year           | FOE; CCRWQCB                                                                                              |
|          |                          |                  |                                                                                                           |
| SED-2    | Sed Traps                | 2-5 year         | NRCS; CSLRCD; UCCE; public & private landowners                                                           |
| SED-3    | Fire Mgmt                | 2-5 year         | USFS; CDF                                                                                                 |
| SED-4    | Landowner<br>BMPs        | 2 year           | NRCS; CSLRCD; BF; UCCE                                                                                    |
| SED-5    | Creek                    | 2 year           | NRCS; CLSRCD; UCCE; CDFG;                                                                                 |
|          | Restoration              |                  | Private Engineers and/or Consultants                                                                      |
|          |                          |                  |                                                                                                           |
| BACT-1   | Grazing Mgmt             | 2 year           | CSLRCD; Farm Bureau; NRCS;                                                                                |
|          |                          | •                | public & private landowners                                                                               |
| BACT-3   | Illegal Mooring          | 2 year           | CDFG                                                                                                      |
| BACT-4   | Aband Boats              | 2 year           | CDFG                                                                                                      |
|          |                          |                  |                                                                                                           |
| NUTR-1   | Los Osos<br>Wastewater   | 5 year           | LOCSD; CCRWQCB                                                                                            |
| NUTR-2   | СМС                      | 5 year           | СМС                                                                                                       |
|          | Wastewater               | ,                |                                                                                                           |
|          |                          |                  |                                                                                                           |
| FLOW-3   | Water<br>Conservation    | 2 year           | MBNEP; public & private landowners                                                                        |
| HMT-1    | Mine<br>Remediation      | 5 year           | CSLCNG; USFS; CCRWQCB; public & private<br>landowners                                                     |
|          |                          |                  |                                                                                                           |
| HAB-1    | Overlay Maps             | 5 year           | MBNEP; MEGA; SLOCo.                                                                                       |
| HAB-8    | Eelgrass                 | 5 year           | ACOE; CMB                                                                                                 |
| HAB-9    | Nonindigenous<br>Species | 2 year           | SLOCo. AG Commissioner's Office; CSLRCD; public & private landowners; CSLCNG                              |
| STI 2    | Ushitat Access           | 2                | CDEC: mublic & private landoumers                                                                         |
| STL-2    | Pool / Riffle            | 2 year           | CDFG, public & private landowners                                                                         |
| 5112-5   | Structures               | 2 yeai           |                                                                                                           |
| EDIT 1   | Ganaral DEO              | 2                | MONED                                                                                                     |
| EDU-1    | Boster Outroach          | 2 year           |                                                                                                           |
| EDU-2    | A a Outroach             | 2 year           |                                                                                                           |
| EDU-3    | Ag. Outreach             | 2 year           | SLOCO AC Commissioner sublic & subjects landourses                                                        |
| EDU-4    | Pest workshops           | 2 year           | SLO Co. AG Commissioner, public & private landowners                                                      |
| EDU-5    | Estuary Conf.            | 2 year           | MBNEP; BF                                                                                                 |
| EDU-6    | CCNHA Exhibit            | 2 year           | CCNHA                                                                                                     |
| EDU-7    | Media                    | 2 year           | MBNEP                                                                                                     |
| EDU-8    | Public Access            | 2 year           | Pedestrian/equestrian trail: developers and public; 1 <sup>st</sup> St., SLOCo. Dept. of General Services |
| EDU-9    | K-12                     | 2 year           | CCNHA; CCCorps; MEGA                                                                                      |
| EDU-10   | Minigrants               | 2 year           | MBNEP                                                                                                     |
| EDU-11   | CEQA Checklist           | 2 year           | CCRWQCB; SLOCo.; CMB; USEPA; SLC                                                                          |



## List of Implementers:

| ACOE                           | CMB                       |
|--------------------------------|---------------------------|
| Air Pollution Control District | CMC                       |
| Assoc Const.                   | Consultants/Engineers     |
| Audubon Society                | Contractors               |
| BF                             | CSLCNG                    |
| Boat owners                    | CSLRCD                    |
| Bureau of Reclamation          | Cuesta College            |
| CA Cattlemen's Assoc.          | Developers                |
| CA Native Plant So.            | Dock Operators            |
| CA Trout                       | ECA                       |
| Cal Poly                       | Farm Bureau               |
| Cattlemen Assoc.               | Fishing Industry          |
| CCC                            | FOE                       |
| CCCorps                        | Fuel Dock Op.             |
| CCDHS                          | IWMA                      |
| CCNHA                          | Kern County               |
| CCRWQCB                        | Land Conservancy          |
| CDBW                           | Local Residents           |
| CDF                            | LOCSD                     |
| CDFG                           | MBHD                      |
| CDOC                           | MBNEP                     |
| CDOT                           | MEGA                      |
| CDPR                           | Morro Group               |
| CDWR                           | Private Industry          |
| CEC                            | Public/Private Landowners |

Rancho El Chorro Santa Lucia Flyfishers SCC Sheriff Dive Sierra Club SLC SLO Land Conservancy SLOCo. SLOCo. Envir. Health Dept. Sports Fish Alliance SSRCSCCC SWAP **SWRCB** Trust for Public Lands UCCE USCG USEPA USFS USFWS USNMFS Volunteer Organizations W. Shellfish Water purveyors Water Supply Districts

# Figure 7.3 Percentage of Total Costs by Priority Action Category (based on figures represented in Table 7.1)





# 7.8 FINANCING THE CCMP

The cost of implementing the CCMP and meeting operating expenses of the program is one of the greatest challenges facing the MBNEP. Financing just the highest priority actions will require approximately \$140 million dollars. The price climbs to \$172 million dollars to finance all 61 action plans. For the most part, these costs are not associated with staffing and maintaining an office in the watershed. The MBNEP will continue to rely on the USEPA for program funding while it investigates other sources of program support such as state legislation and sharing office space, staff, and resources with similar nonprofit organizations.

The program will seek to optimize the resources available to ensure effective and efficient coordination and execution of priority CCMP action plans. The MBNEP has monies from a Consent Decree Implementation Fund (also called Morro Bay Restoration Fund), over \$4.0 million from a State/EPA joint enforcement case, dedicated to CCMP implementation. These funds have been deposited into a conservative investment portfolio managed under the auspices of the Bay Foundation, with oversight by the Regional Water Quality Control Board. The Consent Decree Implementation Fund is aimed primarily at leveraging additional funding from other sources, including public grant programs and partnerships with private, non-profit conservation organizations.

The program has also reviewed the funding mechanisms used by the other 27 National Estuary Programs and will pursue all opportunities to increase funding revenue. The MBNEP will finance implementation of individual action plans through several interrelated mechanisms: 1) In some cases where no other funding is available and the urgency of the project so warrants, the MBNEP will directly fund implementation measures with its Consent Decree Implementation Funds; 2) The MBNEP will more typically utilize Consent Decree Implementation Funds; 3) The MBNEP will apply, usually in partnership with other implementers, for grant monies relevant to implementation plans; 4) The MBNEP will alert implementing organizations to grant and loan opportunities, provide technical assistance in preparing the applications, endorsements to the funding agency, and, if needed, support in the management and monitoring of the resultant project; 5) The MBNEP through its volunteer programs will directly implement action plans within the reasonable scope and abilities of such volunteers; and, 6) The MBNEP through its related non-profit advocacy group, The Friends of the Estuary (FOE), will develop an endowment, built largely from private sources in support of ongoing operations and implementation.

# **Funding Partnerships**

The National Estuary Program, as authorized by Section 320 of the Clean Water Act, funds program development and research, but requires individual NEP's to develop funding mechanisms to implement CCMP action plans. While a few of the CCMP's actions such as the cross-cutting TMDL action, and portions of many others, can be funded through existing agency resources most actions will require additional funding from new federal, state and local sources to leverage the existing resources of the 75 implementing agencies. Many federal funding programs require a state or local match, not only to help offset the high cost of restoration and enhancement projects, but to demonstrate local commitment to program implementation. Sufficient state and local matching funds are currently directed to meet match requirements for program operational costs supported through Section 320 and additional match funds will be needed for implementation. As noted above, more than \$4 million dollars, from the Consent Decree Implementation Fund are dedicated to funding CCMP implementation and can be used as a match for new federal and state grant funds.

It is estimated that the total cost of implementing all 61 action plans would require \$172 million dollars. In addition, the cost to implement the 31 high priority action plans is estimated at \$140 million dollars. The most expensive action, NUTR-1, includes the cost of constructing a wastewater treatment facility for the community of Los Osos, which is estimated to cost between \$40-\$70 million (\$70 million figure was used for calculating total implementation costs). In addition, NUTR-2, calls for upgrading the collection system at a State prison facility for a cost of \$25 million. It should be noted, however, that both of these significant public health projects are likely to be financed through other programs. For example, the community of Los Osos has formed a "Services District" which is designing a collection, treatment and disposal system. The district is applying for a loan through the State Revolving Fund Program to be paid back through user fees charged through special assessment districts. A first phase of an

upgrade to the prison facility treatment plant is also being designed and funding is possible from the State in order to bring the facility into compliance with clean water standards. Most of the other 61 actions plans can be financed through the programs listed in the following strategy and through increased financial support from the implementing agencies.

To address these financial needs, the MBNEP will work with existing federal, state, local, and private partners to generate adequate funding for CCMP implementation. The MBNEP identified a number of funding programs that will be targeted as financial resources for implementation. This strategy is comprised of funding programs particularly well suited to the actions in the CCMP.

The following is a summary of federal, state, local and private funding sources that will serve as the basis for the funding strategy. Currently, this summary contains over 50 federal, 40 State, and a handful of local funding sources. Each funding source is matched with the appropriate implementation project category, designated by CCMP Action Plans. Each of the Action Plans corresponds to at least one funding source and usually numerous options are available. Sources of funding change yearly, in terms of funding levels and also in terms of program priorities. In addition, many programs may no longer be active while new programs are continuously being developed and offered. More detailed and updated descriptions of the funding programs are available from the individual state agencies, non-profit groups, cities, and counties, internet, or the Catalog of Federal Domestic Assistance (CFDA).

The MBNEP's implementation organization includes an Executive Committee composed of representatives of the local political entities, state agencies and representatives of various interests in the estuary. Advising the Executive Committee is an Implementation Committee composed of representatives of the various organizations and agencies involved with implementation measures in the estuary and watersheds. The Implementation Committee, in turn, will assemble a Finance Work Group, chaired by a member of the Executive Committee, that will seek out funding sources and partnerships for implementation possibilities, assist staff with grant applications, advise the Executive Committee on priorities and options and work with other volunteers, notably the Friends of the Estuary, in creating an capital campaign for implementation and an ongoing endowment focusing on private monies. The Work Group will also be an important liaison between the implementers and the MBNEP staff and Executive Committee; the Work Group will also assist with community outreach to garner public support for grants and other funding opportunities.

## **Federal Programs**

The United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) was created in 1935 to help farmers and ranchers care for the land. This assistance is provided through local Soil and Water Conservation Districts by agreements with the USDA and individual states. The NRCS is committed to helping private landowners and managers implement accepted conservation practices to improve land stewardship. The NRCS and the Farm Service Agency administer Farm Bill Programs for the Central Coast of California through the USDA Service Center in Templeton.

Under existing programs, the USDA makes awards in California based on geographic target areas, the Forestry/Range Resource Concern Fund, and the Salmon/Steelhead Natural Resource Concern Fund. Although Morro Bay is not eligible for target area funding, they are eligible to apply for funding through the two special concerns funding programs. The annual statewide budget of the Forestry/Range fund is \$365,000 and \$200,000 for Salmon/Steelhead. In 2000, under Forestry/Range and Salmon/ Steelhead, the agency received 64 and 22 proposals and funded 29 and 9, respectively.

The USFWS under the USDOI funds projects that protect and restore fisheries and wildlife resources. Such projects could include wetlands and salt marsh improvements, as well as research that benefits fish stocks. Eight programs are listed below.



The U.S. Army Corps of Engineers under the DOD provides funds and expertise in addressing navigation, flood control, and restoration needs in watersheds. This agency is currently working in Morro Bay on a feasibility study that is described in the CCMP Action Plan, SED-8, and that might lead to additional implementation funding. Six programs are described below.

EMA, EPA, the Department of Transportation, and the Coast Guard have programs designed to assist with implementation of projects similar to the CCMP actions. FEMA offers financial assistance for flood related events. The Coast Guard provides assistance for boasting safety and enforcement activities. NOAA and the Economic Development Administration, under DOC fund program activities in the coastal zone and assist in the development of public works. EPA offers more than a dozen grant programs which could provide resources for CCMP implementation.

In addition, several federal agencies have received increased budgets through the Clean Water Action Plan, specifically EPA, DOA, DOI, NOAA, and ACOE. Increases in agency budgets will improve the ability of these agencies to assist in CCMP implementation either directly as implementers or jointly through programs such as Coastal America.



|                               | Land and Water Conservation Fund                                                                                                                                                                                                                                                                       |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | Congress, Office of Management and Budget                                                                                                                                                                                                                                                              |
| Description:                  | This program provides funding for land acquisition to better enable sound environmental land management by federal land agencies. Funding is dependent upon the type of project submitted to Congress.                                                                                                 |
| Eligibility:                  | Federal land management agencies.                                                                                                                                                                                                                                                                      |
| Types of assistance:          | Funding for land acquisition.                                                                                                                                                                                                                                                                          |
| Available funds:              | Varies widely.                                                                                                                                                                                                                                                                                         |
| Contact:                      | National Park Service (415) 427-1445                                                                                                                                                                                                                                                                   |
|                               | Bureau of Land Management (661) 391-6113                                                                                                                                                                                                                                                               |
|                               | USFWS (805) 644-1766, USFS (805) 968-6640                                                                                                                                                                                                                                                              |
| <b>Corresponding Actions:</b> | CC-1,2                                                                                                                                                                                                                                                                                                 |
|                               |                                                                                                                                                                                                                                                                                                        |
|                               | Learn and Serve America Program<br>Corporation for National Service                                                                                                                                                                                                                                    |
| Description:                  | This program provides students and youth with opportunities to serve America by connecting community service with academic learning, personal growth, and civic responsibility. Typical projects address local needs in the areas of education, public safety, the environment, and other human needs. |
| Eligibility:                  | Institutions of higher education, partnerships composed of higher education institutions and other public or private non-profit organizations and state education agencies.                                                                                                                            |
| Types of assistance:          | Project grants (higher education, school and community-based, and state formula), match is required (varies from 10 to 50 percent, depending on grantee).<br>EY98 - \$63 million EY99 - \$63 million and EY00 - \$63 million                                                                           |
| Available funds:              | Corporation for National Service (202) 606-5000                                                                                                                                                                                                                                                        |
| Contact:                      | CC-6 7' BACT-8' EDU-1 2 3 6 7 9' FLOW-3' HMT-3 4' HAB-1 2 3 7' STL-2                                                                                                                                                                                                                                   |
| Corresponding Actions:        |                                                                                                                                                                                                                                                                                                        |
|                               | Economic Development: Grants for Public Works and Infrastructure Development                                                                                                                                                                                                                           |
|                               | Economic Development Administration, DOC<br>CFDA number 11.300                                                                                                                                                                                                                                         |
| Description:                  | This program provides funds to promote long-term economic development and assist in the construction of public works and development facilities needed to initiate and support the creation or retention of permanent jobs in the private sector in areas experiencing substantial economic distress.  |
| Eligibility:                  | Any state agency, county, municipality, or nonprofit organization.                                                                                                                                                                                                                                     |
| Types of assistance:          | Direct grants; 50%-80% match required.                                                                                                                                                                                                                                                                 |
| Available funds:              | \$160,200,000.                                                                                                                                                                                                                                                                                         |
| Contact:                      | Public Works Division, Economic Development Administration,<br>Room H7326 Herbert Hoover Bldg. DOC, Washington DC 20230.<br>(202) 482-5265.                                                                                                                                                            |
| <b>Corresponding Actions:</b> | CC-7; SED-1; BACT-2; NUTR-1; FLOW-1; HMT-3,4                                                                                                                                                                                                                                                           |



|                               | <b>Coastal Zone Management, Administration and Implementation Awards</b><br>National Oceanic and Atmospheric Administration, DOC                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description:                  | This program assists states in implementing and enhancing Coastal Zone Management (CZM) programs that have been approved by the Secretary of Commerce. Funds are available for projects in areas such as coastal wetlands management and protection, natural hazards management, public access improvements, reduction of marine debris, assessment of impacts of coastal growth and development, special area management planning, regional management issues, and demonstration projects with potential to improve coastal zone management. |
| Eligibility:                  | Coastal States.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Types of assistance:          | Formula grants and program enhancement grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Available funds:              | FY98 - \$49.7 million, FY99 - \$61.7 million and FY00 - \$89.7 million.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Contact:                      | NOAA (301) 713-3155 x195                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Corresponding Actions:        | CC-3,4; SED-1,3,4,7; BACT-1,9; NUTR-3,4; HMT-2; HAB-5,6,7,9; STL-1; EDU-5,8,11                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                               | Community Restoration Program                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                               | National Oceanic and Atmospheric Administration, DOC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description:</b>           | This program provides funds for small-scale, locally driven habitat restoration projects that<br>foster natural resource stewardship within communities. Projects might include restoring<br>wetlands, coastal habitat, improving fish passage and habitat quality for anadromous species,<br>restoring ovster reefs and removing exotic vegetation.                                                                                                                                                                                          |
| Eligibility:                  | State and local governments, regional governing bodies, public and private agencies and organizations, academic institutions, profit and nonprofit organizations.                                                                                                                                                                                                                                                                                                                                                                             |
| Types of assistance:          | Froject grants and cooperative agreements.<br>\$ 28 million in EV08. $$$ 45 million in EV00 and $$$ 2 million in EV00                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Available funds:              | 9.38 minor in F 1 96, $9.43$ minor in F 1 99 and $92$ minor in F 1 00.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Contact:                      | 0.0 = 0.001713 - 0174                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Corresponding Actions:</b> | STL-1,2,3,4; DU-1,2,3,9,10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                               | Financial Assistance for Ocean Resources Conservation<br>and Assessment Program                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                               | National Oceanic and Atmospheric Administration, DOC<br>CFDA number 11.426                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Description:                  | This program determines long-term consequences of human activities affecting the coastal<br>and marine environment, and assesses the consequences of these activities in terms of<br>ecological, economic and social impacts upon human, physical and biotic environments, and<br>defines and evaluates management alternatives which minimize adverse consequences.                                                                                                                                                                          |
| Eligibility:                  | Any university, laboratory, State and local government agency, public or private, profit or nonprofit entities or individuals.                                                                                                                                                                                                                                                                                                                                                                                                                |
| Types of assistance:          | Project grants (Cooperative Agreements).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Available funds:              | Range of financial assistance \$20,000 - \$200,000, average \$80,000.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Contact:                      | NOAA regional office (206) 526-6187                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Corresponding Actions:</b> | CC-4;SED-4,5; NUTR-4; FLOW-3; HMT-2; EDU-1,2,3,4,8,11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Description:                                                                                   | Fisheries Development and Utilization Research and<br>Development Grants and Cooperative Agreements Program<br>National Oceanic and Atmospheric Administration, DOC<br>This program funds fishery research and development programs to benefit commercial and<br>recreational fisheries and fishing communities.                                                                                                                       |
|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:<br>Corresponding Actions: | <ul> <li>State and local governments, non-federal entities, U.S. corporations, partnerships, associations and citizens.</li> <li>Project grants and cooperative agreements.</li> <li>\$3.35 million in FY98, \$3.05 million in FY99 and \$1.5 million in FY00.</li> <li>NOAA (301) 713-2358</li> <li>CC-5; SED-8; FLOW-4, HAB-4,5,6,8; STL-1,2,3,4; BAC-2,3,4,5,7; HMT-2,3,4; EDU-2; Research components of Monitoring Plan</li> </ul> |
|                                                                                                | Sea Grant Support<br>National Oceanic and Atmospheric Administration, DOC<br>CFDA number 11,417                                                                                                                                                                                                                                                                                                                                        |
| Description:                                                                                   | This program provides support for marine research and development, education and training, and advisory services.                                                                                                                                                                                                                                                                                                                      |
| Eligibility:                                                                                   | Academic institutions, laboratories, corporations, partnerships, state agencies, or any individual.                                                                                                                                                                                                                                                                                                                                    |
| Types of assistance:                                                                           | Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Available funds:                                                                               | Range of financial assistance \$5,000 to \$3,595,000.                                                                                                                                                                                                                                                                                                                                                                                  |
| Contact:                                                                                       | NOAA National Sea Grant Program (301) 713-2448                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Corresponding Actions:</b>                                                                  | CC-6,7; SED-8; BACT-9; EDU-1,2,3,4,5,6,7,9,10,11; Research components of                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                | Monitoring Plan                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Description:                                                                                   | Aquatic Plant Control<br>Army Corps. of Engineers, DOD<br>CFDA number 12.100<br>This program provides assistance for the control of obnoxious aquatic plants in rivers,<br>harbors, and allied waters                                                                                                                                                                                                                                  |
| Fligibility.                                                                                   | States and their political subdivisions or instrumentalities                                                                                                                                                                                                                                                                                                                                                                           |
| Tunes of assistance:                                                                           | Provision of specialized services and dissemination of technical information                                                                                                                                                                                                                                                                                                                                                           |
| A vailable funds:                                                                              | Not applicable                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Contact:                                                                                       | Morro Bay ACOE. (213) 452-3836                                                                                                                                                                                                                                                                                                                                                                                                         |
| Corresponding Actions:                                                                         | НАВ-9                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                                | <b>Emergency Operations Flood Response and Post Flood Response</b><br>Army Corps of Engineers, DOD<br>CFDA number 12.103                                                                                                                                                                                                                                                                                                               |
| Description:                                                                                   | This program provides emergency flood and post flood response assistance as required to supplement State and local efforts and capabilities in time of flood or coastal storm.                                                                                                                                                                                                                                                         |
| Eligibility:                                                                                   | State or local public agencies for flood response and the State for post flood response.                                                                                                                                                                                                                                                                                                                                               |
| Types of assistance:                                                                           | Provision of specialized services.                                                                                                                                                                                                                                                                                                                                                                                                     |
| Available funds:                                                                               | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Contact:                                                                                       | Morro Bay ACOE (213) 452-3836                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Corresponding Actions:</b>                                                                  | CC-2; SED-5,8                                                                                                                                                                                                                                                                                                                                                                                                                          |



| Description                   | Flood Control Projects<br>Army Corps of Engineers, DOD<br>CFDA number 12.106<br>This program provides assistance for reducing flood damages through projects not                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description.                  | specifically authorized by Congress.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Eligibility:                  | States, political subdivisions of States, and local agencies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Types of assistance:          | Provision of specialized services.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Available funds:              | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Contact:                      | Morro Bay ACOE, (213) 452-3836<br>CC 1 2 7: SED 4 5 6 7 8: HAB 3 5 6: STL 3 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Corresponding Actions:</b> | CC-1,2,7, SED-4,5,0,7,8, HAB-5,5,0, S1L-5,4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                               | Flood Hazard Mitigation and Riverine Ecosystem<br>Restoration Program                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                               | Army Corps of Engineers, DOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Description:                  | This program focuses on identifying sustainable solutions to flooding problems by examining<br>nonstructural solutions in flood-prone areas, while retaining traditional measures where<br>appropriate. The program will create a framework for more effective federal coordination of<br>flood programs and will create partnerships with communities to develop solutions to<br>flooding problems. Eligible projects will meet the dual purpose of flood hazard mitigation and<br>riverine ecosystem restoration. Projects might include the relocation of threatened structures,<br>conservation or restoration of wetlands and natural floodwater storage areas and planning for<br>responses to potential future floods. |
| Eligibility:                  | Local governments.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Types of assistance:          | Cost-share between federal and local governments.<br>Available funds: cost-share funds will not be available through this program until FY01<br>(starting October 2000).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Contact:                      | Morro Bay ACOE, (213) 452-3836                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Corresponding Actions:</b> | CC-1,2; SED-5,8; HAB-5,6,7,8; STL-4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Description:                  | Flood Plain Management Services<br>Army Corps of Engineers, DOD<br>CFDA number 12.104<br>This program promotes appropriate recognition of flood hazards in land and water use<br>planning and development through the provision of flood and flood plain related data,<br>technical services and guidance.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Eligibility:                  | States, political subdivisions of States, other nonfederal public organizations and the public.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Types of assistance:          | Provision of specialized services.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Available funds:              | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Contact:                      | Morro Bay ACOE (213) 452-3836                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Corresponding Actions:</b> | CC-1,2,7; SED-4,5,6,7,8; HAB-1,2,3,5,6,7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Description                   | Protection, Clearing, and Straightening of Channels<br>Army Corps. of Engineers, DOD<br>CFDA number 12.109<br>This program provides funds to restore channels for purposes of pavigation and flood                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Elioihility:                  | control. Projects can include clearing logians and restoring channels.<br>States and political subdivisions with the authority to implement projects.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Types of assistance:          | Provision of specialized services.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Available funds:              | Not known.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



| Contact:                      | Morro Bay ACOE, (213) 452-3836                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Corresponding Actions:</b> | CC-2; SED-5,8; HAB-5                                                                                                                                                                                                                                                                                                                                                                |
| Description:                  | <b>Clean Vessel Act</b><br>Fish and Wildlife Service, DOI<br>CFDA number 15.616<br>This program grants funds to coastal States to survey and plan for installing and constructing                                                                                                                                                                                                   |
|                               | pumpout/dump stations, and to develop an education program to prevent recreational boat sewage in U.S waters.                                                                                                                                                                                                                                                                       |
| Eligibility:                  | Coastal States.                                                                                                                                                                                                                                                                                                                                                                     |
| Types of assistance:          | Project grants.                                                                                                                                                                                                                                                                                                                                                                     |
| Available funds:              | Range of financial assistance \$1,000 to \$672,000, average \$170,909.                                                                                                                                                                                                                                                                                                              |
| Contact:                      | U.S. Fish and Wildlife Service, (503) 231-6128                                                                                                                                                                                                                                                                                                                                      |
| <b>Corresponding Actions:</b> | BACT-2,5; EDU-2                                                                                                                                                                                                                                                                                                                                                                     |
|                               | Coastal Program<br>Fish and Wildlife Service, DOI                                                                                                                                                                                                                                                                                                                                   |
| Description:                  | This program works to conserve healthy coastal habitats for the benefit of fish, wildlife, and people. The program forms cooperative partnerships designed to (1) protect coastal habitats through conservation easements and acquisitions; (2) restore coastal wetlands, uplands, and riparian areas; and (3) remove barriers to fish passage in coastal watersheds and estuaries. |
| Eligibility:                  | Projects on either public or private land in coastal watersheds.                                                                                                                                                                                                                                                                                                                    |
| Types of assistance:          | In kind services and federal project match.                                                                                                                                                                                                                                                                                                                                         |
| Available funds:              | FY98 - \$7 million, FY99 - \$7.1 million and FY00 - \$8.8 million.                                                                                                                                                                                                                                                                                                                  |
| Contact:                      | Fish and Wildlife Headquarters (703) 358-2201                                                                                                                                                                                                                                                                                                                                       |
| Corresponding Actions:        | CC-1,5; SED-5,8; HAB-2,5,6,8,9,10; STL-1,2,3,4,                                                                                                                                                                                                                                                                                                                                     |
| Description:                  | National Boating Infrastructure Grant Program<br>Fish and Wildlife Service, DOI<br>This program funds States to install or upgrade transient tie-up facilities for recreational                                                                                                                                                                                                     |
|                               | boats 26 feet or more in length.                                                                                                                                                                                                                                                                                                                                                    |
| Eligibility:                  | States.                                                                                                                                                                                                                                                                                                                                                                             |
| Types of assistance:          | Program grants.                                                                                                                                                                                                                                                                                                                                                                     |
| Available funds:              | \$32 million nationwide.                                                                                                                                                                                                                                                                                                                                                            |
| Contact:                      | Fish and Wildlife Service Portland Office (503) 231-6128                                                                                                                                                                                                                                                                                                                            |
| <b>Corresponding Actions:</b> | BACT-3,4; HMT 2,3                                                                                                                                                                                                                                                                                                                                                                   |
|                               |                                                                                                                                                                                                                                                                                                                                                                                     |



|                        | National Coastal Wetlands Conservation Grants<br>(Coastal Wetlands Planning, Protection and Restoration Act Program)<br>Fish and Wildlife Service, DOI<br>CFDA number 15.614 |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description:           | This program provides grant funds to carry out coastal wetlands conservation projects such as restoring impacted wetlands and acquiring new wetlands for protection.         |
| Eligibility:           | Coastal States.                                                                                                                                                              |
| Types of assistance:   | Project grants.                                                                                                                                                              |
| Available funds:       | \$8,500,000 total. Individual grants range from \$90,000 to \$1,000,000. 50% to 100% cost share.                                                                             |
| Contact:               | Fish and Wildlife Service Portland Office, (503) 231-6128.                                                                                                                   |
| Corresponding Actions: | CC-1,5,7; SED-8; HAB-3,5,6,7,9                                                                                                                                               |

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|                               | North American Wetlands Conservation Act Grants Program<br>(Pacific Coast Joint Venture Program)<br>Fish and Wildlife Service, DOI                                                                                                                                                                                                                                                        |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> :          | This plan is an international agreement between the U.S., Canada and Mexico for the long-term protection of wetland/upland habitats on which waterfowl and other migratory birds in North America depend. Both the Standard and Small Grants programs help deliver funding to on-the-ground projects through the protection, restoration, or enhancement of an array of wetland habitats. |
| Eligibility:                  | Public or private, profit or nonprofit entities or individuals establishing public-private sector partnerships                                                                                                                                                                                                                                                                            |
| Types of assistance:          | Project grants.                                                                                                                                                                                                                                                                                                                                                                           |
| Available funds:              | FY98 standard \$41.5 million/small \$0.5 million, FY99 standard \$37.7 million/small \$0.7 million, and FY00 standard \$43.8 million/small \$0.75 million.                                                                                                                                                                                                                                |
| Contact:                      | Fish and Wildlife Portland Office (503) 231-6164                                                                                                                                                                                                                                                                                                                                          |
| <b>Corresponding Actions:</b> | HAB-1,2,4,6,7,8,9                                                                                                                                                                                                                                                                                                                                                                         |

| Description:                  | Partners for Fish and Wildlife Habitat Restoration<br>Fish and Wildlife Service, DOI<br>This program focuses on restoring former and degraded wetlands, native grasslands, stream<br>and riparian areas, and other habitats to conditions as natural as feasible. Under cooperative<br>agreements, private landowners agree to maintain restoration projects, but otherwise retain<br>full control of the land. |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Eligibility:                  | Private landowners.                                                                                                                                                                                                                                                                                                                                                                                             |
| Types of assistance:          | Project and service 50% cost-share.                                                                                                                                                                                                                                                                                                                                                                             |
| Available funds:              | FY98 \$12.8 million, FY99 \$16.3 million and FY00 \$18 million.                                                                                                                                                                                                                                                                                                                                                 |
| Contact:                      | Fish and Wildlife Portland Office (503) 231-6164                                                                                                                                                                                                                                                                                                                                                                |
| <b>Corresponding Actions:</b> | CC-1; SED-4,5; HAB-6,7; EDU-1,3                                                                                                                                                                                                                                                                                                                                                                                 |



|                        | Sport Fish Restoration (Dingell-Johnson Program)<br>Fish and Wildlife Service, DOI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description:           | CFDA number 15.605<br>This program funds projects designed to restore and manage sport fish populations for the<br>preservation and improvement of sport fishing. Types of funded projects include habitat<br>improvement, fishery research, and fish surveys and inventories.                                                                                                                                                                                                                                                                                                                                                                                                  |
| Eligibility:           | State fish and wildlife agencies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Types of assistance:   | Formula grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Available funds:       | \$257,447,000. Average amount of financial assistance: \$4,800,000.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Contact:               | U.S. Fish and Wildlife Service, (503) 231-2047                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Corresponding Actions: | CC-5; SED-5,6,8; FLOW-2,4; HAB-1,2,3,4,5,6,7,8,9,10; STL-1,2,3,4;<br>Research components of Monitoring Plan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Description:           | Wildlife Conservation and Appreciation Program<br>(Partnerships for Wildlife Act)<br>Fish and Wildlife Service, DOI<br>This program provides grants to fund projects that bring together the U.S. Fish and Wildlife<br>Service, state agencies, and private organizations and individuals. Projects include<br>identification of significant problems that can adversely affect fish and wildlife and their<br>habitats, actions to conserve species and their habitats, actions that will provide opportunities<br>for the public to use and enjoy fish and wildlife through non-consumptive activities,<br>monitoring of species, and identification of significant habitats. |
| Eligibility:           | State fish and wildlife agencies, private organizations and individuals must work with their state agency.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Types of assistance:   | Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Available funds:       | FY98 - \$768,000, FY99 - \$768,000 and FY00 - \$768,000 (estimated).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Contact:               | Fish and Wildlife Portland Office (503) 231-6128                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Corresponding Actions: | CC-5; HAB-4; STL-1,2,3,4; EDU-2,8,9; Research components of Monitoring Plan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                        | Boating Safety Financial Assistance<br>Coast Guard, DOT<br>CFDA number 20.005                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Description:           | This program provides greater State participation and uniformity in boating safety, and<br>permits States to assume the greater share of boating safety education, assistance, and<br>enforcement activities, as well as assists States in developing, carrying out and financing their<br>recreational boating safety programs.                                                                                                                                                                                                                                                                                                                                                |
| Eligibility:           | States having a Coast Guard approved boating safety program. Nonprofit public service organizations may apply and receive a combined total of up to 5 percent of the funds available in any 1 year.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Types of assistance:   | Formula grants, project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Available funds:       | States \$173,000 to \$2,595,000, average \$518,000. Organizations \$10,000 to \$396,286, average \$95,000.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Contact:               | Coast Guard State Program (202) 267-0857;<br>Nonprofit organization (202) 267-0954                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



| Corresponding Actions:        | BACT-3,4,5; HMT-2; EDU-2,8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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|                               | Capitalization Grants for Clean Water Revolving Fund<br>Environmental Protection Agency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Description:                  | This program provides loans for high-priority water quality activities. As loan recipients make<br>payments back into the fund, money is available for new loans to be issued to other<br>recipients. These loans have been traditionally used to build wastewater treatment facilities,<br>but may be used for other water quality management and source water protection activities,<br>including (1) agricultural, silviculture, rural and urban runoff control; (2) estuary<br>improvement projects; (3) wet weather flow control, including stormwater and sewer<br>overflows; (4) alternative wastewater treatment technologies; and (5) landfills and riparian<br>buffers. |
| Eligibility:                  | States lend money to municipalities for wastewater treatment systems and to municipalities, communities, citizens' groups, nonprofit organizations, and citizens for implementing NPS and estuary management activities (provided for in state plans developed under CWA secs. 319 and 320).                                                                                                                                                                                                                                                                                                                                                                                      |
| Types of assistance:          | Loans.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Available funds:              | \$122 million regionally in FY99.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Contact:                      | Environmental Protection Agency, Region 9 (415) 744-1948                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Corresponding Actions:        | CC-3,4; SED-1,2,3,4,7; BACT-1,9; NUTR-1,2,3,4; FLOW-1,2,3,4;<br>HMT-1,2; HAB-6; STL-4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                               | Environmental Education Grants Program<br>Environmental Protection Agency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Description:                  | This program provides financial support for projects that design, demonstrate, or disseminate<br>environmental education practices, methods, or techniques. Projects must focus on one of the<br>following: (1) improving environmental education teaching skills; (2) educating teachers,<br>students, or the public about human health problems; (3) building state, local, or tribal<br>government capacity to develop environmental education programs; (4) educating<br>communities through community-based organization; or (5) educating the public through<br>print, broadcast, or other media.                                                                           |
| Eligibility:                  | Local and state education agencies, academic institutions, nonprofit organizations, state environmental agencies, and noncommercial education broadcasting agencies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Types of assistance:          | Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Available funds:              | \$160,000 regionally in FY99.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Contact:                      | Environmental Protection Agency, Region 9 (415) 744-1161                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Corresponding Actions:</b> | CC-6,7; EDU-1,2,3,4,5,6,7,8,9,10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                               | Environmental Justice Grants to Small Community Groups<br>Environmental Protection Agency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Description:                  | This program provides financial assistance to community-based organizations and tribal governments to support projects to design, demonstrate, or disseminate practices, methods, or techniques related to environmental justice on the local level. Grants may be used for (1) education and awareness programs, (2) environmental justice programs (e.g., river monitoring and pollution prevention), (3) technical assistance in accessing available public information, and (4) technical assistance with gathering and interpreting existing environmental justice data.                                                                                                     |

