Workshop Summary:
Preliminary Identification of Issues and Strategies

U.S. Department of Commerce

National Oceanic and Atmospheric Administration

National Ocean Service

Origin and Purpose

It is important to note that all references to priorities, problems, and sources are reflections of the opinions of those who participated at the workshop. Strategies identified by workshop participants to address water quality problems are recommendations of the individual groups only, and should not be construed to represent the policies or practices of the participating agencies or the Monterey Bay National Marine Sanctuary. Instead, the strategies and activities identified thus far represent critical information that will help guide development of the water quality protection plan.

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This document summarizes the proceedings of the Issue Identification and Strategy Development Workshop held in Monterey, California between January 25-27, 1994. The workshop was sponsored by the Monterey Bay National Marine Sanctuary as part of the Sanctuary's Water Quality Protection Program planning efforts.

The Water Quality Protection Program implements a key provision of the Memorandum of Agreement (MOA) signed by eight Federal, State, and local agencies--that they work together to develop a water quality protection plan for the Sanctuary. The MOA was adopted in September 1992 when Congress and the President established the Monterey Bay National Marine Sanctuary.

Signatories to the agreement are the National Oceanic and Atmospheric Administration; the U.S. Environmental Protection Agency, Region IX; the California Environmental Protection Agency; the California State Water Resources Control Board; the San Francisco Regional Water Quality Control Board; the Central Coast Regional Water Quality Control Board; the California Coastal Commission; and the Association of Monterey Bay Area Governments.

The workshop proceedings summarized in this report are a *first step* in the development of the Water Quality Protection Program (WQPP) Plan. Approximately 125 persons participated in the three-day workshop, including scientists, water quality specialists, and staff from government agencies and representatives from agriculture, fishing, industry, and environmental groups located in central California. A list of the participants is provided in Appendix B.

Workshop goals were to: 1) identify and prioritize water quality problems; 2) identify pollutants and activities related to those problems; 3) establish the relationship between the problems and existing water quality standards; and 4) suggest strategies that will contribute to enhancing management of the natural resources of the Monterey Bay National Marine Sanctuary.

The National Oceanic and Atmospheric Administration wishes to thank all the individuals and organizations that participated in the three-day workshop. The time and efforts committed to this program will result in a better understanding of the processes, both natural and anthropogenic, that affect water quality in the Monterey Bay National Marine Sanctuary.

Providing Input

Appendix D summarizes some of the ways you can provide information to the planners developing the WQPP. In the short-run, information on strategies to solve or prevent the Sanctuary's potential water quality problems is of prime importance. An inventory of existing water quality management programs is another area where outside input is being directly sought. NOAA and its planning partners expect many of the best ideas for protecting Sanctuary water quality to come from the public.

Preliminary Identification of Issues and Strategies

Workshop Summary

Prepared by

National Oceanic and Atmospheric Administration
Office of Ocean Resources Conservation and Assessment
Strategic Environmental Assessments Division
and
Office of Ocean and Coastal Resource Management
Sanctuaries and Reserves Division

In Cooperation with Participating Agencies

October 1994

Participating Agencies/Organizations

Federal

U.S. Department of Commerce, National Oceanic and Atmospheric Administration
U.S. Environmental Protection Agency
U.S. Department of Agriculture, Forest Service
U.S. Department of Agriculture, Soil Conservation Service
U.S. Department of Transportation, U.S. Coast Guard
U.S. Department of Defense, U.S. Army Corps of Engineers

State of California

California Coastal Commission
California Environmental Protection Agency
Department of Fish and Game
State Water Resources Control Board
San Francisco Regional Water Quality Control Board
Central Coast Regional Water Quality Control Board
California Resources Agency
Elkhorn Slough National Estuarine Research Reserve
University of California Sea Grant Extension Program

Local Agencies

Association of Monterey Bay Area Governments
Monterey County Agricultural Commissioner
Monterey County Department of Parks and Recreation
Monterey County Hospitality Association
Monterey County Planning
Santa Cruz County Planning
Santa Cruz Harbor District
San Luis Obispo County & Council of Governments

Other Organizations

Center for Marine Conservation
Elkhorn Slough Foundation
Monterey Fishermen's Marketing Association
Pacific Gas & Electric

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Introduction

This document summarizes the proceedings of the Issue Identification and Strategy Development Workshop held at Monterey, California in January 1994. The workshop was sponsored by the National Oceanic and Atmospheric Administration as part of the Monterey Bay National Marine Sanctuary's Water Quality Protection Program planning efforts (NOAA et al. 1994). Approximately 125 persons participated in the three-day workshop, including scientists, water quality specialists and staff representing government agencies and private organizations.

Workshop goals were to: 1) identify and prioritize water quality problems; 2) identify pollutants and activities related to those problems; 3) establish the relationship between the problems and existing water quality objectives; and 4) suggest strategies that will contribute to enhancing management of the natural resources of the Monterey Bay National Marine Sanctuary.

January Workshop

The January workshop was designed to be the first major step in a two-year planning process. The workshop, held on January 25-27, 1994, in Monterey, California, was designed to: 1) identify water quality priority problems; 2) identify sources and pollution associated with the problems; and 3) develop strategies to address those problems. Figure 1 shows an overview of the process used at the workshop.

This summary document represents the work of approximately 125 persons including local and regional scientists, planners, and resource managers with expertise in water quality issues. Workshop participants also included representatives of the public and organizations most likely to be affected by the WQPP plan (e.g., agriculture, recreation and tourism). Bringing the "stakeholders" into the process early on and keeping them engaged in defining issues, contributing ideas, and thinking about practical ways of implementing solutions, is one of the keys to developing a successful Program. Members of the Core Group identified these experts from Federal, State, and local agencies, and nongovernmental organizations. A complete list of attendees is included in Appendix B.

The workshop was designed around working groups of 10-20 participants each. A structured process was used in order to obtain the most complete information. Worksheets were constructed and pre-loaded with information, where possible, to make the most efficient use of time. Each of the work groups was facilitated by a member of the interagency Core Group, with a NOAA staff person assigned to each group as a rapporteur. A workbook, containing information on regional characteristics related to existing water quality conditions, was produced by NOAA for background information and mailed to the participants before the workshop (NOAA 1994).

Part I. Water Quality Issue Identification

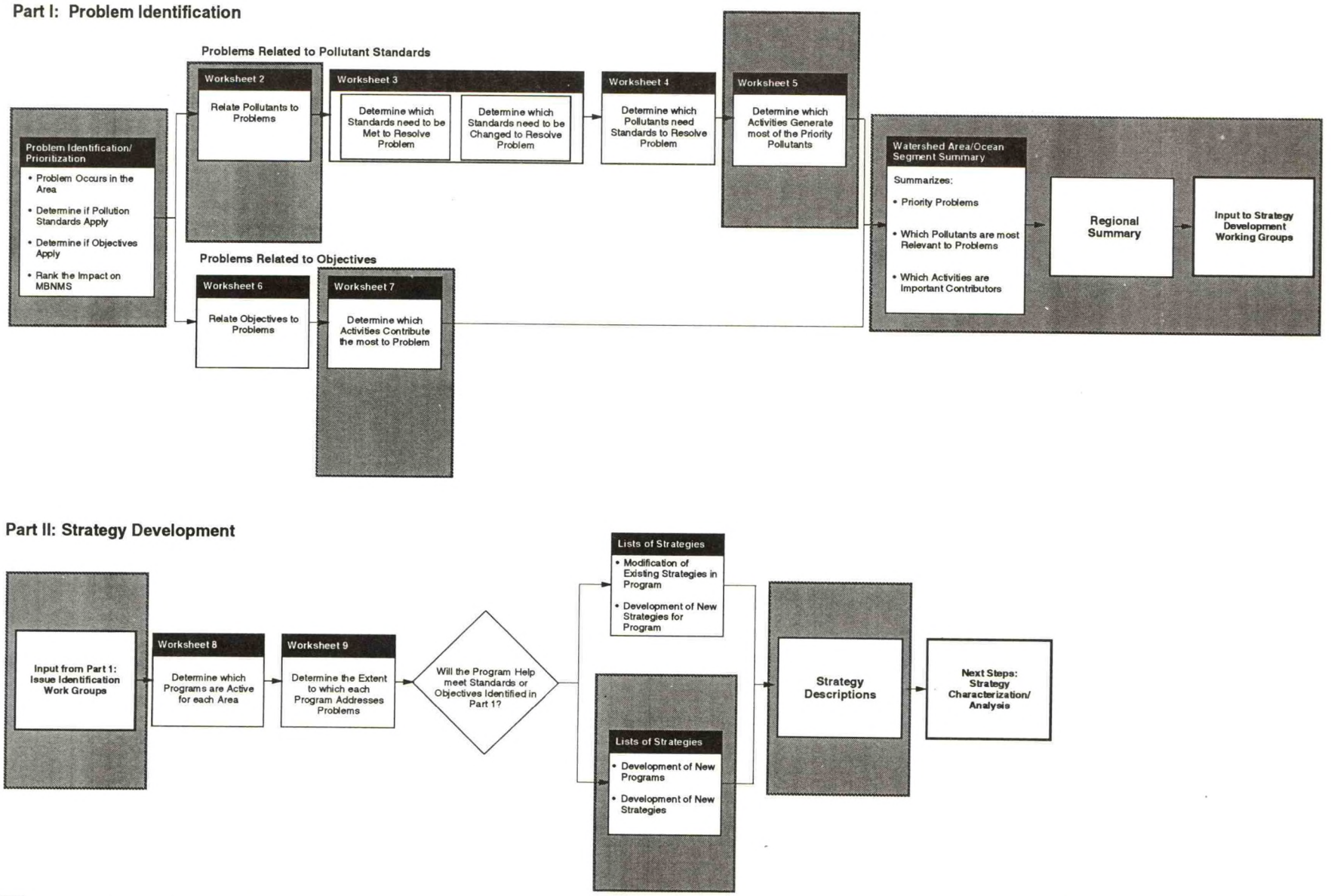
Organization of the workshop was based on the assumption that some problems are unique to certain geographical areas. As a result, the Core Group divided the Monterey Bay area into watershed areas and ocean segments (Figure 2). The watershed areas are based on USGS hydrologic units that were grouped into larger areas defined by NOAA's Coastal Assessment Framework (NOAA 1993). Modifications were made to the boundaries based on the California State Water Resources Control Board hydrologic maps and in consultation with local experts. Each work group was assigned one or more watershed areas or ocean segments.

In order to focus as closely as possible on the location of potential water quality problems, a series of nearshore areas were identified by the Core Group. Work groups analyzing problems in the ocean segments were asked to refer to these areas as a way of providing more precise spatial definition to the problems. Figure 3 shows these areas along the coast.

Problem identification/prioritization for each watershed area and ocean segment. Participants were assigned to one of six geography-based work groups (four for watershed areas and two for ocean segments) for the purpose of identifying and prioritizing problems existing within their areas of concern. An attempt was made to relate problems to existing water quality standards and objectives. However, there was no attempt to bring all groups together to coordinate priority problems across target areas.

Sources and activities. The second step was to identify the sources and activities contributing to the priority problems identified previously. The templates used to collect information were pre-loaded with sources and activities from the State of California's Water Quality Assessment Data Base (State of California 1993).

Figure 1. *January 1994 Workshop Process*



Pollutants. Next, participants were asked to identify the pollutants most likely to cause or contribute to water quality problems. The participants also were asked to link these pollutants to the sources/activities that were previously identified. Where possible, pollutant levels above accepted standards for the State of California were identified.

Summary worksheets describing the priority problems and sources were compiled by the NOAA staff and distributed for use in Part II of the workshop.

Part II. Strategy Development

For the second part of the workshop, participants were divided into six theme groups based on sources and activities contributing to water quality problems. Participants were asked to identify the existing Federal, State, and local programs that address the problems identified in Part I of the workshop. Management strategies were then developed within the work groups to address the priority problems across all watershed areas and ocean segments. The strategies developed in each group were targeted to the source(s) their group was asked to address (i.e. point sources). Participants were asked to take existing programs into consideration when developing strategies. Since all the groups worked with the same list of priority problems, some overlap in strategies was expected. Some of the strategies included in this document were developed by more than one group at the session because they were not specific to one theme. For example, development of a monitoring program for the Sanctuary cuts across several themes (e.g., agricultural sources, point sources, urban nonpoint sources) used to organize the work groups in Part II of the workshop.

Format of this Document

The material summarized in this document represents information gathered at the workshop. This includes the work of research staff, scientists, and public agency managers involved in surface and groundwater management. It is important to note that all references to priorities, problems, and potential sources reflect the opinions of those who participated at the workshop. Since each working group consisted of different individuals with differing perspectives, and each group to some extent adopted their own definitions and sense of priorities, the comparison of problems and source activities across watersheds and ocean segments is complicated. This issue will be addressed further as attempts are made to better define the geographical extent of identified problems and recommended solutions.

This document contains original and summary materials from the workshop. Each chapter contains specific information on a particular phase of the workshop: problems, sources, pollutants, and strategies. In addition, a complete listing of the strategies is included in Appendix C. The final section of this document outlines the next steps planned for the Water Quality Protection Program.

Figure 2. *Spatial Framework of the Water Quality Protection Program*

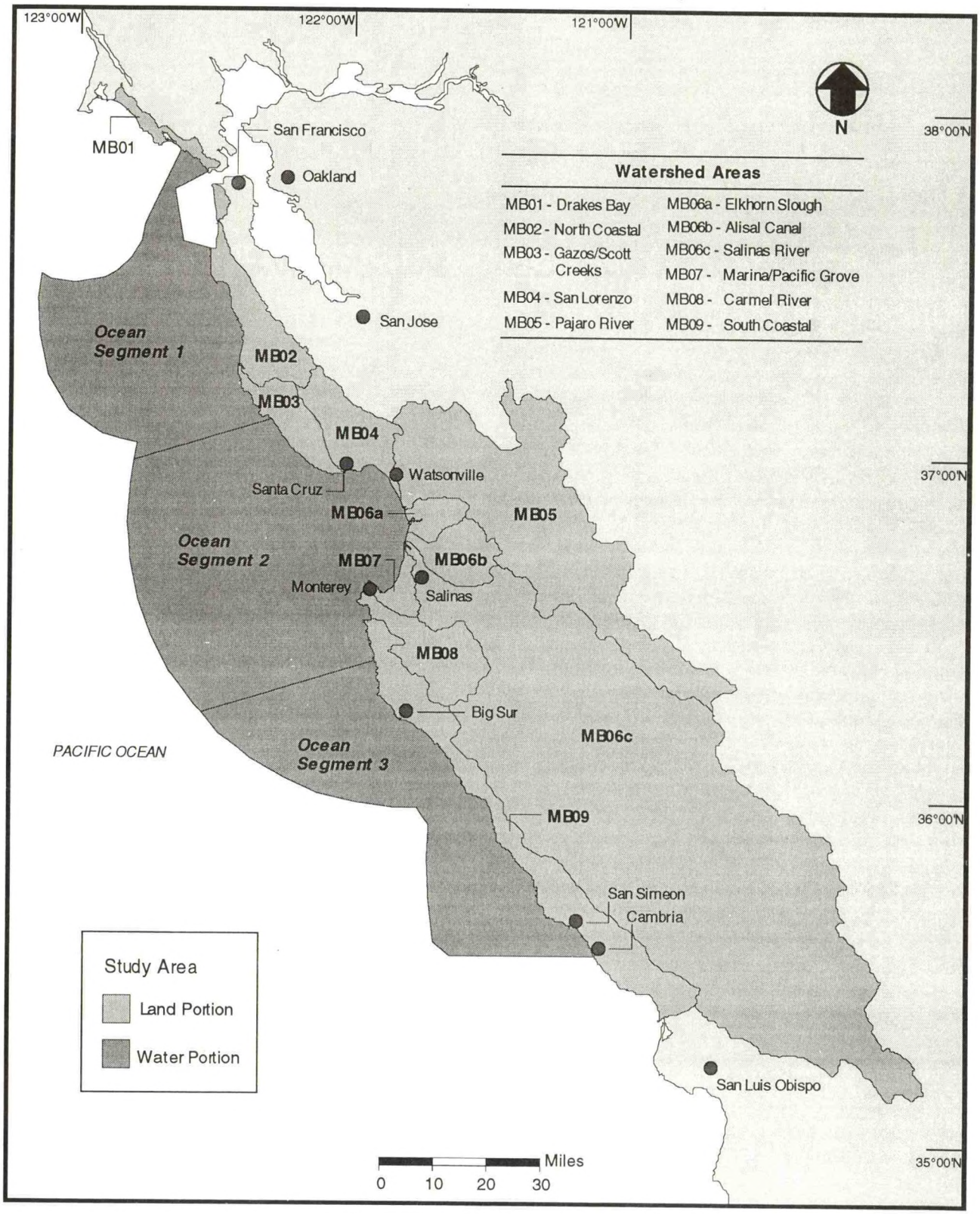
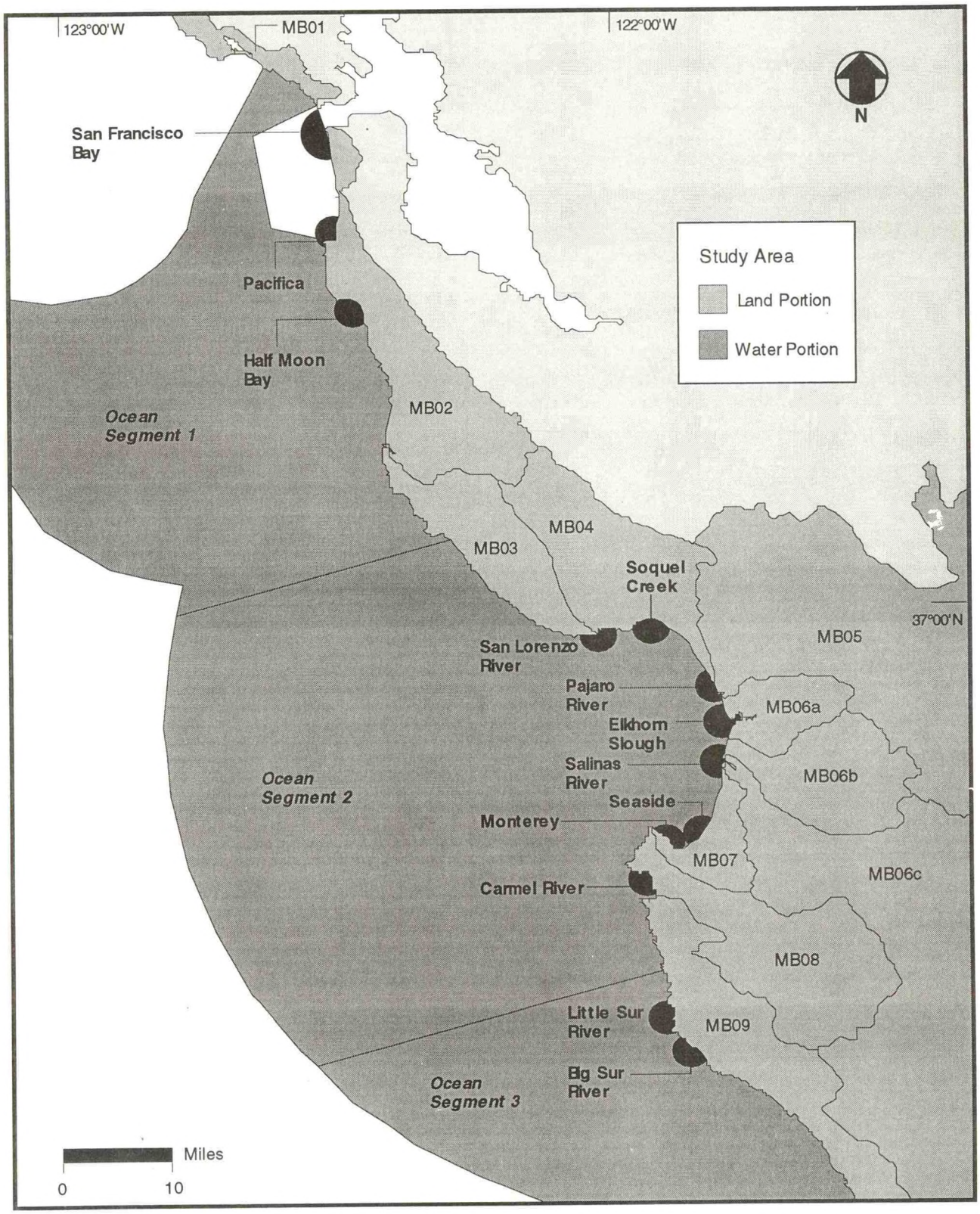


Figure 3. *Nearshore Focus Areas for Ocean Segments*



Priority Problems

In order to develop a Water Quality Protection Program (WQPP) for the MBNMS, it is important to understand the problems occurring in the Sanctuary's 11 watershed areas and three ocean segments. The workshop was an initial step necessary to identify potential sources of problems and potential solutions.

This section describes the workshop participants' perceptions of the most significant problems of the watershed areas and ocean segments, how these problems were derived, and the relationships of the problems to marine and terrestrial environments. Eight problems were categorized as "biotic effects" and six were categorized as "hydro-physical effects." Biotic effects cover problems where living organisms are the means of identifying the symptoms. Hydro-physical effects relate to problems evidenced primarily in the physical environment or the water column. The interagency Project Development Team (PDT) responsible for developing the WQPP recognizes that the workshop results are only one of many potential sources of information on the water quality issues that the WQPP must address. Means for refining these problems and identifying new ones are described in the Program Framework document (NOAA et al. 1994).

Priority Problems of Watershed Areas and Ocean Segments

Biotic Effects

- **Wetlands Alteration***
- **Fish Population Decline***
- **Habitat Degradation***
- **Reproductive Impairment***
- **Rare and Endangered Species Impairment**
- **Impairment of Sensitive Biological Areas**
- **Elevated Tissue Levels**
- **Human Health**

Hydro-Physical Effects

- **Sedimentation***
- **Adverse Levels of Toxic Pollutants***
- **Watershed Disturbance***
- **Groundwater Quality**
- **Low Flows**
- **Erosion**

* High priority for greatest number of watershed areas and ocean segments

Identifying Priority Problems

During Part 1 of the January workshop, two types of working groups were established, those addressing the 11 watershed areas and those addressing the three ocean segments. Watershed area work groups focused primarily on activities occurring in upstream, wetland, and inland areas down to the high tide line. Ocean segment work groups focused on estuarine and marine waters. There was, however, some overlap among the groups. In some cases, ocean segment groups identified problems occurring in the land-based watersheds that drained into their segment. In some of the land-based watershed area groups, participants identified problems that were of an estuarine or nearshore nature. Working groups considered all of the problems identified in the State of California's Water Quality Data System (State of California 1993) before the workshop, and added some of their own.

Each working group identified problems applicable to their individual watersheds or ocean segments and ranked each problem as "high," "medium," or "low" based on their respective impacts on Sanctuary resources. Since there was no standardized definition for "high," "medium," and "low," definitions varied among groups. The groups then compiled a list of the 10 highest-priority problems that were matched with associated activities (e.g., urban area runoff). A summary list of problems was developed by combining those considered high priority from each working group. From this list, NOAA's SEA Division combined some of the related problems (e.g., the habitat degradation problem represents a combination of fisheries degradation and wildlife degradation) and reclassified all problems considered to be sources (e.g., urban runoff, nonpoint agricultural runoff). Several members of the PDT reviewed this problem list and appropriate revisions were incorporated.

Table 1 summarizes the problems associated with each watershed or ocean segment as identified by workshop participants. A ranking of "high," "medium" or "low" indicates the priority or importance of specific problems. This table shows the variation among watershed areas and ocean segments. Table 2 shows prioritized problems for source waterbodies or tributaries of the individual ocean segments. Some variation among the different spatial units may be the result of the biases of the groups who worked on them, or the result of different interpretations as to what constituted a high-priority problem. Those problems not ranked on the templates by the work

Figure 4. *Number of High-priority Problems by Watershed Area and Ocean Segment*

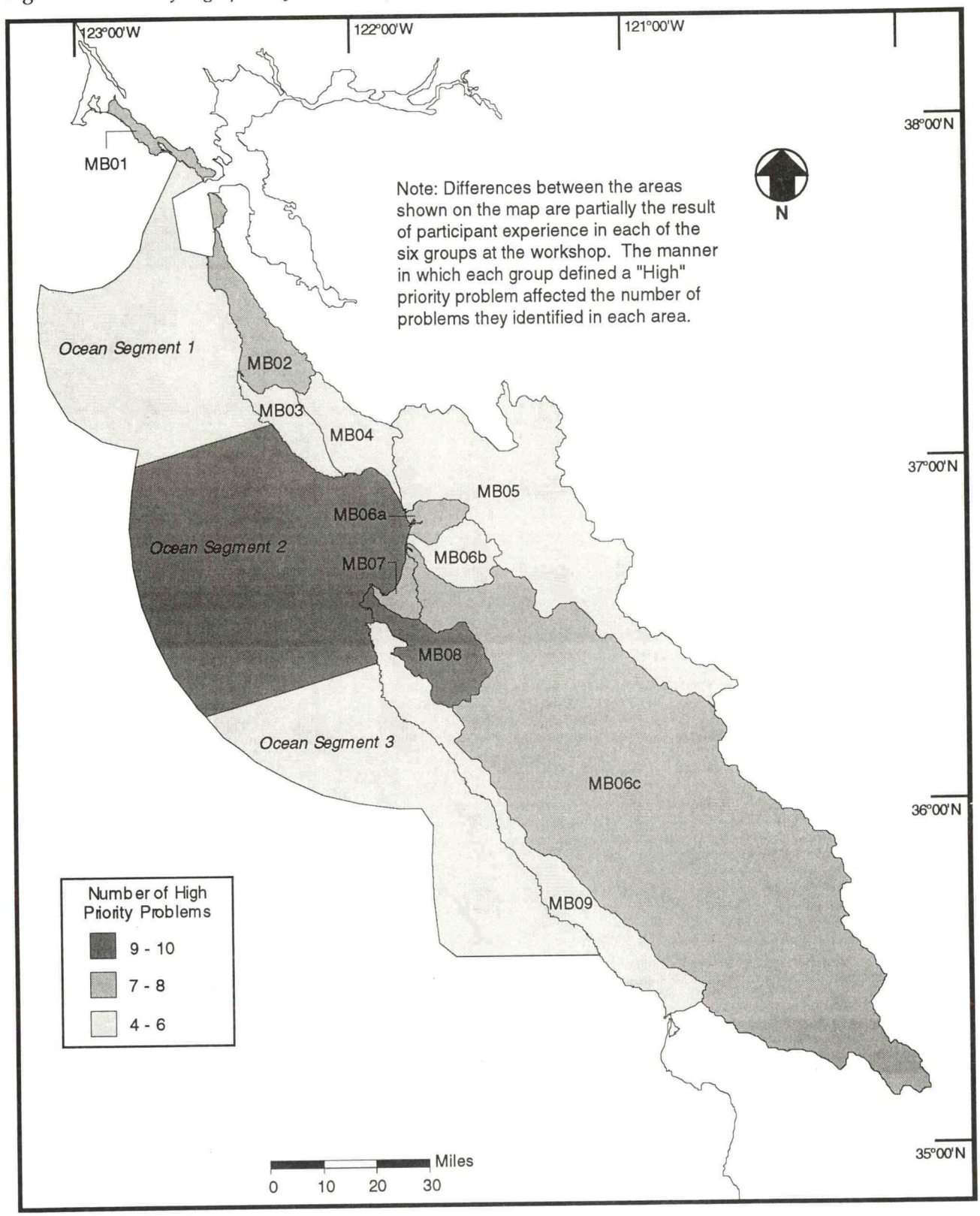


Table 1. *Spatial Distribution of Problems in Watershed Areas and Ocean Segments*