| Eligibility:                                                                                                                                                           | Community-based nonprofit organizations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Types of assistance:                                                                                                                                                   | Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Available funds:                                                                                                                                                       | FY98 - \$2.5 million, FY99 - \$2.0 million and FY00 - \$1.6 million.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Contact:                                                                                                                                                               | Environmental Protection Agency, Region 9 (415) 744-1565                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Corresponding Actions:</b>                                                                                                                                          | CC-6,7; EDU-1,2,3,4,6,7,8,9,10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                        | Environmental Justice Through Pollution<br>Prevention Grants Program<br>Environmental Protection Agency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Description:                                                                                                                                                           | This program provides financial assistance to low-income and people-of-color communities<br>to implement pollution prevention activities. EPA strongly encourages cooperative efforts<br>among communities, business, industry, and government to address common pollution<br>prevention goals. Projects funded under this grant program may involve public education,<br>training, demonstration projects, and public or private partnerships, as well as approaches to<br>develop, evaluate, and demonstrate non-regulatory strategies and technologies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Eligibility:                                                                                                                                                           | Nonprofit organizations, State and local governments and academic institutions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Types of assistance:                                                                                                                                                   | Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Available funds:                                                                                                                                                       | FY98 - \$4 million, FY99 - \$0.75 million and FY00 - \$1.1 million.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Contact:                                                                                                                                                               | Environmental Protection Agency, Region 9 (415) 744-2190                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Corresponding Actions:</b>                                                                                                                                          | CC-6,7; EDU-1,2,3,4,6,7,8,9,10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Description:                                                                                                                                                           | Five-Star Restoration Program<br>Environmental Protection Agency<br>This program funds projects with strong on-the-ground habitat restoration components which<br>provide long-term ecological, educational, and/or socioeconomic benefits to people and their<br>communities. Preference will be given to projects that are part of a larger watershed or                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Description:                                                                                                                                                           | <b>Five-Star Restoration Program</b><br>Environmental Protection Agency<br>This program funds projects with strong on-the-ground habitat restoration components which<br>provide long-term ecological, educational, and/or socioeconomic benefits to people and their<br>communities. Preference will be given to projects that are part of a larger watershed or<br>community stewardship effort and include a description of long-term management activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Description:<br>Eligibility:                                                                                                                                           | <b>Five-Star Restoration Program</b><br>Environmental Protection Agency<br>This program funds projects with strong on-the-ground habitat restoration components which<br>provide long-term ecological, educational, and/or socioeconomic benefits to people and their<br>communities. Preference will be given to projects that are part of a larger watershed or<br>community stewardship effort and include a description of long-term management activities.<br>Any public or private entity that engages in community-based restoration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Description:<br>Eligibility:<br>Types of assistance:                                                                                                                   | Five-Star Restoration Program<br>Environmental Protection Agency<br>This program funds projects with strong on-the-ground habitat restoration components which<br>provide long-term ecological, educational, and/or socioeconomic benefits to people and their<br>communities. Preference will be given to projects that are part of a larger watershed or<br>community stewardship effort and include a description of long-term management activities.<br>Any public or private entity that engages in community-based restoration.<br>Project grants and technical support.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:                                                                                               | Five-Star Restoration Program<br>Environmental Protection Agency<br>This program funds projects with strong on-the-ground habitat restoration components which<br>provide long-term ecological, educational, and/or socioeconomic benefits to people and their<br>communities. Preference will be given to projects that are part of a larger watershed or<br>community stewardship effort and include a description of long-term management activities.<br>Any public or private entity that engages in community-based restoration.<br>Project grants and technical support.<br>FY99 - \$500,000 and FY00 - \$500,000.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:                                                                                   | <ul> <li>Five-Star Restoration Program<br/>Environmental Protection Agency</li> <li>This program funds projects with strong on-the-ground habitat restoration components which<br/>provide long-term ecological, educational, and/or socioeconomic benefits to people and their<br/>communities. Preference will be given to projects that are part of a larger watershed or<br/>community stewardship effort and include a description of long-term management activities.</li> <li>Any public or private entity that engages in community-based restoration.</li> <li>Project grants and technical support.</li> <li>FY99 - \$500,000 and FY00 - \$500,000.</li> <li>Environmental Protection Agency (202) 260-8076</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:<br>Corresponding Actions:                                                         | <ul> <li>Five-Star Restoration Program<br/>Environmental Protection Agency</li> <li>This program funds projects with strong on-the-ground habitat restoration components which<br/>provide long-term ecological, educational, and/or socioeconomic benefits to people and their<br/>communities. Preference will be given to projects that are part of a larger watershed or<br/>community stewardship effort and include a description of long-term management activities.</li> <li>Any public or private entity that engages in community-based restoration.</li> <li>Project grants and technical support.</li> <li>FY99 - \$500,000 and FY00 - \$500,000.</li> <li>Environmental Protection Agency (202) 260-8076</li> <li>CC-6,7; SED-1,2,3,4,5,6,7; NUT-3,4; HMT-1,3;FLOW-3; HAB-4,5,8,10; BACT-8;<br/>STL-1,2,3,4; EDU-1,2,3,4,5,6,7,8,9,10,11;</li> </ul>                                                                                                                                                                                                                                                                                           |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:<br>Corresponding Actions:                                                         | <ul> <li>Five-Star Restoration Program Environmental Protection Agency This program funds projects with strong on-the-ground habitat restoration components which provide long-term ecological, educational, and/or socioeconomic benefits to people and their communities. Preference will be given to projects that are part of a larger watershed or community stewardship effort and include a description of long-term management activities. Any public or private entity that engages in community-based restoration. Project grants and technical support. FY99 - \$500,000 and FY00 - \$500,000. Environmental Protection Agency (202) 260-8076 CC-6,7; SED-1,2,3,4,5,6,7; NUT-3,4; HMT-1,3;FLOW-3; HAB-4,5,8,10; BACT-8; STL-1,2,3,4; EDU-1,2,3,4,5,6,7,8,9,10,11; </li> <li>Jobs Through Recycling Environmental Protection Agency</li></ul>                                                                                                                                                                                                                                                                                                     |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:<br>Corresponding Actions:<br>Description:                                         | <ul> <li>Five-Star Restoration Program<br/>Environmental Protection Agency</li> <li>This program funds projects with strong on-the-ground habitat restoration components which<br/>provide long-term ecological, educational, and/or socioeconomic benefits to people and their<br/>communities. Preference will be given to projects that are part of a larger watershed or<br/>community stewardship effort and include a description of long-term management activities.<br/>Any public or private entity that engages in community-based restoration.</li> <li>Project grants and technical support.</li> <li>FY99 - \$500,000 and FY00 - \$500,000.</li> <li>Environmental Protection Agency (202) 260-8076</li> <li>CC-6,7; SED-1,2,3,4,5,6,7; NUT-3,4; HMT-1,3;FLOW-3; HAB-4,5,8,10; BACT-8;<br/>STL-1,2,3,4; EDU-1,2,3,4,5,6,7,8,9,10,11;</li> <li>Jobs Through Recycling<br/>Environmental Protection Agency</li> <li>This program funds recycling/reuse businesses that increase the use of recyclable or reusable<br/>materials and contribute to economic development and job creation.</li> </ul>                                              |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:<br>Corresponding Actions:<br>Description:<br>Eligibility:                         | <ul> <li>Five-Star Restoration Program<br/>Environmental Protection Agency</li> <li>This program funds projects with strong on-the-ground habitat restoration components which<br/>provide long-term ecological, educational, and/or socioeconomic benefits to people and their<br/>communities. Preference will be given to projects that are part of a larger watershed or<br/>community stewardship effort and include a description of long-term management activities.<br/>Any public or private entity that engages in community-based restoration.</li> <li>Project grants and technical support.</li> <li>FY99 - \$500,000 and FY00 - \$500,000.</li> <li>Environmental Protection Agency (202) 260-8076</li> <li>CC-6,7; SED-1,2,3,4,5,6,7; NUT-3,4; HMT-1,3;FLOW-3; HAB-4,5,8,10; BACT-8;<br/>STL-1,2,3,4; EDU-1,2,3,4,5,6,7,8,9,10,11;</li> <li>Jobs Through Recycling<br/>Environmental Protection Agency</li> <li>This program funds recycling/reuse businesses that increase the use of recyclable or reusable<br/>materials and contribute to economic development and job creation.</li> <li>States and nonprofit organizations.</li> </ul> |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:<br>Corresponding Actions:<br>Description:<br>Eligibility:<br>Types of assistance: | <ul> <li>Five-Star Restoration Program Environmental Protection Agency This program funds projects with strong on-the-ground habitat restoration components which provide long-term ecological, educational, and/or socioeconomic benefits to people and their communities. Preference will be given to projects that are part of a larger watershed or community stewardship effort and include a description of long-term management activities. Any public or private entity that engages in community-based restoration. Project grants and technical support. FY99 - \$500,000 and FY00 - \$500,000. Environmental Protection Agency (202) 260-8076 CC-6,7; SED-1,2,3,4,5,6,7; NUT-3,4; HMT-1,3;FLOW-3; HAB-4,5,8,10; BACT-8; STL-1,2,3,4; EDU-1,2,3,4,5,6,7,8,9,10,11; Jobs Through Recycling Environmental Protection Agency This program funds recycling/reuse businesses that increase the use of recyclable or reusable materials and contribute to economic development and job creation. States and nonprofit organizations. Project grants.</li></ul>                                                                                          |



| Contact:                           | Environmental Protection Agency, Region 9 (415) 744-2131                                                                                                                                                                                                                                                                                                                                                  |
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| <b>Corresponding Actions:</b>      | HMT-1,4; EDU-10                                                                                                                                                                                                                                                                                                                                                                                           |
|                                    | Nonpoint Source Implementation Grants<br>Environmental Protection Agency                                                                                                                                                                                                                                                                                                                                  |
| Description:                       | This program supports nonpoint source pollution reduction projects and general water<br>quality projects for natural resources in a watershed. Examples of previously funded projects<br>include installation of best management practices (BMPs) for animal waste, design and<br>implementation of BMP systems for stream, lake, and estuary watersheds; and basin-wide<br>landowner education programs. |
| Eligibility:                       | State and local governments, and nonprofit organizations.                                                                                                                                                                                                                                                                                                                                                 |
| Types of assistance:               | Formula grants.                                                                                                                                                                                                                                                                                                                                                                                           |
| Available funds:                   | FY00 - \$10.6 million for CA.                                                                                                                                                                                                                                                                                                                                                                             |
| Contact:<br>Corresponding Actions: | Environmental Protection Agency, Region 9 (415) 744-1966<br>CC-3,5,6,7; SED-1,2,3,4,5,6,7,8; BACT-1,2,3,4,5,6,7,8; NUTR-3,4, HMT-1,2,4;<br>EDU-3,4,6; HAB-4,8,10                                                                                                                                                                                                                                          |
|                                    | Pesticide Environmental Stewardship Grants<br>Environmental Protection Agency                                                                                                                                                                                                                                                                                                                             |
| Description:                       | This program forms voluntary partnerships with pesticide users to reduce the risks from pesticides in agricultural and non-agricultural settings, and implement pollution prevention measures.                                                                                                                                                                                                            |
| Eligibility:                       | Partners and supporters of the Pesticide Environmental Stewardship Program (PESP).                                                                                                                                                                                                                                                                                                                        |
| <b>Types of assistance:</b>        | Project grants.                                                                                                                                                                                                                                                                                                                                                                                           |
| Available funds:                   | FY98 - \$347,220, FY99 - \$413,080 and FY00 - \$498,000.                                                                                                                                                                                                                                                                                                                                                  |
| Contact:                           | Environmental Protection Agency, Region 9 (415) 744-1068                                                                                                                                                                                                                                                                                                                                                  |
| <b>Corresponding Actions:</b>      | SED-4; EDU-3,4,5,7                                                                                                                                                                                                                                                                                                                                                                                        |
|                                    | Pollution Prevention Incentives for States<br>Environmental Protection Agency                                                                                                                                                                                                                                                                                                                             |
| Description:                       | This program is focused on institutionalizing multimedia (air, water, land) pollution<br>prevention as an environmental management priority, establishing prevention goals, providing<br>direct technical assistance to businesses, conducting outreach, and collecting and analyzing<br>data.                                                                                                            |
| Eligibility:                       | States.                                                                                                                                                                                                                                                                                                                                                                                                   |
| Types of assistance:               | Project grants.                                                                                                                                                                                                                                                                                                                                                                                           |
| Available funds:                   | \$475,000 regionally in FY00.                                                                                                                                                                                                                                                                                                                                                                             |
| Contact:                           | Environmental Protection Agency, Region 9 (415) 744-2190                                                                                                                                                                                                                                                                                                                                                  |
| Corresponding Actions:             | CC-3,4; SED-1,2,4,7; BACT-1,2,3,4,5,6,7,8,9; NUTR-1,2,3,4;<br>HMT-1,2,3,4; EDU-1,2,3,4,10,11                                                                                                                                                                                                                                                                                                              |



|                                    | Science to Achieve Results<br>Environmental Protection Agency                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description:                       | This program provides for research in the following six areas: (1) Safe Drinking Water (includes source water protection), (2) High Priority Air Pollutants, (3) Research to Improve Human Health Risk Assessment, (4) Research to Improve Ecological Risk Assessment, (5) Emerging Issues, and (6) Pollution Prevention and New Technologies. The STAR program is intended to facilitate cooperation between EPA and the scientific community to help forge solutions to environmental problems. |
| Eligibility:                       | States, public and private universities and colleges, hospitals, laboratories, state and local government departments, other public or private nonprofit institutions, and individuals.                                                                                                                                                                                                                                                                                                           |
| Types of assistance:               | Research grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Available funds:                   | FY98 - \$100 million, FY99 - \$100 million and FY00 - \$100 million.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Contact:<br>Corresponding Actions: | Environmental Protection Agency (800) 490-9194<br>CC-3,4; SED-1,3,4,5,7; BACT-1,6,9; NUTR-2,3,4; HMT-2;<br>HAB-4,7,9,10; STL-1; EDU-11; Research components of Monitoring Plan                                                                                                                                                                                                                                                                                                                    |
|                                    | Small Business Innovation and Research<br>Environmental Protection Agency                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Description:                       | This program contracts funding to small businesses for environmental innovation.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Eligibility:                       | Small businesses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Types of assistance:               | Contracts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Available funds:                   | Phase 1- \$70,000 for 6 months, Phase 2 - \$295,000 for 2 years.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Contact:                           | Environmental Protection Agency, Region 9 (415) 744-1148                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Corresponding Actions:             | CC-4,5; SED-1,3,4,5,7,8; BACT-1,2,6,7; NUTR-1,2,3,4; FLOW-1,4; HMT-1,2,3,4; HAB-1,2,3,7; STL-2,3,4                                                                                                                                                                                                                                                                                                                                                                                                |
| Description:                       | Sustainable Development Challenge Grants (SDCG)<br>Environmental Protection Agency<br>This program encourages community groups, businesses and government agencies to work<br>together on sustainable efforts that protect the local environment and conserve natural<br>resources while supporting a healthy economy and an improved quality of life.                                                                                                                                            |
| Eligibility:                       | Local governments, academic institutions, nonprofit organizations and States.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Types of assistance:               | Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Available funds:                   | FY98 - \$15 million, FY99 - \$15 million and FY00 - \$15 million.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Contact:                           | Environmental Protection Agency (415) 744-2178                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Corresponding Actions:             | CC-1; SED-1,3,4,5,7; BAC1-1,2,8; NUTR-1,3,4; FLOW-1,3, HMT-2,3,4,<br>HAB-5,6,7; STL-1,2,3,4; EDU-1,2,3,5,8,9,10                                                                                                                                                                                                                                                                                                                                                                                   |
|                                    | Water Quality<br>Environmental Protection Agency                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Description:                       | This program supports critical National Pollutant Discharge Elimination System (NPDES) water quality related projects. Emphasis is directed toward the prevention, reduction and elimination of watershed pollution.                                                                                                                                                                                                                                                                              |
| Eligibility:                       | State water quality agencies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

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| Types of assistance:          | Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| Available funds:              | \$1.3 million annually.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Contact:                      | Environmental Protection Agency, Region 9 (415) 744-1874                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Corresponding Actions:        | CC-3,4; NUTR-1,2; FLOW-1,4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                               | Water Quality Assessment and Planning<br>Environmental Protection Agency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Description:                  | This program supports water quality assessment and planning projects leading to implementable actions that promote healthy aquatic ecosystems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Eligibility:                  | State water quality agencies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Types of assistance:          | \$500,000 in CA for EV00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Available funds:              | Five commental Protection Agency, Pagion 9 (415) 744 2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Contact:                      | Environmental Protection Agency, Region 9 (415) $744-2015$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Corresponding Actions:</b> | STL-1,2,3,4; FLOW-1,2,3;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                               | Watershed Assistance Grants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Description:                  | Environmental Protection Agency<br>This program funds projects which pose water quality issues including habitat loss and<br>nonpoint source pollution from urban, rural, and rapidly growing areas. Funding can also<br>support organizational development and capacity building for watershed partnerships with                                                                                                                                                                                                                                                                                                                                            |
|                               | diverse membership.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Eligibility:                  | Project cronts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Types of assistance:          | Floject grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Available funds:              | F = 198 - 50.5 minimon, $F = 199 - 50.5$ minimon and $F = 100 - 50.6$ minimon.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Contact:                      | Environmental Protection Agency (202) 200-4558                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Corresponding Actions:</b> | CC-6,7; EDU- 1,2,3,4,5,6,7,8,9,10,11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                               | Wetland Protection Grants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Description:                  | Environmental Protection Agency<br>This program provides financial assistance to State and local governments to support<br>development of new, or augmentation and enhancement of existing wetland programs.<br>Projects must clearly demonstrate a direct link to an increase in the State's or local<br>government's ability to protect its wetland recourses                                                                                                                                                                                                                                                                                              |
| Flightlift                    | States and local governments, and intergovernmental organizations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Types of assistance:          | Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Available funds:              | FY99 - \$1,500.000 regionally.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Contact:                      | Environmental Protection Agency, Region 9 (415) 744-2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Corresponding Actions:        | CC-5; SED-2,8; HAB-1,2,3,4,5,6,7,8,9,10; STL-1,2,3,4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Corresponding Actions.        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                               | Flood Mitigation Service<br>Federal Emergency Management Agency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Description:                  | This program helps states and communities identify and implement measures to reduce or<br>eliminate the long-term risk of flood damage to homes and other structures insurable under<br>the National Flood Insurance Program (NFIP). Projects may include: (1) elevation,<br>relocation, or demolition of insured structures; (2) acquisition of insured structures and<br>property; (3) dry flood proofing of insured structures; (4) minor, localized structural projects<br>that are not fundable by state or other federal programs (erosion-control and drainage<br>improvements); and (5) beach nourishment activities such as planting of dune grass. |

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| Eligibility:                  | State agencies, participating NFIP communities, or qualified local organizations.                                                                                                                                                                                                                                                                                                                                                                                                           |
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| Types of assistance:          | Planning grants and project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Available funds:              | FY98 - \$20 million, FY99 - \$20 million, and FY00 - \$20 million.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Contact:                      | Federal Emergency Management Agency (202) 646-4621                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Corresponding Actions:</b> | CC-1,2; SED- 2,5,7                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                               | Hazard Mitigation Grant Program                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                               | Federal Emergency Management Agency                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Description:                  | This program helps states and communities implement long-term hazard mitigation measures following a major disaster declaration. The program's objectives are to prevent or reduce the loss of life and property from natural hazards, to implement state or local hazard mitigation plans, to enable mitigation measures to be implemented during immediate recovery from a disaster, and to provide funding for previously identified mitigation measures that benefit the disaster area. |
| Eligibility:                  | State and local governments, certain private nonprofit organizations or institutions.                                                                                                                                                                                                                                                                                                                                                                                                       |
| Types of assistance:          | Project grants (match of funds or in-kind services required). FEMA can fund up to 75 percent of total eligible costs.                                                                                                                                                                                                                                                                                                                                                                       |
| Available funds:              | FY98 - \$415 million, FY99 - \$216 million and FY00 funding levels will depend on disaster declarations.                                                                                                                                                                                                                                                                                                                                                                                    |
| Contact:                      | Federal Emergency Management Agency (202) 646-4621                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Corresponding Actions:</b> | CC-1,2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                               | Project Impact<br>Federal Emergency Management Agency<br>CFDA number 83.551                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Description:                  | This is a new program designed to encourage the implementation of sustained, pre-disaster mitigation programs by states and communities. Examples of projects are elevation of structures and facilities, evacuating flood plain of development, relocating structures out of the floodplain.                                                                                                                                                                                               |
| Eligibility:                  | Any community, state, or jurisdictions with Project Impact communities.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Types of assistance:          | Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Available funds:              | \$300,000 per Project Impact community.                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Contact:                      | FEMA Region 10 (425) 487-4784                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Corresponding Actions:</b> | CC-2; SED-5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Description                   | <b>Rivers, Trails, and Conservation Assistance Program</b><br><i>National Park Service</i><br>This program provides technical assistance in landscape architecture, community planning, or                                                                                                                                                                                                                                                                                                  |
| Description:                  | natural resource management through facilitation and public involvement to conserve river corridors and watersheds, as well as establish trails and greenways.                                                                                                                                                                                                                                                                                                                              |
| Eligibility:                  | Technical assistance                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Types of assistance:          | Rivers & Trails does not give grants or loans. Bather, the program supplies a staff person                                                                                                                                                                                                                                                                                                                                                                                                  |
| Available funds:              | with extensive experience in community-based conservation to work with a local group on a project for a preset duration, typically one to three years during a project's infancy.                                                                                                                                                                                                                                                                                                           |
| Contact:                      | CC-5: SED-5 8: BACT-8: HAB-1 2 3 5 6 7 8 9 10: STL-1 2 3 4: EDIL-1 3 8 9                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Corresponding Actions:        | ~~~~, 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |



| Sustainable Agriculture Research and Education<br>Cooperative State Research, Education and Extension Service, USDA<br>This program facilitates and increases scientific investigation and education to reduce the use<br>of chemical pesticides, fertilizers, and toxic materials in agricultural production; improves<br>management of on-farm resources to enhance productivity, profitability, and competitiveness;<br>promotes crop, livestock, and enterprise diversification and to facilitate the research of<br>agricultural production systems located in areas that possess various soil, climatic, and<br>physical characteristics; studies farms that have been and continue to be managed using farm<br>practices that optimize the use of on-farm resources and conservation practices; and<br>private research and extension institutions.<br>Universities, state agricultural experiment stations, State cooperative extension services,<br>nonprofit organizations, individuals with demonstrable expertise, and federal or state<br>governmental entities. Producers are eligible for a separate small grants program. |
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| Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| FY98 - \$11.3 million, FY99 - \$11.3 million and FY00 - \$11.3 million.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Department of Agriculture (202) 720-5203                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| SED-4; BACT-1; NUTR-3,4; EDU-3,4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Water Quality Special Research Grants Program<br>Cooperative State Research, Education and Extension Service, USDA<br>The program directly targets the identification and resolution of agriculture-related water<br>quality degradation. Eligible proposals will provide watershed-based information that can be<br>used to assess sources of water quality impairment in targeted watersheds; develop and/or<br>recommend options for continued improvement of water quality in targeted watersheds; and<br>evaluate the relative costs and benefits associated with cleanup to all responsible sectors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Federal, State and local governments, academic and nonprofit institutions, and profit making firms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| FY98 - \$3.4 million for research; \$9.6 million for extension and outreach,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| FY00 - \$13 million (estimated): In FY00, the research and extension grant funds will be<br>combined into one competitive program.<br>Department of Agriculture (202) 401-5971<br>SED-4,7; BACT-1; NUTR-3,4; EDU-3,4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Conservation Reserve Program (CRP)<br>Farm Service Agency, USDA<br>CFDA number 10.069<br>This program reduces soil erosion and sedimentation, improves water quality, and creates                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| better habitat for wildlife. It encourages farmers and ranchers to convert marginally productive, environmentally sensitive land to vegetative cover such as native grasses, wildlife plantings, trees, filter strips, or riparian buffers. Farmers receive an annual rental payment for the term of the 10–15 year contract.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Individuals, partnerships, associations, estates, business enterprises, states, or political jurisdictions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Direct payments for specified use.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| \$1,694,142,000 total. Project range is from \$50 to \$50,000 per person.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| San Luis Obispo FSA office (805) 434-0398                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| Notes:                             | To qualify owners must identify marginal pastureland that is suitable for use as a riparian<br>buffer to be planted to trees. Acreage must also be determined by NRCS to be eligible and<br>sustainable for riparian buffers, salt tolerant vegetation, or shallow water areas for wildlife.<br>Rental rates, based on soil type, have been established for the North Coast Basin. The<br>maximum rate is calculated in advance of enrollment. An additional incentive of up to 20% of<br>the soil rental rate is offered for riparian buffers. |
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| Corresponding Actions:             | CC-1,2,5; SED-2,4,7,8; HAB-5,6,7; STL-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                    | Conservation Reserve Enhancement Program (CREP) Farm Service Agency, USDA                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Description:                       | This program supplements rent rates for recipients of CRP funds. Generally, CRP funds are significantly lower than fair market value, thereby limiting the willingness of farmers to enter the program. CREP creates more realistic financial compensation to farmers.                                                                                                                                                                                                                                                                          |
| Eligibility:                       | A landowner, landlord, operator, or tenant of eligible lands.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Types of assistance:               | Direct payments for specified use.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Available funds:                   | Not known.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Contact:                           | San Luis Obispo FSA office (805) 434-0398                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Corresponding Actions:</b>      | CC-1,2,5; SED-2,4,7,8; HAB-5,6,7; STL-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                    | Environmental Quality Incentives Program (EQIP)<br>Natural Resources Conservation Service, USDA<br>CFDA number 10.912                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Description:                       | This program offers technical, financial, and planning assistance to address soil, water, and related natural resource concerns on agricultural lands. Contracts provide incentive payments and cost sharing for practices such as manure management and riparian area fencing.                                                                                                                                                                                                                                                                 |
| Eligibility:                       | Individual or family farmers who face serious threats to soil, water, and related natural resources, or who need assistance with complying with federal or state environmental laws.                                                                                                                                                                                                                                                                                                                                                            |
| Types of assistance:               | Direct payments.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Available funds:                   | Fiscal Year 1999: \$174,000,000 total. \$10,000 per person per year, and \$50,000 total over length of project. Up to 75% cost share.                                                                                                                                                                                                                                                                                                                                                                                                           |
| Contact:                           | Morro Bay NRCS office (805) 772-4391                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Corresponding Actions:</b>      | SED-1,2,4,6,7,8; BACT-1; NUTR-3,4; HAB-2,5,6,8,9; STL-2,4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                    | Watershed Protection and Flood Prevention<br>Natural Resources Conservation Service, USDA<br>CFDA number 10.904                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Description:                       | This program provides technical and financial assistance in carrying out works of improvement to protect, develop, and utilize the land and water resources in small watersheds.                                                                                                                                                                                                                                                                                                                                                                |
| Eligibility:                       | Any state agency, county, municipality, SWCD, or nonprofit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Types of assistance:               | Project grants, advisory services and counseling.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Available funds:                   | \$99,000,000. Average amount of financial assistance: \$650,000. 50% to 100% cost share.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Contact:<br>Corresponding Actions: | Morro Bay NRCS office (805) 772-4391<br>CC-2,3,4,5,6,7; SED-1,2,3,4,5,6,7,8; BACT-9; NUTR-3,4;<br>FLOW-1,2,3,; STL-1,2,3,4; HAB-2,5,6,7,8,9,10                                                                                                                                                                                                                                                                                                                                                                                                  |
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|                               | Wotland Posonia Program (WPP)                                                                    |
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|                               | Natural Resources Conservation Service USDA                                                      |
|                               | CFDA number 10.072                                                                               |
| Description:                  | Eligible landowners may offer farmed wetlands, prior converted wetlands, wetlands farmed         |
| 2 coor prom                   | under natural conditions and certain other lands to be placed under a permanent or 30-year       |
|                               | easement or restoration agreement.                                                               |
| Eligibility:                  | An individual landowner, partnership, association, corporation, estate, trust, other business or |
|                               | other legal entities and, whenever applicable, a state, political subdivision thereof, or any    |
|                               | agency thereof owning private croplands.                                                         |
| Types of assistance:          | Direct payment for specified use.                                                                |
| Available funds:              | Fiscal Year 1999: \$127,741,000 total.                                                           |
| Contact:                      | Morro Bay NRCS office (805) 772-4391                                                             |
| <b>Corresponding Actions:</b> | CC-1,2,5; SED-7,8; HAB-6,8; STL-2,3,4                                                            |
|                               |                                                                                                  |
|                               | Wildlife Habitat Incentive Program (WHIP)                                                        |
|                               | Natural Resources Conservation Service, USDA                                                     |
|                               |                                                                                                  |
| Description:                  | threatened or endangered species, fish and other types of wildlife                               |
| Eligibility:                  | A landowner, landlord, operator, or tenant of eligible lands.                                    |
| Types of assistance:          | Direct payments for specified use.                                                               |
| Available funds:              | No funding in 2000. Limited to \$10,000 per contract. Up to 75% cost share.                      |
| Contact:                      | Morro Bay NRCS office (805) 772-4391                                                             |
| <b>Corresponding Actions:</b> | CC-1,5; SED-8; HAB-2,4,6,7,8; STL-1,2,3,4                                                        |
|                               |                                                                                                  |
|                               | Water and Waste Disposal Loans and Grants                                                        |
|                               | Rural Utilities Service, USDA                                                                    |
|                               | CFDA number 10.770                                                                               |
| Description:                  | This program provides water and waste disposal facilities and services to low income rural       |
|                               | communities whose residents face significant health risks.                                       |
| Eligibility:                  | Public bodies, private nonprofit corporations, cooperatives, political subdivisions of a State.  |
| Types of assistance:          | Project grants, direct loans.                                                                    |
| Available funds:              | Average \$780,000.                                                                               |
| Contact:                      | Rural Utilities Service (202) 690-2670                                                           |
| Corresponding Actions:        | NUTR-1,2; FLOW-1,2,3,4                                                                           |
|                               | Water and Waste Disposal Systems for Rural Communities                                           |
|                               | Rural Utilities Service USDA                                                                     |
|                               | CFDA number 10.760                                                                               |
|                               | This program provides funds to provide basic human amenities, alleviate health hazards, and      |
| Description:                  | promote the orderly growth of the rural areas of the nation by meeting the need for new and      |
| •                             | improved rural water and waste disposal facilities.                                              |
| Eligibility:                  | Any state agency, county, municipality, nonprofit organization, or local association.            |
| <b>Types of assistance:</b>   | Project grants, direct loans, and guaranteed/insured loans.                                      |
| Available funds:              | \$763,977,000 in direct loans, \$75,000,000 in guaranteed loans, \$500,000,000 in grants.        |
| _                             | Average amount of financial assistance: \$700,000. 75% cost share.                               |
| Contact:                      | Water and Environmental Programs Rural Utilities Service (202) 690-2670                          |
| <b>Corresponding Actions:</b> | NUTR-1,2; FLOW-1,2,3,4                                                                           |

## State Programs

The research for state grant programs has resulted in 40 funding possibilities.

The Resource Agency has 23 programs under various departments. Specifically, the Agency offers 6 programs through the Coastal Conservancy related to coastal protection, resource enhancement and restoration, and public access. Another 6 programs are offered through the Department of Fish and Game directed towards fishery restoration and habitat protection, coastal resources protection, and environmental enhancement and mitigation. The remaining agency grant programs are offered through a variety of other departments including: 1 from Boating and Waterways, 3 from Forestry, 2 from Parks and Recreation, 3 from Water Resources, 1 from Wildlife Conservation Board and 1 from Coastal Commission.

The California Environmental Protection Agency has 15 programs in different divisions. The Integrated Waste Management Board has 10 programs related to hazardous and solid waste management, park construction activities and recycling initiatives. The Department of Pesticide Regulation offers 2 programs related to pest management. The Water Control Board offers 3 programs: 1 for riparian habitat conservation, 1 for safe drinking water, watershed protection and flood prevention and 1 for water recycling projects.

The remaining two programs are offered through other State Departments. One is available through the Office of the Secretary for Education and the other, through the Business, Transportation and Housing Agency.

In regards to the amount of funding, three grants sources offer the largest potential: \$760 million from Proposition 13 (Water Board), \$60 million from the Transportation Enhancement Activities Program (Dept. of Trans.) and \$30-200 million range from the Water Conservation Bond Law Loan Grant Program (Dept. of Water Resources). Moderate sources of funding are found in the following programs: \$10 million from the Environmental Enhancement and Mitigation Program (Resource Agency), \$9 million from the Environmental Water Program (Dept. of Water Resources), \$8-9 million from 2 Fisheries Restoration Grants Programs (Dept. of Fish and Game), \$7 million from Bond Funding for Safe Neighborhood Parks (Integrated Waste Mgmt. Board) and \$5-8 million from the Public Access Program (Coastal Conservancy). The remaining grant programs offer less substantial funding but should be taken into consideration according to MBNEP project requirements.