Problems	Watershed Areas: MB01 - Drakes Bay	MB02 - North Coastal	MB03 - Gazos/Scott Creeks	MB04 - San Lorenzo River	MB05 - Pajaro River	MB06a - Elkhorn Slough	MB06b - Alisal Canal	MB06c - Salinas River	MB07 - Marina/Pacific Grove	MB08 - Carmel River	MB09 - South Coastal	Ocean Segments: Ocean Segment 1	Ocean Segment 2	Ocean Segment 3	Number of "High" Areas/Segments
Biotic Effects															
Wetlands Alteration	●	●	●	●	●	●	●	●	●	●		●	●		12
Fish Population Decline	●	●	●	●	●	●	●	●		●		●	●	●	12
Habitat Degradation	●	●	●	●	●	●	●	●	●	●			●	○	11
Reproductive Impairment	●	●	●	●	●	○	○	○		●			●		7
Rare and Endangered Species Impairment	●	●	●	○	○	◉		◉			◉	●	○	●	5
Impairment of Sensitive Biological Areas	●	●							●	●	●	○	◉	√	5
Elevated Tissue Levels	○	○	○	◉	◉	◉	◉	◉	○	○			●	●	2
Human Health													√		0
Hydro-physical Effects															
Sedimentation	●	●	●	●	●	●	●	●	●	◉	●	◉	◉	●	11
Adverse Levels of Toxic Pollutants		◉		●	●	●	●	●	●	●		●	●		9
Watershed Disturbance				√	√	●	●	●	●	●	●	○	●		7
Groundwater Quality		○		◉	◉	○	○	○	●	●	●		●		4
Low Flows		○		◉	◉			●		●			●	●	4
Erosion						●							●		2

Priority Level: ● - High ◉ - Medium ○ - Low √ - Identified but not ranked

groups but considered a priority problem are identified with a check mark (√).

The number of high-priority problems by watershed area and ocean segment is shown in Figure 4. The map indicates that participants generally felt that problems were more of a concern in the area centered around and draining into Monterey Bay. Ocean Segment 2 and Watershed Area MB08 (Carmel River) had the greatest number of high-priority problems as determined by the group members. The large number of high-priority problems identified for Ocean Segment 2 resulted from the group's recognition of the relationship between land-based sources and problems and water quality concerns within the Sanctuary. Ocean Segments 1 and 3 and Watershed Area MB09 (South Coastal) had the least number of high-priority problems identified by the participants.

Figure 5 portrays maps of the problems in Table 1 to more clearly illustrate their spatial distribution. The problems identified but not ranked at the workshop were prioritized as "medium" for presentation on these maps.

Description of Priority Problems

Table 1 illustrates that across all watershed areas and ocean segments, the most significant problems the groups identified were wetlands alteration, fish population decline, habitat degradation, sedimentation, adverse levels of toxic pollutants, reproductive impairment, and watershed disturbance. These problems were the focus of discussions in at least half of the watershed area and ocean segment working groups; the remaining high-priority problems in this table were important to two or more watershed areas or ocean segments. The following describes each high-priority problem within each category.

Biotic Effects

Wetlands Alteration. Wetlands alteration refers to the disruption or alteration of vegetation and/or sediments within wetland areas and their buffer zones. Alteration and loss of wetlands have been linked to activities such as construction, agriculture, fill, road cuts, and water diversion. The results often

Table 2. *Spatial Distribution of Problems of Ocean Segment Sources*

Problems	Ocean Segments: Segment 1 — Throughout	San Francisco Bay	Pacifica	Half Moon Bay	Segment 2 — Throughout	San Lorenzo River	Soquel Creek	Pajaro River	Elkhorn Slough	Salinas River	Carmel River	Seaside	Monterey	Segment 3 — Throughout	Little Sur River	Big Sur River
Biotic Effects																
Wetlands Alteration	●					●		●	●	●	●					
Fish Population Decline	●				●	●	●	●	●	●	●			●		
Habitat Degradation					●	●	●	●	●	●	●			○		
Reproductive Impairment						●	●	●	●	●	●	●	●			
Rare and Endangered Species Impairment	●							○		○				●		
Impairment of Sensitive Biological Areas				○									◉	√		√
Elevated Tissue Levels					●			●	●	●			●	●		
Human Health					√											
Hydro-physical Effects																
Sedimentation		◉	◉	◉		◉	◉	◉		◉	◉			●		●
Adverse Levels of Toxic Pollutants	●	●	●		●			●	●	●	●					
Watershed Disturbance	○					●	●	●	●	●	●					
Groundwater Quality								●	●	●	●					
Low Flows						●	●	●	●	●	●			●		
Erosion						●			●			●				

Priority Level: ● - High ◉ - Medium ○ - Low √ - Identified but not ranked

are degradation and loss of habitat, particularly for birds, crabs, and estuarine fish. Wetland areas are used by these species as protective habitat, nurseries, and for migrating, feeding, and reproducing (i.e., spawning, nesting). In certain areas where there has been a history of wetland sedimentation from upland industrial or agricultural activities, there is the potential that toxins may be present in the bottom soils. If these areas are disrupted by road cuts and fills or dredging, there is the potential that toxins could be released into the water column, subsequently affecting aquatic species.

Figure 5a shows that wetlands alteration is a high-priority problem for all of the watershed areas except MB09 (South Coastal), which has infrequent wetland areas. Table 2 shows that wetlands alteration is a high-priority problem throughout Ocean Segment 1 and in waterbody sources of Ocean Segment 2, including San Lorenzo River, Pajaro River, Elkhorn Slough, Salinas River, and Carmel River.

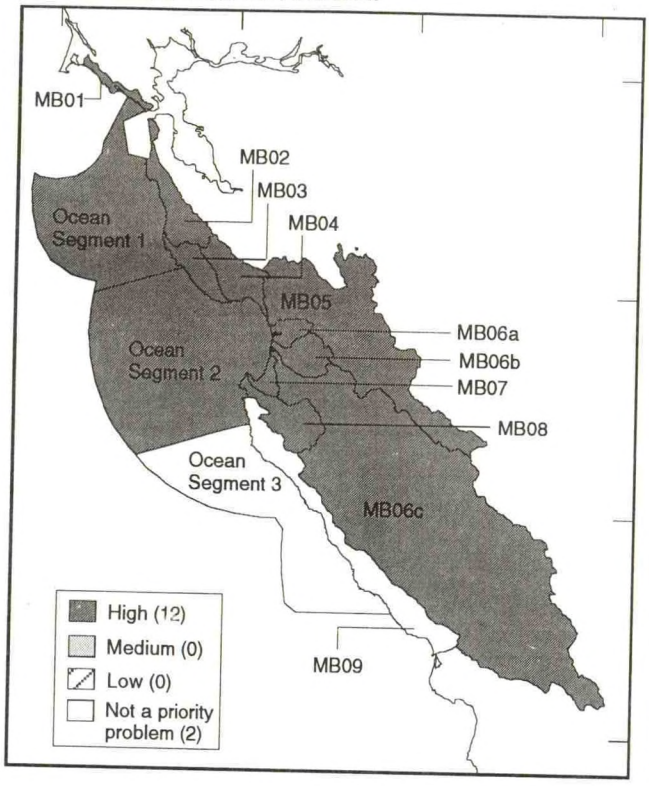
Fish Population Decline. In addition to adverse pollutant levels and habitat degradation, fish population decline has been linked to runoff from construction sites, agricultural lands, boat marinas, water diversions and natural events including drought, flooding and El Nino (periodic warming of the ocean).

Figure 5b shows that fish population decline is a high-priority problem in MB01 (Drakes Bay), MB02 (North Coastal), MB03 (Gazos/Scott Creeks), MB04 (San Lorenzo River), MB05 (Pajaro River), MB06a (Elkhorn Slough), MB06b (Alisal Canal), MB06c (Salinas River), MB08 (Carmel River) and throughout Ocean Segments 1, 2, and 3. Within the ocean segments, Table 2 shows that it is a high-priority problem throughout Ocean Segment 1; throughout Ocean Segment 2, particularly in San Lorenzo River, Soquel Creek, Pajaro River, Elkhorn Slough, Salinas River, and Carmel River; and throughout Ocean Segment 3.

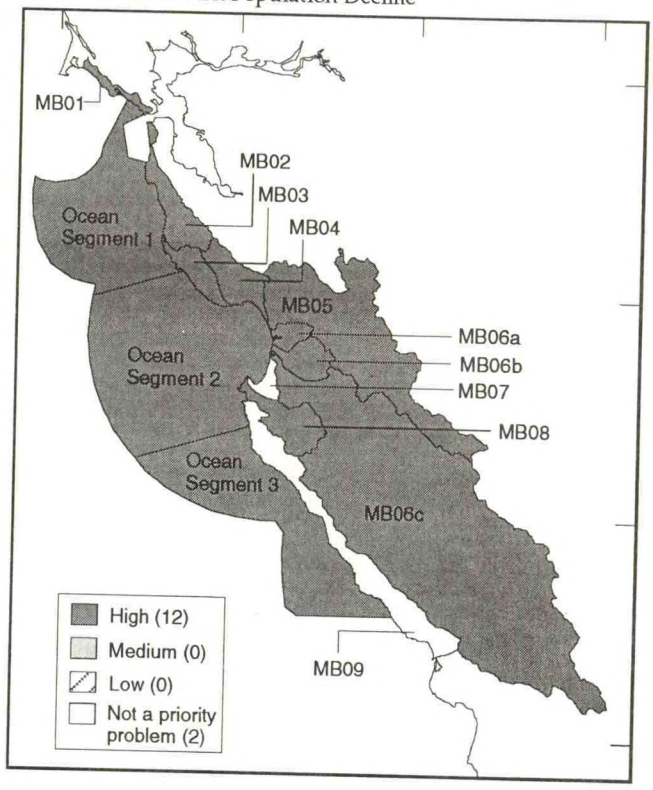
Habitat Degradation. Habitat degradation is often mentioned concurrently with other high-priority problems. Wetland alteration, sedimentation, low flows, toxic pollutants, and erosion are examples of problems contributing to the habitat degradation of various species. Other contributors include agricultural activities, timber harvesting, road cuts, construction runoff, storm drains, water diversions, and overdrafting.