## Water Recycling Grant/Loan Program

|                                                        | California Environmenial Protection Agency                                                                                           |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Description:                                           | This program funds water recycling projects (reuse of treated municipal wastewater for water supply purposes).                       |
| Eligibility:                                           | Public agencies.                                                                                                                     |
| Types of assistance:                                   | Project grants and loans.                                                                                                            |
| Available funds:                                       | Grants: \$75,000 maximum Loans: \$15 million limit.                                                                                  |
| Contact:                                               | California Environmental Protection Agency (916) 227-4580                                                                            |
| <b>Corresponding Actions:</b>                          | NUTR-1; FLOW-1,3                                                                                                                     |
| Available funds:<br>Contact:<br>Corresponding Actions: | Grants: \$75,000 maximum Loans: \$15 million limit.<br>California Environmental Protection Agency (916) 227-4580<br>NUTR-1; FLOW-1,3 |

### **Pest Management Alliance**

California Environmental Protection Agency Department of Pesticide Regulation

**Description:** The Pest Management Alliance program provides funding to address important pest management issues on a statewide scale, such as finding alternatives to highly toxic pesticides, protecting surface and ground water quality, developing IPM policy for public schools and other public buildings, and dealing with pesticide problems in urban situations.



| Eligibility:                  | Federal, State and local agencies, academic institutions, nonprofit and public/private partnerships.                                                                                                                               |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Types of assistance:</b>   | Project grants.                                                                                                                                                                                                                    |
| Available funds:              | 1.5 million.                                                                                                                                                                                                                       |
| Contact:                      | Department of Pesticide Regulation (916) 324-4156                                                                                                                                                                                  |
| <b>Corresponding Actions:</b> | SED-4; HAB-9; EDU-3,4                                                                                                                                                                                                              |
|                               | <b>Pest Management Grants</b><br>California Environmental Protection Agency<br>Department of Pesticide Regulation                                                                                                                  |
| Description:                  | The Pest Management Grants program provides funding to encourage voluntary group efforts to develop pest management practices that reduce pesticide risks, through local and regional demonstration and applied research projects. |
| Eligibility:                  | Public and private entities.                                                                                                                                                                                                       |
| <b>Types of assistance:</b>   | Project grants.                                                                                                                                                                                                                    |
| Available funds:              | \$30,000 - \$100,000 per year.                                                                                                                                                                                                     |
| Contact:                      | Department of Pesticide Regulation (916) 324-4156                                                                                                                                                                                  |
| Corresponding Actions:        | SED-4; HAB-9; EDU-3,4                                                                                                                                                                                                              |
|                               | <b>Beverage Container Recycling Grant Program</b><br>California Environmental Protection Agency<br>Integrated Waste Management Board<br>Department of Conservation                                                                 |
| <b>Description:</b>           | This program aims to increase and maintain beverage container recycling, as well as reduce litter in CA.                                                                                                                           |
| Eligibility:                  | Government agencies and non-profit organizations.                                                                                                                                                                                  |
| <b>Types of Assistance:</b>   | Project grants.                                                                                                                                                                                                                    |
| Available funds:              | \$500,000 annually.                                                                                                                                                                                                                |
| Contact:                      | Department of Conservation (800) RECYCLE                                                                                                                                                                                           |
| <b>Corresponding Actions:</b> | *Not currently applicable but may have future potential.                                                                                                                                                                           |
|                               | Bond Funding for Safe Neighborhood Parks<br>California Environmental Protection Agency<br>Integrated Waste Management Board                                                                                                        |
| Description:                  | This program assists local public agencies in upgrading public playgrounds using recycled-<br>content materials.                                                                                                                   |
| Eligibility:                  | Local public agencies.                                                                                                                                                                                                             |
| Types of assistance:          | Project grants.                                                                                                                                                                                                                    |
| Available funds:              | \$7 million.                                                                                                                                                                                                                       |
| Contact:                      | Integrated Waste Management Board (916) 255-2577                                                                                                                                                                                   |
| <b>Corresponding Actions:</b> | *Not currently applicable but may have future potential.                                                                                                                                                                           |
|                               |                                                                                                                                                                                                                                    |

**CalMAX Partnership Program** California Environmental Protection Agency Integrated Waste Management Board



| Description:                                                                                   | This Program supports business waste reduction and material exchanges. Eligible projects include finished promotional materials, audiovisual products, display materials and advertising campaigne.                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fligibility                                                                                    | California cities, counties and local agencies.                                                                                                                                                                                                                                                                                                                      |
| Types of assistance.                                                                           | Project grants.                                                                                                                                                                                                                                                                                                                                                      |
| Available funds:                                                                               | \$10,000.                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                |                                                                                                                                                                                                                                                                                                                                                                      |
| Contact:                                                                                       | Integrated Waste Management Board (916) 255-2369                                                                                                                                                                                                                                                                                                                     |
| <b>Corresponding Actions:</b>                                                                  | EDU-1,2,3,5,7,10                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                | Farm and Ranch Solid Waste Cleanup Abatement                                                                                                                                                                                                                                                                                                                         |
|                                                                                                | Grant Program                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                | California Environmental Protection Agency                                                                                                                                                                                                                                                                                                                           |
| <b>_</b>                                                                                       | Integrated Waste Management Board                                                                                                                                                                                                                                                                                                                                    |
| Description:                                                                                   | I his Program funds the cleanup of illegal solid waste sites on farm or ranch property.                                                                                                                                                                                                                                                                              |
| Eligibility:                                                                                   | Local governments and entities.                                                                                                                                                                                                                                                                                                                                      |
| Types of assistance:                                                                           | Project grants.                                                                                                                                                                                                                                                                                                                                                      |
| Available funds:                                                                               | Maximum of \$10,000 per site.                                                                                                                                                                                                                                                                                                                                        |
| Contact:                                                                                       | Integrated Waste Management Board (916) 255-2301                                                                                                                                                                                                                                                                                                                     |
| <b>Corresponding Actions:</b>                                                                  | CC-1; SED-4; NUTR-3; EDU-3                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                | Household Hazardous Waste Grant Program<br>California Environmental Protection Agency<br>Integrated Waste Management Roard                                                                                                                                                                                                                                           |
| Description:                                                                                   | This program funds the initiation or expansion of waste programs (collection, source reduction, reuse, load checking and education).                                                                                                                                                                                                                                 |
| Eligibility:                                                                                   | California cities, counties and local agencies.                                                                                                                                                                                                                                                                                                                      |
| Types of assistance:                                                                           | Project grants.                                                                                                                                                                                                                                                                                                                                                      |
| Available funds:                                                                               | \$3 million annually.                                                                                                                                                                                                                                                                                                                                                |
| Contact:                                                                                       | Integrated Waste Management Board (916) 255-2891                                                                                                                                                                                                                                                                                                                     |
| Corresponding Actions:                                                                         | *Not currently applicable but may have future potential.                                                                                                                                                                                                                                                                                                             |
|                                                                                                | Local Enforcement Agency Grant Program<br>California Environmental Protection Agency<br>Integrated Waste Management Board                                                                                                                                                                                                                                            |
| Description:                                                                                   |                                                                                                                                                                                                                                                                                                                                                                      |
| -                                                                                              | This program funds local enforcement agencies to improve their solid waste facilities permit<br>and inspection programs.                                                                                                                                                                                                                                             |
| Eligibility:                                                                                   | This program funds local enforcement agencies to improve their solid waste facilities permit<br>and inspection programs.<br>Local enforcement agencies.                                                                                                                                                                                                              |
| Eligibility:<br>Types of assistance:                                                           | This program funds local enforcement agencies to improve their solid waste facilities permit<br>and inspection programs.<br>Local enforcement agencies.<br>Project grants.                                                                                                                                                                                           |
| Eligibility:<br>Types of assistance:<br>Available funds:                                       | <ul> <li>This program funds local enforcement agencies to improve their solid waste facilities permit and inspection programs.</li> <li>Local enforcement agencies.</li> <li>Project grants.</li> <li>\$1.5 million annually.</li> </ul>                                                                                                                             |
| Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:                           | <ul> <li>This program funds local enforcement agencies to improve their solid waste facilities permit and inspection programs.</li> <li>Local enforcement agencies.</li> <li>Project grants.</li> <li>\$1.5 million annually.</li> <li>Integrated Waste Management Board (916) 255-3843</li> </ul>                                                                   |
| Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:<br>Corresponding Actions: | <ul> <li>This program funds local enforcement agencies to improve their solid waste facilities permit and inspection programs.</li> <li>Local enforcement agencies.</li> <li>Project grants.</li> <li>\$1.5 million annually.</li> <li>Integrated Waste Management Board (916) 255-3843</li> <li>*Not currently applicable but may have future potential.</li> </ul> |

Local Government Waste Tire Amnesty Day Grants California Environmental Protection Agency Integrated Waste Management Board



| Description:                  | This program funds the development of education programs for proper tire disposal and on ways to properly care for tires.                                                                                                                                                                                                                                        |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Eligibility:                  | California cities, counties, special districts, joint powers agencies or political subdivision thereof.                                                                                                                                                                                                                                                          |
| Types of assistance:          | Project grants.                                                                                                                                                                                                                                                                                                                                                  |
| Available funds:              | Maximum of \$20,000.                                                                                                                                                                                                                                                                                                                                             |
| Contact:                      | Integrated Waste Management Board (916) 255-2577                                                                                                                                                                                                                                                                                                                 |
| Corresponding Actions:        | *Not currently applicable but may have future potential.                                                                                                                                                                                                                                                                                                         |
| Corresponding Actions.        |                                                                                                                                                                                                                                                                                                                                                                  |
|                               | Local Public Agency Waste Tire Playground Cover and Track Surfacing                                                                                                                                                                                                                                                                                              |
|                               | Grants                                                                                                                                                                                                                                                                                                                                                           |
|                               | California Environmental Protection Agency                                                                                                                                                                                                                                                                                                                       |
|                               | Integrated Waste Management Board                                                                                                                                                                                                                                                                                                                                |
| Description:                  | This program funds ground preparation, installation and the material costs of rubberized mats<br>and pour-in-place surfacing placed underneath and around playground equipment and running<br>tracks manufacture using CA tire materials.                                                                                                                        |
| Eligibility:                  | California cities, counties, special districts, joint powers agencies or political subdivisions, including school districts, parks and recreation districts, and community services districts.                                                                                                                                                                   |
| Types of assistance:          | Project grants.                                                                                                                                                                                                                                                                                                                                                  |
| Available funds:              | Maximum of \$25,000.                                                                                                                                                                                                                                                                                                                                             |
| Contact:                      | Integrated Waste Management Board (916) 255-2577                                                                                                                                                                                                                                                                                                                 |
| <b>Corresponding Actions:</b> | *Not currently applicable but may have future potential.                                                                                                                                                                                                                                                                                                         |
|                               | Solid Waste Disposal and Co-disposal Site Cleanup Program<br>California Environmental Protection Agency<br>Integrated Waste Management Board                                                                                                                                                                                                                     |
| Description:                  | This program runds remediation projects such as cleanup and emergency actions.                                                                                                                                                                                                                                                                                   |
| Eligibility:                  | Local governments.                                                                                                                                                                                                                                                                                                                                               |
| Types of assistance:          | Project grants and loans.                                                                                                                                                                                                                                                                                                                                        |
| Available funds:              | \$5 million annually.                                                                                                                                                                                                                                                                                                                                            |
| Contact:                      | Integrated Waste Management Board (916) 255-2347                                                                                                                                                                                                                                                                                                                 |
| <b>Corresponding Actions:</b> | *Not currently applicable but may have future potential.                                                                                                                                                                                                                                                                                                         |
| Description:                  | Used Oil Nonprofit Grants<br>California Environmental Protection Agency<br>Integrated Waste Management Board<br>This program develops and promotes alternatives to the illegal disposal of used oil by<br>establishing a statewide network of collection opportunities and undertaking outreach efforts<br>to inform and motivate the public to recycle used oil |
| <b>Eligibility:</b>           | Nonprofit organizations.                                                                                                                                                                                                                                                                                                                                         |
| Types of assistance:          | Project grants.                                                                                                                                                                                                                                                                                                                                                  |
| Available funder              | \$3 million.                                                                                                                                                                                                                                                                                                                                                     |
| Contect                       | Integrated Waste Management Board (916) 255-2891                                                                                                                                                                                                                                                                                                                 |
| Corresponding Actions         | *Not currently applicable but may have future potential                                                                                                                                                                                                                                                                                                          |
| Corresponding Actions:        | ->>>>>>>>>>                                                                                                                                                                                                                                                                                                                                                      |



|                                                                                                                                                                                                        | Proposition 13 (Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection Act)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                        | California Environmental Protection Agency<br>Water Control Board                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Description:                                                                                                                                                                                           | This program funds projects which provide Californians with safe drinking water, flood protection, improved water quality in waterways, and fishery and wildlife habitat protection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Eligibility:                                                                                                                                                                                           | Municipalities, districts, local agencies and nonprofits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Types of assistance:                                                                                                                                                                                   | Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Available funds:                                                                                                                                                                                       | \$763,900.00 statewide.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Contact:                                                                                                                                                                                               | Water Control Board (916) 657-1043                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Corresponding Actions:                                                                                                                                                                                 | CC-1,2,4,5; SED-1,2,4,5,6,7,8; BACT-1,2,3,4,5,8; NUTR-1,2,3,4; FLOW-1,2,4<br>HAB-1,2,3,4,5,6,7,8,9,10; HMT-2,3,4; STL-1,2,3,4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                                        | Wildlife Restoration Fund<br>California Environmental Protection Agency<br>Water Control Board                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description:</b>                                                                                                                                                                                    | This program funds public access projects for fish and wildlife recreation areas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Eligibility:                                                                                                                                                                                           | Public agencies and non-profit organizations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Types of assistance:                                                                                                                                                                                   | Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Available funds:                                                                                                                                                                                       | Maximum of \$1,000,000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Contact:                                                                                                                                                                                               | Water Control Board (916) 445-1095                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Corresponding Actions:</b>                                                                                                                                                                          | EDU-8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                        | Coastal Resources Grant Program<br>California Resources Agency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Description:                                                                                                                                                                                           | Coastal Resources Grant Program<br>California Resources Agency<br>This program provides grants to coastal counties and cities that are affected by the impacts of<br>offshore energy development and/or to coastal counties and cities for coastal resources<br>management.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Description:<br>Eligibility:                                                                                                                                                                           | Coastal Resources Grant Program<br>California Resources Agency<br>This program provides grants to coastal counties and cities that are affected by the impacts of<br>offshore energy development and/or to coastal counties and cities for coastal resources<br>management.<br>Any local coastal county or city.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Description:<br>Eligibility:<br>Types of assistance:                                                                                                                                                   | Coastal Resources Grant Program<br>California Resources Agency<br>This program provides grants to coastal counties and cities that are affected by the impacts of<br>offshore energy development and/or to coastal counties and cities for coastal resources<br>management.<br>Any local coastal county or city.<br>Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:                                                                                                                               | Coastal Resources Grant Program<br>California Resources Agency<br>This program provides grants to coastal counties and cities that are affected by the impacts of<br>offshore energy development and/or to coastal counties and cities for coastal resources<br>management.<br>Any local coastal county or city.<br>Project grants.<br>Range \$100,000-\$500,000.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:                                                                                                                   | Coastal Resources Grant Program<br>California Resources Agency<br>This program provides grants to coastal counties and cities that are affected by the impacts of<br>offshore energy development and/or to coastal counties and cities for coastal resources<br>management.<br>Any local coastal county or city.<br>Project grants.<br>Range \$100,000-\$500,000.<br>California Resources Agency (916) 653-5656                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:<br>Corresponding Actions:                                                                                         | Coastal Resources Grant Program<br>California Resources Agency<br>This program provides grants to coastal counties and cities that are affected by the impacts of<br>offshore energy development and/or to coastal counties and cities for coastal resources<br>management.<br>Any local coastal county or city.<br>Project grants.<br>Range \$100,000-\$500,000.<br>California Resources Agency (916) 653-5656<br>CC-5; BACT-3,4,5,7; HAB-2,4; STL-1,2,3,4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:<br>Corresponding Actions:                                                                                         | Coastal Resources Grant Program<br>California Resources Agency<br>This program provides grants to coastal counties and cities that are affected by the impacts of<br>offshore energy development and/or to coastal counties and cities for coastal resources<br>management.<br>Any local coastal county or city.<br>Project grants.<br>Range \$100,000-\$500,000.<br>California Resources Agency (916) 653-5656<br>CC-5; BACT-3,4,5,7; HAB-2,4; STL-1,2,3,4<br>Environmental Enhancement and Mitigation Program<br>California Resources Agency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:<br>Corresponding Actions:<br>Description:                                                                         | Coastal Resources Grant Program<br>California Resources Agency<br>This program provides grants to coastal counties and cities that are affected by the impacts of<br>offshore energy development and/or to coastal counties and cities for coastal resources<br>management.<br>Any local coastal county or city.<br>Project grants.<br>Range \$100,000-\$500,000.<br>California Resources Agency (916) 653-5656<br>CC-5; BACT-3,4,5,7; HAB-2,4; STL-1,2,3,4<br>Environmental Enhancement and Mitigation Program<br>California Resources Agency<br>This program provides grants for projects that mitigate, directly or indirectly, the<br>environmental impacts of new or modified transportation facilities. Grants are available for<br>planning, restoration and land acquisition.                                                                                                                                                                                                                                                                                                    |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:<br>Corresponding Actions:<br>Description:<br>Eligibility:                                                         | Coastal Resources Grant Program<br>California Resources Agency<br>This program provides grants to coastal counties and cities that are affected by the impacts of<br>offshore energy development and/or to coastal counties and cities for coastal resources<br>management.<br>Any local coastal county or city.<br>Project grants.<br>Range \$100,000-\$500,000.<br>California Resources Agency (916) 653-5656<br>CC-5; BACT-3,4,5,7; HAB-2,4; STL-1,2,3,4<br>Environmental Enhancement and Mitigation Program<br>California Resources Agency<br>This program provides grants for projects that mitigate, directly or indirectly, the<br>environmental impacts of new or modified transportation facilities. Grants are available for<br>planning, restoration and land acquisition.<br>Federal, State and local agencies, nonprofit and public/private partnerships.                                                                                                                                                                                                                   |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:<br>Corresponding Actions:<br>Description:<br>Eligibility:<br>Types of assistance:                                 | <ul> <li>Coastal Resources Grant Program         <ul> <li>California Resources Agency</li> </ul> </li> <li>This program provides grants to coastal counties and cities that are affected by the impacts of offshore energy development and/or to coastal counties and cities for coastal resources management.</li> <li>Any local coastal county or city.</li> <li>Project grants.</li> <li>Range \$100,000-\$500,000.</li> <li>California Resources Agency (916) 653-5656</li> <li>CC-5; BACT-3,4,5,7; HAB-2,4; STL-1,2,3,4</li> <li>Environmental Enhancement and Mitigation Program         <ul> <li>California Resources Agency</li> <li>This program provides grants for projects that mitigate, directly or indirectly, the             environmental impacts of new or modified transportation facilities. Grants are available for             planning, restoration and land acquisition.</li> <li>Federal, State and local agencies, nonprofit and public/private partnerships.</li> <li>Project grants.</li> </ul> </li> </ul>                                                |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:<br>Corresponding Actions:<br>Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:             | <ul> <li>Coastal Resources Grant Program<br/>California Resources Agency</li> <li>This program provides grants to coastal counties and cities that are affected by the impacts of<br/>offshore energy development and/or to coastal counties and cities for coastal resources<br/>management.</li> <li>Any local coastal county or city.</li> <li>Project grants.</li> <li>Range \$100,000-\$500,000.</li> <li>California Resources Agency (916) 653-5656</li> <li>CC-5; BACT-3,4,5,7; HAB-2,4; STL-1,2,3,4</li> <li>Environmental Enhancement and Mitigation Program<br/>California Resources Agency</li> <li>This program provides grants for projects that mitigate, directly or indirectly, the<br/>environmental impacts of new or modified transportation facilities. Grants are available for<br/>planning, restoration and land acquisition.</li> <li>Federal, State and local agencies, nonprofit and public/private partnerships.</li> <li>Project grants.</li> <li>\$10 million for FY00-01.</li> </ul>                                                                       |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact:<br>Corresponding Actions:<br>Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact: | <ul> <li>Coastal Resources Grant Program<br/>California Resources Agency</li> <li>This program provides grants to coastal counties and cities that are affected by the impacts of<br/>offshore energy development and/or to coastal counties and cities for coastal resources<br/>management.</li> <li>Any local coastal county or city.</li> <li>Project grants.</li> <li>Range \$100,000-\$500,000.</li> <li>California Resources Agency (916) 653-5656</li> <li>CC-5; BACT-3,4,5,7; HAB-2,4; STL-1,2,3,4</li> <li>Environmental Enhancement and Mitigation Program<br/>California Resources Agency</li> <li>This program provides grants for projects that mitigate, directly or indirectly, the<br/>environmental impacts of new or modified transportation facilities. Grants are available for<br/>planning, restoration and land acquisition.</li> <li>Federal, State and local agencies, nonprofit and public/private partnerships.</li> <li>Project grants.</li> <li>\$10 million for FY00-01.</li> <li>California Resources Agency (916) 653-5656 or (805) 542-4605</li> </ul> |



|                                    | The Whale Tail License Plate<br>California Resources Agency<br>Coastal Commission                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description:                       | The Coastal Protection (or "Whale Tail") Plate is an official plate issued by the California<br>Department of Motor Vehicles. Proceeds from the sale of these plates will benefit the<br>California Coastal Commission's Adopt-A-Beach Program, Coastal Cleanup Day and other<br>coastal protection and restoration projects throughout the state.                                                                                                                                                                                                                               |
| Eligibility:                       | Nonprofit organizations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Types of assistance:               | Percentage of registration and renewal fees for projects.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Available funds:                   | The usual registration fee is \$50. A portion of the first year's fee goes to the DMV for administrative fees (about \$15); the remainder of the first year fee and 100% of the renewal fees go to support coastal environmental education, beach cleanups, restoration projects, and other projects to preserve and enhance environmental resources. The renewal fee is \$40 annually.                                                                                                                                                                                          |
| Contact:<br>Corresponding Actions: | California Coastal Commission (800) 262-7848<br>CC-1,6; SED-8; HAB-6,7,8,9,10; STL-1,2,3,4; EDU-1,2,3,5,6,7,8,9                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Description:                       | <b>The Agricultural Preservation Program</b><br>California Resources Agency<br>Coastal Conservancy<br>This program provides capital funds and technical assistance to prevent the loss of coastal<br>agricultural lands to other uses by acquiring interests in such lands, installing agricultural<br>improvements and protective measures, and arranging for long-term agricultural ownership<br>and management.                                                                                                                                                               |
| Eligibility:                       | State agencies, resource conservation districts and non-profit organizations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Types of assistance:               | Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Available funds:                   | No runds currently available but ruture potential.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Contact:                           | Coastal Conservancy (510) 280-1015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Corresponding Actions:</b>      | CC-1; SED-4,7; NUTR-3; EDU-3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Description:                       | <b>The Coastal Restoration Program</b><br>California Resources Agency<br>Coastal Conservancy<br>This program provides capital funds and technical assistance to ameliorate conditions that are<br>preventing orderly development in accordance with the provisions of the Local Coastal<br>Programs, principally including resolution of issues concerning inappropriate historic land<br>divisions ("antiquated subdivisions"), by providing technical assistance in resolving land-use<br>disputes and, where necessary, through acquisition and reconsolidation of properties |
| Eligibility:                       | State agencies, resource conservation districts and non-profit organizations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Types of assistance:               | Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Available funds:                   | No funds currently available but future potential.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Contact:                           | Coastal Conservancy (510) 286-1015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Corresponding Actions:</b>      | CC-1,2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



|                               | <b>The Public Access Program</b><br>California Resources Agency<br>Coastal Conservancy                                                                                                                                                                                                                                                                    |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description:                  | This program provides capital funds and technical assistance for the construction of public access stairs, trails, limited-mobility-access projects, hostels, interpretive signs and other facilities that serve state and regional coastal access needs for the acquisition of interests in land necessary to enable the provision of access facilities. |
| Eligibility:                  | State agencies, resource conservation districts and non-profit organizations.                                                                                                                                                                                                                                                                             |
| Types of assistance:          | Project grants.                                                                                                                                                                                                                                                                                                                                           |
| Available funds:              | Total range \$5-8 million.                                                                                                                                                                                                                                                                                                                                |
| Contact:                      | Coastal Conservancy (510) 286-1015                                                                                                                                                                                                                                                                                                                        |
| <b>Corresponding Actions:</b> | CC-6,7; BACT-8; EDU-1,7,8                                                                                                                                                                                                                                                                                                                                 |
|                               | The Resource Enhancement Program                                                                                                                                                                                                                                                                                                                          |
|                               | California Resources Agency                                                                                                                                                                                                                                                                                                                               |
|                               | Coastal Conservancy                                                                                                                                                                                                                                                                                                                                       |
| Description:                  | This program provides capital funds and technical assistance for the preservation,<br>enhancements and restoration of wetlands, watersheds, riparian corridors, and other wildlife<br>habitat lands, including, where necessary, acquisition of interests in land, and for technical                                                                      |
| 37134 •1 •3•.                 | and scientific services necessary to design and implement such projects.                                                                                                                                                                                                                                                                                  |
| Eligibility:                  | Project grants                                                                                                                                                                                                                                                                                                                                            |
| Types of assistance:          | Total of \$4,000,000                                                                                                                                                                                                                                                                                                                                      |
| Available lunds:              | Coastal Conservancy (510) 286-4173                                                                                                                                                                                                                                                                                                                        |
| Contact:                      | CC-1 2.5' SED-5.6.8' FLOW-4' HAB-1 2.3.4.5.6.7.8.9.10' STL-1.2.3.4                                                                                                                                                                                                                                                                                        |
| Corresponding Actions:        |                                                                                                                                                                                                                                                                                                                                                           |
|                               | The Site Reservation Program                                                                                                                                                                                                                                                                                                                              |
|                               | California Resources Agency                                                                                                                                                                                                                                                                                                                               |
| - · · ·                       | Coastal Conservancy<br>This program provides conital funds and technical aggistance to append disrifteent exected                                                                                                                                                                                                                                         |
| Description:                  | resource sites and respond to opportunities to acquire such sites when other agencies are                                                                                                                                                                                                                                                                 |
|                               | unable to so, through acquisition of interests in land for conveyance to permanent                                                                                                                                                                                                                                                                        |
|                               | management agencies.                                                                                                                                                                                                                                                                                                                                      |
| Eligibility:                  | State agencies, resource conservation districts and non-profit organizations.                                                                                                                                                                                                                                                                             |
| Types of assistance:          | Project grants.                                                                                                                                                                                                                                                                                                                                           |
| Available funds:              | No funds currently available but future potential.                                                                                                                                                                                                                                                                                                        |
| Contact:                      | Coastal Conservancy (510) 286-1015                                                                                                                                                                                                                                                                                                                        |
| Corresponding Actions:        | CC-1,2                                                                                                                                                                                                                                                                                                                                                    |
|                               | The Site Urban Waterfront Restoration Program                                                                                                                                                                                                                                                                                                             |
|                               | California Resources Agency                                                                                                                                                                                                                                                                                                                               |
|                               | Coastal Conservancy                                                                                                                                                                                                                                                                                                                                       |
| Description:                  | coastal-dependent recreational, commercial and industrial facilities and to expend                                                                                                                                                                                                                                                                        |
|                               | opportunities for public access and use of waterfronts in conjunction with new development,                                                                                                                                                                                                                                                               |
|                               | including the provision of technical assistance to landowners and local governments and                                                                                                                                                                                                                                                                   |
| Fligihility                   | State agencies, resource conservation districts and non-profit organizations.                                                                                                                                                                                                                                                                             |
| Types of assistance           | Project grants.                                                                                                                                                                                                                                                                                                                                           |
| -, peo or assistance.         |                                                                                                                                                                                                                                                                                                                                                           |

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| Available funds:              | No funds currently available but future potential.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Contact:                      | Coastal Conservancy (510) 286-1015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |
| Corresponding Actions:        | CC-1,2; BACT-2; HMT-3,4; EDU-8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |    |
|                               | Abandoned Watercraft Abatement Program                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |    |
|                               | California Resources Agency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |
|                               | Department of Boating and Waterways                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |
| Description:                  | This program funds removing abandoned watercraft and substantial navigational hazards<br>from California navigable waterways. Specifically, grant funds can be used for the removal,<br>storage and/or disposal of these navigational hazards.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |    |
| Eligibility:                  | Public local agencies with waterway jurisdiction in CA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |    |
| Types of assistance:          | Program grants with 10% match.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |    |
| Available funds:              | Maximum \$100,000 over 3 year period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |    |
| Contact:                      | Dept. of Boating and Waterways (916) 263-8142                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |
| <b>Corresponding Actions:</b> | BACT-4; HMT-2,3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |    |
|                               | Fisheries Restoration Grants Program (SB 271)<br>California Resources Agency<br>Department of Fish and Game                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |
| Description:                  | Projects require the consent of a willing landowner, and emphasize the development of coordinated watershed improvement activities. Projects that restore habitat for salmon and anadromous trout species that are eligible for protection as listed or candidate species under state or federal endangered species acts shall be given top funding priority. Projects shall be cost-effective and treat causes and not symptoms of fish habitat degradation. Projects may implement instream, riparian, water quality, water quantity, and watershed prescriptions and shall be designed to restore the structure and function of fish habitat. Projects may fund organizational and educational activities. Primary funding source is from Salmon and Steelhead Trout Restoration Account (SB 271 (Chapter 293, Statues of 1997). | l' |
| Eligibility:                  | Nonprofit organizations, private individuals, government agencies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |
| Types of assistance:          | Contracts or grants for watershed assessment and restoration planning, and implementation of projects that address important limiting factors. No funding for design.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |    |
| Available funds:              | Total funds are variable to \$8 million from SB 271 source, plus several other smaller sources.<br>Projects are proposed in response to a Request for Proposal released once a year in spring.<br>No limitation on amount requested, but awards competitive and based on evaluations that<br>include cost-share and effectiveness.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |
| Contact:                      | Department of Fish and Game (916) 327-8842                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |
|                               | http://www.dfg.ca.gov/nafwrb/index.html                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |    |
| <b>Corresponding Actions:</b> | CC-1,5; SED-8; FLOW-4; HAB-2,4,5,6,7; STL-1,2,3,4; EDU-1,3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |
|                               | Fisheries Restoration Grants Program (California Coastal Salmon Recovery<br>Program, Legislation pending as of 6-00)<br>California Resources Agency<br>Department of Fish and Game                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |

| Description:                  | Projects require the consent of a willing landowner, and emphasize the development of coordinated watershed improvement activities. Projects that restore habitat for salmon and anadromous trout species that are eligible for protection as listed or candidate species under state or federal endangered species acts shall be given top funding priority. Projects shall be cost-effective and treat causes and not symptoms of fish habitat degradation. Projects may implement instream, riparian, water quality, water quantity, and watershed prescriptions and shall be designed to restore the structure and function of fish habitat. Projects may also purchase water, riparian buffers, conservation easements, and fund organizational and educational activities. Funding source is from the Pacific Coastal Salmon Recovery Program. |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Eligibility:                  | Nonprofit organizations, private individuals, gov't agencies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Types of assistance:          | Contracts or grants for watershed assessment and restoration planning, and implementation of projects that address important limiting factors. No funding for design.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Available funds:              | Pending funds are \$9 million. Additional sources are likely. Projects are proposed in response to a Request for Proposal released once a year in spring. No limitation on amount requested, but awards competitive and based on evaluations that include cost-share and effectiveness.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Contact:                      | Department of Fish and Game (916) 327-8842                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Corresponding Actions:</b> | CC-1,2,5; SED-2,7,8; FLOW-4; HAB-2,4,5,6,7; STL-1,2,3,4; EDU-1,3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                               | <b>Proposition 99</b><br>California Resources Agency<br>Department of Fish and Game                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Description:                  | This program funds fish habitat restoration with priority on coho salmon streams in central California. |
|-------------------------------|---------------------------------------------------------------------------------------------------------|
| Eligibility:                  | Open to all.                                                                                            |
| Types of assistance:          | Project grants.                                                                                         |
| Available funds:              | Total of \$116,000                                                                                      |
| Contact:                      | Department of Fish and Game (916) 654-6505                                                              |
| <b>Corresponding Actions:</b> | CC-5; SED-8; FLOW-4; HAB-4,5,6; STL-1,2,3,4                                                             |

## **Steelhead Report Card**

|                               | California Resources Agency                                                                             |
|-------------------------------|---------------------------------------------------------------------------------------------------------|
|                               | Department of Fish and Game                                                                             |
| Description:                  | This program funds steelhead watershed and restoration habitat plans, and is financed by sportsfishing. |
| Eligibility:                  | Open to all.                                                                                            |
| Types of assistance:          | Project grants.                                                                                         |
| Available funds:              | Maximum of \$10,000-\$26,000                                                                            |
| Contact:                      | Department of Fish and Game (916) 654-1811                                                              |
| <b>Corresponding Actions:</b> | CC-5; SED-8; FLOW-4; HAB-1,2,3,4,5,6,7; STL-1,2,3,4                                                     |
|                               | Stewardship Incentive Program (SIP)<br>California Resources Agency                                      |

 Description:
 Department of Forestry

 Description:
 This program funds reforestation, protection and improvement of riparian, wetland, fisheries and wildlife habitats.

 Eligibility:
 Landowners.

 Types of assistance:
 Project grants.



| Available funds:       | Maximum of \$10,000 with 75% cost share                                      |
|------------------------|------------------------------------------------------------------------------|
| Contact:               | Department of Forestry (916) 653-8286                                        |
| Corresponding Actions: | CC-5; SED-5,8; BACT-3,4,5,6,7; FLOW-4; HAB-1,2,3,4,5,6,7,8,9,10; STL-1,2,3,4 |

## Urban Forestry Program (Trees for the Millennium)

|                                    | California Resources Agency                                                                      |
|------------------------------------|--------------------------------------------------------------------------------------------------|
|                                    | Department of Forestry                                                                           |
| Description:                       | This program funds tree planting programs that will enhance the livability of urban areas.       |
| Eligibility:                       | Non-profit organizations.                                                                        |
| Types of assistance:               | Project grants.                                                                                  |
| Available funds:                   | Maximum of \$50,000                                                                              |
| Contact:                           | Department of Forestry (909) 782-4140                                                            |
| <b>Corresponding Actions:</b>      | Not currently applicable but may have future potential.                                          |
| Contact:<br>Corresponding Actions: | Department of Forestry (909) 782-4140<br>Not currently applicable but may have future potential. |

# Vegetation Management Program California Resources Agency

|                      | California Resources Agency                                                 |
|----------------------|-----------------------------------------------------------------------------|
|                      | Department of Forestry                                                      |
| <b>Description:</b>  | This program funds fire management projects through brush control measures. |
| Eligibility:         | Private land owners and state parks.                                        |
| Types of assistance: | Project grants with cost share.                                             |
| Available funds:     | Total \$3 million.                                                          |
| Contact:             | Department of Forestry (916) 653-2380                                       |
| responding Actions:  | SED-3                                                                       |
|                      |                                                                             |

Contact **Corresponding Actions:** 

## Habitat Conservation Fund

California Resources Agency Department of Parks and Recreation

| Description:                  | This program funds the acquisition and restoration of wildlife habitat and significant natural areas. |
|-------------------------------|-------------------------------------------------------------------------------------------------------|
| Eligibility:                  | Local public agencies.                                                                                |
| Types of assistance:          | Project grants.                                                                                       |
| Available funds:              | \$250,000 grant limit.                                                                                |
| Contact:                      | Department of Parks and Recreation (916) 653-7423                                                     |
| <b>Corresponding Actions:</b> | CC-1,2,5; SED-6; HAB-1,2,3,4,5,6,7,8,9,10; STL-1,2,3,4                                                |

|                               | Land and Water Conservation Fund<br>California Resources Agency<br>Department of Parks and Recreation       |
|-------------------------------|-------------------------------------------------------------------------------------------------------------|
| Description:                  | The program funds local and state acquisition of park lands.                                                |
| Eligibility:                  | Cities, counties, community service and park districts.                                                     |
| Types of assistance:          | Project grants.                                                                                             |
| Available funds:              | FY2000 – 2.4 million (40% state projects and 60% subgrantees such as park districts, cities, and counties). |
| Contact:                      | Division of Local Services (916) 653-8758                                                                   |
| <b>Corresponding Actions:</b> | CC-1,2                                                                                                      |


| Description:<br>Eligibility:  | Environmental Water Program<br>California Resources Agency<br>Department of Water Resources<br>This program funds enhancement and restoration projects (not studies) which will contribute<br>significant environmental benefits to States.<br>States.                                                                                                                       |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Types of assistance:          | Project grants.                                                                                                                                                                                                                                                                                                                                                              |
| Available funds:              | Total of \$9,000.000                                                                                                                                                                                                                                                                                                                                                         |
| Contact:                      | Department of Water Resources (916) 445-8259                                                                                                                                                                                                                                                                                                                                 |
| <b>Corresponding Actions:</b> | Plans: CC-5; HAB-8; STL-2,3,4                                                                                                                                                                                                                                                                                                                                                |
|                               | Urban Stream Restoration Program<br>California Resources Agency<br>Department of Water Resources                                                                                                                                                                                                                                                                             |
| Description:                  | This program funds fish and wildlife habitat protection in urban waterways, as well as stream restoration and flood control projects.                                                                                                                                                                                                                                        |
| Eligibility:                  | Non-profit organizations.                                                                                                                                                                                                                                                                                                                                                    |
| Types of assistance:          | Project grants.                                                                                                                                                                                                                                                                                                                                                              |
| Available funds:              | Maximum of \$15,000                                                                                                                                                                                                                                                                                                                                                          |
| Contact:                      | Department of Water Resources (916) 327-1664                                                                                                                                                                                                                                                                                                                                 |
| <b>Corresponding Actions:</b> | CC-2,5; SED-1,5,7,8; HAB-4,5,6,7; STL-1,2,3,4                                                                                                                                                                                                                                                                                                                                |
| Description:<br>Eligibility:  | Water Conservation Bond Law Loan and<br>Grant Program (Proposition 12)<br>California Resources Agency<br>Department of Water Resources<br>This Proposition contains several funding programs: Urban and Agricultural Water<br>Conservation, Groundwater Recharge and Storage and Infrastructure Rehabilitation projects<br>or feasibility studies.<br>Local public agencies. |
| Types of assistance:          | Project grants and loans.                                                                                                                                                                                                                                                                                                                                                    |
| Available funds:              | Urban Water Conservation (\$30 million), Agricultural Water Conservation (\$35 million),<br>Groundwater Recharge (\$30 million), Storage (\$200 million) and Infrastructure<br>Rehabilitation (\$60 million).<br>*More detailed info will be available in autumn of 2000.<br>Department of Water Resources (916) 327-1663                                                    |
| Corresponding Actions:        | CC-2,4; SED-5; FLOW1,2,3,4                                                                                                                                                                                                                                                                                                                                                   |
| Corresponding Actions.        |                                                                                                                                                                                                                                                                                                                                                                              |
|                               | <b>The Riparian Habitat Conservation Program</b><br>California Resources Agency<br>Wildlife Conservation Board                                                                                                                                                                                                                                                               |
| Description:                  | The program funds the protection of remaining healthy stands of riparian lands, and the enhancement and protection of fragmented or degraded riparian corridors.                                                                                                                                                                                                             |
| Eligibility:                  | Nonprofit organizations.                                                                                                                                                                                                                                                                                                                                                     |
| Types of assistance:          | Project grants.                                                                                                                                                                                                                                                                                                                                                              |
| Available funds:              | \$1.5 million annually.                                                                                                                                                                                                                                                                                                                                                      |
| Contact:                      | Wildlife Conservation Board (916) 445-1072                                                                                                                                                                                                                                                                                                                                   |
| <b>Corresponding Actions:</b> | CC-1,2,5; SED-1,2,6,7,8; HAB-3,5,6,7,10; STL-1,2,3,4                                                                                                                                                                                                                                                                                                                         |
|                               |                                                                                                                                                                                                                                                                                                                                                                              |

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|                                                                                      | Transportation Enhancement Activities Program                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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|                                                                                      | Business, Transportation and Housing Agency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Description:                                                                         | This program funds the acquisition of scenic lands and mitigation of water pollution due to highway runoff.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Eligibility:                                                                         | Public agencies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Types of assistance:                                                                 | \$60 million annually.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Available funds:                                                                     | Project grants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Contact:                                                                             | Department of Transportation (916) 654-5275                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Corresponding Actions:</b>                                                        | CC-1,2,3,4; SED-1,2; NUTR-4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                      | Environmental Education Grant Program State of California                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Description:                                                                         | Environmental Education Grant Program<br>State of California<br>Office of the Secretary for Education<br>This program funds the development and implementation of educational opportunities<br>relating to energy conservation, environmental protection and use of natural resources.                                                                                                                                                                                                                                                                                                                                        |
| Description:<br>Eligibility:                                                         | Environmental Education Grant Program<br>State of California<br>Office of the Secretary for Education<br>This program funds the development and implementation of educational opportunities<br>relating to energy conservation, environmental protection and use of natural resources.<br>Governing boards of any school district, county school superintendents, academic<br>institutions, regional conservation centers, non-profit organizations, state and local agencies,<br>including cities, counties, regional boards and commissions.                                                                                |
| Description:<br>Eligibility:<br>Types of assistance:                                 | Environmental Education Grant Program<br>State of California<br>Office of the Secretary for Education<br>This program funds the development and implementation of educational opportunities<br>relating to energy conservation, environmental protection and use of natural resources.<br>Governing boards of any school district, county school superintendents, academic<br>institutions, regional conservation centers, non-profit organizations, state and local agencies,<br>including cities, counties, regional boards and commissions.<br>Project grants.                                                             |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:             | Environmental Education Grant Program<br>State of California<br>Office of the Secretary for Education<br>This program funds the development and implementation of educational opportunities<br>relating to energy conservation, environmental protection and use of natural resources.<br>Governing boards of any school district, county school superintendents, academic<br>institutions, regional conservation centers, non-profit organizations, state and local agencies,<br>including cities, counties, regional boards and commissions.<br>Project grants.<br>Maximum of \$10,000                                      |
| Description:<br>Eligibility:<br>Types of assistance:<br>Available funds:<br>Contact: | Environmental Education Grant Program<br>State of California<br>Office of the Secretary for Education<br>This program funds the development and implementation of educational opportunities<br>relating to energy conservation, environmental protection and use of natural resources.<br>Governing boards of any school district, county school superintendents, academic<br>institutions, regional conservation centers, non-profit organizations, state and local agencies,<br>including cities, counties, regional boards and commissions.<br>Project grants.<br>Maximum of \$10,000<br>Dept. of Education (916) 322-9503 |

#### Local Government and Nonprofit Programs

#### Local Government

The County of San Luis Obispo (SLOCO) currently has an Environmental Grants Program available on an annual basis. The amount of funding available from SLOCO is \$10,000. SLOCO is a primary implementer of CCMP Action Plans: CC-2, SED-1, BACT-9, FLOW-4, HMT-1,2,4, HAB-9,10, and EDU-4,8,11.