Figure 5 a-n. *Problem Priority Level* in Watershed Areas and Ocean Segments*

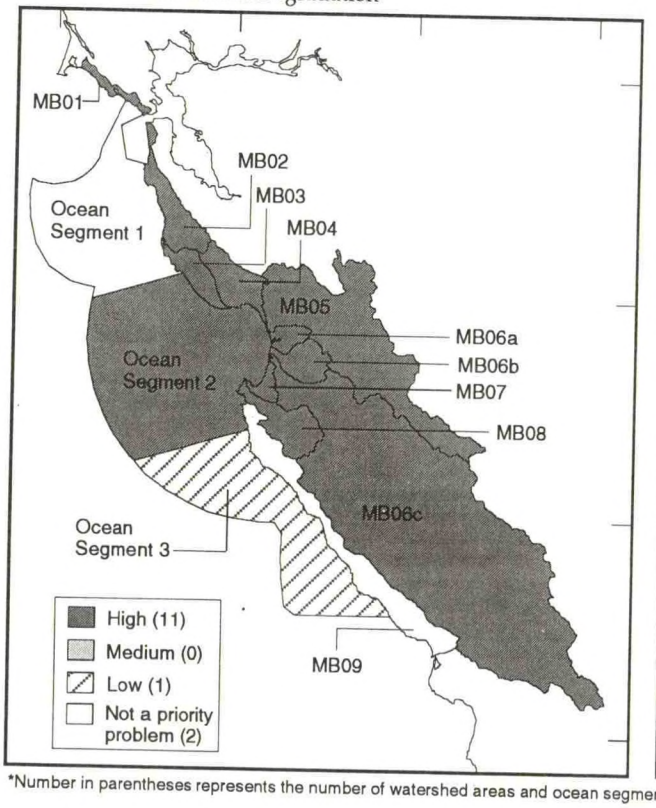
a. Biotic Effects: Wetlands Alteration



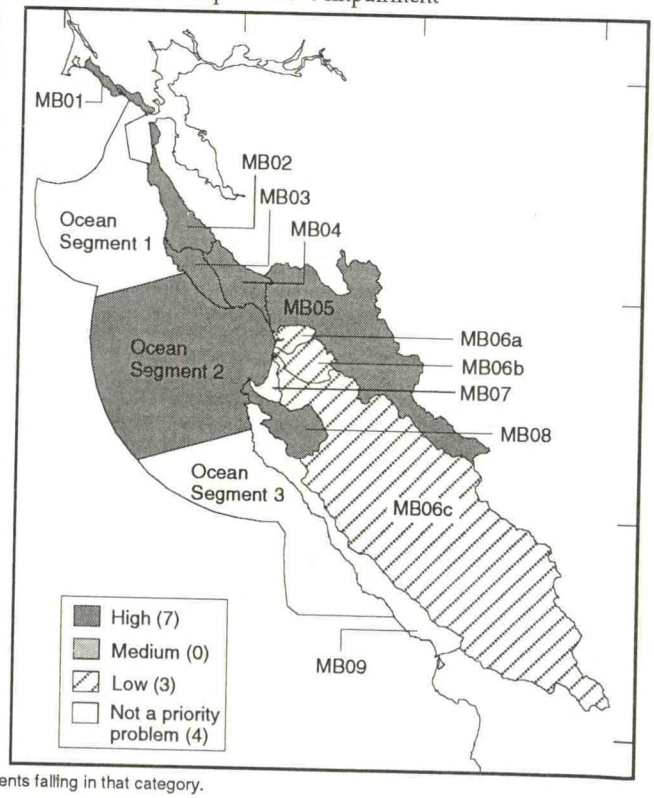
b. Biotic Effects: Fish Population Decline



c. Biotic Effects: Habitat Degradation



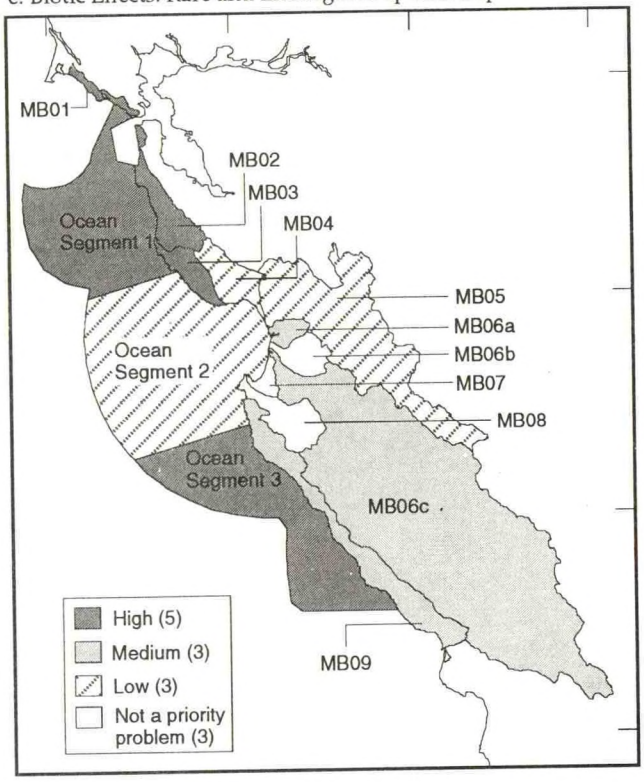
d. Biotic Effects: Reproductive Impairment



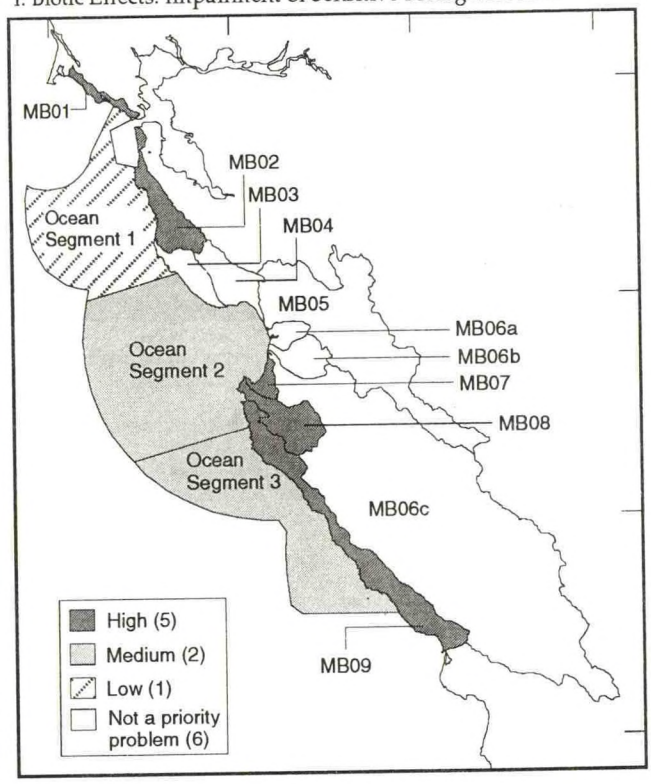
*Number in parentheses represents the number of watershed areas and ocean segments falling in that category.

Figure 5 a-n. *Problem Priority Level* in Watershed Areas and Ocean Segments (cont.)*

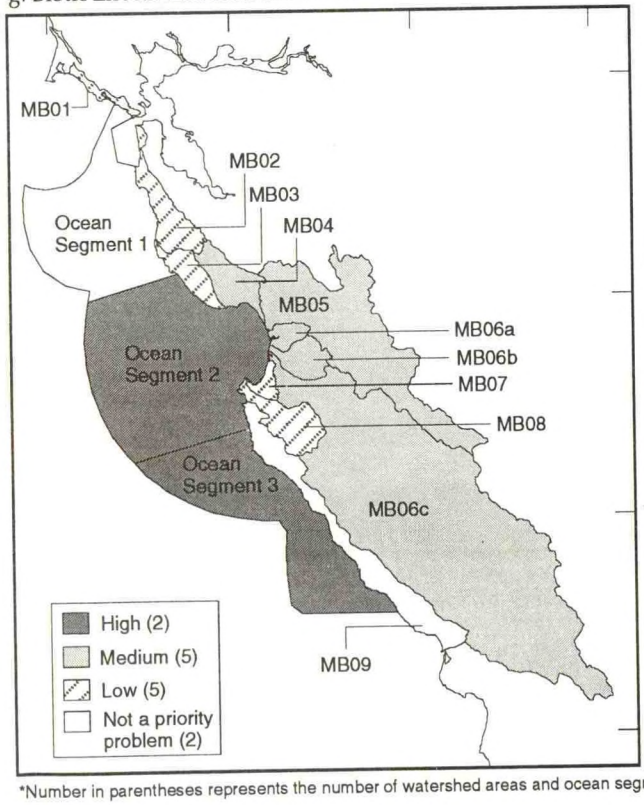
e. Biotic Effects: Rare and Endangered Species Impairment



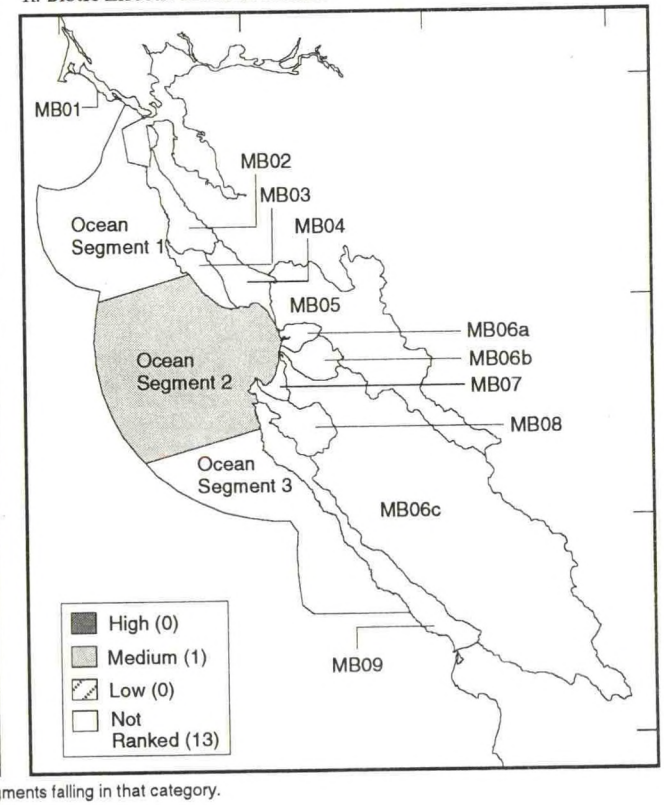
f. Biotic Effects: Impairment of Sensitive Biological Areas



g. Biotic Effects: Elevated Tissue Levels



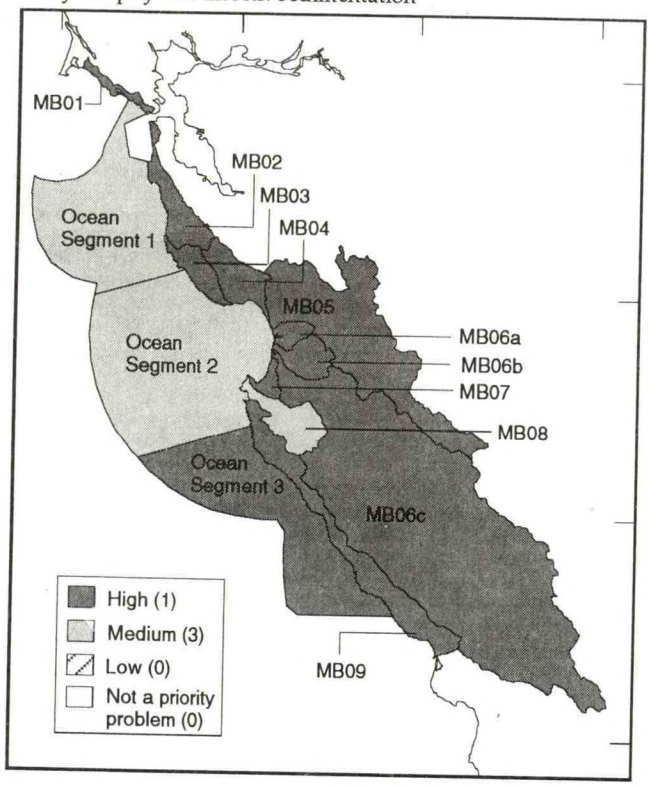
h. Biotic Effects: Human Health



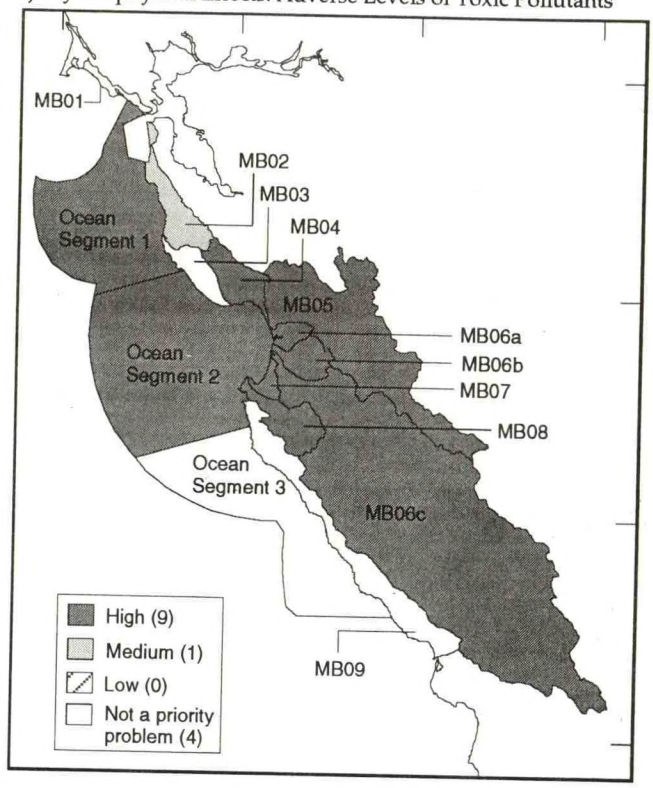
*Number in parentheses represents the number of watershed areas and ocean segments falling in that category.

Figure 5 a-n. *Problem Priority Level* in Watershed Areas and Ocean Segments (cont.)*

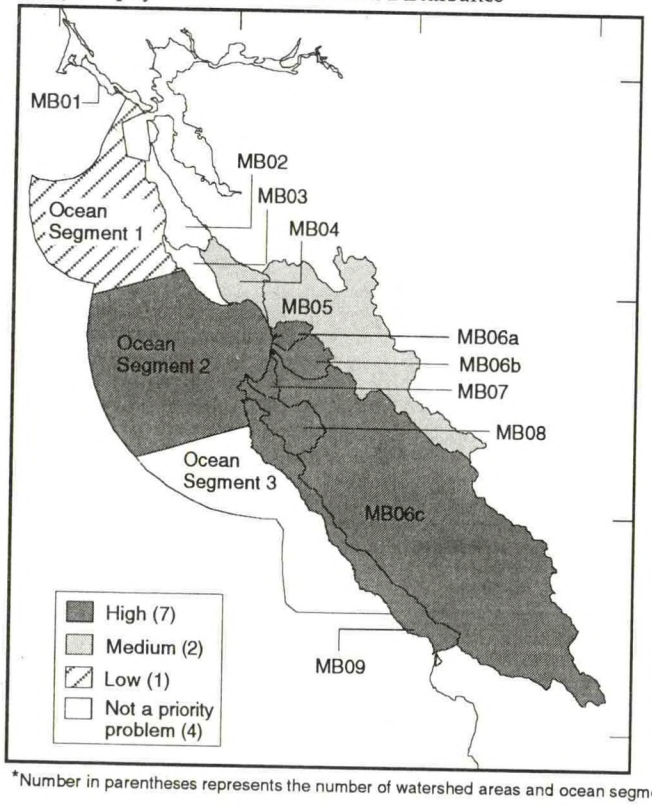
i. Hydro-physical Effects: Sedimentation



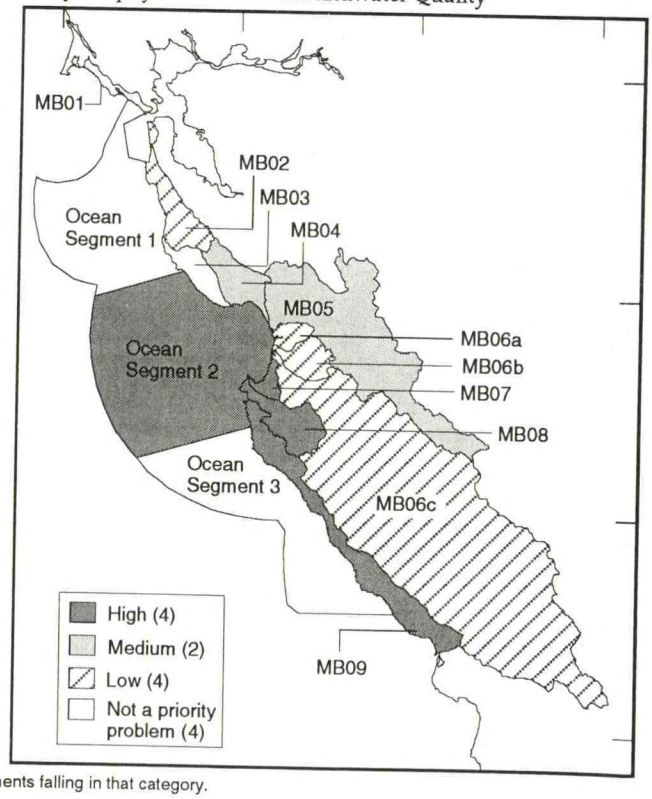
j. Hydro-physical Effects: Adverse Levels of Toxic Pollutants



k. Hydro-physical Effects: Watershed Disturbance



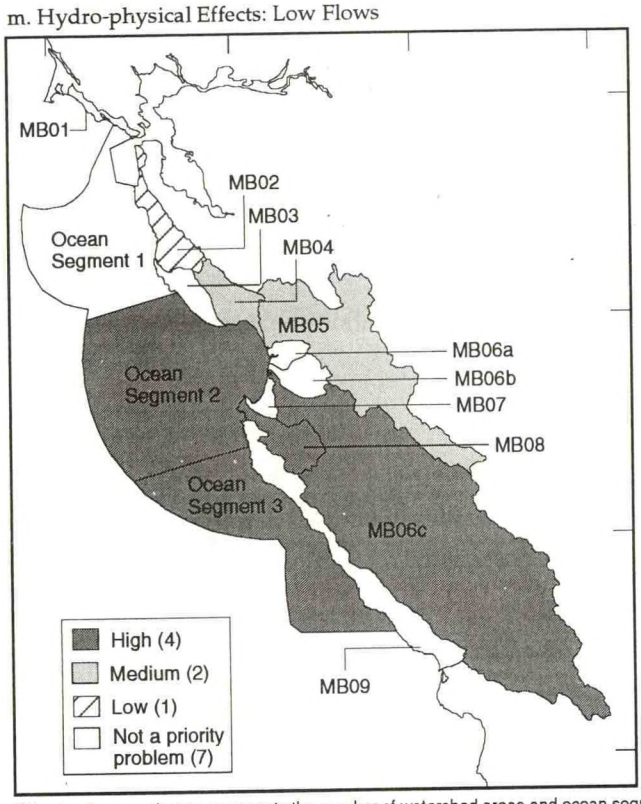
l. Hydro-physical Effects: Groundwater Quality



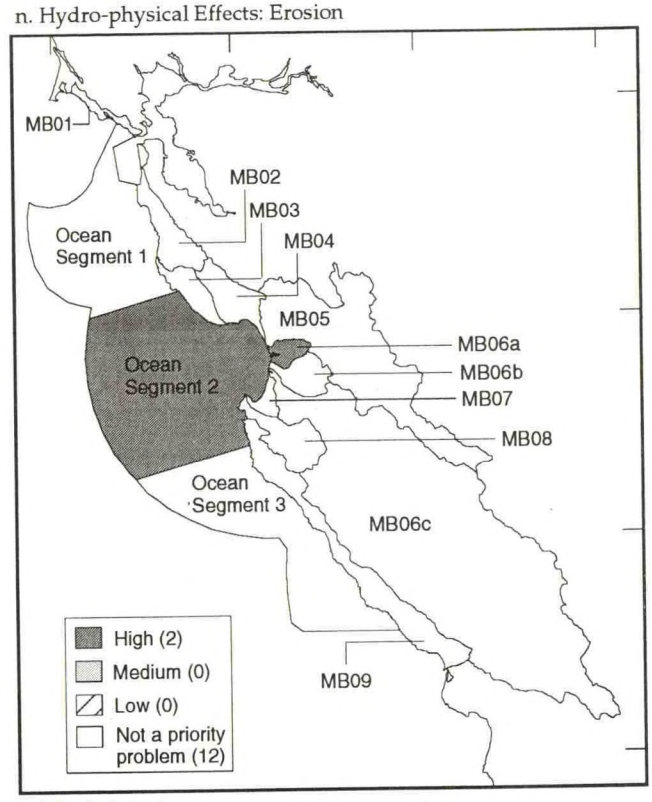
*Number in parentheses represents the number of watershed areas and ocean segments falling in that category.

Figure 5 a-n. *Problem Priority Level* in Watershed Areas and Ocean Segments (cont.)*

m. Hydro-physical Effects: Low Flows



n. Hydro-physical Effects: Erosion



*Number in parentheses represents the number of watershed areas and ocean segments falling in that category.

Figure 5c shows that it is a high-priority problem for MB01 (Drakes Bay), MB02 (North Coastal), MB03 (Gazos/Scott Creeks), MB04 (San Lorenzo River), MB05 (Pajaro River), MB06a (Elkhorn Slough), MB06b (Alisal Canal), MB06c (Salinas River), MB07 (Marina/Pacific Grove), MB08 (Carmel River), and Ocean Segment 2. Table 2 shows that habitat degradation is a high-priority problem throughout Ocean Segment 2, particularly within San Lorenzo River, Soquel Creek, Pajaro River, Elkhorn Slough, Salinas River, and Carmel River.

Reproductive Impairment. Reproductive impairment has been caused by many of the same sources leading to fish population decline. These sources include habitat degradation, adverse pollutant levels, water diversions, droughts, marinas, and agricultural and urban runoff.

Figure 5d shows that reproductive impairment is a high-priority problem in MB01 (Drakes Bay), MB02 (North Coastal), MB03 (Gazos/Scott Creeks), MB04 (San Lorenzo River), MB05 (Pajaro River), and MB08 (Carmel River). Table 2 shows that it is also a high priority in the San Lorenzo River, Soquel Creek, Pajaro River, Elkhorn Slough, Salinas River, Seaside, Monterey and Carmel River portions of Ocean Segment 2.

Rare and Endangered Species Impairment. Several other high-priority problems including wetlands alteration, habitat degradation, and adverse levels of toxic pollutants have been linked to rare and endangered species impairment. Other sources contributing to this problem include agricultural activities, storm drains and road cuts.

Figure 5e shows that rare and endangered species impairment is a high-priority problem in MB01 (Drakes Bay), MB02 (North Coastal), MB03 (Gazos/Scott Creeks) and throughout Ocean Segments 1 and 3 (Table 2). Some of these watershed areas/ocean segments are adjacent to or overlap Areas of Special Biological Significance (ASBS) including the James V. Fitzgerald Marine Reserve, inhabited by diverse and rare invertebrates, and Ano Nuevo Island, which is inhabited by a small breeding colony of threatened Steller sea lions.

Impairment of Sensitive Biological Areas. Impairment of sensitive biological areas is associated with various sources including runoff, storm drains, overdrafting, and road cuts. Like rare and endangered species impairment, it can be caused by other high-priority problems including habitat degradation, sedimentation, and adverse levels of toxic pollutants. This is a high-priority problem primarily

in waters affecting areas of special biological significance (ASBS).

Figure 5f shows that it is a high-priority problem in MB01 (Drakes Bay), MB02 (North Coastal), MB07 (Marina/Pacific Grove), MB08 (Carmel River), and MB09 (South Coastal). These areas collectively contain or are adjacent to the following ASBSs: James V. Fitzgerald Marine Reserve; Pacific Grove Marine Gardens Fish Refuge and Hopkins Marine Life Refuge; Carmel Bay; Point Lobos Ecological Reserve; California Sea Otter Game Reserve; Big Creek MRPA Ecological Reserve; and Julia Pfeiffer Underwater Park.

Elevated Tissue Levels. Elevated levels of organic and inorganic chemicals in fish and shellfish tissues have been associated with toxic pollutants entering marine waters. Potential sources of these pollutants are agricultural activities, marina activities, storm drains, and municipal wastewater outfalls.

Figure 5g shows that elevated tissue levels were a high priority only throughout Ocean Segments 2 and 3. Table 2 shows that in Ocean Segment 2, it is a particularly high priority in the Pajaro River, Elkhorn Slough and Salinas River.

Human Health. Human health focuses on the effects of certain water contact and seafood consumption on humans. Sources affecting water and seafood quality (and ultimately human health) include municipal wastewater outfalls, storm drains, sewage disposal/septic systems, and toxic spills.

Table 2 and Figure 5h show that human health is a priority problem throughout Ocean Segment 2, but was not ranked since it was discussed after the initial templates were completed.

Hydro-physical Effects

Sedimentation. Sedimentation refers to the physical movement and deposition of sediment to receiving waters, including wetlands, rivers, sloughs, and ocean waters of the Sanctuary. Sedimentation occurs when soils are washed from dirt roads, agricultural fields, areas of cleared timber, and construction sites, usually as a result of rainstorms. This process can degrade aquatic habitats by causing turbidity. Also, depending on the nature of the soils, the process provides a mechanism for releasing toxins into the receiving waters.

Sediment sampling within tributaries of the Sanctuary has identified the presence of toxins such as DDT, chlordane, and toxaphene in silt and sand. These substances have been linked to reproductive failures (i.e., thin shells) in endangered birds (e.g., peregrine falcon) and other species.

Figure 5i shows that sedimentation is considered a high-priority problem for all watershed areas except MB08 (Carmel River), where it is a medium priority. For the ocean segments, Table 2 shows that sedimentation is considered a high priority throughout Ocean Segment 3, particularly in Big Sur River.

Adverse Levels of Toxic Pollutants. Heavy metals, pesticides, herbicides, nutrients, petroleum hydrocarbons, and coliform bacteria from sources such as agriculture, municipal wastewater outfalls, storm drains, golf courses, and marinas can have detrimental effects on the water quality and living marine resources of the Sanctuary. Pollutants discharged into rivers and creeks have the potential to accumulate in fish tissue. In some species it has been demonstrated that the intake of toxins will cause mortalities and population declines.

Figure 5j shows that adverse toxic pollutant levels are considered a high-priority problem for MB04 (San Lorenzo River), MB05 (Pajaro River), MB06a (Elkhorn Slough), MB06b (Alisal Canal), MB06c (Salinas River), MB07 (Marina/Pacific Grove), and MB08 (Carmel River). Table 2 shows that adverse levels of pollutants also are a high priority throughout Ocean Segment 1, particularly off San Francisco Bay and Pacifica; and throughout Ocean Segment 2, particularly in Pajaro River, Elkhorn Slough, Salinas River, and Carmel River.