The City of Morro Bay (CMB) does not currently offer any environmental grants, although they have contributed staff and equipment to support the MBNEP. CMB resources include a harbor patrol boat and other marine related equipment, as well as a local laboratory located at the wastewater treatment facility. CMB is a primary implementer of CCMP Action Plans: CC-4, SED-1,6, BACT-5, NUTR-4, FLOW-1, HMT-3, HAB-8, and EDU-11.

#### Foundations and Non-Profits

This source category offers funding possibilities for environmental projects which address broad cross-cutting components. Project funding varies widely and requirements often change from one year to another (making it difficult to correspond grants with specific CCMP Action Plans).

A new organization, San Luis Obispo County Community Foundation (SLOCCF), has funding available for a wide variety of interests, including environmental purposes. They are currently awarding approximately \$50,000 on a quarterly basis for all their areas of interest.

Another private foundation who provides funding for conservation purposes is the David and Lucille Packard Foundation. Last year the Packard Foundation provided over \$40 Million for Conservation purposes. The Packard Foundation has been active in the area, since they recently funded some of SLOCCF 's activities. The Packard Foundation web site is www.packfound.org The William C. Kenney Watershed Protection Foundation provides grants ranging from \$7,500 - \$15,000 for general support, technical assistance, and administrative purposes. Their web site is <u>www.kenneyfdn.org</u>

Another private foundation, The David and Lucille Packard Foundation, has been providing funding for a wide variety of purposes. The Packard Foundation has been active in the area, since they recently funded some of SLOCCF's activities.

The National Fish & Wildlife Foundation has grants available through a number of programs for restoration and enhancement of critical habitats. Additional information on these programs can be obtained at their Web site (www.nfwf.org). Some of these programs and a brief description are as follows:

- National Fish and Wildlife Foundation Challenge Grants
   habitat conservation and restoration
- Five-Star Restoration Challenge Grant Program
   wetland and riparian restoration
- Migratory Bird Conservancy

   habitat conservation for migratory birds
- NRCS and NACD Partnership: Challenge Grants for Conservation

   conservation on private land
- Pacific Grassroots Salmon Initiative
   native anadromous fish habitat improvements
- Partnership with the Corps of Engineers
   non-structural flood control, and habitat restoration
- Wildlife Links
   management and enhancement of wildlife on golf courses
- General Conservation
   conservation projects on BLM and Forest Service land
- Bring Back the Natives
   habitat restoration for native aquatic species
- Native Plant Conservation Initiative
   protecting and restoring native plant communities
- Seeking Common Ground
   wildlife habitat improvements on rangeland
- Pulling Together Initiative
   controlling and eradicating invasive plants

#### Penalty Funds

The MBNEP currently has over \$4 million available for implementation purposes. These funds were generated from penalties charged to PG&E for improper operation of the Diablo Canyon Nuclear Power Plant. The funds are not eligible for public outreach and education purposes.



#### Other Local Funding Mechanisms

General Obligation Bonds - Cities, counties, and park and recreation districts have the authority to issue bonds for park and open space purposes. If approved, bonds and the interest they incur are repaid through an increase in property taxes. Current law requires a 2/3 majority vote. Bonds that are issued for specific projects are more likely to be approved.

Assessments - Involves the levying of a charge on property owners to provide financing for public improvements. For example, the Los Osos Community Sever District is the lead for Action Plans CC-4 and NUTR-1,4.

Local Park Districts - Many local or regional park districts are actively involved in acquiring open space and restoring wetland and riparian habitat.

Flood Control Districts - The acquisition and restoration of floodplains and wetlands is recognized as providing both environmental and flood control benefits.

#### **Corporate Contributions**

The MBNEP greatly appreciates the financial support of local corporations and individuals who have provided support in the past. We thank the following contributors and hope they will continue to offer future support.

AGP Video California Polytechnic State University Canoe To You Daily Muse Print Magnets Duke Energy Glenn, Burdette, Phillips, & Bryson Red Howard ICS Computer Services Glenn, Burdette, Phillips, & Bryson Red Howard Kayak Horizons Kayaks of Morro Bay Kinko's Mills Copy Center Jan Howell Marx Morro Bay Recreation and Parks Ted Peterson PG&E San Luis Video Publishing Sullivan & Associates T-Pier Cleanup Tables 7.3 though 7.11 are a detailed list of potential funding sources for the action plans described in Chapter 4. These are the abbreviations used in the tables to denote the type of funding.

| AS  | Advisory Services      |
|-----|------------------------|
| С   | Contracts              |
| CA  | Cooperative Assistance |
| F   | Fees                   |
| G   | Grants                 |
| GS  | General Support        |
| IKS | In Kind Services       |
| L   | Loans                  |
| ТА  | Technical Assistance   |
| TS  | Technical Support      |
| SS  | Specialized Services   |

### Table 7.3 Cross-Cutting Actions - Additional Potential Funding Sources

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| Agency/Org. and Program                                                                                                | CC-1<br>Land<br>Acq. | CC-2<br>Drainage | CC-3<br>TMDLs | CC-4<br>Urban<br>Runoff | CC-5<br>Stream<br>WQ | CC-6<br>VMP | CC-7<br>Water<br>Crew |
|------------------------------------------------------------------------------------------------------------------------|----------------------|------------------|---------------|-------------------------|----------------------|-------------|-----------------------|
| <b>Congress, Office of Mgmt and<br/>Budget</b><br>Land and Water Conservation<br>Fund                                  | G                    | G                |               |                         |                      |             |                       |
| Corps. for Nat'l Service<br>Learn and Serve America                                                                    |                      |                  |               |                         |                      |             | G                     |
| <b>EDA (DOC)</b><br>Economic Development: Grants<br>for Public Works and Infrastrucure                                 |                      |                  |               |                         |                      |             | G                     |
| NOAA (DOC)<br>Coastal Zone Management,<br>Administration and Implementation<br>Awards                                  |                      |                  | G             | G                       |                      |             |                       |
| NOAA (DOC)<br>Community Restoration                                                                                    |                      |                  |               |                         | G/CA                 |             |                       |
| NOAA (DOC)<br>Financial Assistance for Ocean<br>Resources Conservation and<br>Assessment                               |                      |                  |               | G/CA                    |                      |             |                       |
| NOAA (DOC)<br>Fisheries Development and<br>Utilization Research and<br>Development Grants and<br>Cooperative Agreement |                      |                  |               |                         | G/CA                 |             |                       |
| NOAA (DOC)<br>Sea Grant Support                                                                                        |                      |                  |               |                         |                      | G           | G                     |
| ACOE (DOD)<br>Emergency Operations Flood<br>Response and Post Flood<br>Response                                        |                      | SS               |               |                         |                      |             |                       |
| ACOE (DOD)<br>Flood Corps Projects                                                                                     | SS                   | SS               |               |                         |                      |             | SS                    |
| ACOE (DOD)<br>Flood Hazard Mitigation and<br>Riverine Ecosystem Restoration<br>Program                                 | G                    | G                |               | -                       |                      |             |                       |



| Γ                                                                           | Y                    | <u>↓</u>         | Y             | r <del>i</del>          | · · · · · · · · · · · · · · · · · · · |             | · · · · · · · · · · · · · · · · · · · |
|-----------------------------------------------------------------------------|----------------------|------------------|---------------|-------------------------|---------------------------------------|-------------|---------------------------------------|
| Agency/Org. and Program                                                     | CC-1<br>Land<br>Acq. | CC-2<br>Drainage | CC-3<br>TMDLs | CC-4<br>Urban<br>Runoff | CC-5<br>Stream<br>WQ                  | CC-6<br>VMP | CC-7<br>Water<br>Crew                 |
| ACOE (DOD)<br>Flood Plain Management Services                               | SS                   | SS               |               |                         |                                       |             | SS                                    |
| ACOE (DOD)<br>Protection, Clearing and<br>Straightening of Channels         |                      | SS               |               |                         |                                       |             |                                       |
| USFWS (DOI)<br>Coastal Program                                              | G/IKS                |                  |               |                         | G/IKS                                 |             |                                       |
| <b>USFWS (DOI)</b><br>National Coastal Wetlands<br>Conservation             | G                    |                  |               |                         | G                                     |             | G                                     |
| <b>USFWS (DOI)</b><br>Partners for Fish and Wildlife<br>Habitat Restoration | G/IKS                |                  |               |                         |                                       |             |                                       |
| USFWS (DOI)<br>Sport Fish Restoration                                       |                      |                  |               |                         | G                                     |             |                                       |
| <b>USFWS (DOI)</b><br>Wildlife Conservation and<br>Appreciation             |                      |                  |               |                         | G                                     |             |                                       |
| <b>USEPA</b><br>Capitalization Grants for Clean<br>Water Revolving Fund     |                      |                  | L             | L                       |                                       |             |                                       |
| USEPA<br>Environmental Education                                            |                      |                  |               |                         |                                       | G           | G                                     |
| <b>USEPA</b><br>Environmental Justice Grants to<br>Small Community Groups   |                      |                  |               |                         |                                       | G           | G                                     |
| USEPA<br>Environmental Justice Through<br>Pollution Prevention              |                      |                  |               |                         |                                       | G           | G                                     |
| USEPA<br>Five Star Restoration                                              |                      |                  |               |                         |                                       | G/TA        | G/TA                                  |
| USEPA<br>Nonpoint Source Implementation                                     |                      |                  | G             |                         | G                                     | G           | G                                     |



| Agency/Org. and Program                                                 | CC-1<br>Land<br>Acq. | CC-2<br>Drainage | CC-3<br>TMDLs | CC-4<br>Urban<br>Runoff | CC <b>-5</b><br>Stream<br>WQ | CC-6<br>VMP | CC-7<br>Water<br>Crew |
|-------------------------------------------------------------------------|----------------------|------------------|---------------|-------------------------|------------------------------|-------------|-----------------------|
| <b>USEPA</b><br>Pollution Prevention Incentives<br>for States           |                      |                  | G             | G                       |                              |             |                       |
| USEPA<br>Science to Achieve Results                                     |                      |                  | G             | G                       |                              |             |                       |
| USEPA<br>Small Business Innovation and<br>Research                      |                      |                  |               | С                       | С                            |             |                       |
| <b>USEPA</b><br>Sustainable Development<br>Challenge                    | G                    |                  |               |                         |                              | ·           |                       |
| <b>USEPA</b><br>Water Quality                                           |                      |                  | G             | G                       |                              |             |                       |
| USEPA<br>Water Quality Assessment and<br>Planning                       |                      |                  | G             | G                       | G                            |             |                       |
| USEPA<br>Watershed Assistance                                           |                      |                  |               |                         |                              | G           | G                     |
| USEPA<br>Wetland Protection                                             |                      |                  |               |                         | G                            |             |                       |
| FEMA<br>Flood Mitigation Service                                        | G                    | G                |               |                         |                              |             |                       |
| FEMA<br>Hazard Mitigation                                               | G                    | G                |               |                         |                              |             |                       |
| FEMA<br>Project Impact                                                  |                      | G                |               |                         |                              |             |                       |
| National Park Service<br>Rivers, Trails, and Conservation<br>Assistance |                      |                  |               |                         | TA                           |             |                       |
| FSA (USDA)<br>Conservation Reserve                                      | G                    | G                |               |                         | G                            |             |                       |
| FSA (USDA)<br>Conservation Reserve<br>Enhancement                       | G                    | G                |               |                         | G                            |             |                       |



|                                                                           |                      |                  |               | ÷                       |                      |             |                       |
|---------------------------------------------------------------------------|----------------------|------------------|---------------|-------------------------|----------------------|-------------|-----------------------|
| Agency/Org. and Program                                                   | CC-1<br>Land<br>Acq. | CC-2<br>Drainage | CC-3<br>TMDLs | CC-4<br>Urban<br>Runoff | CC-5<br>Stream<br>WQ | CC-6<br>VMP | CC-7<br>Water<br>Crew |
| NRCS (USDA)<br>Watershed Protection and Flood<br>Prevention               |                      | G/AS             | G/AS          | G/AS                    | G/AS                 | G/AS        | G/AS                  |
| NRCS (USDA)<br>Wetland Reserve Program                                    | G                    | G                |               |                         | G                    |             | }                     |
| NRCS (USDA)<br>Wildlife Habitat Incentive<br>Program                      | G                    |                  |               |                         | G                    |             |                       |
| (IWMB) CAL EPA<br>Farm and Ranch Solid Waste<br>Cleanup Abatement         | G                    |                  |               |                         |                      |             |                       |
| (WCB) CAL EPA<br>Proposition 13                                           | G                    | G                |               | G                       | G                    |             |                       |
| <b>CA Resources Agency</b><br>Coastal Resources                           |                      |                  |               |                         | G                    |             |                       |
| <b>CA Resources Agency</b><br>Environmental Enhancement and<br>Mitigation | G                    | G                | G             | G                       | G                    |             |                       |
| CCC (CA Resources Agency)<br>The Whale Tail License Plate                 | F                    |                  |               |                         |                      | F           |                       |
| CCC (CA Resources Agency)<br>The Agricultural Preservation                | G                    |                  |               |                         |                      |             |                       |
| CCC (CA Resources Agency)<br>The Coastal Restoration                      | G                    | G                |               |                         |                      |             |                       |
| CCC (CA Resources Agency)<br>The Public Access                            |                      |                  |               |                         |                      | G           | G                     |
| CCC (CA Resources Agency)<br>The Resource Enhancement                     | G                    | G                |               |                         | G                    |             |                       |
| CCC (CA Resources Agency)<br>The Site Reservation                         | G                    | G                |               |                         |                      |             |                       |
| CCC (CA Resources Agency)<br>The Site Urban Waterfront<br>Restoration     | G                    | G                |               |                         |                      |             |                       |

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| Agency/Org. and Program                                            | CC-1<br>Land<br>Acq. | CC-2<br>Drainage | CC-3<br>TMDLs | CC-4<br>Urban<br>Runoff | CC-5<br>Stream<br>WQ | CC-6<br>VMP | CC-7<br>Water<br>Crew |
|--------------------------------------------------------------------|----------------------|------------------|---------------|-------------------------|----------------------|-------------|-----------------------|
| <b>DFG (CA Resources Agency)</b><br>Fisheries Restoration          | G/C                  |                  |               |                         | G/C                  |             |                       |
| <b>DFG (CA Resources Agency)</b><br>Fisheries Restoration (Salmon) | G/C                  | G/C              |               |                         | G/C                  |             |                       |
| <b>DFG (CA Resources Agency)</b><br>Proposition 99                 |                      |                  |               |                         | G                    |             |                       |
| DFG (CA Resources Agency)<br>Steelhead Report Card                 |                      |                  |               |                         | G                    |             |                       |
| DF (CA Resources Agency)<br>Stewardship Incentive                  |                      |                  |               | ×                       | G                    |             |                       |
| <b>DPR (CA Resources Agency)</b><br>Habitat Conservation Fund      | G                    | G                |               |                         | G                    |             |                       |
| <b>DPR (CA Resources Agency)</b><br>Land and Water Conservation    | G                    | G                |               |                         |                      |             |                       |
| <b>DWR (CA Resources Agency)</b><br>Environmental Water Program    |                      |                  |               |                         | G                    |             |                       |
| <b>DWR (CA Resources Agency)</b><br>Urban Stream Restoration       |                      | G                |               |                         | G                    |             |                       |
| <b>DWR (CA Resources Agency)</b><br>Proposition 12                 |                      | G/L              |               | G/L                     |                      |             |                       |
| WCB (CA Resources Agency)<br>The Riparian Habitat<br>Conservation  | G                    | G                |               |                         | G                    |             |                       |
| State of CA<br>Transportation Enhancement<br>Activities            | G                    | G                | G             | G                       |                      |             |                       |
| SLOCO<br>Environmental Grants                                      |                      | G                |               |                         |                      |             |                       |
| CMB<br>General support to MBNEP                                    |                      |                  |               | GS                      |                      |             | ,                     |

# Table 7.4 Sediment - Additional Potential Funding Sources

| Agency/Org. and<br>Program                                                                                                | SED-1<br>Road<br>Mgmt | SED-2<br>Sed<br>Traps | SED-3<br>Fire<br>Mgmt | SED-4<br>Land<br>BMPs | SED-5<br>Creek<br>Restor | SED-6<br>Sand-<br>spit | SED-7<br>BMPs<br>Incent | SED-8<br>Estuary<br>Rest Proj |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------|------------------------|-------------------------|-------------------------------|
| EDA (DOC)<br>Economic Development:<br>Grants for Public Works<br>and Infrastrucure                                        | G                     |                       |                       |                       |                          |                        |                         |                               |
| NOAA (DOC)<br>Coastal Zone<br>Management,<br>Administration and<br>Implementation Awards                                  | G                     |                       | G                     | G                     |                          |                        | G                       |                               |
| NOAA (DOC)<br>Community Restoration                                                                                       | G/CA                  | G/CA                  |                       |                       | G/CA                     |                        |                         | G/CA                          |
| NOAA (DOC)<br>Financial Assistance for<br>Ocean Resources<br>Conservation and<br>Assessment                               |                       |                       |                       | G/CA                  | G/CA                     |                        |                         |                               |
| NOAA (DOC)<br>Fisheries Development<br>and Utilization Research<br>and Development Grants<br>and Cooperative<br>Agreement |                       |                       |                       |                       |                          |                        |                         | G/CA                          |
| NOAA (DOC)<br>Sea Grant Support                                                                                           |                       |                       |                       |                       |                          |                        |                         | G                             |
| ACOE (DOD)<br>Emergency Operations<br>Flood Response and Post<br>Flood Response                                           |                       |                       |                       |                       | SS                       |                        |                         | SS                            |
| ACOE (DOD)<br>Flood Control                                                                                               |                       |                       |                       | SS                    | SS                       | SS                     | SS                      | SS                            |
| ACOE (DOD)<br>Flood Hazard Mitigation<br>and Riverine Ecosystem<br>Restoration                                            |                       |                       |                       |                       | G                        |                        |                         | G                             |



|                                                                                |                       |                       |                       |                       |                                  | ·                      |                         |                               |
|--------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------------------|------------------------|-------------------------|-------------------------------|
| Agency/Org. and<br>Program                                                     | SED-1<br>Road<br>Mgmt | SED-2<br>Sed<br>Traps | SED-3<br>Fire<br>Mgmt | SED-4<br>Land<br>BMPs | SED <b>-5</b><br>Creek<br>Restor | SED-6<br>Sand-<br>spit | SED-7<br>BMPs<br>Incent | SED-8<br>Estuary<br>Rest Proj |
| ACOE (DOD)<br>Flood Plain Management<br>Services                               |                       |                       |                       | SS                    | SS                               | SS                     | SS                      | SS                            |
| ACOE (DOD)<br>Protection, Clearing and<br>Straightening of Channels            |                       |                       |                       |                       | SS                               |                        |                         | SS                            |
| USFWS (DOI)<br>Coastal Program                                                 |                       |                       |                       |                       | G/IKS                            |                        |                         | G/IKS                         |
| <b>USFWS (DOI)</b><br>National Coastal<br>Wetlands Conservation                |                       |                       |                       |                       |                                  |                        |                         | G                             |
| <b>USFWS (DOI)</b><br>Partners for Fish and<br>Wildlife Habitat<br>Restoration |                       |                       |                       | G/IKS                 | G/IKS                            |                        |                         |                               |
| USFWS (DOI)<br>Sport Fish Restoration                                          |                       |                       |                       |                       | G                                | G                      |                         | G                             |
| USEPA<br>Capitalization Grants for<br>Clean Water Revolving<br>Fund            | L                     | L                     | L                     | L                     |                                  |                        | L                       |                               |
| USEPA<br>Five Star Restoration                                                 | G/TS                  | G/TS                  | G/TS                  | G/TS                  | G/TS                             | G/TS                   | G/TS                    |                               |
| USEPA<br>Nonpoint Source<br>Implementation                                     | G                     | G                     | G                     | G                     | G                                | G                      | G                       | G                             |
| USEPA<br>Pesticide Environmental<br>Stewardship                                |                       |                       |                       | G                     |                                  |                        |                         |                               |
| <b>USEPA</b><br>Pollution Prevention<br>Incentives for States                  | G                     | G                     |                       | G                     |                                  |                        | G                       |                               |
| USEPA<br>Science to Achieve<br>Results                                         | G                     |                       | G                     | G                     | G                                |                        | G                       |                               |

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|---------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------|------------------------|-------------------------|-------------------------------|
| Agency/Org. and<br>Program                                                | SED-1<br>Road<br>Mgmt | SED-2<br>Sed<br>Traps | SED-3<br>Fire<br>Mgmt | SED-4<br>Land<br>BMPs | SED-5<br>Creek<br>Restor | SED-6<br>Sand-<br>spit | SED-7<br>BMPs<br>Incent | SED-8<br>Estuary<br>Rest Proj |
| USEPA<br>Small Business Innovation<br>and Research                        | С                     |                       | С                     | С                     | С                        |                        | С                       | С                             |
| <b>USEPA</b><br>Sustainable Development<br>Challenge                      | G                     |                       | G                     | G                     | G                        |                        | G                       |                               |
| <b>USEPA</b><br>Water Quality Assessment<br>and Planning                  | G                     |                       | G                     |                       |                          |                        | G                       |                               |
| USEPA<br>Wetland Protection                                               |                       | G                     |                       |                       |                          |                        |                         | G                             |
| FEMA<br>Flood Mitigation Service                                          |                       | G                     |                       |                       | G                        |                        | G                       |                               |
| FEMA<br>Project Impact                                                    |                       |                       |                       |                       | G                        |                        |                         |                               |
| National Park Service<br>Rivers, Trails, and<br>Conservation Assistance   |                       |                       |                       |                       | ТА                       |                        |                         | TA                            |
| <b>CSREES (USDA)</b><br>Sustainable Agriculture<br>Research and Education |                       |                       |                       | G                     |                          |                        |                         |                               |
| <b>CSREES (USDA)</b><br>Water Quality Special<br>Research                 |                       |                       |                       | G                     |                          |                        | G                       |                               |
| FSA (USDA)<br>Conservation Reserve                                        |                       | G                     |                       | G                     |                          |                        | G                       | G                             |
| FSA (USDA)<br>Conservation Reserve<br>Enhancement                         |                       | G                     |                       | G                     |                          |                        | G                       | G                             |
| NRCS (USDA)<br>Environmental Quality<br>Incentives                        | G                     | G                     |                       | G                     |                          | G                      | G                       | G                             |
| NRCS (USDA)<br>Watershed Protection and<br>Flood Prevention               | G/AS                  | G/AS                  | G/AS                  | G/AS                  | G/AS                     | G/AS                   | G/AS                    | G/AS                          |



| Agency/Org. and<br>Program                                                | SED-1<br>Road<br>Mgmt | SED-2<br>Sed<br>Traps | SED-3<br>Fire<br>Mgmt | SED-4<br>Land<br>BMPs | SED <b>-5</b><br>Creek<br>Restor | SED-6<br>Sand-<br>spit | SED-7<br>BMPs<br>Incent | SED-8<br>Estuary<br>Rest Proj |
|---------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------------------|------------------------|-------------------------|-------------------------------|
| NRCS (USDA)<br>Wetland Reserve Program                                    |                       |                       |                       |                       |                                  |                        | G                       | G                             |
| NRCS (USDA)<br>Wildlife Habitat Incentive<br>Program                      |                       |                       |                       |                       |                                  |                        |                         | G                             |
| (DPR) CAL EPA<br>Pest Management<br>Alliance                              |                       |                       |                       | G                     |                                  |                        |                         |                               |
| (DPR) CAL EPA<br>Pest Management                                          |                       |                       |                       | G                     |                                  |                        |                         |                               |
| (IWMB) CAL EPA<br>Farm and Ranch Solid<br>Waste Cleanup<br>Abatement      |                       |                       |                       | G                     |                                  |                        |                         |                               |
| (WCB) CAL EPA<br>Proposition 13                                           | G                     | G                     |                       | G                     | G                                | G                      | G                       | G                             |
| <b>CA Resources Agency</b><br>Environmental Enhancement<br>and Mitigation | G                     | G                     |                       | G                     | G                                |                        | G                       | G                             |
| CCC<br>(CA Resources Agency)<br>The Whale Tail License<br>Plate           |                       |                       | -                     |                       |                                  |                        |                         | F                             |
| CCC<br>(CA Resources Agency)<br>The Agricultural<br>Preservation          |                       |                       |                       | G                     |                                  |                        | G                       |                               |
| CCC<br>(CA Resources Agency)<br>The Resource Enhancement                  |                       |                       |                       |                       | G                                | G                      |                         | G                             |
| DFG<br>(CA Resources Agency)<br>Fisheries Restoration                     |                       |                       |                       |                       |                                  |                        |                         | G/C                           |
| DFG<br>(CA Resources Agency)<br>Fisheries Restoration<br>(Salmon)         |                       | G/C                   |                       |                       |                                  |                        | G/C                     | G/C                           |



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|-----------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------|------------------------|-------------------------|-------------------------------|
| Agency/Org. and<br>Program                                            | SED-1<br>Road<br>Mgmt | SED-2<br>Sed<br>Traps | SED-3<br>Fire<br>Mgmt | SED-4<br>Land<br>BMPs | SED-5<br>Creek<br>Restor | SED-6<br>Sand-<br>spit | SED-7<br>BMPs<br>Incent | SED-8<br>Estuary<br>Rest Proj |
| DFG<br>(CA Resources Agency)<br>Proposition 99                        |                       |                       |                       |                       |                          |                        |                         | G                             |
| DFG<br>(CA Resources Agency)<br>Steelhead Report Card                 |                       |                       |                       |                       |                          |                        |                         | G                             |
| DF<br>(CA Resources Agency)<br>Stewardship Incentive                  |                       |                       |                       |                       | G                        |                        |                         | G                             |
| DF<br>(CA Resources Agency)<br>Vegetation Management                  |                       |                       | G                     |                       |                          |                        |                         |                               |
| DPR<br>(CA Resources Agency)<br>Habitat Conservation Fund             |                       |                       |                       |                       |                          | G                      |                         |                               |
| <b>DPR</b><br>(CA Resources Agency)<br>Land and Water<br>Conservation |                       | G                     | G                     |                       |                          |                        |                         |                               |
| <b>DWR</b><br>(CA Resources Agency)<br>Urban Stream Restoration       | G                     |                       |                       |                       | G                        |                        | G                       | G                             |
| <b>DWR</b><br>(CA Resources Agency)<br>Proposition 12                 |                       |                       |                       |                       | G/L                      |                        |                         |                               |
| WCB<br>(CA Resources Agency)<br>The Riparian Habitat<br>Conservation  | G                     | G                     |                       |                       |                          | G                      | G                       | G                             |
| State of CA<br>Transportation Enhancement<br>Activities               | G                     | G                     |                       |                       |                          |                        |                         |                               |
| SLOCO<br>Environmental Grants                                         | G                     |                       |                       |                       |                          |                        |                         |                               |
| CMB<br>General support to MBNEP                                       | GS                    |                       |                       |                       |                          | GS                     |                         |                               |



### Table 7.5 Bacteria - Additional Potential Funding Sources

| Agency/Org. and<br>Program                                                                                                   | BAC-1<br>Graz<br>Mgmt | BAC-2<br>Pump-<br>outs | BAC-3<br>Illegal<br>Moor | BAC-4<br>Aband<br>Boats | BAC-5<br>Live-<br>aboard | BAC-6<br>Bio-<br>filtrat | BAC-7<br>Bird<br>Deter | BAC-8<br>Pet<br>Waste | BAC-9<br>WQ<br>Stand |
|------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------|--------------------------|-------------------------|--------------------------|--------------------------|------------------------|-----------------------|----------------------|
| Corps. for Nat'l<br>Service<br>Learn and Serve<br>America                                                                    |                       |                        |                          |                         |                          |                          |                        | G                     |                      |
| EDA (DOC)<br>Economic<br>Development: Grants<br>for Public Works and<br>Infrastrucure                                        |                       | G                      |                          |                         |                          |                          |                        |                       |                      |
| NOAA (DOC)<br>Coastal Zone<br>Management,<br>Administration and<br>Implementation<br>Awards                                  | G                     |                        |                          |                         |                          |                          |                        |                       | G                    |
| NOAA (DOC)<br>Community<br>Restoration                                                                                       |                       |                        |                          |                         |                          | G/CA                     | G/CA                   |                       |                      |
| NOAA (DOC)<br>Fisheries Development<br>and Utilization<br>Research and<br>Development Grants<br>and Cooperative<br>Agreement |                       | G/CA                   | G/CA                     | G/CA                    | G/CA                     |                          | G/CA                   |                       |                      |
| NOAA (DOC)<br>Sea Grant Support                                                                                              |                       |                        |                          |                         |                          |                          |                        |                       | G                    |
| USFWS (DOI)<br>Clean Vessel Act                                                                                              |                       | G                      |                          |                         | G                        |                          |                        |                       |                      |
| USFWS (DOI)<br>National Boating<br>Infrastructure                                                                            |                       |                        | G                        | G                       |                          |                          |                        |                       |                      |
| USCG (DOT)<br>Boating Safety<br>Financial Assistance                                                                         |                       |                        | G                        | G                       | G                        |                          |                        |                       |                      |

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|-------------------------------------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------|--------------------------|--------------------------|------------------------|-----------------------|--------------------------|
| Agency/Org. and<br>Program                                                    | BAC-1<br>Graz<br>Mgmt | BAC-2<br>Pump-<br>outs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | BAC-3<br>Illegal<br>Moor | BAC-4<br>Aband<br>Boats | BAC-5<br>Live-<br>aboard | BAC-6<br>Bio-<br>filtrat | BAC-7<br>Bird<br>Deter | BAC-8<br>Pet<br>Waste | BAC-<br>9<br>WQ<br>Stand |
| USEPA<br>Capitalization Grants<br>for Clean Water<br>Revolving Fund           | L                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |                         |                          |                          |                        |                       | L                        |
| USEPA<br>Five Star Restoration                                                |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |                         |                          |                          |                        | G/TS                  |                          |
| USEPA<br>Nonpoint Source<br>Implementation                                    | G                     | G                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | G                        | G                       | G                        | G                        | G                      | G                     | G                        |
| USEPA<br>Pollution Prevention<br>Incentives for States                        | G                     | G                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | G                        | G                       | G                        | G                        | G                      | G                     | G                        |
| USEPA<br>Science to Achieve<br>Results                                        | G                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |                         |                          | G                        |                        |                       | G                        |
| USEPA<br>Small Business<br>Innovation and<br>Research                         | C                     | C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |                         |                          | C                        | C                      |                       |                          |
| USEPA<br>Sustainable<br>Development<br>Challenge                              | G                     | G                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |                         |                          |                          |                        | G                     |                          |
| USEPA<br>Water Quality<br>Assessment and<br>Planning                          |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |                         |                          | G                        |                        |                       |                          |
| National Park<br>Service<br>Rivers, Trails, and<br>Conservation<br>Assistance |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |                         |                          |                          |                        | ТА                    |                          |
| CSREES (USDA)<br>Sustainable<br>Agriculture Research<br>and Education         | G                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |                         |                          |                          |                        |                       |                          |

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| Agency/Org. and<br>Program                                                      | BAC-1<br>Graz<br>Mgmt | BAC-2<br>Pump-<br>outs | BAC-3<br>Illegal<br>Moor | BAC-4<br>Aband<br>Boats | BAC-5<br>Live-<br>aboard | BAC-6<br>Bio-<br>filtrat | BAC-7<br>Bird<br>Deter | BAC-8<br>Pet<br>Waste | BAC-<br>9<br>WQ<br>Stand |
|---------------------------------------------------------------------------------|-----------------------|------------------------|--------------------------|-------------------------|--------------------------|--------------------------|------------------------|-----------------------|--------------------------|
| CSREES (USDA)<br>Water Quality Special<br>Research                              | G                     |                        |                          |                         |                          | *****                    |                        |                       |                          |
| NRCS (USDA)<br>Environmental Quality<br>Incentives                              | G                     |                        |                          |                         |                          |                          |                        |                       |                          |
| NRCS (USDA)<br>Watershed Protection<br>and Flood Prevention                     |                       |                        |                          |                         |                          |                          |                        |                       | G/AS                     |
| CCC (CA Resources<br>Agency)<br>The Public Access                               |                       |                        |                          |                         |                          |                          |                        | G                     |                          |
| CCC (CA Resources<br>Agency)<br>The Site Urban<br>Waterfront<br>Restoration     |                       | G                      |                          |                         |                          |                          |                        |                       |                          |
| <b>DBA (CA Resources</b><br><b>Agency)</b><br>Abandoned Watercraft<br>Abatement |                       |                        |                          | G                       |                          |                          |                        |                       |                          |
| <b>DFG (CA Resources</b><br><b>Agency)</b> Steelhead<br>Report Card             |                       |                        | G                        | G                       | G                        | G                        | G                      |                       |                          |
| <b>DF (CA Resources</b><br><b>Agency)</b><br>Stewardship Incentive              |                       |                        | G                        | G                       | G                        | G                        | G                      |                       |                          |
| SLOCO<br>Environmental Grants                                                   |                       |                        |                          |                         |                          |                          |                        |                       | G                        |
| CMB<br>General support to<br>MBNEP                                              |                       |                        |                          |                         | GS                       |                          |                        |                       |                          |



# Table 7.6 Nutrients - Additional Potential Funding Sources

| Agency/Org. and Program                                                                  | NUTR-1<br>Los Osos<br>Wastewater | NUTR-2<br>CMC<br>Wastewater | NUTR-3<br>Agricultural<br>BMPs | NUTR-4<br>Residential<br>BMPs |
|------------------------------------------------------------------------------------------|----------------------------------|-----------------------------|--------------------------------|-------------------------------|
| EDA (DOC)<br>Economic Development: Grants<br>for Public Works and Infrastrucure          | G                                |                             |                                |                               |
| NOAA (DOC)<br>Coastal Zone Management,<br>Administration and Implementation<br>Awards    |                                  |                             | G                              | G                             |
| NOAA (DOC)<br>Financial Assistance for Ocean<br>Resources Conservation and<br>Assessment |                                  |                             |                                | G/CA                          |
| <b>USEPA</b><br>Capitalization Grants for Clean<br>Water Revolving Fund                  | L                                | L                           | L                              | L                             |
| USEPA<br>Five Star Restoration                                                           |                                  |                             | G/TA                           | G/TA                          |
| USEPA<br>Nonpoint Source Implementation                                                  |                                  |                             | G                              | G                             |
| <b>USEPA</b><br>Pollution Prevention Incentives for<br>States                            | G                                | G                           | G                              | G                             |
| USEPA<br>Science to Achieve Results                                                      |                                  | G                           | G                              | G                             |
| USEPA<br>Small Business Innovation and<br>Research                                       | С                                | С                           | С                              | С                             |
| USEPA<br>Sustainable Development<br>Challenge                                            | G                                |                             | G                              | G                             |
| USEPA<br>Water Quality                                                                   | G                                | G                           |                                |                               |
| <b>CSREES (USDA)</b><br>Sustainable Agriculture Research<br>and Education                |                                  |                             | G                              | G                             |



| Agency/Org. and Program                                                        | NUTR-1<br>Los Osos<br>Wastewater | NUTR-2<br>CMC<br>Wastewater | NUTR-3<br>Agricultural<br>BMPs | NUTR-4<br>Residential<br>BMPs |
|--------------------------------------------------------------------------------|----------------------------------|-----------------------------|--------------------------------|-------------------------------|
| <b>CSREES (USDA)</b><br>Water Quality Special Research                         |                                  |                             | G                              | G                             |
| NRCS (USDA)<br>Environmental Quality Incentives                                |                                  |                             | G                              | G                             |
| NRCS (USDA)<br>Watershed Protection and Flood<br>Prevention                    |                                  |                             | G/AS                           | G/AS                          |
| RUS (USDA)<br>Water and Waste Disposal Loans                                   | G/L                              | G/L                         |                                |                               |
| <b>RUS (USDA)</b><br>Water and Waste Disposal Systems<br>for Rural Communities | Ġ/L                              | G/L                         |                                |                               |
| CAL EPA<br>Water Recycling                                                     | G/L                              |                             |                                |                               |
| (IWMB) CAL EPA<br>Farm and Ranch Solid Waste<br>Cleanup Abatement              |                                  |                             | G                              |                               |
| (WCB) CAL EPA<br>Proposition 13                                                | G                                | G                           | G                              | G                             |
| <b>CA Resources Agency</b><br>Environmental Enhancement and<br>Mitigation      |                                  |                             |                                | G                             |
| CCC (CA Resources Agency)<br>The Agricultural Preservation                     |                                  |                             | G                              |                               |
| State of CA<br>Transportation Enhancement<br>Activities                        |                                  |                             |                                | G                             |
| CMB<br>General support to MBNEP                                                |                                  |                             |                                | GS                            |

# Table 7.7 Freshwater Flow - Additional Potential Funding Sources

| Agency/Org. and Program                                                                                                | FLO-1<br>CMB<br>WWTP | FLO-2<br>Chorro Water<br>Workgroup | FLO-3<br>Water<br>Conservation | FLO-4<br>WWTP<br>Releases |
|------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------------------|--------------------------------|---------------------------|
| Corps. for Nat'l Service<br>Learn and Serve America                                                                    |                      |                                    | G                              |                           |
| EDA (DOC)<br>Economic Development: Grants<br>for Public Works and Infrastrucure                                        | G                    |                                    |                                |                           |
| NOAA (DOC)<br>Community Restoration                                                                                    |                      |                                    |                                | G/CA                      |
| NOAA (DOC)<br>Financial Assistance for Ocean<br>Resources Conservation and<br>Assessment                               |                      |                                    | G/CA                           |                           |
| NOAA (DOC)<br>Fisheries Development and<br>Utilization Research and<br>Development Grants and<br>Cooperative Agreement |                      |                                    |                                | G/CA                      |
| USFWS (DOI)<br>Sport Fish Restoration                                                                                  |                      | G                                  |                                | G                         |
| <b>USEPA</b><br>Capitalization Grants for Clean<br>Water Revolving Fund                                                | L                    | L                                  | L                              | L                         |
| USEPA<br>Five Star Restoration                                                                                         |                      |                                    | G/TA                           |                           |
| USEPA<br>Small Business Innovation and<br>Research                                                                     | С                    |                                    |                                | С                         |
| <b>USEPA</b><br>Sustainable Development<br>Challenge                                                                   | G                    |                                    | G                              |                           |
| USEPA<br>Water Quality                                                                                                 | G                    |                                    |                                | G                         |
| USEPA<br>Water Quality Assessment and<br>Planning                                                                      | G                    | G                                  | G                              |                           |



| Agency/Org. and Program                                                        | FLO-1<br>CMB<br>WWTP | FLO-2<br>Chorro Water<br>Workgroup | FLO-3<br>Water<br>Conservation | FLO-4<br>WWTP<br>Releases |
|--------------------------------------------------------------------------------|----------------------|------------------------------------|--------------------------------|---------------------------|
| CSREES (USDA)<br>Water Quality Special Research                                |                      |                                    | G                              | G                         |
| NRCS (USDA)<br>Watershed Protection and Flood<br>Prevention                    | G/AS                 | G/AS                               | G/AS                           |                           |
| RUS (USDA)<br>Water and Waste Disposal Loans                                   | G/L                  | G/L                                | G/L                            | G/L                       |
| <b>RUS (USDA)</b><br>Water and Waste Disposal Systems<br>for Rural Communities | G/L                  | G/L                                | G/L                            | G/L                       |
| CAL EPA<br>Water Recycling                                                     | G/L                  |                                    | G/L                            |                           |
| (WCB) CAL EPA<br>Proposition 13                                                | G                    | G                                  |                                | G                         |
| CCC (CA Resources Agency)<br>The Resource Enhancement                          |                      |                                    |                                | G                         |
| <b>DFG (CA Resources Agency)</b><br>Fisheries Restoration                      |                      |                                    |                                | C/G                       |
| <b>DFG (CA Resources Agency)</b><br>Fisheries Restoration (Salmon)             |                      |                                    |                                | C/G                       |
| DFG (CA Resources Agency)<br>Proposition 99                                    |                      |                                    |                                | G                         |
| <b>DFG (CA Resources Agency)</b><br>Steelhead Report Card                      |                      |                                    |                                | G                         |
| <b>DF (CA Resources Agency)</b><br>Stewardship Incentive                       |                      |                                    |                                | G                         |
| DWR (CA Resources Agency)<br>Proposition 12                                    | G/L                  | G/L                                | G/L                            | G/L                       |
| SLOCO<br>Environmental Grants                                                  |                      |                                    |                                | G                         |
| CMB<br>General support to MBNEP                                                | GS                   |                                    |                                |                           |

# Table 7.8 Heavy Metals and Toxics - Additional Potential Funding Sources

| Agency/Org. and Program                                                                                                | HMT-1<br>Mine<br>Remediation | HMT-2<br>Marina<br>BMPs | HMT-3<br>Boat<br>Haulout | HMT-4<br>Haz Waste<br>Network |
|------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------|--------------------------|-------------------------------|
| Corps. for Nat' I Service<br>Learn and Serve America                                                                   |                              |                         | G                        | G                             |
| EDA (DOC)<br>Economic Development: Grants<br>for Public Works and Infrastrucure                                        |                              |                         | G                        | G                             |
| NOAA (DOC)<br>Coastal Zone Management,<br>Administration and Implementation<br>Awards                                  |                              | G                       |                          |                               |
| NOAA (DOC)<br>Financial Assistance for Ocean<br>Resources Conservation and<br>Assessment                               |                              | G/CA                    |                          |                               |
| NOAA (DOC)<br>Fisheries Development and<br>Utilization Research and<br>Development Grants and<br>Cooperative Agreement |                              | G/CA                    | G/CA                     | G/CA                          |
| USFWS (DOI)<br>National Boating Infrastructure                                                                         |                              | G                       | G                        |                               |
| <b>USCG (DOT)</b><br>Boating Safety Financial<br>Assistance                                                            |                              | G                       |                          |                               |
| <b>USEPA</b><br>Capitalization Grants for Clean<br>Water Revolving Fund                                                | L                            | L                       |                          |                               |
| USEPA<br>Five Star Restoration                                                                                         | G/TA                         |                         | G/TA                     |                               |
| USEPA<br>Jobs Through Recycling                                                                                        | G                            |                         |                          | G                             |
| USEPA<br>Nonpoint Source Implementation                                                                                | G                            | G                       |                          | G                             |



| Agency/Org. and Program                                                   | HMT-1<br>Mine<br>Remediation | HMT-2<br>Marina<br>BMPs | HMT-3<br>Boat<br>Haulout | HMT-4<br>Haz Waste<br>Network |
|---------------------------------------------------------------------------|------------------------------|-------------------------|--------------------------|-------------------------------|
| USEPA<br>Pollution Prevention Incentives for<br>States                    | G                            | G                       | G                        | G                             |
| USEPA<br>Science to Achieve Results                                       |                              | G                       |                          |                               |
| USEPA<br>Small Business Innovation and<br>Research                        | С                            | С                       | С                        | C                             |
| USEPA<br>Sustainable Development<br>Challenge                             |                              | G                       | G                        | G                             |
| <b>USEPA</b><br>Water Quality Assessment and<br>Planning                  |                              | G                       | G                        |                               |
| (WCB) CAL EPA<br>Proposition 13                                           |                              | G                       | G                        | G                             |
| <b>CA Resources Agency</b><br>Environmental Enhancement and<br>Mitigation |                              |                         | G                        |                               |
| CCC (CA Resources Agency)<br>The Site Urban Waterfront<br>Restoration     |                              |                         | G                        | G                             |
| <b>DBA (CA Resources Agency)</b><br>Abandoned Watercraft Abatement        |                              | G                       | G                        |                               |
| SLOCO<br>Environmental Grants                                             | G                            | G                       |                          | G                             |
| <b>CMB</b><br>General support to MBNEP                                    |                              |                         | GS                       |                               |

### Table 7.9 Habitat - Additional Potential Funding Sources

| Agency/Org<br>and Program                                                                                                             | HAB-1<br>Over<br>Maps | HAB-2<br>Upland<br>Habitat | HAB-3<br>Map | HAB-4<br>Species<br>Recov. | HAB-5<br>Benef.<br>Dredg | HAB-6<br>Ripar<br>Veg | HAB-7<br>Ri/Wet<br>Policy | HAB-8<br>Eel<br>grass | HAB-9<br>Non-i<br>Species | HAB-10<br>A-don<br>remove |
|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------|--------------|----------------------------|--------------------------|-----------------------|---------------------------|-----------------------|---------------------------|---------------------------|
| Corps. for<br>Nat=l Service<br>Learn and<br>Serve America                                                                             | G                     | G                          | G            |                            |                          |                       | G                         |                       |                           |                           |
| NOAA<br>(DOC)<br>Coastal Zone<br>Management,<br>Administration<br>and Implemen-<br>tation Awards                                      |                       |                            |              |                            | G                        | G                     | G                         |                       | G                         |                           |
| NOAA<br>(DOC)<br>Community<br>Restoration                                                                                             |                       | G/CA                       |              | G/CA                       | G/CA                     |                       | G/CA                      | G/CA                  | G/CA                      | G/CA                      |
| NOAA<br>(DOC)<br>Fisheries<br>Development<br>and Utilization<br>Research and<br>Development<br>Grants and<br>Cooperative<br>Agreement |                       |                            |              | G/CA                       | G/CA                     | G/CA                  |                           | G/CA                  |                           |                           |
| ACOE<br>(DOD)<br>Aquatic Plant<br>Control                                                                                             |                       |                            |              |                            |                          |                       |                           |                       | SS                        |                           |
| ACOE<br>(DOD)<br>Flood Corps<br>Projects                                                                                              |                       |                            | SS           |                            | SS                       | SS                    |                           |                       |                           |                           |



| Agency/Org<br>and Program                                                                          | HAB-1<br>Over<br>Maps | HAB-2<br>Upland<br>Habitat | HAB-3<br>Map | HAB-4<br>Species<br>Recov. | HAB-5<br>Benef.<br>Dredg | HAB-6<br>Ripar<br>Veg | HAB-7<br>Ri/Wet<br>Policy | HAB-8<br>Eel<br>grass | HAB-9<br>Non-i<br>Species | HAB-10<br>A-don<br>remove |
|----------------------------------------------------------------------------------------------------|-----------------------|----------------------------|--------------|----------------------------|--------------------------|-----------------------|---------------------------|-----------------------|---------------------------|---------------------------|
| ACOE<br>(DOD)<br>Flood Hazard<br>Mitigation and<br>Riverine<br>Ecosystem<br>Restoration<br>Program |                       |                            |              |                            | G                        | G                     | G                         | G                     |                           |                           |
| ACOE<br>(DOD)<br>Flood Plain<br>Management<br>Services                                             | SS                    | SS                         | SS           |                            | SS                       | SS                    | SS                        |                       |                           |                           |
| ACOE<br>(DOD)<br>Protection,<br>Clearing and<br>Straightening<br>of Channels                       |                       |                            |              |                            | SS                       |                       |                           |                       |                           |                           |
| USFWS<br>(DOI)<br>Coastal<br>Program                                                               |                       | G/IKS                      |              |                            | G/IKS                    | G/IKS                 |                           | G/IKS                 | G/IKS                     | G/IKS                     |
| USFWS<br>(DOI)<br>National<br>Coastal<br>Wetlands<br>Conservation                                  |                       |                            | G            |                            | G                        | G                     | G                         |                       | G                         |                           |
| USFWS<br>(DOI)<br>North<br>American<br>Wetlands<br>Conservation<br>Act                             | G                     | G                          |              | G                          |                          | G                     | G                         | G                     | G                         |                           |



| Agency/Org<br>and Program                                                        | HAB-1<br>Over<br>Maps | HAB-2<br>Upland<br>Habitat | HAB-3<br>Map | HAB-4<br>Species<br>Recov. | HAB-5<br>Benef.<br>Dredg | HAB-6<br>Ripar<br>Veg | HAB-7<br>Ri/Wet<br>Policy | HAB-8<br>Eel<br>grass | HAB-9<br>Non-i<br>Species | HAB-10<br>A-don<br>remove |
|----------------------------------------------------------------------------------|-----------------------|----------------------------|--------------|----------------------------|--------------------------|-----------------------|---------------------------|-----------------------|---------------------------|---------------------------|
| USFWS<br>(DOI)<br>Partners for<br>Fish and<br>Wildlife<br>Habitat<br>Restoration |                       |                            |              |                            |                          | G                     | G                         |                       |                           |                           |
| USFWS<br>(DOI)<br>Sport Fish<br>Restoration                                      | G                     | G                          | G            | G                          | G                        | G                     | G                         | G                     | G                         | G                         |
| USFWS<br>(DOI)<br>Wildlife<br>Conservation<br>and<br>Appreciation                |                       |                            |              | G                          |                          |                       |                           |                       |                           |                           |
| USEPA<br>Capitalization<br>Grants for<br>Clean Water<br>Revolving<br>Fund        |                       |                            |              |                            |                          | L                     |                           |                       |                           |                           |
| USEPA<br>Five Star<br>Restoration                                                |                       |                            |              | G/TS                       | G/TS                     |                       |                           | G/TS                  |                           | G/TS                      |
| USEPA<br>Nonpoint<br>Source<br>Implemen-<br>tation                               |                       |                            |              | G                          |                          |                       |                           | G                     |                           | G                         |
| USEPA<br>Science to<br>Achieve<br>Results                                        |                       |                            |              | G                          |                          |                       | G                         |                       | G                         | G                         |
| USEPA<br>Small Business<br>Innovation and<br>Research                            | С                     | С                          | С            |                            |                          |                       | С                         |                       |                           |                           |



| Agency/Org<br>and Program                                                        | HAB-1<br>Over<br>Maps | HAB-2<br>Upland<br>Habitat | HAB-3<br>Map | HAB-4<br>Species<br>Recov. | HAB-5<br>Benef.<br>Dredg | HAB-6<br>Ripar<br>Veg | HAB-7<br>Ri/Wet<br>Policy | HAB-8<br>Eel<br>grass | HAB-9<br>Non-i<br>Species | HAB-10<br>A-don<br>remove |
|----------------------------------------------------------------------------------|-----------------------|----------------------------|--------------|----------------------------|--------------------------|-----------------------|---------------------------|-----------------------|---------------------------|---------------------------|
| USEPA<br>Sustainable<br>Development<br>Challenge                                 |                       |                            |              |                            | G                        | G                     | G                         |                       |                           |                           |
| USEPA<br>Water Quality<br>Assessment<br>and Planning                             | G                     | G                          | G            | G                          | G                        | G                     | G                         | G                     | G                         | G                         |
| USEPA<br>Wetland<br>Protection                                                   | G                     | G                          | G            | G                          | G                        | G                     | G                         | G                     | G                         | G                         |
| National Park<br>Service<br>Rivers, Trails,<br>and<br>Conservation<br>Assistance | ТА                    | ТА                         | ТА           |                            | ТА                       | ТА                    | TA                        | TA                    | ТА                        | TA                        |
| FSA (USDA)<br>Conservation<br>Reserve                                            |                       |                            |              |                            | G                        | G                     | G                         |                       |                           |                           |
| FSA (USDA)<br>Conservation<br>Reserve<br>Enhancement                             |                       |                            |              |                            | G                        | G                     | G                         |                       |                           |                           |
| NRCS<br>(USDA)<br>Environmental<br>Quality<br>Incentives                         |                       | G                          |              |                            | G                        | G                     |                           | G                     | G                         |                           |
| NRCS<br>(USDA)<br>Watershed<br>Protection and<br>Flood<br>Prevention             |                       | G/AS                       |              |                            | G/AS                     | G/AS                  | G/AS                      | G/AS                  | G/AS                      | G/AS                      |



|                                                                          |                       |                            |              |                            |                          | <u>Y</u>              |                           |                       |                           |                           |
|--------------------------------------------------------------------------|-----------------------|----------------------------|--------------|----------------------------|--------------------------|-----------------------|---------------------------|-----------------------|---------------------------|---------------------------|
| Agency/Org<br>and Program                                                | HAB-1<br>Over<br>Maps | HAB-2<br>Upland<br>Habitat | HAB-3<br>Map | HAB-4<br>Species<br>Recov. | HAB-5<br>Benef.<br>Dredg | HAB-6<br>Ripar<br>Veg | HAB-7<br>Ri/Wet<br>Policy | HAB-8<br>Eel<br>grass | HAB-9<br>Non-i<br>Species | HAB-10<br>A-don<br>remove |
| NRCS<br>(USDA)<br>Wetland<br>Reserve<br>Program                          |                       |                            |              |                            |                          | G                     |                           | G                     |                           |                           |
| NRCS<br>(USDA)<br>Wildlife<br>Habitat<br>Incentive<br>Program            |                       | G                          |              | G                          |                          | G                     | G                         | G                     |                           |                           |
| (DPR) CAL<br>EPA<br>Pest<br>Management<br>Alliance                       |                       |                            |              |                            |                          |                       |                           |                       | G                         |                           |
| (DPR) CAL<br>EPA<br>Pest<br>Management                                   |                       |                            |              |                            |                          |                       |                           |                       | G                         |                           |
| (WCB) CAL<br>EPA<br>Proposition 13                                       | G                     | G                          | G            | G                          | G                        | G                     | G                         | G                     | G                         | G                         |
| CA Resources<br>Agency<br>Coastal<br>Resources                           |                       | G                          |              | G                          |                          |                       |                           |                       |                           |                           |
| CA Resources<br>Agency<br>Environmental<br>Enhancement<br>and Mitigation |                       |                            |              | G                          | G                        |                       |                           |                       |                           |                           |
| CCC (CA<br>Resources<br>Agency)<br>The Whale<br>Tail License<br>Plate    |                       |                            |              |                            |                          | F                     | F                         | F                     | F                         | F                         |



| Agency/Org<br>and Program                                               | HAB-1<br>Over<br>Maps | HAB-2<br>Upland<br>Habitat | HAB-3<br>Map | HAB-4<br>Species<br>Recov. | HAB-5<br>Benef.<br>Dredg | HAB-6<br>Ripar<br>Veg | HAB-7<br>Ri/Wet<br>Policy | HAB-8<br>Eel<br>grass | HAB-9<br>Non-i<br>Species | HAB-10<br>A-don<br>remove |
|-------------------------------------------------------------------------|-----------------------|----------------------------|--------------|----------------------------|--------------------------|-----------------------|---------------------------|-----------------------|---------------------------|---------------------------|
| CCC (CA<br>Resources<br>Agency)<br>The Resource<br>Enhancement          | G                     | G                          | G            | G                          | G                        | G                     | G                         | G                     | G                         | G                         |
| DFG (CA<br>Resources<br>Agency)<br>Fisheries<br>Restoration             |                       | G/C                        |              | G/C                        | G/C                      | G/C                   | G/C                       |                       |                           |                           |
| DFG (CA<br>Resources<br>Agency)<br>Fisheries<br>Restoration<br>(Salmon) |                       | G/C                        |              | G/C                        | G/C                      | G/C                   | G/C                       |                       |                           |                           |
| DFG (CA<br>Resources<br>Agency)<br>Proposition 99                       |                       |                            |              | G                          | G                        | G                     |                           |                       |                           |                           |
| DFG (CA<br>Resources<br>Agency)<br>Steelhead<br>Report Card             | G                     | G                          | G            | G                          | G                        | G                     | G                         |                       |                           |                           |
| DF (CA<br>Resources<br>Agency)<br>Stewardship<br>Incentive              | G                     | G                          | G            | G                          | G                        | G                     | G                         | G                     | G                         | G                         |
| DPR (CA<br>Resources<br>Agency)<br>Habitat<br>Conservation<br>Fund      | G                     | G                          | G            | G                          | G                        | G                     | G                         | G                     | G                         | G                         |



|                                                                            |                       |                            |              |                            |                          | 19                    |                           |                       |                           |                           |
|----------------------------------------------------------------------------|-----------------------|----------------------------|--------------|----------------------------|--------------------------|-----------------------|---------------------------|-----------------------|---------------------------|---------------------------|
| Agency/Org<br>and Program                                                  | HAB-1<br>Over<br>Maps | HAB-2<br>Upland<br>Habitat | HAB-3<br>Map | HAB-4<br>Species<br>Recov. | HAB-5<br>Benef.<br>Dredg | HAB-6<br>Ripar<br>Veg | HAB-7<br>Ri/Wet<br>Policy | HAB-8<br>Eel<br>grass | HAB-9<br>Non-i<br>Species | HAB-10<br>A-don<br>remove |
| DWR (CA<br>Resources<br>Agency)<br>Environmental<br>Water<br>Program       |                       |                            |              |                            |                          |                       |                           | G                     |                           |                           |
| DWR (CA<br>Resources<br>Agency)<br>Urban Stream<br>Restoration             |                       |                            |              | G                          | G                        | G                     | G                         |                       |                           |                           |
| WCB (CA<br>Resources<br>Agency)<br>The Riparian<br>Habitat<br>Conservation |                       |                            | G            |                            | G                        | G                     | G                         |                       |                           | G                         |
| SLOCO<br>Environmental<br>Grants                                           |                       |                            |              |                            |                          |                       |                           |                       | G                         | G                         |
| CMB<br>General<br>support to<br>MBNEP                                      |                       |                            |              |                            |                          |                       |                           | GS                    |                           |                           |



### Table 7.10 Steelhead - Additional Potential Funding Sources

| Agency/Org. and Program                                                                                                | STL-1<br>Recovery<br>Plan | STL-2<br>Habitat<br>Access | STL-3<br>Pool/Riffle<br>Structure | STL-4<br>Riparian<br>Corridors |
|------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------|-----------------------------------|--------------------------------|
| Corps. for Nat' I Service<br>Learn and Serve America                                                                   |                           | G                          |                                   |                                |
| NOAA (DOC)<br>Coastal Zone Management,<br>Administration and Implementation<br>Awards                                  | G                         |                            |                                   |                                |
| NOAA (DOC)<br>Community Restoration                                                                                    | G/CA                      | G/CA                       | G/CA                              | G/CA                           |
| NOAA (DOC)<br>Fisheries Development and<br>Utilization Research and<br>Development Grants and<br>Cooperative Agreement | G/CA                      | G/CA                       | G/CA                              | G/CA                           |
| ACOE (DOD)<br>Flood Corps Projects                                                                                     |                           |                            | SS                                | SS                             |
| ACOE (DOD)<br>Flood Hazard Mitigation and<br>Riverine Ecosystem Restoration<br>Program                                 |                           |                            |                                   | G                              |
| <b>USFWS (DOI)</b><br>Coastal Program                                                                                  | G/IKS                     | G/IKS                      | G/IKS                             | G/IKS                          |
| USFWS (DOI)<br>Sport Fish Restoration                                                                                  | G                         | G                          | G                                 | G                              |
| <b>USFWS (DOI)</b><br>Wildlife Conservation and<br>Appreciation                                                        | G                         | G                          | G                                 | G                              |
| <b>USEPA</b><br>Capitalization Grants for Clean<br>Water Revolving Fund                                                |                           |                            |                                   | L                              |
| <b>USEPA</b><br>Five Star Restoration                                                                                  | G/TA                      | G/TA                       | G/TA                              | G/TA                           |
| USEPA<br>Science to Achieve Results                                                                                    | G                         |                            |                                   |                                |
| USEPA<br>Small Business Innovation and<br>Research                                                                     |                           | C                          | С                                 | С                              |



|                                                                         |                           | · · · · · · · · · · · · · · · · · · · |                                   |                                |
|-------------------------------------------------------------------------|---------------------------|---------------------------------------|-----------------------------------|--------------------------------|
| Agency/Org. and Program                                                 | STL-1<br>Recovery<br>Plan | STL-2<br>Habitat<br>Access            | STL-3<br>Pool/Riffle<br>Structure | STL-4<br>Riparian<br>Corridors |
| <b>USEPA</b><br>Sustainable Development<br>Challenge                    | G                         | G                                     | G                                 | G                              |
| USEPA<br>Water Quality Assessment and<br>Planning                       | G                         | G                                     | G                                 | G                              |
| USEPA<br>Wetland Protection                                             | G                         | G                                     | G                                 | G                              |
| National Park Service<br>Rivers, Trails, and Conservation<br>Assistance | ТА                        | ТА                                    | ТА                                | ТА                             |
| FSA (USDA)<br>Conservation Reserve                                      |                           | G                                     |                                   |                                |
| FSA (USDA)<br>Conservation Reserve<br>Enhancement                       |                           | G                                     |                                   |                                |
| NRCS (USDA)<br>Environmental Quality Incentives                         |                           | G                                     |                                   | G                              |
| NRCS (USDA)<br>Watershed Protection and Flood<br>Prevention             | G/AS                      | G/AS                                  | G/AS                              | G/AS                           |
| NRCS (USDA)<br>Wetland Reserve Program                                  |                           | G                                     | G                                 | G                              |
| NRCS (USDA)<br>Wildlife Habitat Incentive Program                       | G                         | G                                     | G                                 | G                              |
| (WCB) CAL EPA<br>Proposition 13                                         | G                         | G                                     | G                                 | G                              |
| CCC (CA Resources Agency)<br>Coastal Resources                          | G                         | G                                     | G                                 | G                              |
| CA Resources Agency<br>Environmental Enhancement and<br>Mitigation      |                           | G                                     | G                                 | G                              |
| CCC (CA Resources Agency)<br>The Whale Tail License Plate               | F                         | F                                     | F                                 | F                              |
| CCC (CA Resources Agency)<br>The Resource Enhancement                   | G                         | G                                     | G                                 | G                              |
| <b>DFG (CA Resources Agency)</b><br>Fisheries Restoration               | G/C                       | G/C                                   | G/C                               | G/C                            |

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| Agency/Org. and Program                                         | STL-1<br>Recovery<br>Plan | STL-2<br>Habitat<br>Access | STL-3<br>Pool/Riffle<br>Structure | STL-4<br>Riparian<br>Corridors |
|-----------------------------------------------------------------|---------------------------|----------------------------|-----------------------------------|--------------------------------|
| DFG (CA Resources Agency)<br>Fisheries Restoration (Salmon)     | G/C                       | G/C                        | G/C                               | G/C                            |
| DFG (CA Resources Agency)<br>Proposition 99                     | G                         | G                          | G                                 | G                              |
| DFG (CA Resources Agency)<br>Steelhead Report Card              | G                         | G                          | G                                 | G                              |
| DF (CA Resources Agency)<br>Stewardship Incentive               | G                         | G                          | G                                 | G                              |
| <b>DPR (CA Resources Agency)</b><br>Habitat Conservation Fund   | G                         | G                          | G                                 | G                              |
| <b>DWR (CA Resources Agency)</b><br>Environmental Water Program |                           | G                          | G                                 | G                              |
| <b>DWR (CA Resources Agency)</b><br>Urban Stream Restoration    | G                         | G                          | G                                 | G                              |
| WCB (CA Resources Agency)<br>The Riparian Habitat Conservation  | G                         | G                          | G                                 | G                              |



# Table 7.11 Education & Outreach - Additional Potential Funding Sources

| Agency/<br>Org and<br>Program                                                                                       | EDU-1<br>Gen.<br>PEO | EDU-2<br>Boater<br>Ed | EDU-3<br>Ag<br>Ed | EDU-4<br>Pest<br>Wksp | EDU-5<br>Estuary<br>Confer | EDU-6<br>CCNHA<br>Exhibit | EDU-7<br>Media | EDU-8<br>Public<br>Access | EDU-9<br>K-12 | EDU-10<br>Mini<br>Grants | EDU-11<br>CEQA<br>List |
|---------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|-------------------|-----------------------|----------------------------|---------------------------|----------------|---------------------------|---------------|--------------------------|------------------------|
| Corps.<br>for Nat' l<br>Service<br>Learn and<br>Serve<br>America                                                    | G                    | G                     | G                 |                       |                            | G                         | G              |                           | G             |                          |                        |
| NOAA<br>(DOC)<br>Coastal<br>Zone<br>Manage-<br>ment,<br>Adminis-<br>tration<br>and<br>Implemen<br>tation<br>Awards  |                      |                       |                   |                       | G                          |                           |                | G                         |               |                          | G                      |
| NOAA<br>(DOC)<br>Com-<br>munity<br>Restorati<br>on                                                                  | G/CA                 | G/CA                  | G/CA              |                       |                            |                           |                |                           | G/CA          | G/CA                     |                        |
| NOAA<br>(DOC)<br>Financial<br>Assis-<br>tance for<br>Ocean<br>Resources<br>Conser-<br>vation and<br>Assess-<br>ment | G/CA                 | G/CA                  | G/CA              | G/CA                  |                            |                           |                | G/CA                      |               |                          | G/CA                   |



| Agency/<br>Org and<br>Program                                                                                                                           | EDU-<br>1<br>Gen.<br>PFO | EDU-2<br>Boater<br>Ed | EDU-3<br>Ag<br>Ed | EDU-4<br>Pest<br>Wksp | EDU-5<br>Estuary<br>Confer | EDU-6<br>CCNHA<br>Exhibit | EDU-7<br>Media | EDU-8<br>Public<br>Access | EDU-9<br>K-12 | EDU-10<br>Mini<br>Grants | EDU-11<br>CEQA<br>List |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------|-------------------|-----------------------|----------------------------|---------------------------|----------------|---------------------------|---------------|--------------------------|------------------------|
| NOAA<br>(DOC)<br>Fisheries<br>Develop-<br>ment and<br>Utilization<br>Research<br>and<br>Develop-<br>ment<br>Grants and<br>Cooper-<br>ative<br>Agreement |                          | G/CA                  |                   |                       |                            |                           |                |                           |               |                          |                        |
| NOAA<br>(DOC)<br>Sea Grant<br>Support                                                                                                                   | G                        | G                     | G                 | G                     | G                          | G                         | G              |                           | G             | G                        | G                      |
| USFWS<br>(DOI)<br>Clean<br>Vessel Act                                                                                                                   |                          | G                     |                   |                       |                            |                           |                |                           |               |                          |                        |
| USFWS<br>(DOI)<br>Partners for<br>Fish and<br>Wildlife<br>Habitat<br>Restoration                                                                        | G                        |                       | G                 |                       |                            |                           |                |                           |               |                          |                        |
| USFWS<br>(DOI)<br>Wildlife<br>Conser-<br>vation and<br>Apprecia-<br>tion                                                                                |                          | G                     |                   |                       |                            |                           |                | G                         | G             |                          |                        |


|                                                                                      |                          |                       |                   |                       |                            |                           |                | -                         |               |                          | _                      |
|--------------------------------------------------------------------------------------|--------------------------|-----------------------|-------------------|-----------------------|----------------------------|---------------------------|----------------|---------------------------|---------------|--------------------------|------------------------|
| Agency/<br>Org and<br>Program                                                        | EDU-<br>1<br>Gen.<br>PEO | EDU-2<br>Boater<br>Ed | EDU-3<br>Ag<br>Ed | EDU-4<br>Pest<br>Wksp | EDU-5<br>Estuary<br>Confer | EDU-6<br>CCNHA<br>Exhibit | EDU-7<br>Media | EDU-8<br>Public<br>Access | EDU-9<br>K-12 | EDU-10<br>Mini<br>Grants | EDU-11<br>CEQA<br>List |
| USCG<br>(DOT)<br>Boating<br>Safety<br>Financial<br>Assis-tance                       |                          | G                     |                   |                       |                            |                           |                | G                         |               |                          |                        |
| USEPA<br>Environ-<br>mental<br>Education                                             | G                        | G                     | G                 | G                     | G                          | G                         | G              | G                         | G             | G                        | G                      |
| USEPA<br>Environme<br>ntal Justice<br>Grants to<br>Small<br>Comm-<br>unity<br>Groups | G                        | G                     | G                 | G                     |                            | G                         | G              | G                         | G             | G                        |                        |
| USEPA<br>Environ-<br>mental<br>Justice<br>Through<br>Pollution<br>Preven-tion        | G                        | G                     | G                 | G                     |                            | G                         | G              | G                         | G             | G                        |                        |
| USEPA<br>Five Star<br>Restor-<br>ation                                               | G/T<br>S                 | G/TS                  | G/TS              | G/TS                  | G/TS                       | G/TS                      | G/TS           | G/TS                      | G/TS          | G/TS                     | G/TS                   |
| USEPA<br>Jobs<br>Through<br>Recycling                                                |                          |                       |                   |                       |                            |                           |                |                           |               | G                        |                        |
| USEPA<br>Nonpoint<br>Source<br>Implemen-<br>tation                                   |                          |                       | G                 | G                     | G                          |                           |                |                           |               |                          |                        |

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| Agency/<br>Org and<br>Program                                                                    | EDU-1<br>Gen.<br>PEO | EDU-2<br>Boater<br>Ed | EDU-3<br>Ag<br>Ed | EDU-4<br>Pest<br>Wksp | EDU-5<br>Estuary<br>Confer | EDU-6<br>CCNHA<br>Exhibit | EDU-7<br>Media | EDU-8<br>Public<br>Access | EDU-9<br>K-12 | EDU-10<br>Mini<br>Grants | EDU-11<br>CEQA<br>List |
|--------------------------------------------------------------------------------------------------|----------------------|-----------------------|-------------------|-----------------------|----------------------------|---------------------------|----------------|---------------------------|---------------|--------------------------|------------------------|
| USEPA<br>Pesticide<br>Environ-<br>mental<br>Steward-<br>ship                                     |                      |                       | G                 | G                     | G                          |                           | G              |                           |               |                          |                        |
| USEPA<br>Pollution<br>Preven-<br>tion<br>Incentives<br>for States                                | G                    | G                     | G                 | G                     |                            |                           |                |                           |               | G                        | G                      |
| USEPA<br>Science to<br>Achieve<br>Results                                                        |                      |                       |                   |                       |                            |                           |                |                           |               |                          | G                      |
| USEPA<br>Sustain-<br>able<br>Develop-<br>ment<br>Challenge                                       | G                    | G                     | G                 |                       | G                          |                           |                | G                         | G             | G                        |                        |
| USEPA<br>Water-<br>shed<br>Assis-<br>tance                                                       | G                    | G                     | G                 | G                     | G                          | G                         | G              | G                         | G             | G                        | G                      |
| National<br>Park<br>Service<br>Rivers,<br>Trails,<br>and<br>Conser-<br>vation<br>Assis-<br>tance | ТА                   |                       | ТА                |                       |                            |                           |                | TA                        | TA            |                          |                        |



|                                                                                       |                      |                       |                   |                       |                            | r                         |                |                           |               |                          |                        |
|---------------------------------------------------------------------------------------|----------------------|-----------------------|-------------------|-----------------------|----------------------------|---------------------------|----------------|---------------------------|---------------|--------------------------|------------------------|
| Agency/<br>Org and<br>Program                                                         | EDU-1<br>Gen.<br>PEO | EDU-2<br>Boater<br>Ed | EDU-3<br>Ag<br>Ed | EDU-4<br>Pest<br>Wksp | EDU-5<br>Estuary<br>Confer | EDU-6<br>CCNHA<br>Exhibit | EDU-7<br>Media | EDU-8<br>Public<br>Access | EDU-9<br>K-12 | EDU-10<br>Mini<br>Grants | EDU-11<br>CEQA<br>List |
| CSREES<br>(USDA)<br>Sustain-<br>able Agri-<br>culture<br>Research<br>and<br>Education |                      |                       | G                 | G                     |                            |                           |                |                           |               |                          |                        |
| CSREES<br>(USDA)<br>Water<br>Quality<br>Special<br>Research                           |                      |                       | G                 | G                     |                            |                           |                |                           |               |                          |                        |
| (DPR)<br>CAL<br>EPA<br>Pest<br>Manage-<br>ment<br>Alliance                            |                      |                       | G                 | G                     |                            |                           |                |                           |               |                          |                        |
| (DPR)<br>CAL<br>EPA<br>Pest<br>Manage-<br>ment                                        |                      |                       | G                 | G                     |                            |                           |                |                           |               |                          |                        |
| (IWMB)<br>CAL<br>EPA<br>Cal MAZ<br>Partner-<br>ship                                   | G                    | G                     | G                 |                       | G                          |                           | G              |                           |               | G                        |                        |



| Agency/<br>Org and<br>Program                                                            | EDU-1<br>Gen.<br>PEO | EDU-2<br>Boater<br>Ed | EDU-3<br>Ag<br>Ed | EDU-4<br>Pest<br>Wksp | EDU-5<br>Estuary<br>Confer | EDU-6<br>CCNHA<br>Exhibit | EDU-7<br>Media | EDU-8<br>Public<br>Access | EDU-9<br>K-12 | EDU-10<br>Mini<br>Grants | EDU-11<br>CEQA<br>List |
|------------------------------------------------------------------------------------------|----------------------|-----------------------|-------------------|-----------------------|----------------------------|---------------------------|----------------|---------------------------|---------------|--------------------------|------------------------|
| (IWMB)<br>CAL<br>EPA<br>Farm and<br>Ranch<br>Solid<br>Waste<br>Cleanup<br>Abate-<br>ment |                      |                       | G                 |                       |                            |                           |                |                           |               |                          |                        |
| (WCB)<br>CAL<br>EPA<br>Wildlife<br>Restor-<br>ation<br>Fund                              |                      |                       |                   |                       |                            |                           |                | G                         |               |                          |                        |
| CA<br>Resource<br>s Agency<br>Environ-<br>mental<br>Enhance-<br>ment and<br>Mitigation   |                      | G                     |                   |                       |                            |                           |                |                           |               |                          |                        |
| CCC (CA<br>Resource<br>s Agency)<br>The<br>Whale<br>Tail<br>License<br>Plate             | F                    | F                     | F                 |                       | F                          | F                         | F              | F                         | F             |                          |                        |
| CCC (CA<br>Resource<br>s Agency)<br>The Agri-<br>cultural<br>Preser-<br>vation           |                      |                       | G                 |                       |                            |                           |                |                           |               |                          |                        |



| r                                                                                           |                          | · ·····               | · · · · · · · · · · · · · · · · · · · | ·                     |                            | 2                         |                |                           |               |                          |                        |
|---------------------------------------------------------------------------------------------|--------------------------|-----------------------|---------------------------------------|-----------------------|----------------------------|---------------------------|----------------|---------------------------|---------------|--------------------------|------------------------|
| Agency/<br>Org and<br>Program                                                               | EDU-<br>1<br>Gen.<br>PEO | EDU-2<br>Boater<br>Ed | EDU-3<br>Ag<br>Ed                     | EDU-4<br>Pest<br>Wksp | EDU-5<br>Estuary<br>Confer | EDU-6<br>CCNHA<br>Exhibit | EDU-7<br>Media | EDU-8<br>Public<br>Access | EDU-9<br>K-12 | EDU-10<br>Mini<br>Grants | EDU-11<br>CEQA<br>List |
| CCC (CA<br>Resources<br>Agency)<br>The Public<br>Access                                     | G                        |                       |                                       |                       |                            |                           | G              | G                         |               |                          |                        |
| CCC (CA<br>Resources<br>Agency)<br>The Site<br>Urban<br>Water-<br>front<br>Restor-<br>ation |                          |                       |                                       |                       |                            |                           |                | G                         |               |                          |                        |
| DFG (CA<br>Resources<br>Agency)<br>Fisheries<br>Restor-<br>ation                            | G/C                      |                       | G/C                                   |                       |                            |                           |                |                           |               |                          |                        |
| DFG (CA<br>Resources<br>Agency)<br>Fisheries<br>Restor-<br>ation<br>(Salmon)                | G/C                      |                       | G/C                                   |                       |                            |                           |                |                           |               |                          |                        |
| State of<br>CA<br>Environ-<br>mental<br>Education                                           | G                        | G                     | G                                     | G                     | G                          | G                         | G              |                           | G             |                          |                        |
| SLOCO<br>Environ-<br>mental<br>Grants                                                       |                          |                       |                                       | G                     |                            |                           |                | G                         |               |                          | G                      |
| CMB<br>General<br>support to<br>MBNEP                                                       |                          |                       | х.                                    |                       |                            |                           |                |                           |               |                          | GS                     |