Watershed Disturbance. Watershed disturbance was generally treated by the work groups as a broad problem, overlapping many others. From this perspective, various land-based activities (e.g., construction runoff, agricultural activities, road cuts) directly disturb the watersheds that drain to Sanctuary waters. Hydromodification activities on land can affect the salinity dynamics at river mouths or alter the rates of freshwater input to lagoons and estuaries. This can cause degradation of watershed habitat and other detrimental effects to various species within these habitats.

Figure 5k shows that this problem is considered a high priority for MB06a (Elkhorn Slough), MB06b (Alisal Canal), MB06c (Salinas River), MB07 (Marina/Pacific Grove), MB08 (Carmel River), MB09 (South Coastal); and in Ocean Segments 2. Table 2 shows that it is a particular problem for the San Lorenzo River, Soquel Creek, Pajaro River, Elkhorn

Slough, Salinas River, and Carmel River portions of Ocean Segment 2.

Groundwater Quality. When addressing groundwater quality as a problem, most of the work groups focused on seawater intrusion caused by overdrafts to aquifers in the region. Other sources that may potentially affect groundwater quality include agricultural lands, golf courses, construction sites, dams, and water diversions.

Figure 5l illustrates that groundwater quality is considered a high-priority problem in MB07 (Marina/Pacific Grove), MB08 (Carmel River), and MB09 (South Coastal), and in portions of Ocean Segment 2. It is a high-priority problem primarily in the Pajaro River, Elkhorn Slough, Salinas River, and Carmel River areas of Ocean Segment 2. While seawater intrusion is a problem, most groups determined that it is not a priority threat to the Sanctuary and its resources.

Low Flows. Workshop participants felt that low water flows were related primarily to overdrafting, agricultural activities, construction runoff, dams, and water diversions. Figure 5m shows that low flows are a high-priority problem in MB06c (Salinas River), MB08 (Carmel River); and in Ocean Segments 2 and 3. Table 2 shows that it is a high-priority problem in San Lorenzo River, Soquel Creek, Pajaro River, Elkhorn Slough, Salinas River, and Carmel River of Ocean Segment 2; and throughout Ocean Segment 3.

Erosion. When considering erosion as a problem, work groups referred to coastal erosion or tidal scour rather than soil erosion. Figure 5n shows that this is a high-priority problem in MB06a (Elkhorn Slough) and in Ocean Segment 2, particularly in San Lorenzo River, Elkhorn Slough, and Seaside (Table 2).

Concluding Remarks

Distinct connections exist between the activities or problems occurring in the watershed or terrestrial areas and the problems occurring in the ocean segments and marine waters. Work groups that focused on watersheds considered sedimentation, wetlands alteration and habitat degradation to be the highest-priority problems (Table 1). Ocean segment work groups considered fish population decline, reproductive impairment, and adverse levels of toxic pollutants to be the most significant problems (Table 2). As previously mentioned, sedimentation, wetlands alteration, and habitat degradation within watershed areas can be linked to fish population decline, reproductive impairment, and inputs of toxic pollutants in ocean segments. The connections between these problems point to the need for a systematic approach to identify corrective actions. However, direct linkages are not well documented. Random and isolated management actions will not achieve the goals of this program. This program will largely focus on building the knowledge to better understand these relationships.

This workshop represents the first attempt to determine the highest-priority problems in each watershed area and ocean segment. These problems will be reviewed during focus work group sessions by representatives of various agencies (federal, state, local) and organizations, and appropriate revisions will be incorporated. The following section describes the relationships between the problems and the sources and activities that contribute to these problems.

Sources and Activities of Concern

Because of the problem-driven approach being used to develop the Water Quality Protection Program (WQPP), it was necessary to identify the relationships between problems, their sources, and the pollutants of concern before the workshop participants could develop detailed strategies. Sanctuary water quality is potentially at risk of degradation from various activities and sources in the 11 watersheds and three ocean segments that form the study area for the WQPP. These sources/activities are grouped as point sources, nonpoint sources, and water management sources. Table 3 lists the pollution sources currently under consideration as being potential contributors to water quality problems of the Sanctuary. This list will evolve as further refinement takes place in the "focus groups", which will address the problems, sources, and strategies (NOAA et al. 1994).

How the List of Sources was Developed

Since most strategies will focus on a particular source or a subset of sources, it was necessary to have a preliminary list of potential sources at the workshop to consider when examining the problems. This preliminary list was based on information in the State Water Resources Control Board's water quality assessment data base (State of California 1993). At the workshop, participants were asked to 1) identify relevant sources and activities of concern in each of the watersheds and ocean segments assigned to their group and 2) identify the high-priority problems associated with these sources. This work was conducted in the same groups that identified and assigned priorities to problems. Participants added sources to the list during the workshop and some reorganization of the list took place after the session. The connections between sources and problems are shown in Table 4.

One of the objectives of the WQPP's Project Development Team is to connect the work conducted under CZARA (Section 6217, the Coastal Nonpoint Source Pollution Control Program of the Coastal Zone Management Act) with the results of this workshop and with the nonpoint pollution sources of the WQPP. To make the connections more clearly understood, the nonpoint sources listed in this document are organized to reflect the series of management measures contained in Section 6217 documents (U.S. EPA 1993). Results from the State of California's process to address Section 6217 requirements will be adapted to the WQPP as they become available.

Point Sources

Point sources, those sources discharging to receiving waters at a specific location, were not identified as a cause of water quality problems in as many watersheds as were nonpoint sources. Figure 6a shows the distribution of point source concerns of each watershed area and ocean segment as determined by the

Table 3. *List of Potential Sources of Water Quality Pollution in Study Area*

Point Sources

Hazardous/Toxic Waste Spills

Industrial
Ocean Disposal Sites
Hazardous Material Sites
Industrial/Commercial Dischargers
Mining Activities
Underground Storage Tanks

Municipal
Wastewater Disposal
Land Fills

Vessels
Boatyards/Boat Repair & Maintenance
Marinas
Dredging
Vessel Discharges

Nonpoint Sources

Abandoned Mines

Agriculture
Agricultural Wastewater
Return Flows
Grazing/Livestock Operations
Pesticide/Fertilizer Application
Agricultural Soil Management (Tilling, Plowing, etc.)
Timber Harvesting

Urban
Grading
Golf Courses
Storm Drains
Road Cuts
Construction Runoff
Sewage Disposal/Septic

Water Management

Dams
Diversion of Water
Overdrafting
Bulkheads/ Revetments

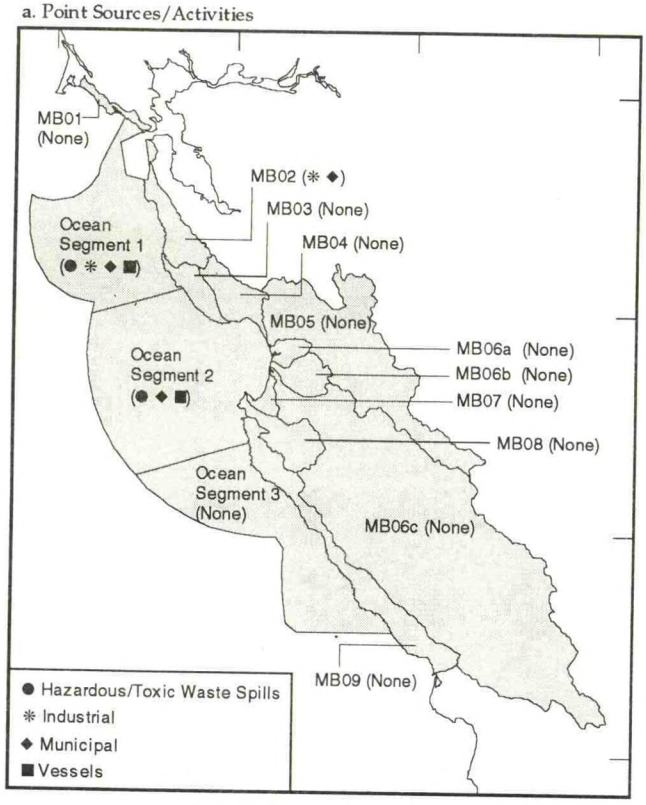
Table 4. *Number of Watersheds and Ocean Segments Relating Sources and Activities to Problems*

Sources/Activities	Biotic Effects								Hydro-physical Effects					
	Wetlands Alteration	Fish Population Decline	Habitat Degradation	Reproductive Impairment	Rare and Endangered Species Impairment	Impairment of Sensitive Biological Areas	Elevated Tissue Levels	Human Health	Sedimentation	Adverse Levels of Toxic Pollutants	Watershed Disturbance	Groundwater Quality	Low Flows	Erosion
Point Sources														
Hazardous/Toxic Waste Spills	○	○	○	○	○		○	○		○				
Industrial														
Ocean Disposal Sites		○	○		○		○			○				
HAZMAT Sites										○				
Industrial/Commercial Dischargers									○					
Mining Activities														
Underground Storage Tanks														
Municipal														
Wastewater Disposal		○	○		○		○	○		◉				
Landfills	○			○					○					
Vessels														
Boatyards/Boat Repair & Maintenance														
Marinas			○		○		○			◉				
Dredging			○		○		○			○				
Vessel Discharges		○	○	○	○		○			○				
Nonpoint Sources														
Abandoned Mines														
Agriculture														
Agricultural Wastewater														
Return Flows	○	◉	◉	◉	○			○		○				
Grazing/Livestock Operations	●	●	●	◉	◉		○	○	◉	○	◉	◉	◉	
Pesticide/Fertilizer Application	◉	◉	◉	◉	○		○			◉				
Agricultural Soil Management	●	●	●	◉	◉		○		◉	◉	◉	◉	●	
Timber Harvesting	◉	◉	●	◉	○				◉					
Urban														
Grading	○	○	○	○	○				○	○				
Golf Courses	○	○	○	○						○		◉		
Storm Sewers	◉	◉	◉	◉	◉	○	○	○	◉	●	○		○	
Road Cuts	●	●	●	●	◉	○			◉		◉			
Construction Runoff	●	●	●	●	○				●	◉	●	◉	●	
Sewage Disposal/Septic		◉	○	◉				○		○				
Water Management														
Dams	○	○	○	○							◉	◉	◉	
Diversion of Water	●	●	◉	◉	○						◉	◉	◉	
Overdrafting	●	●	◉	●	○	○					◉	◉	●	
Bulkheads/Revetments		○	○											○

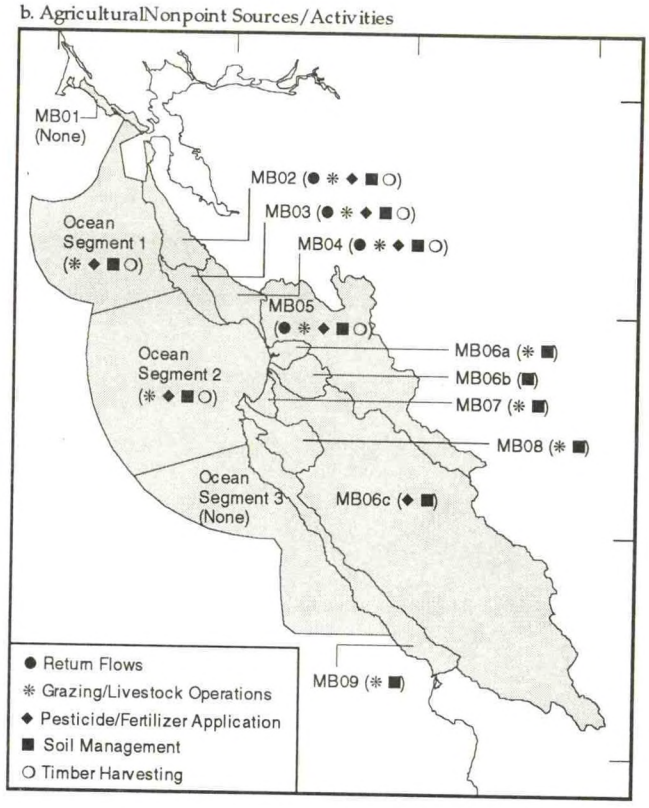
Number of watershed areas or ocean segments: ● - 6 or more ◉ - 3 to 5 ○ - 1 or 2

Figure 6. *Sources and Activities of Concern by Watershed Area and Ocean Segment Identified as Being a Moderate or Greater Threat to Water Quality*