# LIST OF ACRONYMS

| ACOE U.S. Army Corps of Engineers                          |
|------------------------------------------------------------|
| APDP Action Plan Demonstration Project                     |
| BF The Bay Foundation of Morro Bay                         |
| BLM Bureau of Land Management                              |
| BMPs Best Management Practices                             |
| BPA Base Programs Analysis                                 |
| CAC Citizens Advisory Committee                            |
| CAL-EPA California Environmental Protection Agency         |
| Cal-Trans California Department of Transportation          |
| CCAMP Central Coast Ambient Monitoring Program             |
| CCC California Coastal Commission                          |
| CCCorps California Conservation Corps                      |
| CCMP Comprehensive Conservation and Management Plan        |
| CCNHA Central Coast Natural History Association            |
| CCRWQCB Central Coast Regional Water Quality Control Board |
| CDA California Department of Agriculture                   |
| CDBWCalifornia Department of Boating and Waterways         |
| CDC California Department of Corrections                   |
| CDF California Department of Forestry & Fire Protection    |
| CDFG                                                       |
| CDOC California Department of Conservation                 |
| CDPR California Department of Parks and Recreation         |
| CDHS California Department of Health Services              |
| CDIFConsent Decree Implementation Fund                     |
| CDTSCCalifornia Department of Toxic Substances Control     |
| CDWR California Department of Water Resources              |
| CEC Santa Barbara Community Environmental Council          |
| CEQA California Environmental Quality Act                  |
| CFEP Chorro Flats Enhancement Project                      |
| CFR Code of Federal Regulations                            |
| cfs Cubic feet per second                                  |
| CMB City of Morro Bay                                      |
| CMC                                                        |



| CNDD           | . California Natural Diversity Database         |
|----------------|-------------------------------------------------|
| CNPS           | California Native Plant Society                 |
| CRA            | California Resources Agency                     |
| CSD            | Community Services District                     |
| CSLCNG         | Camp San Luis, California National Guard        |
| CSLRCD         | Coastal San Luis Resource Conservation District |
| CWA            | Clean Water Act                                 |
| CZARA          | . Coastal Zone Act Reauthorization Amendments   |
| CZLUO          | Coastal Zone Land Use Ordinance                 |
| DEHSan Luis Ob | ispo County Department of Environmental Health  |
| DO             | Dissolved Oxygen                                |
| ECA            | Estero Conservation Alliance                    |
| EFDC           | Environmental Fluids Dynamic Code               |
| EMP            | Environmental Monitoring Plan                   |
| EQIP           | Environmental Quality Incentives Program        |
| ESA            | Endangered Species Act                          |
| ESH            | Environmentally Sensitive Habitat               |
| ESU            | Evolutionary Significant Unit                   |
| FOE            | Friends of the Estuary at Morro Bay             |
| FSA            | Farm Service Agency                             |
| GIS            | Geographic Information System                   |
| НСР            | Habitat Conservation Plan                       |
| HUA            |                                                 |
| IPM            | Integrated Pest Management                      |
| IWMA           | Integrated Waste Management Authority           |
| LOCSD          | Los Osos Community Services District            |
| LPC            | Local Policy Committee                          |
| MBERF          | Morro Bay Estuary Restoration Fund              |
| MBHD           | Morro Bay Harbor Department                     |
| MBNEP          | Morro Bay National Estuary Program              |
| MBNMP          | Morro Bay National Monitoring Plan              |
| MBSEP          | Morro Bay State Estuary Program                 |
| MBTF           | Morro Bay Task Force                            |
| MBWEP          | Morro Bay Watershed Enhancement Plan            |



| MEGA                                                                                                                                                           | Morro Estuary Greenbelt Alliance                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MOA                                                                                                                                                            | Memorandum of Agreement                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| MPN                                                                                                                                                            | Most Probable Number                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| MSD                                                                                                                                                            | Marine Sanitation Device                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| MURP                                                                                                                                                           | Model Urban Runoff Program                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| NEP                                                                                                                                                            | National Estuary Program                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| NEPA                                                                                                                                                           | National Environmental Policy Act                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| NGVD                                                                                                                                                           | National Geodetic Vertical Datum                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| NMP                                                                                                                                                            | National Monitoring Program                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| NOAA                                                                                                                                                           | National Oceanic and Atmospheric Administration                                                                                                                                                                                                                                                                                                                                                                                                                             |
| NPDES                                                                                                                                                          | National Pollutant Discharge Elimination System                                                                                                                                                                                                                                                                                                                                                                                                                             |
| NPSPC                                                                                                                                                          | Nonpoint Source Pollution Control                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| NRCS                                                                                                                                                           | Natural Resources Conservation Service                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| NSSP                                                                                                                                                           | National Shellfish Sanitation Program                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| OEHHA Office of En                                                                                                                                             | vironmental Health Hazard Assessment, CAL-EPA                                                                                                                                                                                                                                                                                                                                                                                                                               |
| OSPRO                                                                                                                                                          | ffice of Oil Spillage Prevention & Response (DFG)                                                                                                                                                                                                                                                                                                                                                                                                                           |
| SBNEP                                                                                                                                                          | Sarasota Bay National Estuary Program                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| SCB                                                                                                                                                            | Southern California Bight                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| SCB<br>SCC                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| SCB<br>SCC<br>SCS                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| SCB<br>SCC<br>SCS<br>Sheriff Dive                                                                                                                              | Southern California Bight<br>California State Coastal Conservancy<br>Soil Conservation Service<br>Sheriff's Dive Team                                                                                                                                                                                                                                                                                                                                                       |
| SCB<br>SCC<br>SCS<br>Sheriff Dive<br>SIP                                                                                                                       | Southern California Bight<br>California State Coastal Conservancy<br>Soil Conservation Service<br>Sheriff's Dive Team<br>Stewardship Incentive Program                                                                                                                                                                                                                                                                                                                      |
| SCB<br>SCC<br>SCS<br>Sheriff Dive<br>SIP<br>SLC                                                                                                                | Southern California Bight<br>California State Coastal Conservancy<br>Soil Conservation Service<br>Sheriff's Dive Team<br>Stewardship Incentive Program<br>State Lands Commission                                                                                                                                                                                                                                                                                            |
| SCB         SCC         SCS         Sheriff Dive         SIP         SLC         SLO                                                                           | Southern California Bight<br>California State Coastal Conservancy<br>Soil Conservation Service<br>Sheriff's Dive Team<br>Stewardship Incentive Program<br>State Lands Commission<br>San Luis Obispo                                                                                                                                                                                                                                                                         |
| SCB         SCC         SCS         Sheriff Dive         SIP         SLC         SLOCo                                                                         | Southern California Bight<br>California State Coastal Conservancy<br>Soil Conservation Service<br>Sheriff's Dive Team<br>Stewardship Incentive Program<br>State Lands Commission<br>San Luis Obispo<br>San Luis Obispo County                                                                                                                                                                                                                                               |
| SCB         SCC         SCS         Sheriff Dive         SIP         SLC         SLOCo         SMW                                                             | Southern California Bight<br>California State Coastal Conservancy<br>Soil Conservation Service<br>Sheriff's Dive Team<br>Stewardship Incentive Program<br>State Lands Commission<br>San Luis Obispo<br>San Luis Obispo County<br>State Mussel Watch                                                                                                                                                                                                                         |
| SCB         SCC         SCS         Sheriff Dive         SIP         SLC         SLO         SLOCo         SMW         SRAs                                    | Southern California Bight<br>California State Coastal Conservancy<br>Soil Conservation Service<br>Sheriff's Dive Team<br>Stewardship Incentive Program<br>State Lands Commission<br>San Luis Obispo<br>San Luis Obispo<br>San Luis Obispo County<br>State Mussel Watch<br>Sensitive Resource Areas                                                                                                                                                                          |
| SCB         SCC         SCS         Sheriff Dive         SIP         SLC         SLO         SLOCo         SMW         SRAs         SRF                        | Southern California Bight<br>California State Coastal Conservancy<br>Soil Conservation Service<br>Sheriff's Dive Team<br>Stewardship Incentive Program<br>State Lands Commission<br>San Luis Obispo<br>San Luis Obispo<br>San Luis Obispo County<br>State Mussel Watch<br>Sensitive Resource Areas<br>State Revolving Fund                                                                                                                                                  |
| SCB<br>SCC                                                                                                                                                     | Southern California Bight<br>California State Coastal Conservancy<br>Soil Conservation Service<br>Sheriff's Dive Team<br>Stewardship Incentive Program<br>State Lands Commission<br>San Luis Obispo<br>San Luis Obispo County<br>State Mussel Watch<br>Sensitive Resource Areas<br>State Revolving Fund<br>Coalition for the South Central Coast of California                                                                                                              |
| SCB                                                                                                                                                            | Southern California Bight<br>California State Coastal Conservancy<br>Soil Conservation Service<br>Sheriff's Dive Team<br>Stewardship Incentive Program<br>State Lands Commission<br>San Luis Obispo<br>San Luis Obispo<br>San Luis Obispo County<br>State Mussel Watch<br>Sensitive Resource Areas<br>State Revolving Fund<br>Coalition for the South Central Coast of California<br>Small Wilderness Area Preservation                                                     |
| SCB                                                                                                                                                            | Southern California Bight<br>California State Coastal Conservancy<br>Soil Conservation Service<br>Sheriff's Dive Team<br>Stewardship Incentive Program<br>State Lands Commission<br>San Luis Obispo<br>San Luis Obispo<br>San Luis Obispo County<br>State Mussel Watch<br>Sensitive Resource Areas<br>State Revolving Fund<br>Coalition for the South Central Coast of California<br>Small Wilderness Area Preservation<br>State Water Resources Control Board              |
| SCB                                                                                                                                                            | Southern California Bight<br>California State Coastal Conservancy<br>Soil Conservation Service<br>Sheriff's Dive Team<br>Stewardship Incentive Program<br>State Lands Commission<br>San Luis Obispo<br>San Luis Obispo County<br>State Mussel Watch<br>Sensitive Resource Areas<br>State Revolving Fund<br>Coalition for the South Central Coast of California<br>Small Wilderness Area Preservation<br>State Water Resources Control Board<br>Technical Advisory Committee |
| SCB<br>SCC<br>SCS<br>Sheriff Dive<br>SIP<br>SLC<br>SLO<br>SLOCo<br>SMW<br>SRAs<br>SRF<br>SSRCSCCC Steelhead and Stream Recovery<br>SWAP<br>SWRCB<br>TAC<br>TDC | Southern California Bight<br>California State Coastal Conservancy<br>Soil Conservation Service<br>Sheriff's Dive Team<br>Stewardship Incentive Program<br>State Lands Commission<br>San Luis Obispo<br>San Luis Obispo County<br>State Mussel Watch<br>Sensitive Resource Areas<br>State Revolving Fund<br>Coalition for the South Central Coast of California<br>Small Wilderness Area Preservation<br>State Water Resources Control Board<br>Technical Advisory Committee |



| UCCE.  | University of California Cooperative Extension   |
|--------|--------------------------------------------------|
| USCG   | United States Coast Guard                        |
| USDA   | United States Department of Agriculture          |
| USEPA  | United States Environmental Protection Agency    |
| USFS   | United States Forest Service                     |
| USFWS  | United States Fish and Wildlife Service          |
| USGS   | United States Geological Survey                  |
| USNMFS | United States National Marine Fisheries Services |
| VMP    | Volunteer Monitoring Program                     |
| WC     |                                                  |
| WCB    | Wildlife Conservation Board                      |
| WHIP   | Wildlife Habitat Improvement Program             |
| WRP    | Wetland Reserve Program (federal)                |
| WWTP   | Wastewater Treatment Plant                       |

# - GLOSSARY



| Aggraded                            | Raising the grade or level of (a river valley, stream bed, etc.) by depositing detritus, sediment or the like.                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient                             | Refers to overall conditions surrounding a place or thing. For example, ambient monitoring refers to routine water quality monitoring which assess overall conditions for the particular site.                                                                                                                                                                                                                                               |
| Anadromous                          | Describes fish that are born in fresh water, migrate to the sea, and return to fresh water to spawn (reproduce). Examples include salmon, sturgeon, shad, smelt, and steelhead.                                                                                                                                                                                                                                                              |
| Bathymetry                          | The physical shape of a basin which contains water, with special attention to the contours of depth; variations in mean depth in a body of water.                                                                                                                                                                                                                                                                                            |
| Benthic                             | Bottom-dwelling or substrate-oriented; at or in the bottom of a body of water.                                                                                                                                                                                                                                                                                                                                                               |
| Best Management<br>Practices (BMPs) | Practice or combination of practices that are determined to be the most effective and practical means of controlling point and non-point source pollutants at levels compatible with environmental quality goals. The term originated from the rules and regulations developed pursuant to the federal Clean Water Act (40 CFR 130).                                                                                                         |
| Brackish                            | Less salty than seawater, but more salty than fresh water. An intermediate saline habitat that falls between 4 and 18 ppm of salinity and usually found under low flushing conditions                                                                                                                                                                                                                                                        |
| Catch Basin                         | Box-like underground concrete receptacles with openings in curbs and gutters designed to collect water from streets and carry it into the storm drain system.                                                                                                                                                                                                                                                                                |
| Depuration                          | To make or become free from impurities; purification.                                                                                                                                                                                                                                                                                                                                                                                        |
| Detention                           | The process of collecting and holding back stormwater for delayed release to receiving waters.                                                                                                                                                                                                                                                                                                                                               |
| Dissolved Oxygen                    | Oxygen that is present (dissolved) in water and therefore available for fish and other aquatic animals to use. If the amount of dissolved oxygen in the water is too low, then aquatic animals may die. Wastewater and naturally occurring organic matter contain oxygen-demanding substances that consume dissolved oxygen.                                                                                                                 |
| Dredging                            | Any physical digging into the bottom sediment of a water body. Dredging can be done<br>with mechanical or hydraulic machines, and it changes the shape and form of the bottom.<br>Dredging is performed in order to maintain navigation channels that would otherwise fill<br>with sediment and block ship passage.                                                                                                                          |
| Effluent                            | Wastewater discharged into a body of water from point sources. The material which flows out of a pipe or facility into a water body (or another larger pipe). For example the treated liquid discharged by a wastewater treatment plant is the plant's effluent.                                                                                                                                                                             |
| Endemic                             | A native species defined in terms of a restricted geographical range.                                                                                                                                                                                                                                                                                                                                                                        |
| Estuary                             | A semi-closed coastal water body which has free connection to the open sea and within<br>which seawater is measurably diluted with freshwater. The degree of mixing and layering<br>(freshwater tends to float on top of the sea water) depends on tidal conditions, river flow,<br>and local currents. Estuaries typically support a biota which can tolerate varying<br>salinities and therefore differ from marine and freshwater biotas. |



| Estuarine                                    | Of or having to do with an estuary.                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fauna                                        | The animals of a given region or period considered as a whole.                                                                                                                                                                                                                                                                                                                                                                                               |
| Fertilizers                                  | Material added to the soil to supply chemical elements needed for plant nutrition.                                                                                                                                                                                                                                                                                                                                                                           |
| Flora                                        | The plants of a particular region or period, listed by species and considered as a whole.                                                                                                                                                                                                                                                                                                                                                                    |
| Geographical<br>Information Systems<br>(GIS) | Computer mapping tool capable of overlaying data for manipulation and display.                                                                                                                                                                                                                                                                                                                                                                               |
| Groundtruthed                                | Verification of aerial data by physically walking on the ground.                                                                                                                                                                                                                                                                                                                                                                                             |
| Heavy Metals                                 | Metallic elements, such as lead, mercury, silver, cadmium, copper, chromium, and zinc, which have relatively high atomic weights and may be toxic at high concentrations. Such metals are toxic to life and continuously pose a threat because of resuspension.                                                                                                                                                                                              |
| Impaired Water                               | Pursuant to the Clean Water Act, Section 303(d), a water is listed as impaired if evidence exists that a violation, or potential future violation of a water quality standard has or may occur.                                                                                                                                                                                                                                                              |
| Inactive/Abandoned<br>Mines                  | Inactive mines are subject to recovery costs by responsible parties, whereas abandoned mines are not.                                                                                                                                                                                                                                                                                                                                                        |
| Intertidal                                   | That portion of the shore or structures in the ocean which is between high and low tide levels; the substrate and organisms in the intertidal are alternately covered by seawater and exposed to the air.                                                                                                                                                                                                                                                    |
| Mean                                         | Mid-point between high and low.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| National Estuary<br>Program (NEP)            | A federal program established in 1987 by amendments to the Clean Water Act and<br>administered by the U.S. Environmental Protection Agency. The NEP's primary goal is<br>to "protect estuaries of national significance that are threatened by degradation caused by<br>human activity." The NEP employs community-based environmental planning,<br>designating primary responsibility for program development and implementation to the<br>local community. |
| Nitrate                                      | A form of the nutrient nitrogen that is readily absorbed by plants.                                                                                                                                                                                                                                                                                                                                                                                          |
| Nonindigenous Species                        | Refers to non-native plants and animals that have been introduced (accidentally or intentionally) to a region. Some non-indigenous species establish and grow quickly, crowding out native species.                                                                                                                                                                                                                                                          |
| Non-point Source<br>Pollution (NPS)          | Pollution that enters water from dispersed and uncontrolled sources (such as surface<br>runoff) rather than through pipes. Nonpoint sources (e.g., forest practices, agricultural<br>practices, on-site sewage disposal, automobiles, and recreational boats) may contribute<br>pathogens, suspended solids and toxicants. While individual sources may seem<br>insignificant, the cumulative effects of nonpoint source pollution can be significant.       |

| Nutrients                            | Any substance required by organisms for normal growth and maintenance. Mineral nutrients usually refer to inorganic substances derived from soil and water. Excessive amounts of nutrients, including nitrogen and phosphorus, may result in excessive growth of algae, leading to oxygen depletion and water quality degradation.                                                                                                                                                                                                                                                                                                     |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pathogen                             | An agent, such as a virus, bacteria or fungus, that can cause disease in humans.<br>Pathogens can be present in municipal, industrial and nonpoint source discharges.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Phytoplankton                        | Free-floating aquatic plants and plant-like organisms, usually algae; an important food source for many animals.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Point Source                         | A source of pollutants from a single point of conveyance, such as a pipe. For example, the discharge from a sewage treatment plant or a factory is a point source.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Priority Organics                    | A class of toxic pollutants found in wells near the Los Osos landfill. Specifically refers to tetrachorothylene volatile organics found in cleaning solvents.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Rare, Threatened<br>or Endangered    | Rare is a classification given only to a species when, although not presently threatened<br>with extinction, it exists in such small numbers through its range that it may become<br>endangered if its present environment worsens. A species is threatened when, although<br>not presently at risk of extinction, it is likely to become an endangered species in the<br>foreseeable future in the absence of special protection and management efforts. A<br>species is considered endangered when it faces possible extinction throughout all, or a<br>significant portion of, its range. The predominant cause is loss of habitat. |
| Riparian                             | Habitat occurring along the bank of a natural and freshwater waterway (e.g., river, stream or creek), which provides for a high density, diversity, and productivity of plant and animal species.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Sediment                             | Mud, sand, silt, clay, and other particles that settle on the bottoms of waterways.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Special Status Species               | Federal and state classifications for plants and animals species that are either listed as threatened or endangered species, are formally recognized candidates for a listing, or are declining to a point where they may be listed.                                                                                                                                                                                                                                                                                                                                                                                                   |
| Substrate                            | Material that forms a stream or lake bed (silt, sand, gravel, cobble, etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Thalweg                              | (1) A line, as drawn on a map, connecting the lowest points of a valley; (2) the middle of the main navigable channel of a waterway that serves as a boundary line.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Total Maximum<br>Daily Loads (TMDLs) | The maximum amount of pollution a body of water can receive in a 24-hour period without deterioration in water quality.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Turbidity                            | A measure of the amount of material suspended in the water. Increasing the turbidity of the water decreases the amount of light that penetrates the water column. High levels of turbidity are harmful to aquatic life.                                                                                                                                                                                                                                                                                                                                                                                                                |
| Urban runoff                         | Water containing pollutants like oil and grease from leaking cars and trucks; heavy metals from vehicle exhaust; soaps and grease removers; pesticides from gardens; animal waste; and street debris, which washes into storm drains and gets carried out to the ocean.                                                                                                                                                                                                                                                                                                                                                                |
| Wastewater                           | Water contaminated with the byproducts of domestic, commercial, agricultural, or industrial uses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



#### Appendix B

| Wastewater Treatment | Processes that help remove solids, nutrients and other pollutants from water before it is discharged or reused.                                                                                                                                                                                                                      |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Watershed            | The geographic region within which water drains into a particular river, stream, or body of water. A watershed includes hills, lowlands, and the body of water into which the land drains. Watershed boundaries are defined by the ridges of separating watersheds.                                                                  |
| Wetlands             | Land where the water table is usually at or near the surface. Some wetlands contain water year-round; others may remain relatively dry for months, becoming moist only during periods of heavy rain. Wetlands are vital habitats for many species of plants and animals; they are protected by local, state and federal regulations. |
| Wildlife             | Undomesticated animals that live either live in a single geographic area or migrate from one area to another.                                                                                                                                                                                                                        |



# "4-H MORRO BAY WATERSHED RUN-OFF MODELS"

**Summary Project Description:** Completion of a concrete, scale-model relief map of the MB Watershed, from Bishops Peak to Morro Rock, and from the Cuesta Grade to the Irish Hills. This model helps students understand the physical geography of the land, and allows students to examine the quality of runoff water as it is affected by various features of the watershed.

**Project Locations:** One model is housed at Rancho El Chorro, San Luis Obispo County Superintendent of Schools' Environmental Education facility, and another model is housed at Monarch Grove Elementary School in Los Osos.

**Priority Problem Addressed:** The model gives a dramatic demonstration of the effectiveness of vegetated filter strips and marshes in preventing eroded soil from entering the stream system or the estuary. It demonstrates various ways to prevent rapid sedimentation of the estuary, and the effect on soil erosion of different cropping strategies.

**Objective:** To educate both youth and adults as to how they can take personal action to prevent some of the problems. Incorporation of possible solutions to prevent contaminated runoff in the Model helps guide viewers to implement simple, creative measures to minimize the impacts of runoff into their streams and estuary.

**Methods Used:** A foundation frame was constructed and filled with decomposed granite. A trench was dug, rebar hung, and cement was poured to provide a foundation on which the model rests. The topographic map was transferred onto clear acetate, and lines were traced onto two-inch thick, 4' x 8' rigid isocyanate foam insulation boards. The foam contours were cut into layers and stacked on top of each other. Spaces between the back of the foam and edge of the model were filled with a mixture of decomposed granite and cement. Layers of concrete (mixed with glue and chopped synthetic fiber) were applied, much like traditional stucco construction. The 2<sup>nd</sup> layer was covered with carpet foam and allowed to cure slowly. The color coat consisted of a stucco mixture rich in concrete powder and glue, cement dyes provided the colors. A mixture of cement powder, glue and dye was sponged on as a final coat to give the mottled look of different vegetation types.

Advisory Committee Members: Scott Robbins, Frank Oakes, Dick Miller, James Dillis, Rich Guenther, William Chesnut, Aiden Sugano.

Who: Rancho El Chorro Environmental Education Center, 4-H Watershed Project, and 4-H SLO scientists.

Status: Project complete. Very popular, interactive K-12 educational tool demonstrating Morro Bay watershed processes and priority problems. Final Report submitted 2/1/99.

**Evaluation:** This project was a great success. It provided a unique, hands-on tool for communicating to school children and adults of all ages and interests about the functions of watersheds. The model is large enough for elementary aged children to walk on. They enjoy demonstrating the consequences of pollution and rainfall in the watershed and estuary using a garden hose and bare feet. Children delight in becoming experts in watershed functions and their enthusiasm is reflected in the applause of their audiences. Other watershed groups are using this model to make their own watershed model.

Cost: \$3,610.00; Match: \$1,404.00



# "INTRODUCED SPECIES"

Summary Project Description: This project provides information to increase public awareness of the ecological consequences of marine species introductions into the Morro Bay Estuary. ("Introduced species" are plants and animals that are not native to an area.) Examples used were two species recently discovered in Morro Bay, the Tortellini Slug (*Philine auriformis*) and the European Green Crab (*Carcinus maenas*).

Project Location: Morro Bay, California

**Priority Problem Addressed:** Valuable habitats and food chains can become harmed by non-native species introductions.

**Objective:** The introduced species used in this project acted as models to address the MBNEP priority issues of habitat loss and modification from oceanic influences within Morro Bay's estuarine watershed.

**Methods Used:** (1) Developed/produced 1,000 pamphlets summarizing the spread of marine introduced species. (2) Installed three signs along the Morro Bay waterfront notifying the public that new marine species introductions and population expansions are occurring in the Bay. (3) An introduced species display of marine animals in Morro Bay has been designed in conjunction with the Morro Bay Natural History Association and is being installed at the Museum. (4) Conducted several guest lectures/public information seminars.

**Highlights:** Observations of *Philine* led to a basic understanding of the slug's life cycle, population dynamics, reproductive habits, and food requirements. It appears that at least two, and perhaps four, *Philine* species have been introduced in California waters. Also, tentatively identified a second species (*P. japonica* from Hong Kong) in Morro Bay.

Advisory Committee Members: Tenera Environmental Services, located in San Luis Obispo and San Francisco, provided all services to conduct the project. The advisory committee and MBNEP staff supplied invaluable input for the work products.

Who: Dr. Andrew Cohen; Ms. Jodi Cassell; Ms. Christine Pattison; Mr. Richard Algert; Ms. Diane McGrath; Mr. John Tranmer; Mr. Richard "Popeye" Thormber.

Status: Project complete. Brochure prepared and signage installed informing visitors of the issues associated with invasive species. Final Report submitted 4/30/99.

**Evaluation**: The project provided the MBNEP with valuable experience in developing brochures and installing signage near the edge of the estuary. This information will be useful as the program implements other educational action plans.

Cost: \$12,820.00; Match: \$8,370.00

## "YARDS AND NEIGHBORS"

Summary Project Description: This project resulted in the production of a brochure that promotes the protection of Morro Bay by offering residents model landscape plans, a drought tolerant plant list, and tips on how to reduce pollutant discharge and conserve water.

**Project Location:** The brochure is focused on the community of Los Osos and the City of Morro Bay, but the concepts are transferable to all Central Coast California residents. It can be accessed at City and Community libraries, nurseries, and civic organizations.



**Priority Problem Addressed:** Addresses the increased bacterial and toxic concentrations in the estuary and the potential adverse effects on marine species and recreational uses of the Bay.

Objective: To decrease urban pollutants flowing to the Bay through storm water runoff sources.

Methods Used: Reviewed State and National Estuary Program materials; work plan draft reviewed by Technical Committee members; researched/reviewed all plant/design resource materials; designed acceptable and unacceptable garden/yard designs via computer software; created acceptable drought tolerant plant list; checked/reviewed yard designs and plant list with landscape professionals, technical review committee, reference materials, City/County public officials, and NEP officials.

**Highlights:** This project produced an educational landscape/yards information brochure, promoting water conservation and sustainable, non-polluting gardening. The brochure is being distributed to over 3,000 families residing in the vicinity of the estuary.

Advisory Committee Members: Stuart, Susan & Rachel McElninney, Patricia Cullinan, Genevieve Holloway, Hope Lee, Don Doubledee, Walt Tryon, John Barta, Shauna Nauman, Mike Wulkan, Ellen Perryess, Brian Osborn, Emily Henning, and Peter Durland.

Who: Friends of the Estuary; Morro Bay's Public Works Advisory Board; Morro Bay's Planning Commission; Morro Bay's Building & Planning Department; Tropicana Nursery; Miners Ace Nursery; Los Osos Valley Nursery; and the National Estuary Program.

Status: Project complete. Final Report submitted 3/1/99.

**Evaluation:** Producing this brochure provided the MBNEP program with valuable experience in developing an informative pamphlet. This experience will aid the program in implementing other education action plans.

Cost: \$3,250.00; Match: \$3,438.00

## "PERMIT STREAMLINING FOR BEST MANAGEMENT PRACTICES" (Morro Bay Partners in Restoration)

Summary Project Description: This program is designed to develop an expedited and streamlined permitting process for farmers who are willing to voluntarily implement conservation practices on their lands.

Project Location: Agricultural lands in the Morro Bay Watershed.

**Priority Problem Addressed:** Some of the water quality problems in Morro Bay have been associated with runoff or nonpoint source pollution from agricultural lands. Erosion and sedimentation pose a severe threat to the rich resources of Morro Bay. To control this erosion and degradation, watershed management practices must be improved. Current regulatory agency review processes often act as disincentives to voluntary initiatives to reduce non-point source pollution and enhance habitat. This project is designed to decrease time and financial costs of seeking governmental approvals for farmers who engage in voluntary conservation activities while honoring the environmental laws protecting the natural resources.

**Objective:** To offer, "one stop regulatory shopping" to landowners and land managers willing to implement voluntary conservation practices with the guidance of the NRCS.



Methods Used: The Morro Bay National Estuary Program, the Natural Resources Conservation Service, and the Coastal San Luis Resource Conservation District are partnering with a non-profit entity called "Sustainable Conservation" to convene agency personnel and seek ways to develop watershed-based permits for implementing conservation practices.

**Who:** Sustainable Conservation, Natural Resources Conservation Service, Coastal San Luis Resource Conservation District, the Morro Bay National Estuary Program, the David and Lucile Packard Foundation, the Greenville Foundation, the Compton Foundation, Environment Now, National Fish and Wildlife Foundation, and the Central Coast Regional Water Quality Control Board.

Status: Demonstration in progress. Local regulatory agencies engaged in dialogue to streamline permit process for installation/implementation of management measures to control erosion. The COE Section 404 permit application will be submitted this summer.

**Evaluation:** This project establishes a permit for stream restoration work and installation of management practices in the Morro Bay watershed and estuary. With this permit, farmers and other implementers of action plans can use this permit to perform work in the watershed without needing to apply separately for each project. This project will reduce the regulatory paperwork and time required for six different approvals from various agencies.

Cost: \$57,800.00; Match: \$19,267.00

## "PHOTOJOURNALISM"

Summary Project Description: To produce a series of geographically linked articles with accompanying photographs to illustrate the problems facing the estuary and the goals articulated by the MBNEP to solve them.

Project Location: Morro Bay and the Morro Bay watershed.

#### **Priority Problem Addressed:**

**Objective:** The ultimate objective of this project is to reawaken the public's engagement in the planning process and to supplement the MBNEP outreach work that is currently under way.

Methods Used: A series of articles were published in the local news media: (1) "The Life and Death of the Estuary;" (George Mason explains the forces that created and also threaten the Bay); (2) "Eelgrass, the Energy Supply of the Estuary;" (botanist, John Chesnut, measures the storehouse that feeds the bay; (3) "Preserving the Oyster in Morro Bay;" (pollution threatens survival of estuary's shellfish, livelihoods); (4) "Fresh vs. Salt: Rooting Out the Weak;" (sedimentation favors exotic plant interlopers); (5) "Swimming Upstream Made a Little Easier; (by restoring waterways, scientists are giving steelhead trout clear paths to area creeks); (6) "Model Creates a Birds-Eye View of Watershed;" (4-H project shows effects of erosion and pollution).

Advisory Committee Members: Melissa Mooney, Katie Kropp, Morro Bay National Estuary Program, and other technical specialists consulted.

**Partners:** Jeff Wheelwright (project leader and writer); Ruth Ann Angus, photographer. The series was published in the Tribune, the local San Luis Obispo County newspaper, and the Sun Bulletin, the key newspaper for the communities of Morro Bay and Los Osos.

Status: 5 articles completed. Published in Sun-Bulletin and The Tribune newspapers, June-July 1999. Final Report submitted 7/16/99.



**Evaluation**: This project resulted in a series of newspaper articles that educated the public on the Morro Bay estuary. The public responded to these articles by contacting the program to express their appreciation for the information.

Cost: \$7,000; Match: \$2,118.00

## "VELDT GRASS SUPPRESSION"

**Summary Project Description:** The goal of this project is to protect the Elfin Forest and other dune based plant communities in the Morro Bay Watershed from further invasion of veldt grass (*Ehrharta calycina*). The objective is to suppress veldt grass, replant dune slopes with native species (expanding native dune habitat), and reduce erosion.

**Project Location:** The target site is located on the eastern edge of the Elfin Forest, which is west of South Bay Boulevard, in the community of Los Osos.

**Priority Problem Addressed:** In California, there are no known biological controls for veldt grass. Veldt grass is an aggressive and invasive plant pest and its spread has been converting dune scrubland throughout the central coast to perennial veldt grassland. A fast grower, veldt grass exploits available water and nutrients that would otherwise be available to the slower growing shrubs. Thus, the native shrubs are at a competitive disadvantage to the robust veldt grass.

**Objective:** The purpose of this project is to demonstrate one approach to removal of veldt grass.

Methods Used:(1) initial mowing; (2) initial application of post-emergent herbicide; (3) second mowing; (4) second application of post-emergent herbicide; (4) two applications of pre-emergent herbicide; (5) planting and watering native plants, and (6) heavy mulching to prevent reinvasion. Results will be monitored.

Advisory Committee Members: Alan Naydol, John Roser, Chuck Cesena, Les Bowker, Vince Cicero; Jan DiLeo, Pete Waldburger.

Who: The Land Conservancy of San Luis Obispo, Las Pilitas Nursery, D'Alfonso's Landscapes, Small Wilderness Area Preservation, and San Luis Obispo County Parks and Recreation. (Note: Approximately 90 volunteers and 15 organizations participated in this project.)

Status: Demonstration in progress. Veldt grass mowed, herbicide applied, native species planted and heavy mulch applied to 1-acre site in Los Osos. Report submitted 5/26/99.

**Evaluation:** This project resulted in re-vegetation of a highly visible, roadside area that was infested with an invasive species. The new plantings are growing slowly and the site contains large areas without vegetation. Local scientists have discussed the key factors to consider in revegetation other areas.

Cost: \$28,000.00; Match: \$7,840.00



# "BAYFRONT BOATYARD/MARINA BEST MANAGEMENT PRACTICE IMPLEMENTATION"

**Summary Project Description:** This project focused on implementation of Best Management Practices (BMPs) to prevent pollution and environmental problems that can stem from boat maintenance and repair activities on the waterfront. Coastal Boatworks has investigated measures to prevent pollutants from getting into the bay from activities associated with boat work and marina operation or through storm water runoff.

**Project Location:** Coastal Boatworks, located on the bay at 261 Main Street in Morro Bay, is an established boatyard and marina between the public boat launch at Tidelands Park and the Inn at Morro Bay.

Priority Problem Addressed: Heavy metal and toxic pollutant loading.

**Objective:** The objectives included installation of new testing treatment technologies, facilitation of operator use of specialized tools to reduce pollution, promotion of recycling, and community education.

Methods Used: 500 pamphlets promoting pollution prevention along the waterfront were distributed to various agencies and organizations. New cleaning equipment (e.g., dustless sanders and a vacu-boom system) is being made available to boaters.

Highlights: Agreement among boatyard patrons about the need to use BMPs.

Advisory Committee Members: Jodi Gianinni, Gianinni's Marine Supply, Peggy Keith and Vicki Wheeler, Morro Bay Marina; Pat Rygh and Bill Ulum, Morro Bay Yacht Club; patrons of Coastal Boatworks.

Who: Morro Bay Harbor Department; Morro Bay National Estuary Program; Central Coast Regional Water Quality Control Board.

Status: Project completed. Final Report submitted 9/10/99.

**Evaluation:** This project resulted in the installation of pollution prevention equipment at a boat haul out facility at the water's edge in the City of Morro Bay. The equipment is containing dust pollution from boat sanding equipment as well as storm water filtration and contain.

Cost: \$9,065.00; Match: \$5,438.00

## "A. DONAX ERADICATION PROJECT"

Summary Project Description: The Morro Bay watershed, and Chorro Creek in particular, has a pioneer population of *A. donax*, an invasive exotic plant that is capable of displacing the creek flora. The goal of this project is to eradicate these plants. Early eradication of invasive plants is sound watershed management. Low impact and successful removal is a known management practice.

Priority Problems Addressed: 1) habitat loss, 2) sedimentation and erosion, 3) freshwater flow reductions.

Status: Completed Fall of 1999.



Advisory Committee Members: Michael Kresbach, Joe McDermitt, Cathy Darling

Who: San Luis Obispo County Agriculture Department, Morro Bay National Estuary Program, Bay Foundation of Morro Bay.

Cost: \$800.00; Match: \$1,155.00

# "POSTER CONTEST AND MBNEP CALENDAR"

**Summary Project Description:** This project implements part of the MBNEP public participation strategy by producing 200 educational calendars. The calendar features, for each month, one of the winning posters from the MBNEP "Turning the Tide" poster contest. The calendars have been distributed to active participants in the CCMP planning process, teachers, and winners of the contest. Additional calendars can be produced if demand is high and funding is available. The target audience is the general public. The calendar will also be a valuable tool for recognizing the past efforts and encourage continued participation of the volunteers that are assisting in the planning process.