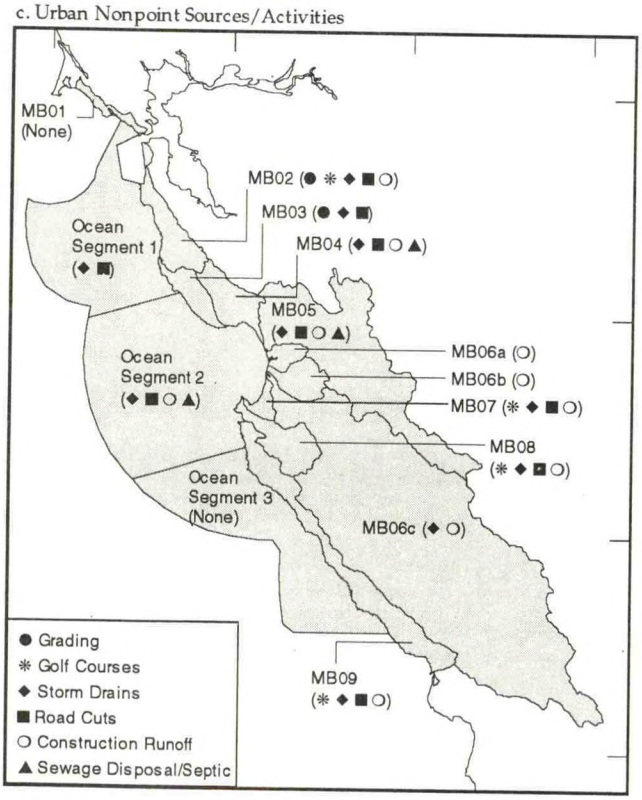
a. Point Sources/Activities



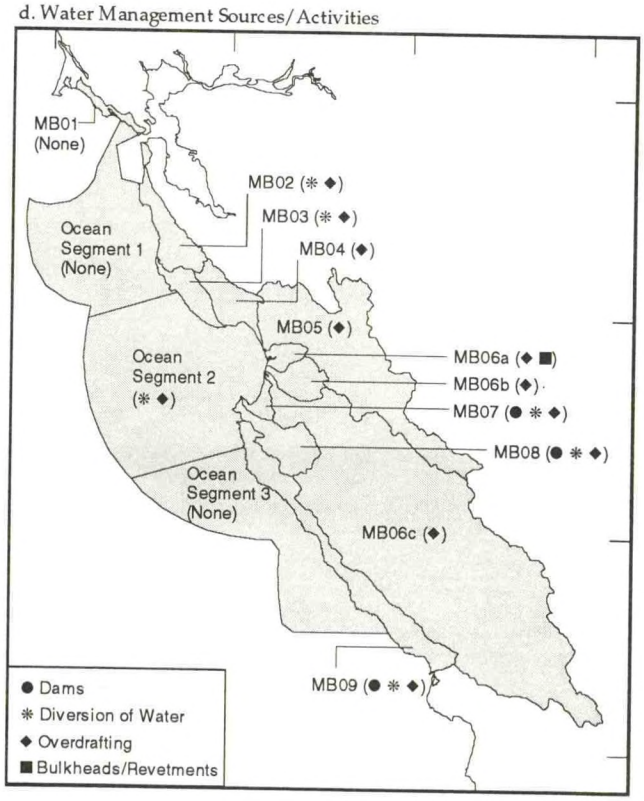
b. AgriculturalNonpoint Sources/Activities



c. Urban Nonpoint Sources/Activities



d. Water Management Sources/Activities



work groups. The sources and activities identified represent those deemed by the work groups to be at least of moderate concern with respect to one of the high priority water quality problems.

Point sources were seen as a significant concern in only one of the watershed areas, MB02-North Coastal. This is because the largest point sources discharge directly to coastal or estuarine waters and were, therefore, identified by the ocean segment work groups. As shown in Figure 6a, point sources were cited as a potential cause of environmental degradation in Ocean Segments 1 and 2. Ocean Segment 1 had the greatest variety of point sources listed as concerns. Municipal wastewater disposal sites, oil spills from vessels, industrial ocean disposal sites, marinas, and dredging were all cited as affecting not only the mouth of San Francisco Bay, Pacifica, and Half Moon Bay, but throughout Ocean Segment 1. These point sources were identified as being related to habitat degradation, elevated tissue levels, rare and endangered species impairment, and adverse levels of toxic pollutants. Three types of point sources were identified for Ocean Segment 2: municipal wastewater disposal, oil spills, and vessel discharges.

Based on 1991 data, there were only 12 major and 70 minor permitted point source dischargers in the drainage area of the Sanctuary (NOAA 1994). These sources are estimated to discharge more than 550 billion gallons of wastewater per year. The point sources that the participants related to the greatest number of problems included municipal wastewater disposal, vessel discharges, and spills of hazardous or toxic material from vessels and other sources.

Municipal wastewater treatment facilities treat wastewater from domestic, commercial, and industrial sources. The larger facilities discharge between five and six billion gallons of effluent per year. Pollutants contained in effluent vary but some of the constituents include oil and grease, heavy metals, and organic chemicals. Pollution indicators including biochemical oxygen demand (BOD), total suspended solids (TSS), and fecal coliform bacteria are also found in these discharges. Fecal coliform bacteria discharges are especially a concern in areas where there is human contact with water or shellfish harvesting.

Toxic and/or hazardous materials spills are primarily a source of concern because of the potential for a catastrophic accident in or adjacent to Sanctuary waters. A preliminary analysis of oil spills indicates that spills occur most frequently in Ocean Segment 2, followed by Ocean Segments 1 and 3, respectively (NOAA 1994). The volume of oil spilled was greatest in Ocean Segment 1, followed by Ocean Segments 2 and 3, respectively.

Nonpoint Sources

Workshop participants cited unregulated nonpoint sources as a greater and more.widespread threat to water quality than point sources. Nonpoint sources, except for abandoned mines, are grouped as either agricultural or urban. Both agricultural and urban sources were cited as affecting water quality in watersheds and ocean segments. Effects were noted by the workshop participants everywhere except in one of the watersheds (MB01) and in Ocean Segment 3.

Agricultural runoff, stemming from grazing/livestock operations and agricultural practices (i.e., poor soil management), was seen as the most significant pollutant source. It affects a number of watersheds, and was identified as affecting water quality throughout Ocean Segment 1 and in the open water portions of Ocean Segment 2 (Figure 6b). Grazing/livestock operations were specifically cited as a cause of habitat degradation, fish population decline, wetlands alteration, watershed disturbance, and increases in sedimentation, among other effects.

Although construction runoff was viewed as directly threatening only a limited portion of the ocean segments (part of Ocean Segment 2), it is perceived as a major threat to the ecological health of Sanctuary watershed areas. Workshop participants felt that all but two of the watershed areas (MB01-Drakes Bay and MB03-Gazos/Scott Creeks) were affected by construction runoff (Figure 6c). The most commonly cited effects of construction runoff were fish population decline, spawning impairment, wetlands alteration, low flows, watershed disturbance, and an increase in sedimentation.

Water Management

While water supply and consumption activities may not be traditionally classified as pollution sources, workshop participants felt that they led to biotic and hydro-physical effects and other environmental disturbances. Overdrafting, the practice of withdrawing groundwater at a rate exceeding natural recharge, was cited by most groups as causing

habitat destruction, fish population decline, spawning impairment, wetlands alteration, and low flows (Figure 6d).

The diversion of water from its natural courses was related to habitat degradation, fish population declines, spawning impairment, wetlands alteration and low flows, among other effects. These effects were most strongly noted in MB02 (North Coastal), MB03 (Gazos/Scott Creeks), MB07 (Marina/Pacific Grove), MB08 (Carmel River), MB09 (South Coastal), and in the open water portion of Ocean Segment 2.

Relating Sources and Activities to Priority Problems

Table 4 shows how each source was related to the priority problems identified by the participants. The entries in the table represent the number of watershed or ocean areas with either a large or moderate contribution from the sources listed. Sources that the work groups felt had low or minimal contributions to the problems were not counted in this summary.

Table 4 indicates that the workshop participants viewed unregulated nonpoint sources as the greatest concern. Agricultural and urban runoff can carry a wide range of pollutants and occur throughout the region. Participants felt that existing and potential future water quality problems should be addressed by carefully considering how to control all forms of runoff. The single most important point source category under existing conditions was municipal wastewater discharge. Some groups, however, felt that the potential damage from a major oil spill was a concern equal to any other expressed at the session.

Table 4 also indicates that some of the potential sources do not appear to be of significant concern with respect to Sanctuary water quality. Abandoned mines, mining activities, underground storage tanks, and agricultural wastewater were not identified as sources of moderate or high concern for the priority problems by any of the work groups. In the case of the mining sources, this apparent lack of concern may be the result of those activities taking place well upstream of the Sanctuary. Concerns with agricultural wastewater may have been addressed by citing all of the other agricultural sources shown in Table 4.

Concluding Remarks

The sources included in this section were useful in organizing material for the workshop and have helped to summarize its results. These sources are the focus of the strategies that follow in Appendix C.

As work continues to define the problems in focus groups and through additional contributions from the Project Development Team, the role of each source will be better understood. This understanding will allow more thoughtful consideration of how to develop strategies that can most effectively correct these problems. The list of sources of greatest concern will be modified as consensus is reached by the PDT on the focus for the WQPP. The following section describes how pollutants fit into the discussion of problems and sources.

Pollutants of Concern

The Water Quality Protection Program must identify pollutants that may contribute to the degradation of water quality, and determine sources and activities that directly or indirectly affect Sanctuary waters. Understanding the connection between problems, pollutants, and contributing sources and activities is important for developing meaningful management actions to improve or protect water quality. This part of the workshop was the first step in establishing these connections.

This section of the document provides the raw material to begin to systematically evaluate how well existing pollutant standards and objectives address water quality problems affecting the Sanctuary. This evaluation also complements the SWRCB's development and review of water quality standards in accordance with Section 303(c)(1) of the Federal Clean Water Act and Section 13170.2(b) of the California Water Code. Work will be conducted to determine if existing standards adequately address the range of water quality problems facing Sanctuary waters. In addition, this process will provide a basis for improving compliance with existing standards or modifying those standards as necessary.

Identifying and Connecting Significant Pollutants to Sources and Activities

During the workshop, the watershed area and ocean segment work groups were asked to list pollutants that might be associated with problems they had identified. To accomplish this, participants were provided with a list of pollutants regulated by standards and objectives set by the State of California. They also were instructed to add other pollutants and classes of pollutants that may affect water quality, but are not included in existing standards. Participants discussed each pollutant in relation to the problems they had identified and narrowed the list to those that were most relevant.

Next, each work group was provided with a list of sources and activities known to generate pollutants capable of causing water quality problems. This list was extracted from the SWRCB Water Quality Data System. For each pollutant, the work group determined the relative contribution (high, moderate, low, or minimal) from each source or activity. For example, if a group determined that channel dredging was prevalent in their watershed area or ocean segment of concern, they would rate its potential for contributing the pollutants they had identified. While provided with similar instructions, the groups may have assigned moderate and high classifications differently since it was not possible to define a common set of criteria to be used by all the groups in the time provided.

The following summarizes the results for Watershed Areas MB06a - MB09 and all three ocean segments. Work groups for Watershed Areas MB01- MB05 were unable to complete this information because of time constraints.

Results

The information generated by the work groups was summarized and combined into Table 5. This contains all sources and activities across watershed areas and ocean segments that contribute moderate to high amounts of the pollutants listed.

There was some overlap among the pollutants listed. This occurs in three particular cases. Some work groups addressed pesticides as a class of pollutants, while others rated individual pesticides such as DDT, diazinon, dieldrin, and endosulfan. Also, some work groups examined heavy metals, while others examined individual metals such as lead, copper, and zinc. The same type of specification occurred within the petroleum hydrocarbons category. The table shows both the individual pollutants and classes of pollutants used by the individual work groups.

Sources and activities listed in Table 5 that are not followed by data on pollutants fall into four categories: 1) those that rated low or minimal for all pollutants (i.e., mining activities and return flows); 2) those added by the PDT after the workshop (i.e., boatyards/boat repair and maintenance); 3) those addressed as problems at the workshop but were later determined to be sources or activities that generate problems (e.g., agricultural wastewater); and 4) those connected to problems in Watershed Areas MB01- MB05 (grading and landfills). With the exception of those that rated minimal or low, these sources and activities will be addressed at future work sessions.

This information provides an overview of the connections between sources and activities in the Monterey Bay region and pollutants that may be associated with water quality problems. It provides two valuable pieces of information: 1) the pollutants

Table 5. *Number of Watersheds and Ocean Segments Relating Sources and Activities to Pollutants**

Sources/Activities	Pollutants: Heavy Metals: Copper	Heavy Metals: Tributyltin	Heavy Metals: Zinc	Heavy Metals: Non-specific	Pesticides: Diazonon	Pesticides: DDT	Pesticides: Dieldrin	Pesticides: Endosulfan	Pesticides: Non-specific	Petroleum Hydrocarbon: Oil and Grease	Petroleum Hydrocarbon: PAH	Petroleum Hydrocarbon: Non-specific	Other: Nutrients	Other: FCB	Other: Pathogens	Other: Solids	Other: Suspended Sediments	Other: PCBs	Other: VOC	Other: Non-specific Chemicals	Other: Radioactivity
Point Sources																					
Hazardous/Toxic Waste Spills												○									
Industrial																					
Ocean Disposal Sites	○		○																		
HAZMAT Sites				○																	○
Industrial/Commercial Dischargers				○						○										○	
Mining Activities																					
Underground Storage Tanks												○							○		
Municipal																					
Wastewater Disposal	○		○	●	○				○	◉	○		●	○	◉			○		○	
Land Fills																					
Vessels																					
Boatyards/Boat Repair & Maintenance																					
Marinas	○	◉	○	◉						○	●	○	○	●	○			○	○	○	
Dredging		●		○		●	◉	◉		○	○		○				○	●			
Vessel Discharges	○		○									○			○	○					
Non-point Sources																					
Abandoned Mines				○													○				
Agriculture																					
Agricultural Wastewater																					
Return Flows																					
Grazing/Livestock Operations	○				○								○	●	○		○				
Pesticide/Fertilizer Application								◉	○											○	
Agricultural Soil Management						◉	◉	◉	○			○	○				○				
Timber Harvesting																					
Urban																					
Grading																					
Golf Courses									○				○								
Storm Sewers	○		○	●	○				○	◉	●	○	○	●	◉	○	○	●		○	
Road Cuts				○			◉	◉									●				
Construction Runoff				◉		◉	◉	◉		◉	○		○	○		○	◉	○			
Sewage Disposal/Septic													◉		○						
Water Management																					
Dams																	○				
Diversion of Water																	○				
Overdrafting																					
Bulkheads/Revetments						◉	◉	◉									◉				

Number of watershed areas or ocean segments: ● 4 or more ◉ 3 ○ 1 or 2

Abbreviations: PAH, polycyclic aromatic hydrocarbons; DDT, dichloro diphenyl trichloroethane; FCB, fecal coliform bacteria; PCBs, polychlorinated biphenyls; VOC, volatile organic compound.