Status: Project complete. 200 calendars depicting Morro Bay issues given to volunteers and MC participants in appreciation of their work.

Who: MBNEP Office and Pacific Gas and Electric Company

**Evaluation:** This project was a big success. The art work contest brought an awareness of the estuary to the local school children, the calendars brought further awareness of the estuary to the public as well as appreciated tokens of appreciation to the many volunteers and others working to protect the estuary.

Cost: \$2,645.00; Match: \$4,386.00

## "HARBOR DEBRIS REMOVAL" (Land/Sea Interface; Williams Shellfish Farms)

**Summary Project Description**: This project resulted in the removal 64 cubic yards of "junk," numerous illegal moorings, and various sunken vessels from the Bay; and provided for the clean up of trash, styrofoam debris, and abandoned materials.

Project Location: Morro Bay Estuary.

**Priority Problem Addressed**: Increased toxic concentrations in the estuary and the potential adverse impacts to marine resources and recreational opportunities.

Objective: Decrease the potential toxic pollutants from abandoned vessels and illegally moored boats.

Methods Used: Removal of bottom-mired "junk", abandoned vessels, and illegal moorings. Material was subsequently disposed of in appropriate landfills.

Who: Williams Shellfish Farms; Land/Sea Interface; City of Morro Bay; The Bay Foundation.

Status: Project completed in the summer, 1999. Cleared debris from the bay bottom (area: 64 cubic yards). Final Report completed 9/7/99.



**Evaluation:** The MBNEP and local implementers obtained valuable experience completing this early action. This experience will be used to implement several action plans in the CCMP.

Cost: \$8,000; Match: \$2,480.00

## "RIPARIAN FENCING PROJECT" (in progress)

Summary Project Description: This project is fencing off revegetated stream corridors within the Morro Bay watershed to minimize impacts from grazing.

Project Location: San Luis Obispo Wildlife Area, Chorro Creek watershed.

Priority Problem Addressed: Increased bacterial concentrations in the estuary and the potential adverse effects to the Bay.

**Objective**: Decrease livestock pollutants that flow to Morro Bay through stream runoff.

Methods Used: Fence stream corridors to prevent pollution by livestock grazing operations from entering stream corridors.

Who: Central Coast Firearms Association, California Department of Fish & Game, Friends of the Estuary, and The Bay Foundation.

Status: In progress. Completion anticipated in July 2000.

**Evaluation:** This project provided useful experience to local implementers in installing management practices in the watershed. The program will apply this knowledge when implementing other action plans in the CCMP.

Cost: \$2,700.00 Match: \$837.00

## "BOAT RINSE STATION PROJECT"

**Summary Project Description:** The City of Morro Bay has installed a coin-operated, self-service boat rinse down station at Tideland's Park with a hydrocarbon filter on the facility storm drain. The City will pay for one-year maintenance on the hydrocarbon filter.

Project Location: Tidelands Park, Morro Bay.

**Priority Problem Addressed**: Increased toxic concentrations in the estuary and the potential adverse effects on marine resources and recreational opportunities.

**Objective:** Prevent pollutants from boat wash down operations from entering the Bay and decrease industrial pollutants that flow to the Bay through storm water runoff sources.

Who: City of Morro Bay Harbor Department, City of Morro Bay Public Works Department, and The Bay Foundation.

Status: Project completed summer, 1999. Final Report submitted 10/26/99.



**Evaluation:** This project is effective in preventing pollutants from entering the bay from boat wash down operations. Implementing this project provided the City of Morro Bay valuable experience in the process of implementing storm water runoff treatment systems.

Cost: \$3,885.00; Match: \$1,204.00

## "VOLUNTEER MONITORING PROGRAM" (In progress and on-going since 1995)

**Summary Project Description**: This project provides leadership for community volunteers who collect water samples to help assess water quality issues in the Morro Bay Estuary. The coordination of the volunteers and the standardization of their collection techniques provide a basis for observing changes in water quality for the next year.

Project Location: Morro Bay Estuary

**Priority Problem Addressed**: Creation of a baseline data in which to determine whether implementation projects are successful in improving water quality.

Objective: Monitor the changes in water quality within the estuary.

Methods Used: Under the direction of Friends of the Estuary staff, coordinated and standardized water sample collection techniques for proper laboratory analysis by community volunteers.

Who: Citizen volunteers, Friends of the Estuary, and The Bay Foundation.

**Evaluation:** This project provided funds for staffing to coordinate and standardize water sample collection techniques. The information developed will support implementation of the Volunteer Monitoring Action Plan.

Cost: \$10,000; Match: \$3,100.00

## "CHANGE ON THE RANGE VIDEO"

Summary Project Description: This project produced a video of Morro Bay ranchers and farmers who have implemented soil erosion control techniques in the Morro Bay watershed.

Project Location: Morro Bay Watershed

Priority Problem Addressed: Reduction of sediment loading to the Morro Bay Estuary.

**Objective**: Provide information concerning: 1) land-use practices that are beneficial to landowners and their farm operations; 2) technical and/or financial assistance that is available to landowners to implement such practices; and 3) soil conservation projects that have been undertaken by watershed farmers and ranchers in the hope that other agriculturists will incorporate similar plans.

Methods Used: A 22-minute video was produced and distributed to agriculturists, libraries, media, politicos, and numerous agencies.



**Partners**: Morro Bay National Estuary Program, University of California Cooperative Extension, Natural Resources Conservation Service, Cal Poly, Coastal San Luis Resource Conservation District, State Coastal Conservancy, and San Luis Video Publishing.

Status: Project Complete.

**Evaluation:** This project resulted in a video produced for the local farming audience. Twenty-five copies of the video were distributed widely throughout the estuary through key agencies, organizations, and individuals working with farmers. The video was well received by the farming community.

Cost: \$10,000.00; Match: \$3,100.00

## APDPS: LESSONS LEARNED

In the interest of learning from our experiences, probably the most important questions to ask after going through a

Appendix C



## A CALL FOR ACTION: A Summary of Grassroots Participation in Watershed Management Planning

The Morro Bay Estuary and its watershed are important and extremely complex resources, and managing them is a significant challenge. Environmental protection must be balanced with the competing uses of the land, water, and other natural resources. To meet this challenge, the watershed communities of Morro Bay, Los Osos, Baywood, Cuesta-by-the-Sea, Los Osos, and Chorro Valleys succeeded in achieving widespread multi-partisan support to develop a management plan for the estuary and watershed. This grassroots effort has involved hundreds of individuals and countless volunteer hours, working together with environmental specialists and government resource managers to produce a watershed management plan that integrates sound scientific analysis and technical data with local understanding of social and economic concerns and goals for a healthy environment.

A fundamental component of a successful management program arises from strong community involvement throughout each phase of the planning process. In early 1995, guided by the Morro Bay Task Force (MBTF), and through a grant administered by the CSLRCD, a formalized plan for public involvement was first developed for the Morro Bay State Estuary Program (MBSEP). Drawing on a decade of experience and knowledge of the nearly 250 participants in the MBTF, a group of individuals including environmental specialists, stakeholders and interested citizens were nominated to serve on the MBSEP Watershed Council, a small executive committee responsible for leadership in developing the MBSEP.

One of the first acts of the Council was to form a Public Outreach Workgroup to begin developing a community education and outreach program in support of the goals of the estuary management planning process. The Council asked the Public Outreach Workgroup to focus efforts on two key areas: first, to begin informing the community about the issues and problems affecting the health of the bay and the watershed; and, second, to solicit broad-based input and involvement in the management planning process.

By early 1995, a public participation strategy began to take shape based on specific tasks set out by the Council. These included: 1) developing information for the community about the Estuary Program and watershed management goals; 2) drafting a list of interest groups and stakeholders for recruitment into the management planning process; and 3) identifying community resources for collaborative efforts to support community education and outreach.

These early steps organized by the Morro Bay watershed communities helped to demonstrate to the USEPA a strong commitment to achieve a community-based approach to environmental governance of the Morro Bay Estuary and its watershed. In July of 1995, when Morro Bay was designated as a National Estuary, much of the necessary groundwork for community involvement, education and outreach was in place, and the work of the MBSEP continued jointly with support and additional funding provided by the NEP.

## D.1 PEOPLE, OPPORTUNITY AND ACTION: ORGANIZING A COMMUNITY-BASED PLANNING STRUCTURE

During the first year of the joint National and State Estuary Programs, public outreach goals centered on formalizing a public participation strategy to promote community awareness and involvement in estuarine management issues through formal and informal education, opportunities to participate in the planning process itself, and through involvement in the volunteer monitoring program sponsored by the FOE. The Watershed Council established three main objectives for public participation:

• Ensure that interested individuals and representatives of key stakeholder groups have the opportunity to participate in the development of the comprehensive plan through direct contact, mailings, meetings, presentation, news articles, or other media,



- Develop strong support within the Morro Bay watershed for the development and implementation of a
  comprehensive plan to enhance the natural resources of Morro Bay and its watershed while maintaining the
  social and economic benefits of the area.,
- Provide individuals with the opportunity to become informed about the unique resources of Morro Bay and its watershed, the problems affecting these resources, and what individuals can do to make a difference.

The cornerstone of the CCMP has been the involvement of the watershed communities in all aspects of the planning process from identifying environmental issues and problems, to searching for the best course of action, as well as to work to resolve conflicts over management goals among different people who live and work in the watershed.

Identifying individuals to participate in the joint program was focused on attracting community members to work on seven major topics identified by the MBTF and the MBSEP as priority problems. Recruitment also aimed at building local participation in the activities of the Public Outreach Workgroup itself. The topical Workgroups were Biological Resources, Freshwater Inflow, Bay Water Quality, Agriculture, Land Use Planning, and Government Land Management. Community members were also given the opportunity to participate in one of the three supporting Workgroups that included Public Outreach as well as Research Needs and Education.

Community members were solicited to participate in topical Workgroups and supporting Workgroups through a public notice process designed to involve a broad range of the community in order to include citizens:

- That represent a group that may be affected by management plan recommendations, including those in business, industry, real estate, sport and commercial fisheries, agriculture and recreation, as well as public institutions and local, state and federal government with an interest in the watershed;
- Willing to participate on a regular basis and communicate with particular interest groups to keep them informed of the process;
- Willing to take responsibility for developing solutions in the form of action plans;
- Willing to support and participate in implementation of public education and outreach efforts; and,
- Willing to review planning documents, assess their potential affect on the community, and contribute through the formal comment and response process mandated by the program.

Over 220 people responded to the call for action during 1995 and 1996 in meetings held on a regular basis to formulate initial details of the State Estuary Plan. In March of 1996, an interdisciplinary Research Needs Workshop sponsored by the California Sea Grant Program, the Morro Bay Watershed Council and the NEP was held to bring all workgroup members together for a comprehensive look at watershed management goals and priorities.

A major outcome of the workshop was the identification of three major watershed problems: 1) riparian habitat restoration and enhancement, 2) soil erosion on upland (non-riparian) areas and 3) urban discharge into Morro Bay. In the spring of 1996, three Issue Groups were convened to further explore and refine each priority problem and begin the process of developing action agendas through collaboration and consensus between different levels of government and private interests.

In May of 1997, with the State Estuary Plan nearly completed, the MBNEP was reorganized in order to clarify the roles and responsibilities of participants of the Management Conference under guidelines set for the completion of the CCMP. Goals to expand local community representation in the Management Conference were also achieved through reorganization. The new organizational structure consisted of a Local Policy Committee, a Watershed Committee, a Technical Advisory Committee, and various subcommittees convened as necessary (see Figure 1.3 MBNEP Management Conference). The action agendas developed by the Issue Groups in 1996 addressing seven priority problems were adopted by the MBNEP Management Conference. Utilizing the Public Participation

Strategy developed jointly by the MBSEP and the MBNEP as a model for community involvement, the participants of the Management Conference were ready to begin work on the CCMP by August of 1997.

#### D.2 IDENTIFYING TARGET GROUPS FOR PUBLIC OUTREACH AND EDUCATION

Fundamental to creating an effective outreach and recruitment program is knowing who in the community may ultimately be affected by implementation of the CCMP. In the case of the Morro Bay Watershed, this includes those who either live or work in the watershed, as well as those who enjoy recreational activities in the watershed and estuary regions, including tourists. Defining target groups in the watershed communities was in part guided by criteria provided by the NEP. Equally essential to the task of identifying different interest groups in the community came from the local knowledge and input of community representatives participating in the Outreach Workgroup. Recruitment goals for broad representation were geared to: 1) achieving common definitions among a wide range of outlooks and understanding about the problems facing the estuary; and 2) ensuring that solutions to watershed problems and goals for environmental protection be developed in the context of diverse values and competing views of the social and economic benefits of proposed actions.

During this period, the groundwork was also put into place for educational support to assist the topical Workgroups with outreach needs. This aspect of education and outreach efforts focused on the issues and proposed actions, as well as on the overall management planning process and NEP program. Community participation in the Public Outreach and Education committees played a key role in creating partnerships and collaborative arrangements to utilize existing networks and channels of communication among the target groups identified in the community. Opportunities for meaningful dialogue and interaction concerning priority problems allowed the planning process to gain the benefit of local knowledge from members of the community with different experiences, perspectives and values.

Outreach efforts have focused on five key local groups: 1) elected officials, 2) environmental managers, 3) scientists and technical specialists, 4) educators and students, and,5) the public. The last category was further refined in order to create different outreach strategies to effectively communicate with different demographic groups and different user/beneficiary groups. A mailing list database of organizations and individuals was created based on the following target groups:

- Agricultural business operators and farm organizations
- Tourist oriented businesses and groups
- Children at K-12 level
- Conservation and environmental advocacy groups
- Commercial and recreational fishing groups
- Real estate firms and developers
- Seafood packers and marketers
- Chambers of commerce, business, and industry
- Service, civic and good-government groups
- Recreational boating clubs
- Media contacts for print, radio, and television
- Scientists and resource managers
- Educators
- Local government elected officials
- Federal and state legislators

As part of the effort to identify existing community resources that compliment MBNEP outreach activities, the Outreach Workgroup developed a list of organizations that actively provide education about the watershed and estuary through ongoing programs and public events geared for all ages. Many of the following organizations have been involved from the beginning in collaborative activities that allowed MBNEP Workgroups and staff to gain access to large segments of the community. Enthusiasm and support for the goals of the watershed management program among these community organizations greatly helped to begin widespread recruitment among people with



interests in a healthy environment, as well as to provide information and raise awareness of CCMP management plan goals.

- Friends of the Estuary at Morro Bay
- Environmental Watershed Program and SLO Scientists
- University of California Cooperative Extension
- Morro Coast Audubon Society
- The Museum of Natural History Museum Morro Bay State Park and California Department of Parks and Recreation
- Small Wilderness Preservation Program
- Sierra Club
- Environmental Center of San Luis Obispo
- The Latino Outreach Council
- Rancho El Chorro Outdoor School
- Rotary Clubs
- Chambers of Commerce
- Morro Estuary Greenbelt Alliance

Involving diverse community groups in outreach and education efforts during the CCMP planning process has resulted in a broad-based approach to gain input from anyone with an interest in the watershed, from farmers to birders, business owners to residents, fishermen and recreationalists alike, to create environmental governance of the estuary and watershed based on mutual community values and goals. Through this approach, community members have themselves given structure to a meaningful process that ensures long-term support and implementation of a program viewed as beneficial to the community.

## D.3 SETTING THE COMMUNITY AGENDA FOR WATERSHED MANAGEMENT THROUGH EDUCATION AND OUTREACH

To accomplish outreach and education goals, a wide variety of outreach tools were identified in the Public Participation Strategy and utilized throughout the planning process. The overall approach has included special workshops, forums and hearings convened at different stages of the planning process in order to provide opportunities for public dialogue and input on priority problems and potential solutions. To efficiently reach the broadest audiences possible, a speakers bureau was also created to provide informational presentations in the community.

Educational displays, informational handouts and brochures were developed for dissemination throughout the community. The NEP newsletter, "Turning the Tide," was established in December of 1995 as a main source of information for the public as well as for those involved in the process. Equally essential to the overall effort, local media provided a major means to achieve outreach and education goals through feature articles and regular columns appearing in local newspapers. Radio, television, local cable stations, as well as the Internet were also utilized for their effective reach into the community.

Volunteer participation in water quality monitoring and data management activities has also formed another key component of the education and outreach strategy. Through first-hand knowledge gained as a volunteer monitor, individuals learn to assess for themselves the meaning and value of scientific evaluations supporting management strategies.

The following general goals for outreach and education were defined through the Workgroup process with guidance from the NEP:

- Raise visibility of the MBNEP;
- Provide for broad public education on the importance of protecting the estuary and watershed;
- Gain the support of government agencies and estuary regulators to assist in achieving coordinated management of the watershed and estuary;

- Provide opportunities to incorporate public input;
- Provide a forum to define problems;
- Build confidence in and general support for estuary management programs;
- Determine benefits of an estuary watershed management approach;
- Establish timelines to meet goals and objectives;
- Coordinate dissemination of information to target groups about priority problems; and,
- Identify existing networks and outreach programs, including appropriate media

Much of the work accomplished in the last four years has centered on refining and detailing a comprehensive plan for action through a rigorous public review process designed to integrate comments from environmental specialists, scientists and resource managers, community residents, farmers, ranchers, fishermen, and environmental advocates alike. In many ways, early emphasis on education and outreach that helped to generate public awareness about the issues and promote involvement in the planning process has also supported informed decision making throughout the development of the CCMP.

# D.4 MEDIA OUTREACH: PRINT, TV AND RADIO, VIDEO, AND THE INTERNET

From a local media standpoint, effective and fairly inexpensive widespread access to the community has been achieved throughout the planning process. Within the watershed communities including the City of Morro Bay and the unincorporated areas of Los Osos, Baywood, and Cuesta-by-the-Sea, there are a limited number of media outlets available for broad-based communication. These include four local newspapers, radio stations, three cable channels and electronic media.

The role of public media in the planning process has served a number of essential outreach needs in the course of the planning process:

- Helped to inform a broad range of the community both within and outside the watershed about program goals and progress toward achieving those goals;
- Provided information about public forums, workshops and notice on hearings necessary to the public review process;
- Helped to raise awareness of the role of volunteers of all ages in the success of the program;
- Provided topic oriented overviews of estuary problems and proposed solutions, as well as general information on environmental science and methods of analysis;
- Increased awareness of estuarine habitat and wildlife of the watershed bioregion, including information related to threatened and endangered species; and,
- Increased access via the Internet to reports, draft planning documents, and other aspects of the NEP program both locally and nationwide.

**Print Media**. Feature articles on the estuary and program milestones, as well as announcements about the NEP and public notice meetings were published in the four locally published newspapers. They include the Telegram Tribune (daily), the Sun Bulletin (weekly) the New Times (a free weekly) and the Bay Breeze (a free biweekly that recently ceased publication). In addition to feature articles carried in the local newspapers, regular columns written by members of the topical Workgroups were initiated early in the planning process coordinated by the Public Outreach Workgroup. These columns provided concise explanations of the issues and various facets of the planning process generated by each workgroup about the seven priority problems in the watershed and estuary.

The NEP newsletter, "Turning the Tide," was established in December of 1995 as the main source of information on NEP meetings, forums, and workshop opportunities. Twenty-two hundred copies of the newsletter are published and distributed monthly, primarily by direct mail, to interested members of the public as well as to participants in the NEP Management Conference. The NEP newsletter has also served as an effective tool for ongoing volunteer recruitment, as well as recognition for those already involved in NEP and other environmental and estuarine wildlife advocacy programs in the community. The newsletter has also provided an excellent means to disseminate the latest scientific data and understanding developing from the efforts of the topical Workgroups and Issue Groups.



Announcements of meetings and events, as well as information on the planning process were also published in local community organizational newsletters whenever possible.

**TV and Radio.** Three local networks providing daily news reporting for the Central Coast Counties of San Luis Obispo, Santa Barbara and Ventura, also aired occasional special programs about the importance of protecting the estuary and various management issues for the television viewing public. NEP staff, Watershed Committee members and key Workgroup participants also utilized open format radio talk shows with listener call-in to respond to questions from the community directly over the air. Radio and TV notices to solicit public involvement in volunteer monitoring, as well as to participate in the review process of the CCMP were also an effective method of raising awareness about the importance of public input.

Video. Video recorded NEP programs and meetings were cablecast in the watershed communities to residents in their homes over local government channels that serve Morro Bay, the Los Osos area, and San Luis Obispo. In addition, the public libraries in Morro Bay and Los Osos also maintain a video library of public meetings and events that are available on loan for people to view at a more convenient time.

Special video programs were also produced to support outreach goals for particular target groups. In 1998, "Change on the Range, Solutions for the Estuary," produced jointly by the MBNEP, the CSLRCD, the Natural Resources Conservation Service (NRCS) and the USEPA was distributed widely throughout the watershed. The video focuses on soil erosion control techniques and benefits to local landowners in the Morro Bay Watershed that have participated in a technical/financial assistance program. Distribution of the video to local elected officials, landowners in the watershed, educators, scientists and many other watershed groups has helped to demonstrate to nonagricultural groups how these management practices ultimately contribute to reducing sediment loading in the bay. The video program has been cablecast regularly and is also available to the public at local libraries within the watershed communities, as well as at the NEP office at a nominal cost.

**The Internet**. In August of 1994, BayNet, an internet-based communication network, was created by the BF to meet the need for rapid communication between various agency staff, environmental specialists and members of the community working to establish a unified watershed management program. BayNet provided an especially critical component to support grassroots participation and information sharing despite the lack of a centralized base of operations. Internet communication allowed participants to stay up to date, share information easily and frequently, recognize and eliminate duplicate efforts between working committees, and promote support for relevant research efforts by others outside the estuary planning process.

In 1999, the official MBNEP website was established, providing access via the internet to the local community, as well as to those outside the Morro Bay Watershed interested in knowing more about the Central Coast area, coastal resource management, marine and estuarine wildlife, and other related areas of interest to the general public. The website will also continue to provide access to the CCMP document and other NEP reports and environmental assessments generated during the next three to five years. Information on individual CCMP action plans will also be available via the website making it possible to track the progress and milestones of the NEP during implementation of action plans.

#### D.5 THE VOLUNTEER MONITORING PROGRAM: GRASSROOTS PARTICIPATION IN WATER QUALITY ASSESSMENTS

The volunteer Monitoring Program (VMP), begun in 1993 by the FOE, has been an important component of ongoing data gathering and assessments of water and habitat quality. In 1997, the VMP was reorganized and expanded with assistance from the NEP Scientific Coordinator. The program has not only contributed significant amounts of information for the NEP, but has also provided volunteer support to the National Monitoring Program in a partnership with the Regional Water Quality Control Board (RWQCB). By 1998 the program had trained approximately 200 volunteers in quality assurance sampling techniques, many of who continue to remain active and regularly involved in different monitoring activities, including data management.

Several of the long-standing water quality monitoring volunteer groups have adopted names to fit their particular tasks: the Bac Attackers monitor bacteria levels; the SLO Floaters measure flow rates twice each month in the freshwater tributaries draining into the estuary; the Drain Rangers can be counted on at the onset of a rainstorm to measure the water quality of the "first flush" runoff into the bay; and the Dawn Patrol, who head out in their kayaks twice monthly, to measure dissolved oxygen in the back bay

While the work carried out by the volunteer monitors provides a critical service in the form of time intensive data gathering processes, it has also come to be regarded as the single most effective way to introduce basic scientific principles, ecological understanding and appreciation of the bay and its watershed to local community members. The success of the NEP is dependent upon the participation of people who care about the environmental health of their community, and who are willing to make long-term commitments to give their time, effort and energy to help carry out the work of maintaining the environmental quality of the watershed bioregion.

The Friends of the Estuary have received grant funding for the VMP through the State Water Resources Control Board (SWRCB) to evaluate implementation actions in the CCMP and the health of the estuary and the watershed. The volunteer program will continue to form an especially critical component of the program once implementation projects begin.

#### D.6 OUTCOMES OF THE PLANNING PROCESS

Throughout the four-year planning process, nearly 700 individuals have contributed to developing the CCMP, providing critical input on a wide range of issues through involvement in the Management Conference, specially convened Workgroups, Issue Groups, and public forums. Through this process, issues and solutions proposed to address priority problems were broadly reviewed and discussed. The draft action plans that emerged from early discussions were circulated and reviewed by members of the Management Conference, interest groups, stakeholders and community members for further comment. This process continued through the summer of 1999, when the draft CCMP at last took its final form. At each step along the way of the process, those involved in the work of creating the plan for action also accepted the responsibility to move the process forward. The task has not been an easy one, and participants in the planning phase no doubt appreciate the dynamic effort that also required creating an effective and interactive consensus-based process to accomplish their goals to complete the CCMP.

**NEP Mail List Database**. One of the first efforts of the Public Outreach Workgroup early in 1995 was to develop a computerized mailing list. The initial database was compiled from the existing lists of the MBTF, FOE, BF, and various municipal departments and advisory panels including the Los Osos Community Advisory Council, the Farm Bureau and commercial fishing groups. By October of 1996, the database included 3300 individuals, and is coded for geographic area, group/organization affiliation, as well as other specialized information, including level of participation in the program. In addition to maintaining a complete list of the Management Conference and other volunteer participants, the database has also supported direct mailings of public notice meetings, the monthly newsletter, as well as special mailings to target groups in the community.

Educational Activities. Two separate gatherings were organized in October of 1996, bringing educators, environmental specialists and watershed residents together to help develop ideas to create formal as well as non-formal education programs about the estuary and it's watershed, as well as information about the watershed management plan itself. Opportunities to provide family oriented educational activities at many of the annual events held throughout the community have also been effective in reaching a wide range of age groups in the community. These include the Audubon Bird Festival, Earth Day, Estuary Day, the Harbor Festival, and Octoberfest.

The NEP regularly also assists in promoting a number of quarterly, biannual or annual volunteer programs organized by many of the local environmental advocacy organizations. These activities are designed to take citizens of all ages out into the estuary and back into the foothills of the watershed, to clean up and restore trails, riparian areas, and carry out other important habitat restoration and native plant revegetation projects. At the close of 1997, the NEP Scientific Coordinator began a local effort in conjunction with the University of California Cooperative Extension to support a statewide Ranch Stewardship Program, providing technical assistance to local landowners for implementation of best management practices.



Community outreach for children has been equally ambitious. In the fall of 1996, twelve San Luis High School students wrote and produced a community play entitled, "An Estuary Odyssey." Six performances were given the following Spring in the community, at local schools for students of all ages, and one evening performance given at the Barnes and Noble Bookstore in San Luis Obispo.

The annual Estuary Poster contest begun in 1995, continues to be widely promoted each year throughout the county. Accompanied by classroom materials to introduce k-12 students to significant concepts related to the watershed and the estuary, the event has drawn as many as 500 entrants in a single year. Winning posters have been displayed throughout the watershed communities at festivals, in libraries and businesses. And in 1998, 12 posters were selected to illustrate the Morro Bay National Estuary Program calendar that was distributed to many of the long-time volunteers in the program.

**Early Action Plan Demonstration Projects**. In 1998, the NEP Watershed Committee established a special subcommittee to assist with the evaluation of proposed Action Plan Demonstration Projects (APDP). Twenty proposals were submitted to the MBNEP, nine of which were funded in 1998 under a special USEPA grant (see Appendix C, Action Plan Demonstration Projects). Four of the early action plans are fundamentally educational in nature, and they include the "4-H Morro Bay Watershed Run-Off Models," the publication, "Yards and Neighbors," the "Photojournalism" project, and the "Introduced Species" pamphlet. Local community volunteer support and involvement in these projects was an essential component that ensured successful outcomes to these early implementation efforts.

**Ongoing Program Meetings**. In addition to the monthly meetings of the Watershed Council, Workgroups, and Issue Groups, a series of public meetings were held during the four-year planning process to provide opportunities to gather input from the local community on the implementation plan (see Table 1.1 MBNEP Public Workshops, 1996-1999). In 1998 a forum for fishermen was organized and held in March, followed by a forum in July for agriculturalists, with assistance from The Water Quality Hydrologic Unit Area (HUA) project. The HUA project is a cooperative program between agencies and landowners to reduce nonpoint sources pollution. Funded by USDA, the Morro Bay HUA began in 1991. These forums provided an interactive opportunity for those groups to voice their needs and concerns related to implementation.

A number of other specialized workshops were held to facilitate interagency cooperation and support for watershed management goals. In July of 1997, the USEPA organized a two-day Resolve Workshop to provide orientation and guidance for members of the newly revised MBNEP Management Conference. In May of 1998, a two-day Local Government Workshop was held in Morro Bay to update local decision-makers with information on the watershed planning and implementation process. This was followed in November of that year with an Advance Workshop, to review CCMP progress and update members of the Management Conference, as well as local agencies, elected officials, stakeholders and members of the community.

#### Table D.1MBNEP Public Workshops, 1996-1999

|   | March 1996    | Research Needs Workshop                      | _ |
|---|---------------|----------------------------------------------|---|
|   | August 1996   | Informal Youth Education Activities Workshop |   |
|   | October 1996  | Informal Education Forum                     |   |
| [ | August 1997   | Resolve Workshop                             |   |
|   | March 1998    | Fisherman's Forum                            |   |
|   | April 1998    | Volunteer Recognition Program                |   |
|   | May 1998      | Local Government Workshop                    | _ |
|   | July 1998     | Agricultural Forum                           |   |
| ſ | November 1998 | Advance Workshop                             |   |
|   | May 1999      | Priority Setting and Implementation Workshop | _ |
|   | October 1999  | Los Osos CCMP Public Workshop                |   |
| ſ | October 1999  | Morro Bay CCMP Public Workshop               |   |

In May of 1999, the Watershed Committee and the Local Policy Committee held a joint, facilitated two-day Priority Setting and Implementation Workshop. Organized by NEP staff, workshop participants produced an ambitious schedule to determine priorities for implementation of the action plans and outlined a schedule to complete the draft CCMP by August of 1999 for public review and comments.

The schedule for completion of the plan incorporated a series of required steps, including public notification 30 days prior to release of the draft CCMP through media announcements designed to inform the public of the schedule for public review and comment. Numerous presentations were also made by NEP staff throughout the county in public forums providing information and details of the formal 60-day public review process. Two public hearings were also held in October of 1999, one in the City of Morro Bay, and one in Los Osos, to present the completed draft CCMP to the community and facilitate written response and comments from the community. Three hundred and fifty copies of the draft CCMP were printed and distributed via direct mail. Copies of the draft as well as summaries of the 61 action plans were also made available at local libraries, as well as at the NEP office itself. The public commented, comments were addressed and are located in Volume III of the CCMP.

The results of this four-year effort have produced a CCMP that contains not only a compendium of ideas about the problems and what should be done to solve those problems, but also spells out the details of how solutions can be put into action over the next three to five years. This includes identifying potential implementation participants, sources of funding, and outlines for achieving collaborative institutional partnering, all designed to operate within a framework built on maintaining local oversight of the program. The process also included efforts to build a broad-based outreach program in order to provide information on the issues and support informed decision-making by the local community, ensuring that they needs of the community are considered in balance with the needs of the estuary and watershed.

#### D.7 WHERE DO WE GO FROM HERE? COMMUNITY INVOLVEMENT IN THE IMPLEMENTATION PROCESS

The level of participation and range of representation from across the public and private sectors of the watershed communities has produced a planning document that reflects thoughtful and hard won decisions about the best way to proceed to protect the health of the bay and watershed. The CCMP must ensure not only the protection of wildlife habitat and ecological integrity of the watershed system, but also make every effort to initiate actions that will maintain and support the needs of the watershed communities that are dependent upon a healthy, clean environment in which to live, earn a living and recreate.

While completing the CCMP represents yet another major milestone in the legacy of environmental stewardship demonstrated over the last twenty years by the Morro Bay Watershed communities, the need for community participation during implementation of the plan is as great as ever. The management actions proposed in the CCMP must now be carried out with the same careful scrutiny and thoughtful community involvement as the process that created them. The MBNEP implementation structure calls for a Public Education and Outreach Workgroup to provide guidance to continue efforts outlined in the Public Participation Strategy created in 1997. In addition, the 11 Education Action Plans detailed in this document are designed to support the implementation process through the MBNEP newsletter and other media projects, outreach designed especially for k-12 programs, as well as the VMP. Public forums for special target groups in the local community will also be convened as needed during implementation. Action Plans that call for specific interest group and/or stakeholder participation are listed in Table 1.2, Community Participation in CCMP Implementation Action Plans.

The most valuable tools and resources for the work ahead are in the minds and hearts of those in the community committed to carrying out the plan for action spelled out in the pages that follow. Collaboration within the institutional framework of regulatory and resource management agencies can provide support through policy implementation that reflects the goals outlined in the CCMP. Local nonprofit environmental organizations dedicated to particular environmental goals can continue to play an important role in galvanizing public support and maintaining their efforts to inform and involve the public in vital efforts to restore and enhance the watershed bioregion. Formal and nonformal educational programs in the community also form an essential component necessary to successful implementation of the CCMP, providing a way for community members to gain knowledge and assess for themselves the importance of protecting the estuary and its watershed. The catalyst provided by a



community actively involved in environmental management is the key ingredient that can make the difference between a plan that sits on a shelf collecting dust and a living document that grows and improves with lessons learned and successes gained.

## Table D.2 Community Participation in CCMP Implementation Action Plans

| CC-3    | Foster stakeholder participation in technical TMDL development, implementation planning,         |
|---------|--------------------------------------------------------------------------------------------------|
|         | monitoring and implementation of management measures.                                            |
| CC-6    | Volunteer Monitoring: Recruit community members of all ages to participate in the monitoring     |
|         | program to help gather water quality data in the watershed and estuary.                          |
| SED-4   | Supply technical and financial assistance to landowners to implement Best Management             |
|         | Practices on their land.                                                                         |
| SED-5   | Supply technical and financial assistance to landowners to implement creek restoration projects  |
|         | in Los Osos and Chorro Creeks.                                                                   |
| SED-7   | Provide incentives for landowners to encourage implementation of Best Management Practices       |
|         | for erosion control and sediment retention.                                                      |
| BACT-1  | Assist farmers and ranchers to implement grazing management measures that are successful at      |
| DA COLO | reducing bacteria levels.                                                                        |
| BACT-3  | Create a committee of domestic pet owners, including horse owners, to work with the Habitat      |
|         | Committee to develop a list of appropriate potential sites for use by owners of domestic         |
| DACT 5  | animais, including an on-least dog park.                                                         |
| DAU1-3  | limite)                                                                                          |
| BACT-0  | Meet with public and private landowners, the agricultural community, and the community at        |
| DACI-7  | large to gather input on water quality standards and monitoring efforts                          |
| NUTR-3  | Assist farmers and ranchers to implement agricultural management practices that are successful   |
| NO IR D | at reducing nitrate levels                                                                       |
| NUTR-4  | Assist landowners to implement Best Management Practices to decrease fertilizer runoff from      |
| no in i | residential and other urban areas.                                                               |
| FLOW-2  | Reconvene the Chorro Valley Water Users Workgroup.                                               |
| FLOW-3  | Develop outreach for all water users to encourage participation in water conservation planning   |
|         | and implementation.                                                                              |
| HMT-2   | Conduct a survey in the boating community to assess local ideas and attitudes on implementing    |
|         | BMPs in the bay to protect water quality.                                                        |
| HAB-1   | Convene a committee, including members of the agricultural community to review and refine the    |
|         | locations of existing Sensitive Resource Areas (SRA) combining designations and                  |
|         | accompanying standards in the Coastal Zone Land Use Ordinance.                                   |
| HAB-2   | Convene a scientific committee to work with members of the Audubon Society and other natural     |
|         | history organizations and landowners to develop an inventory of species that utilize Morro       |
| ΠΑΒ 2   | Bay, as well as upland nabitats to sustain the species.                                          |
| нав-з   | Establish a continuitee of local scientists, resource managers, GIS specialists, landowners, and |
|         | ringerian corridors                                                                              |
| HAR-A   | Establish a work group to evamine existing recovery plans and work with the EWS NMES             |
| 4.4.0-4 | CDFG and others to identify design and implement tasks in alignment with MRNFP goals             |
|         | and objectives.                                                                                  |
| HAB-6   | Organize NEP sponsored workshops for agency representatives, wildlife specialists and local      |
|         | landowners to identify proven management techniques for the purpose of implementing              |
|         | recommended management measures.                                                                 |
| HAB-7   | Convene a forum, including local landowners to identify and evaluate the significance of the     |
|         | differences in county and coastal protection standards in upper watersheds for wetland and       |
|         | riparian resources.                                                                              |
| HAB-9   | Establish an interagency Weed Management District/Committee including representatives of the     |
|         | agricultural community, conservation organizations and interested landowners.                    |

| EDU-1 | Sponsor public forums to gather community input and assess needs, as well as provide         |
|-------|----------------------------------------------------------------------------------------------|
|       | educational opportunities on focused topics relating to the priority issues of the MBNEP.    |
| EDU-2 | Maintain and support local forums for the commercial and recreational boating community to   |
| ļ     | identity concerns and provide information of new guidennes of strategies for a nearther day. |
| EDU-3 | Develop educational materials geared toward agricultural and ranch landowners and various    |
|       | public agencies to improve partnering and educate all parties of pressing issues regarding   |
|       | erosion, sedimentation, and sensitive resources.                                             |
| EDU-4 | Conduct cross-education workshops on the positive and negative uses of pesticides for local  |
|       | landowners.                                                                                  |
| EDU-5 | Create a "State of the Bay" Conference Steering Committee comprised of members of local      |
|       | organizations and the community to develop a plan and coordinate conference proceedings.     |
| EDU-7 | Develop a media strategy to increase public awareness of the MBNEP through the Public        |
|       | Education and Outreach Committee.                                                            |

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# CALIFORNIA MANAGEMENT MEASURES FOR POLLUTED RUNOFF (CAMMPR) State Water Resources Control California Coastal Commission

For a complete version of this document, please go to <u>www.swrcb.ca.gov</u> (click on the Nonpoint Source Program and then NPS Guidance in Your Area of Interest).

California's Management Measures for Polluted Runoff (CAMMPR) is designed to assist California in improving implementation of the California=s Nonpoint Source Pollution Control Program 1998-2013 (Program Plan) and provide goals for the management of NPS pollution to which various management practices are applied. The measures are organized into six categories or sectors, all of which are present in California:

- 1. Agriculture;
- 2. Forestry (Silviculture);
- 3. Urban Areas;
- 4. Marinas and Recreational Boating;
- 5. Hydromodification Activities; and
- 6. Wetlands, Riparian Areas, and Vegetated Treatment Systems.

# 1. AGRICULTURE MANAGEMENT MEASURES

#### □ 1A - Erosion and Sediment Control

Apply the erosion component of a CMS as defined in the Field Office Technical Guide of the U.S. Department of Agriculture - Natural Resources Conservation Service (NRCS) to minimize the delivery of sediment from agricultural lands to surface waters, or

Design and install a combination of management and physical practices to settle the settleable solids and associated pollutants in runoff delivered from the contributing area for storms of up to a 25-year, 24-hour frequency.

# 1B - Facility Wastewater and Runoff From Confined Animal Facilities (All Units)

Limit the discharge from the confined animal facilities to surface waters by:

<u>Management Measure Component (MMC) (1)</u>: Containing both facility wastewater and the contaminated runoff from confined animal facilities at all times up to and including storms exceeding a 25-year, 24-hour frequency event [storage facilities should be of adequate capacity to allow for proper waste water utilization and should be constructed so they prevent seepage to ground water] and;

<u>MMC (2)</u>: Managing stored runoff and accumulated solids from the facility through an appropriate waste utilization system that is consistent with MMC (1C).

# □ 1C - Nutrient Management

Develop, implement, and periodically update a nutrient management plan to: (1) apply nutrients at rates necessary to achieve realistic crop yields, (2) improve the timing of nutrient application, and (3) use agronomic crop production technology to increase nutrient use efficiency. When the source of the nutrients is other than commercial fertilizer, determine the nutrient value and the rate of availability of the nutrients. Determine and credit the nitrogen contribution of any legume crop. Soil and plant tissue testing should be used routinely. Nutrient management plans contain the following core components:

MMC (1): Farm and field maps showing acreage, crops, soils, and water bodies;



Appendix E

<u>MMC (2)</u>: Realistic yield expectations for the crop(s) to be grown, based primarily on the producer's actual yield history. State Land Grant University yield expectations for the soil series, or NRCS Soils-5 information for the soil series;

<u>MMC (3)</u>: A summary of the nutrient resources available to the producer, which at a minimum include: (a) soil test results for PH, phosphorus, nitrogen and potassium; (b) nutrient analysis of manure, sludge, mortality compost (birds, pigs, etc) or effluent (if applicable); (c) nitrogen contribution to the soil from legumes grown in the rotation (if applicable); and (d) other significant nutrient sources (e.g., irrigation water);

<u>MMC (4)</u>: An evaluation of field limitations based on environmental hazards or concerns such as: (a) sinkholes, shallow soils over fractured bedrock, and soils with high leaching potential, (b) lands near surface water, (c) highly erodible soils, and (d) shallow aquifers;

<u>MMC (5)</u>: Use of the limiting nutrient concept to establish the mix of nutrient sources and requirements for the crop based on a realistic yield expectation;

<u>MMC (6)</u>: Identification of timing and application methods for nutrients to: (a) provide nutrients at rates necessary to achieve realistic crop yields; (b) reduce losses to the environment: and (c) avoid applications as much as possible to frozen soil and during periods of leaching or runoff;

MMC (7): Provisions for the proper calibration and operation of nutrient application equipment;

<u>MMC (8)</u>: When manure from confined animal facilities is to be used as a soil amendment and/or is disposed of on land, take steps to assure that subsequent irrigation of that land does not leach excess nutrients to surface or ground waters.

#### ID - Pesticide Management

To reduce contamination of surface water and ground water from pesticides.

MMC (1): Evaluate the pest problems, previous pest control measures, and cropping history;

<u>MMC (2)</u>: Evaluate the soil and physical characteristics of the site including mixing, loading, and storage areas for potential leaching or runoff of pesticides. If leaching or runoff is found to occur steps should be taken to prevent further contamination;

<u>MMC (3)</u>: Use integrated pest management (IPM) strategies that: (a) apply pesticides only when an economic benefit to the producer will be achieved (i.e., applications based on economic thresholds); and (b) apply pesticides efficiently and at times when runoff losses are unlikely;

<u>MMC (4)</u>: When pesticide applications are necessary and a choice of registered materials exist, consider the persistence, toxicity, runoff potential, and leaching potential of products in making a decision;

MMC (5): Periodically calibrate pesticide spray equipment;

MMC (6): Use anti backflow devices on hoses used for filling tank mixtures.

## **IE - Grazing Management**

Protect range, pasture and other grazing lands:

<u>MMC (1)</u>: By implementing one or more of the following to protect sensitive areas (such as streambanks, wetlands, estuaries, ponds, lake shores, and riparian zones): (a) exclude livestock, (b) provide stream



crossings or hardened watering access for drinking, (c) provide alternative drinking water locations away from surface waters, (d) locate salt and additional shade, if needed, away from sensitive areas, or (e) use improved grazing management (e.g., herding) to reduce the physical disturbance and reduce direct loading of animal waste and sediment carried by livestock; and

<u>MMC (2)</u>: By achieving either of the following on all range pasture, and other grazing lands not addressed under (1) above: (a) implement the range and pasture components of a CMS as defined in the Field Office Technical Guide of the USDA-NRCS by applying the progressive planning approach of the USDA-NRCS to reduce erosion, or (b) maintain range, pasture, and other grazing lands in accordance with activity plans established by either the Bureau of Land Management of the U.S. Department of the Interior or the Forest Service of USDA or the California Rangeland Water Quality Management Plan.

#### **IF - Irrigation Water Management**

To reduce nonpoint source pollution of surface and ground waters caused by irrigation:

<u>MMC (1)</u>: Operate the irrigation system so that the timing and amount of irrigation water applied match crop water needs. This will require, as a minimum: (a) the accurate measurement of soil-water depletion volume and the volume of irrigation water applied, and (b) uniform application of water; and

<u>MMC (2)</u>: When chemigation is used, include backflow preventers for wells, minimize the harmful amounts of chemigation waters that discharge from the edge of the field, and control deep percolation. In cases where chemigation is performed with furrow irrigation systems, a tailwater management system may be needed.

#### □ **1G - Education/Outreach**

Implement educational programs to provide greater understanding of watersheds, and to raise awareness and increase the use of applicable agricultural management measures and practices where needed to control and prevent adverse impacts to surface and ground water. Public education, outreach, and training programs should involve applicable user groups and the community.

#### 2. FORESTRY MANAGEMENT MEASURES

#### □ 2A – Pre-harvest Planning

MMC (1): Perform advance planning for forest harvesting that includes the following elements where appropriate:

Element (E)(1): Identify (a) the area to be harvested including location of waterbodies and sensitive areas such as wetlands, threatened or endangered aquatic species habitat areas, or high-erosion-hazard areas (landslide-prone areas) within the harvest unit, and (b) the hydrologic unit where the project is located and name the waterbodies the project is tributary to.

E (2): Time the activity for the season or moisture conditions to avoid degradation of water quality and prevent impacts to beneficial uses. Avoid any activities that cause soil disturbance or discharge from road surfaces during wet weather except for emergency maintenance work.

E (3): Consider potential water quality impacts and erosion and sedimentation control in the selection of silviculture and regeneration systems, especially for harvesting and site preparation.

E (4): Reduce the risk of occurrence of landslides and severe erosion by identifying high-erosion-hazard areas and avoiding timber operations where they may exacerbate risk.



E (5): Consider cumulative effects from timber operations or roads to any known existing water quality impairments or problems in watersheds.

## 2A – Pre-harvesting Planning

<u>MMC (2)</u>: Perform advance planning for forest road systems that includes the following elements where appropriate:

E (1): Locate and design road systems to minimize potential sediment generation and delivery to surface waters. Key components are: (a) locate roads, landings and skid trails to avoid steep grades and steep or unstable hillslope areas, and to decrease the number of stream crossings, (b) avoid to the extent practicable locating new roads and landings in SMAs; and (c) determine road usage and select the appropriate road standard.

E (2): Locate and design temporary and permanent stream crossings to prevent failure and control impacts from the road system. Key components are: (a) size, design and site crossings structures to prevent failure and minimize diversion potential; (b) for fish-bearing streams, design crossings to facilitate fish passage.

E (3): Ensure that the design of road prism and the road surface drainage is appropriate to the terrain and that road surface design is consistent with the road drainage structures.

E (4): Use suitable materials for surface roads planned for all-weather use to support truck traffic.

E (5): Design road systems to avoid high erosion or landslide hazard areas. Identify these areas and consult a qualified specialist for design of any roads that must be constructed through these areas.

#### **2B** - Streamside Management Areas (SMA)

<u>MMC (1)</u>: Establish and maintain a streamside management area along surface waters that is sufficiently wide and which includes a sufficient number of canopy species to buffer against detrimental changes in the temperature regime of the waterbody to provide bank stability, and to withstand wind damage.

<u>MMC (2)</u>: Manage the SMA including flood-prone areas in such a way as to protect against soil disturbance in the SMA and delivery to the stream of sediments and nutrients generated by forestry activities, including harvesting.

<u>MMC (3)</u>: Manage the SMA canopy species to provide a sustainable source of large woody debris needed for instream channel structure and aquatic species habitat.

## **2C - Road Construction/Reconstruction**

MMC (1): Follow pre-harvest planning (as described under 2A) when constructing or reconstructing the roadway.

MMC (2): Follow designs planned under 2A for road surfacing and shaping.

<u>MMC (3)</u>: Install road drainage structures according to designs planned under 2A and regional storm return period and installation specifications. Match these drainage structures with terrain features and with road surface and prism designs.

MMC (4): Guard against the production of sediment when installing stream crossings.



MMC (5): Protect surface waters from slash and debris material from roadway clearing.

MMC (6): Use straw bales, silt fences, mulching, or other favorable practices on disturbed soils on cuts, fill, etc.

MMC (7): Avoid constructing new roads in SMAs to extent practicable.

# D - Road Management

<u>MMC (1)</u>: Avoid using roads for timber hauling or heavy traffic during wet or thaw periods on roads not designed and constructed for these conditions.

<u>MMC (2)</u>: Evaluate the future needs for a road and close roads that will not be needed. Leave closed roads and drainage channels in a stable condition to withstand storms.

<u>MMC (3)</u>: Remove drainage crossings and culverts if there is a reasonable risk of plugging or failure from lack of maintenance.

<u>MMC (4)</u>: Following completion of harvesting, close and stabilize temporary spur roads and seasonal roads to control and direct water away from the roadway. Remove all temporary stream crossings.

<u>MMC (5)</u>: Inspect roads to determine the need for structural maintenance. Conduct maintenance practices, when conditions warrant, including cleaning and replacement of deteriorated structures and erosion controls, grading or seeding of road surfaces, and, in extreme cases, slope stabilization or removal of road fills where necessary to maintain structural integrity.

<u>MMC (6)</u>: Conduct maintenance activities, such as dust abatement, so that contaminants or pollutants are not introduced into surface waters.

<u>MMC (7)</u>: Properly maintain permanent stream crossings and associated fills and approaches to reduce the likelihood (a) that stream overflow will divert onto roads, and (b) that fill erosion will occur if the drainage structures become obstructed.

### **2E - Timber Harvesting**

The timber harvesting management measure consists of implementing the following:

#### MMC (1): General

E (1): Timber harvesting operations with skid trails or cable yarding follow layouts determined under 2A.

E (2): Install landing drainage structures to minimize erosion and prevent sedimentation.

E (3): Construct landings away from steep slopes and reduce the likelihood of fill slope failures. Protect landing surfaces used during wet periods. Locate landings outside SMAs.

E (4): Protect stream channels and significant ephemeral drainages from logging debris and slash material.

E (5): Use appropriate areas for petroleum storage, equipment maintenance and service. Establish procedures to contain and treat spoils. Recycle or properly dispose of all waste materials.



#### MMC (2): For cable yarding

E (1): Limit yarding corridor gouge or soil plowing by properly locating cable yarding loadings.

E (2): Locate corridors for SMAs following 2B.

<u>MMC (3)</u>: For groundskidding

E (1): Within SMAs, operate groundskidding equipment only at stream crossings. In SMAs, fell and endline trees to avoid sedimentation and damage to residual vegetation.

E (2): Use improved stream crossings for skid trails which cross flowing drainages. Conduct skid trails to disperse runoff and with adequate drainage structures.

E (3): On steep slopes, use cable systems rather than groundskidding where groundskidding may cause excessive erosion.

#### **2F** - Site Preparation and Forest Regeneration

Confine on-site potential NPS pollution and erosion resulting from site preparation and the regeneration of forest strands. The components of the management measures for site preparation and regeneration are:

MMC (1): Select a method of site preparation and regeneration suitable for the site conditions;

<u>MMC (2)</u>: Conduct mechanical tree planting and ground-disturbing site preparation activities on the contour of sloping terrain;

<u>MMC (3)</u>: Do not conduct mechanical site preparation and mechanical tree planting on sidestream management areas;

MMC (4): Protect surface waters from logging debris and slash material;

MMC (5): Suspend operations during wet periods;

<u>MMC (6)</u>: Locate windows at a safe distance from drainages and SMAs to control movement of the material during high runoff conditions;

<u>MMC (7)</u>. Conduct bedding operations in high-water-table areas during dry periods of the year. Conduct bedding in sloping areas on the contour;

MMC (8): Protect small ephemeral drainages when conducting mechanical tree planting.

#### **2G - Fire Management**

Prescribe fire for site preparation and control or suppress wildfire in a manner that reduces potential nonpoint source pollution of surface waters:

<u>MMC (1):</u> Intense prescribed fire should not cause excessive erosion due to the combined effect of removal of canopy species and the loss of soil-binding ability of subcanopy and herbaceous vegetation roots, especially in SMAs, in streamside vegetation for small ephemeral drainages, or on very steep slopes;

<u>MMC (2)</u>: Prescriptions for prescribed fire should protect against excessive erosion or prevent sedimentation;



<u>MMC (3)</u>: All bladed firelines, for prescribed fire and wildfire, should be plowed on contour or stabilized with water bars and/or other appropriate techniques if needed to control excessive sedimentation or erosion of the fireline;

MMC (4): Rehabilitation and salvage logging areas burned by wildfires should be managed to minimize erosion and prevent sedimentation.

#### **2H - Revegetation of Disturbed Areas**

Reduce erosion and prevent sedimentation by rapid revegetation of areas disturbed by timber operations.

<u>MMC (1)</u>: Revegetate disturbed areas (using seeding or planting) promptly after completion of earthdisturbing activity. Local growing conditions will dictate the timing for establishment of vegetative cover.

<u>MMC (2)</u>: Use mixes of species and treatments developed and tailored for successful vegetation establishment for the region or area.

<u>MMC (3)</u>: Concentrate revegetation efforts initially on priority areas, such as disturbed areas in SMAs or the steepest areas of disturbance near drainages.

#### 2I - Forest Chemical Management

Use chemicals when necessary for forest management in accordance with the following to reduce nonpoint source pollution impacts due to the movement of forest chemicals off-site during and after applications.

<u>MMC (1)</u>: Conduct applications by skilled and licensed applicators according to the registered use, with special consideration given to impacts to nearby surface waters.

MMC (2): Carefully prescribe the type and amount of pesticides appropriate for the insect, fungus, or herbaceous species.

<u>MMC (3)</u>: Prior applications of pesticides and fertilizers, inspect the mixing and loading process and the calibration of equipment, and identify the appropriate weather conditions, the spray area, and buffer areas for surface waters and mixing and loading areas.

<u>MMC (4)</u>: Establish and identify buffer areas for surface waters to protect beneficial uses. (This is especially important for aerial applications).

<u>MMC (5)</u>: Immediately report accidental spills of pesticides or fertilizers into surface waters to the California Office of Emergency Services (Cal/OES). Develop an effective spill contingency plan to contain spills.

#### **2J - Wetland Forest**

Plan, operate, and manage normal ongoing forestry activities (including harvesting, road design and construction, site preparation and regeneration, and chemical management) to adequately protect the aquatic functions of forested wetlands.

## **2K – Post-harvest Education**

Conduct post-operation evaluation of the effectiveness of the State=s forest practices requirements as implemented. The components of this are: a) implementation monitoring to determine if the operation was conducted according to specifications, and b) effectiveness monitoring after at least one winter period to determine if the specified operation prevented or minimized discharges.



Appendix E

# 2L - Education/Outreach

Implement educational programs to provide greater understanding of watersheds, and to raise awareness and increase the use of applicable forestry management measures and practices where needed to control and prevent adverse impacts to surface and ground water. Public education, outreach, and training programs should involve applicable user groups and the community.

# 3. URBAN MANAGEMENT MEASURES

# **3.1 - Runoff from Developing Areas**

# 3.1A - Watershed Protection

Develop a watershed protection program to:

- 1. Avoid conversion, to the extent practicable, of areas that are particularly susceptible to erosion and sediment loss;
- 2. Preserve areas that provide important water quality benefits and/or are necessary to maintain riparian and aquatic biota;
- 3. Protect to the extent practicable, the natural integrity of water bodies and natural drainage systems associated with site development including roads, highways, and bridges;
- 4. Limit increases of percent impervious surfaces; and
- 5. Provide education and outreach to address sources or nonpoint pollution.

# 3.1B - Site Development

Plan, design and develop sites to:

- 1. Protect areas that provide important water quality benefits, necessary to main riparian and aquatic biota, and/or particularly susceptible to erosion and sediment loss;
- 2. Limit increases of impervious areas;
- 3. Limit land disturbance activities such as clearing and grading, and cut-and-fill to reduce erosion and sediment loss; and
- 4. Limit disturbance of natural drainage features and vegetation

# 3.1C - New Development

- Part (1): By design or performance:
  - (a) After construction has been completed and the site is permanently stabilized, reduce the average annual TSS loadings by 80% (for the purposes of this measure, an 80% TSS reduction is to be determined on an average annual basis); or
  - (b) Reduce the post development loadings of TSS so that the average annual TSS loadings are no greater than pre-development loadings;
- Part (2): To the extent practicable, maintain post-development peak runoff rate and average volume at levels that are similar to pre-development levels.

# **3.2 - Runoff from Construction Sites**

3.2A - Construction Site Erosion and Sediment Control

- Part (1): Reduce erosion and, to the extent practicable, retain sediment on site during and after construction; and
- Part (2): Prepare and implement, prior to land disturbance, an effective, approved erosion and sediment control plan or similar administrative document that specifies erosion and sediment control provisions.

3.2B - Construction Site Chemical Control

- Part (1): Limit application, generation, and migration of toxic substances;
- Part (2): Ensure the proper storage and disposal of toxic materials;



| Part (3): | Apply nutrients at rates necessary to establish and maintain vegetation without causing  |
|-----------|------------------------------------------------------------------------------------------|
|           | nutrient runoff to surface waters; and                                                   |
| Part (4): | Prepare and implement, prior to use or storage of toxic materials on site, an effective, |
|           | approved chemical control plan or similar administrative document that contains chemical |
|           | control provisions (e.g., minimize use of toxic materials; ensure proper containment if  |
|           | toxic materials are to be used/stored on site).                                          |

## **3.3 - Runoff from Existing Development**

#### 3.3A - Existing Development

Develop and implement watershed management programs to reduce runoff pollutant concentrations and volumes from existing development:

- 1. Identify priority local and/or regional watershed pollutant reduction opportunities (e.g., improve existing urban runoff control structures);
- 2. Specify a schedule for implementing appropriate controls;
- 3. Limit destruction of natural conveyance systems; and
- 4. Where appropriate, preserve, enhance, or establish buffers along surface water bodies and their tributaries.

# □ 3.4 - Onsite Disposal Systems

# 3.4A - New Onsite Disposal Systems (OSDS)

Part (1): Ensure that new OSDS are located, designed, installed, operated, inspected, and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable, reduce the discharge of pollutants into ground water. Where necessary to meet these objectives: (a) discourage the installation of garbage disposals to reduce hydraulic and nutrient loadings; and (b) install low-volume plumbing fixtures in existing developments. Implement OSDS inspection schedules for pre-construction, construction, and post-construction.

- Part (2): Direct placement of OSDS away from unsuitable areas. Where OSDS placement away from unsuitable areas is not practicable, ensure that the OSDS is designed or sited at a density so as not to adversely affect surface waters or ground water. Unsuitable sites include, but are not limited to, areas (a) with poorly or excessively drained soils; (b) with shallow water tables or high seasonal water tables; (c) within floodplains; or (d) where nutrient and/or pathogen concentrations in the effluent cannot be sufficiently treated or reduced before the effluent reaches sensitive water bodies.
- Part (3): Establish protective setbacks from surface waters, wetlands, and floodplains for conventional as well as alternative OSDS. The lateral setbacks should be based on soil type, slope, hydrologic factors, and type of OSDS. Where uniform protective setbacks cannot be achieved, site development with OSDS so as not to adversely affect water bodies and/or contribute to a public health nuisance.
- Part (4): Establish protective separation distances between OSDS system components and groundwater. The separation distances should be based on soil type, distance to ground water, hydrologic factors, and types of OSDS.
- Part (5): Where conditions indicate that nitrogen-limited surface waters may be adversely affected by excess nitrogen loadings from ground water, prohibit the installation of OSDSs or require the installation of OSDSs that reduce total nitrogen loadings to meet water quality objectives.

#### 3.4B - Operating Onsite Disposal Systems (OSDSs)

Part (1): Establish and implement policies and systems to ensure that existing OSDSs are operated and maintained to prevent the discharge of pollutants to the surface of the ground



|           | and, to the extent practicable, reduce the discharge of pollutants into ground water. Where necessary to meet these objectives, encourage the reduced use of garbage disposals, encourage the use of low-volume plumbing fixtures, and reduce total phosphorus loadings to the OSDS by 15% (if the use of low-level phosphate detergents has not been required or widely adopted by OSDS users). Establish and implement policies that require an OSDS to be required, replaced, or modified where the OSDS fails or threatens or impairs |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           | surface waters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Part (2): | Inspect OSDSs at a frequency adequate to ascertain whether the OSDSs are failing.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Part (3): | Consider replacing or upgrading OSDS to treat influent so that total nitrogen loadings in<br>the effluent are reduced to meet water quality objectives. This provision applies only<br>where: (a) conditions indicate that nitrogen-limited surface waters may be adversely<br>affected by significant ground water nitrogen loadings from an OSDS, and (b) nitrogen<br>loadings from OSDS are delivered to ground water.                                                                                                                 |

# **3.5** - Transportation Development: Roads, Highways and Bridges

3.5A - Planning, Siting, and Developing Roads and Highways

Plan, site, and develop roads and highways to:

- 1. Protect areas that provide important water quality benefits or are particularly susceptible to erosion or sediment loss;
- 2. Limit land disturbance such as clearing and grading and cut and fill to reduce erosion and sediment loss; and
- 3. Limit disturbance of natural drainage features and vegetation.

#### 3.5B - Bridges

Site, design and maintain bridge structures so that sensitive and valuable aquatic ecosystems and areas providing important benefits are protected from adverse effects.

#### 3.5C - Construction Projects [Roads, Highways and Bridges]

- Part (1): Reduce erosion and, to the extent practicable, retain sediment on site during and after construction and
- Part (2): Prior to land disturbance, prepare and implement an approved erosion control plan or similar administrative document that contains erosion and sediment control provisions.

#### 3.5D - Construction Site Chemical Control [Roads, Highways and Bridges]

- Part (1): Limit application, generation, and migration of toxic substances;
- Part (2): Ensure the proper storage and disposal of toxic materials;
- Part (3): Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface water.

3.5E - Operation and Maintenance [Roads, Highways and Bridges]

Incorporate pollution prevention procedures into the operation and maintenance of roads, highways, and bridges to reduce pollutant loadings to surface waters.

3.5F - Road, Highway and Bridge Runoff Systems

Develop and implement runoff management systems for existing roads, highways, and bridges to reduce pollutant concentrations and volumes entering surface waters.

- 1. Identify priority and watershed pollutant reduction opportunities (e.g., improvements to existing urban runoff control structures;) and
- 2. Establish schedules for implementing appropriate controls.



# **3.6 - Education/Outreach**

#### 3.6A - Pollution Prevention/Education: General Sources

Implement educational programs to provide greater understanding of watersheds, and to raise awareness and increase the use of applicable urban management measures and practices where needed to control and prevent adverse impacts to surface and ground water. Public education, outreach, and training programs should involve applicable user groups and the community. Implementation of urban pollution prevention and education programs includes the following activities, where applicable:

- 1. Households
  - \$ Improper storage, use and disposal of household hazardous chemicals, including automotive fluids, pesticides, paints, solvents, etc.;
  - Lawn and garden activities, including the application and disposal of lawn and garden care products, and improper disposal of leaves and yard trimmings;
  - \$ Improper operation and maintenance of onsite disposal systems;
  - \$ Improper disposal of pet excrement.

# 2. Landscaping

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Turf management on golf courses, park and recreational areas.

- 3. Commercial
  - Commercial activities, including parking lots, restaurants, vehicle service facilities, and other entities.
- 4. Other General Sources
  - \$ Discharge of pollutants into storm drains, including floatables, waste oil, and litter;
  - \$ Roads, highways, and bridges.

# 4. MARINAS AND RECREATIONAL BOATING MANAGEMENT MEASURES

#### 4.1 - Assessment, Siting and Design

# 4.1A - Water Quality Assessment

Part (1): Assess water quality as a part of the siting and design of new and expanding marinas to establish baseline water quality conditions or trends.

Part (2): Assess water quality at existing marinas to establish baseline water quality conditions.

## 4.1B - Marina Flushing

Site and design new and expanding marinas such that tides and/or currents will aid in flushing of the site or renew its water regularly.

#### 4.1C - Habitat Assessment

Site and design new and expanding marinas to protect against adverse effects on shellfish resources, wetlands, submerged aquatic vegetation, or other important riparian and aquatic habitat areas as designated by local, State, or federal governments.

#### 4.1D - Shoreline Stabilization

Where streambank or shoreline erosion is a nonpoint source pollution problem, streambanks/shorelines should be stabilized (when determining whether streambank/shoreline erosion is a NPS problem, assess natural erosion rates and the dynamic equilibrium of the streambank/shoreline). The use of vegetative stabilization methods is preferred over the use of structural stabilization methods, if appropriate considering the climate, severity of erosion, offshore bathymetry, and or the potential adverse impact on other streambanks or shorelines and offshore areas.



# Appendix E

#### <u>4.1E - Storm Water Runoff</u>

Implement effective runoff control strategies which include the use of pollution prevention activities and the proper design of marinas and boat maintenance areas (including parking areas). Reduce the average annual loadings of total suspended solids (TSS) in runoff from these areas to meet water quality objectives.

## 4.1F - Fuel Station Design

Design existing and proposed fueling stations to allow for spill prevention and for ease in cleanup of spills that may occur.

#### 4.1G - Sewage Facilities

Install pumpout, dump station and restroom facilities where needed at new and expanding and existing marinas to reduce the release of sewage to surface waters. Design these facilities to allow ease of access and post signage to promote use by the boating public.

#### 4.1H - Waste Management Facilities

Install facilities, where needed, for the proper recycling or disposal of solid wastes (such as oil filters, lead acid batteries, used absorbent pads, spent zinc anodes, and fish waste as applicable) and liquid materials (such as fuel, oil, solvents, antifreeze, and paints) generated by users of marinas and boat maintenance areas. Design these facilities to allow ease of access, post signage to promote use by the boating public, and encourage recycling to the fullest extent possible.

# **4.2 - Operation and Maintenance**

#### 4.2A - Solid Waste Control

Properly dispose of solid wastes produced by the operation, cleaning, maintenance, and repair of boats and

operation of marinas - and encourage recycling of recyclable materials to the fullest extent possible - to limit entry of solid wastes to surface waters.

#### 4.2B - Fish Waste

Promote sound fish waste management through a combination of fish-cleaning restrictions, public education, and proper disposal of fish waste.

#### 4.2C - Liquid Material Control

Provide and maintain appropriate storage, transfer, containment, and disposal facilities for liquid materialsuch as fuel, oil, solvents, antifreeze, and paints- and encourage recycling of these materials to the fullest extent possible.

#### 4.2D - Petroleum Control

Reduce the amount of fuel and oil from boat bilges and fuel tank air vents entering marina and surface waters.

#### 4.2E - Boat Cleaning and Maintenance

For boats that are in the water, perform:

- (1) topside cleaning and maintenance operations to minimize, to the extent practicable, the release to surface waters of (a) harmful products such as cleaners and solvents and (b) paint; and
- (2) underwater hull cleaning and maintenance operations to minimize, to the extent practicable, the release of paint and anodes.

#### 4.2F - Maintenance of Sewage Facilities

Ensure that sewage pumpout facilities are maintained in operational condition and encourage their use.



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4.2G - Boat Operation
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Restrict boating activities where necessary to decrease turbidity and physical destruction of shallow-water habitat.

# □ 4.3 - Education/Outreach

# 4.3A - Public Education and Outreach

Implement educational programs to provide greater understanding of watersheds, and to raise awareness and increase the use of applicable marina and boating management measures and practices where needed to control and prevent adverse impacts to ground and surface water. Public education, outreach, and training programs should involve applicable user groups and the community (e.g., boaters, boating groups, marina owners and operators, boat maintenance facility operators, waterfront agencies, service providers, live-aboards, environmental community and other related groups).

# 5. HYDROMODIFICATION MANAGEMENT MEASURES

# **5.1** - Channelization and Channel Modification

5.1A - Physical and Chemical Characteristics of Surface Waters

- 1. Evaluate the potential effects of proposed channelization and channel modification on the physical and chemical characteristics of surface water;
- 2. Plan and design channelization and channel modification to reduce undesirable impacts;
- 3. Develop an operation and maintenance program for existing modified channels that includes identification and implementation of opportunities to improve physical and chemical characteristics of surface waters in those channels.
- 5.1B Instream and Riparian Habitat Restoration
- 1. Evaluate the potential effects of proposed channelization and channel modification on instream and riparian habitat;
- 2. Plan and design channelization and channel modification to reduce undesirable impacts;
- 3. Develop an operation and maintenance program for existing modified channels that includes identification and implementation of opportunities to restore instream and riparian habitat in those channels.

# □ 5.2 - Dams

5.2A - Erosion and Sediment Control

- 1. Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction, and
- 2. Prior to land disturbance, prepare and implement an approved erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions.

# 5.2B - Chemical and Pollutant Control

- 1. Limit application, generation, and migration of toxic substances;
- 2. Ensure the proper storage and disposal of toxic materials
- 3. Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters.

5.2C - Protection of Surface Water Quality and Instream and Riparian Habitat

Develop and implement a program to manage the operation of dams in coastal areas that includes an



#### assessment of:

- 1. Surface water quality and instream and riparian habitat and potential for improvement, and
- 2. Significant nonpoint source pollution problems that result from excessive surface water withdrawals.

#### 5.3 - Streambank and Shoreline Erosion

#### 5.3A - Eroding Streambanks and Shorelines

- 1. Where streambank or erosion is a NPS problem, streambanks and shorelines should be stabilized. The use of vegetative stabilization methods is strongly preferred over the use of structural stabilization methods, if appropriate considering the climate, severity of wave and wild erosion, offshore bathymetry, and the potential adverse impact on other streambanks, shorelines, and offshore areas.
- 2. Protect streambank and shoreline features with the potential to reduce NPS pollution.
- 3. Protect streambank and shorelines from erosion due to uses of either the shorelines or adjacent surface waters.

# **5.4 - Education/Outreach**

#### 5.4A - Educational Programs

Implement educational programs to provide greater understanding of watersheds, to raise awareness and increase the use of applicable hydromodification management measures and practices where needed to control and prevent adverse impacts to surface and ground water, and to promote projects which retain or re-establish natural hydrologic functions (e.g., channel restoration projects). Public education, outreach, and training programs should involve applicable user groups and the community.

# 6. WETLANDS, RIPARIAN AREAS & VEGETATED TREATMENT SYSTEMS MANAGEMENT MEASURES

#### 6.A - Protection of Wetlands and Riparian Areas

Protect from adverse effects wetlands and riparian areas that serve to reduce NPS pollution; maintain this function while protecting the other existing functions of these wetlands and riparian areas as measured by characteristics such as vegetative species composition, diversity, and cover, hydrology and quality of surface water and ground water, geochemistry of the substrate, and fauna species composition, diversity, and abundance.

#### 6.B - Restoration of Wetlands and Riparian Areas

Promote the restoration of the pre-existing functions in damaged and destroyed wetlands and riparian systems in areas where the systems will serve to reduce NPS pollution.

#### 6.C - Vegetated Treatment Systems

Promote the use of engineered vegetated treatment systems such as constructed wetlands or vegetated filter strips where these systems will serve to reduce NPS pollution.

#### 6.D - Education/Outreach

Implement educational programs to provide greater understanding of watersheds, to raise awareness and increase the use of applicable management measures and practices for wetlands and riparian areas, and to promote projects which retain or re-establish natural hydrologic functions. Public education, outreach, and training programs should involve applicable user groups and the community.

# EPA FACT SHEET 1.0: STORMWATER PHASE II



United States Environmental Protection Agency

Office of Water (4203)

EPA 833-F-00-001 January 2000 Fact Sheet 1.0



Storm Water Phase II Final Rule **Fact Sheet Series** 

#### Overview

1.0 - Storm Water Phase II Final Rule: An Overview

#### Small MS4 Program

2.0 - Small MS4 Storm Water Piogram Overview

2.1 - Who's Covered? Designation and Waivers of Regulated Small MS4s

2.2 - Urbanized Areas: Definition and Description

#### Minimum Control Measures

2.3 - Public Education and Outreach

2.4 - Public Participation/ Involvement

2.5 – Micit Discharge Detection and Elimination

2.6 - Construction Site Runoff Control

2.7 - Post-Construction Runoff Control

2.8 - Pollution Prevention/Good Housekeeping

2.9 - Permitting and Reporting: The Process and Requirements

2.10 - Federal and State-Operated MS4s: Program Implementation

#### Construction Program

3.0 - Construction Program Overview

3.1 - Construction Rainfall Erosivity Waiver

Industrial "No Exposure"

4.0 - Conditional No Exposure Exclusion for Industrial Activity

Storm Water Phase II **Final Rule** 

# An Overview

#### Why Is the Phase II Storm Water Program Necessary?

vince the passage of the Clean Water Act (CWA), the quality of our Nation's waters has Simproved dramatically. Despite this progress, however, degraded waterbodies still exist. According to the 1996 National Water Quality Inventory (Inventory), a biennial summary of State surveys of water quality, approximately 40 percent of surveyed U.S. waterbodies are still impaired by pollution and do not meet water quality standards. A leading source of this impairment is polluted runoff. In fact, according to the Inventory, 13 percent of impaired rivers, 21 percent of impaired lake acres and 45 percent of impaired estuaries are affected by urban/suburban storm water runoff and 6 percent of impaired rivers, 11 percent of impaired lake acres and 11 percent of impaired estuaries are affected by construction site discharges.

Phase I of the U.S. Environmental Protection Agency's (EPA) storm water program was promulgated in 1990 under the CWA. Phase I relies on National Pollutant Discharge Elimination System (NPDES) permit coverage to address storm water runoff from: (1) "medium" and "large" municipal separate storm sewer systems (MS4s) generally serving populations of 100,000 or greater, (2) construction activity disturbing 5 acres of land or greater, and (3) ten categories of industrial activity.

The Storm Water Phase II Final Rule is the next step in EPA's effort to preserve, protect, and improve the Nation's water resources from polluted storm water runoff. The Phase II program expands the Phase I program by requiring additional operators of MS4s in urbanized areas and operators of small construction sites, through the use of NPDES permits, to implement programs and practices to control polluted storm water runoff. See Fact Sheets 2.0 and 3.0 for overviews of the Phase II programs for MS4s and construction activity.

Phase II is intended to further reduce adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of storm water discharges that have the greatest likelihood of causing continued environmental degradation. The environmental problems associated with discharges from MS4s in urbanized areas and discharges resulting from construction activity are outlined below.

#### MS4s in Urbanized Areas

Storm water discharges from MS4s in urbanized areas are a concern because of the high concentration of pollutants found in these discharges. Concentrated development in urbanized areas substantially increases impervious surfaces, such as city streets, driveways, parking lots, and sidewalks, on which pollutants from concentrated human activities settle and remain until a storm event washes them into nearby storm drains. Common pollutants include pesticides, fertilizers, oils, salt, litter and other debris, and sediment. Another concern is the possible illicit connections of sanitary sewers, which can result in fecal coliform bacteria entering the storm sewer system. Storm water runoff picks up and transports these and other harmful pollutants then discharges them -- untreated -- to waterways via storm sewer systems. When left uncontrolled, these discharges can result in fish kills, the destruction of spawning and wildlife habitats, a loss in aesthetic value, and contamination of drinking water supplies and recreational waterways that can threaten public health

For the full document, please see <u>www.epa.gov/owm/sw/phase2</u>