*Numbers only include groups that considered the relationship between the pollutants and sources to be moderate or high.

generated by the greatest number of sources and activities; and 2) the sources and activities identified as generating the greatest number of individual pollutants. According to the work groups that completed the exercise, municipal wastewater disposal, marinas, dredging, and agricultural and urban nonpoint sources were identified as contributing the broadest range of pollutants.

Significant Pollutants

Significant Pollutants

Pollutants	Number of Activities
Suspended Sediment	10
Nutrients	9
Heavy Metals (non-specific)	9

Suspended Sediments. Of the pollutants listed, suspended sediments had the greatest number of contributing sources and activities. Watershed Areas MB07- MB09 and Ocean Segment 2 work groups identified road cuts, construction runoff, and bulkheads/revetments as capable of generating high-to-moderate levels of suspended sediments that might pose water quality problems. In MB09 and Ocean Segment 2, timber harvesting, croplands, and grazing/livestock operations were identified as important sources of suspended sediments. Sediment inputs to Sanctuary waters occur during heavy rains, especially if erosion control measures (e.g., sediment basins, grass swales, buffers) are not present or are improperly installed.

Sediments, particularly fine-grained, clay particles, can remain in suspension and reduce the amount of sunlight available to support submerged vegetation, especially in bays and estuaries. Sediments also can bury benthic habitats and organisms. Several work groups associated high levels of suspended sediment with altering wetlands and affecting spawning habitat for many fish species. The release of toxic pollutants that may be adsorbed in sediments was cited as a potential threat to aquatic life.

Nutrients. High to moderate levels of nitrogen and phosphorus were associated with nine different sources and activities. High nutrient levels associated with wastewater disposal and on-site disposal systems (OSDS) are of particular concern. Golf courses also were identified as being a potentially significant source of nutrient loading in Watershed Areas MB07 and MB08. Soils in these areas are thin and nonporous, and allow nutrients to directly enter the Sanctuary through rapid runoff of surface water. Nutrients from golf courses in the coastal areas of MB08 may currently affect the Carmel Bay Area of Special Biological Significance. Other sources, such as storm drains and marinas, were noted as contributing nutrients to Sanctuary waters.

Nutrients can upset the ecological balance of an area and cause numerous problems. They are of primary concern in enclosed bays and estuaries exhibiting low flushing rates. Nutrients may induce excess plant and algae growth, which lowers dissolved oxygen levels, reducing available oxygen for native fish and plants.

Heavy Metals. Watershed Areas MB07-MB09 and all three Ocean Segment work groups identified storm drains, wastewater disposal, marinas, and construction runoff as contributing heavy metals to the marine environment. Other important sources and activities include: hazardous material disposal sites, dredging and dredge material disposal, and road cuts. In MB09, abandoned mines also were identified as contributors of heavy metals.

Resource managers are concerned with heavy metals because of their potential for contributing to population decline in marine species. Heavy metals can persist in the marine environment and concentrate in shellfish tissues. This process of bioaccumulation may interfere with their reproduction and lead to population declines.

Significant Sources

Significant Sources

Sources and Activities	Number of Pollutants
Storm Sewers	15
Marinas	13
Agricultural Activities	12
Wastewater Disposal	12
Construction Runoff	11
Dredging	10

Storm Sewers. Storm sewers were identified as contributing the greatest variety of pollutants to Sanctuary waters in all watershed areas and ocean segments. Pollutants of concern discharged by storm drains include oil and grease, polycyclic aromatic

hydrocarbons (PAH), fecal coliform bacteria (FCB), polychlorinated biphenyls (PCB), various heavy metals, and pathogens. Storm sewers also contribute nutrients, solid waste, suspended sediments, and other pollutants to Sanctuary waters. Storm sewers are often used as dumping grounds for liquid wastes that should be disposed of via other means.

During periods of rain, pollutants associated with urban activities (i.e., landscaping and commercial and industrial activities) are collected in storm sewers and discharged into Sanctuary waters. This may affect nearshore environments adjacent to surrounding urban centers. Some materials also may be transported great distances with ocean currents.

Marinas. Marina-related activities can contribute various pollutants to the Sanctuary, and were considered an important source in Watershed Areas MB06a, MB07, MB09, and all three ocean segments. Marina activities such as waste disposal (pump-outs), refueling operations, boat maintenance and painting, and live-aboards are of particular importance. Tributyltins, PAH, FCB, and heavy metals are the primary pollutants of concern. Nutrients, oil and grease, and petroleum hydrocarbons also are generated by marina activities at levels that might degrade water quality.

Marinas and harbors located within enclosed embayments do not receive the full benefit of direct tidal action and flushing. Therefore, pollutants are likely to concentrate in these areas. Species coming into contact with these pollutants may suffer high mortality and low reproduction rates, leading to population decline. The PDT subsequently added the Boatyards/Boat Repair and Maintenance category as a separate source because they contribute a set of pollutants that are not necessarily connected to marinas without such facilities.

Agricultural Activities. Agricultural activities considered important by the work groups include grazing/livestock operations, pesticide/fertilizer application, and agricultural soil management. Contributions of fecal coliform bacteria from grazing/livestock operations was cited in the most watershed areas compared to the other activities. At least one of the activities was cited as a significant contributor of pollutants in all of the watershed areas and ocean segments except MBO 1 and Ocean Segment 3.

Wastewater Disposal. Wastewater disposal was linked with high-to-moderate levels of nutrients, oil and grease, heavy metals, and pathogens in Watershed Areas MB07-MB09 and all three ocean segments. Other pollutants of concern include PAH, PCB, other man-made chemicals, and FCB.

Wastewater disposal problems are usually site-specific. The increased nutrient levels surrounding wastewater disposal outfalls may attract various organisms and expose them to potentially harmful levels of other pollutants.

Construction Runoff. Runoff from construction activities was associated with high to moderate levels of suspended sediments, oil and grease, and heavy metals in Watershed Areas MB07-MB09 and in Ocean Segment 2. It also was associated with the release of potentially harmful levels of banned pesticides (DDT, dieldrin) and legal pesticides (endosulfan) where agricultural areas are undergoing development (primarily in Watershed Areas MB06a-MB06c). Improperly controlled construction activities also can add to the solid waste stream by contributing wood, paper, plastics, metals, and other debris.

Construction runoff has the potential to cause sedimentation in bays and estuaries and alter wetland habitats. It may also contain pollutants harmful to marine organisms.

Dredging. Dredging and the disposal of dredged materials were identified as contributing high to moderate levels of tributyltins, DDT, dieldrin, endosulfan, and PCB in Watershed Areas MB06a-MB06c, MB07, and in Ocean Segments 1 and 3. Participants also associated dredging activities with the release of potentially harmful amounts of nutrients, PAH, suspended sediments, and heavy metals into the water column.

The release of toxic substances from dredging may be associated with adverse impacts to marine organisms including bioaccumulation and population decline. Dredging and the disposal of dredged materials (e.g. burial) also can physically alter benthic habitats.

Additional Sources and Activities. Other sources and activities considered important by the work groups include road cuts and bulkheads/revetments. Suspended sediments and pesticides are the pollutants of concern for these activities in three or more watershed areas or ocean segments.

Concluding Remarks

The process to develop the Water Quality Protection Program will require a more detailed assessment of the information generated through this part of the workshop. However, this was the first step in correlating pollutants to potential sources and activities that could be targeted for remedial action. Some of the questions remaining to be answered include:

- Are water quality pollutant standards and objectives being met?
- If standards are not being met, would meeting them help resolve most water quality problems?
- If current pollutant standards and objectives are being met but problems still exist, what new standards or objectives are necessary?
- Should standards be set for other pollutants?
- Are the beneficial use designations adequate?
- Should existing antidegradation policies be strengthened?

Addressing these questions in coordination with existing state efforts to evaluate and revise standards is critical for developing integrated management actions to reduce pollutant levels. This work will be a significant part of the process to develop the Water Quality Protection Program.

Strategy Development

Management strategies are the suite of potential "actions" or "physical measures" that were proposed by participants at the workshop. These measures set out a conceptual course to address water quality problems and detail the conditions that must be met for successful implementation. The strategies presented in this document are the "raw materials" that will be assessed and refined in future work sessions. As part of this refinement some strategies may be found to be infeasible, while others may be replaced by more effective approaches. Others may simply be described more completely.

This section is divided into four subsections that address strategy development in detail: Workshop; Post Workshop; Strategies and Problems; and Concluding Remarks.

Figure 7. *Strategy Development Template*

Monterey Bay National Marine Sanctuary
Water Quality Strategy Description Sheet

Strategy # / Name

Description

Strategy Type
- ☐ Educational
- ☐ Regulatory
- ☐ Administrative
- ☐ Economic
- ☐ Research

Pollutant Standards/Objectives to Meet

Program the Strategy is Associated with

Geographic Area
- ☐ MB01
- ☐ MB02
- ☐ MB03
- ☐ MB04
- ☐ MB05
- ☐ MB06a
- ☐ MB06b
- ☐ MB06c
- ☐ MB07
- ☐ MB08
- ☐ MB09
- ☐ Ocean Segment 1
- ☐ Ocean Segment 2
- ☐ Ocean Segment 3

Subarea/Segment

Targeted Use(r) & Cost to User

How Administered

Administrative Costs and Financing

Implementation Schedule

Prerequisites for Implementation

Workshop

Strategy Development. In Part II of the workshop, participants were divided into six category groups based on sources and activities that are likely to contribute to water quality problems: Agriculture, Hydromodification, Marinas/Water-based Activities, Nonpoint Sources, Point Sources, and Urban Land Use. Using the priority problems developed in Part I of the workshop, each group was asked to develop a list of strategies that applied to its category. Each strategy was assigned to an individual or small group to develop a complete description. Participants were provided with a template (Figure 7) to record the information.

The strategy description template was designed to allow participants to fully outline their ideas and to stimulate their thinking on the types of information necessary to implement the action. A well developed strategy should include the elements described below.

- *Type* is a characterization of the major activities undertaken in the strategy (Table 6, next page). Some strategies use two or more types to carry out their objectives.
- *Description* captures the thrust of what the strategy is supposed to do and how it is to be accomplished.
- *Pollutant Standards/Objectives to Meet* describes the present standards for the pollutants or activities that must be met to resolve the problem. New standards may also be identified if they are necessary to meet the goals of the strategy.
- *Associated Programs* identifies existing programs and the agencies that administer/address the problem pollutants, and/or activities in the strategy.
- *Geographic area* describes the spatial distribution for actions described by the strategy.
- *Targeted use(r) and cost to user* describes "who pays." Many strategies target specific types of activities detrimental to the goals of the Sanctuary. While costs cannot be estimated in many cases, the type of cost (e.g., time, money) should be noted.
- *How administered* describes the institutional component of the strategy, identifying which

public and/or private groups should be part of implementing the strategy.

- *Administrative costs and financing* builds on the previous element. It attempts to quantify expenditures and identify funding to implement the strategy.

- *Prerequisites for implementation* are the components that must be in place before a strategy can be put into effect. Prerequisites may include research, education, financing, public or legislative approval, or other needs.

Table 6. *Types of Strategies*

Type	Description
Management Coordination	Apply within public and private institutions.
Research	Direct study toward areas where knowledge is incomplete.
Regulatory	Implement and monitor requirements through laws, regulations, ordinances, or permits. Specify: 1) a measure; 2) a result or performance; 3) limitation on location of activity; 4) extent, timing, and type of activity; 5) procedure; 6) self monitoring and reporting; 7) enforcement.
Education	Inform public of alternative activities/methods that would reduce effects on Sanctuary.
Economic	Use market-based approaches to achieve results.

Incomplete strategy descriptions were assigned to participants for further refinement after the workshop. Participants also were given the opportunity to submit additional strategies following the workshop.

The work session resulted in 151 proposed strategies as raw materials for the Water Quality Protection Program Plan. Table 7 shows the distribution of the original strategies across categories. Agricultural and Marinas/Water-based strategies accounted for more than half of those developed at the workshop.

Post Workshop

Refining Strategies

The first step in refining the 151 original strategies was to combine those that were similar. Redundancy was anticipated because of similarities among category groups. For example, nonpoint source strategies to control urban runoff effects on Sanctuary waters were similar to strategies developed in the urban work group. Also, while participants were asked to remain focused on the subject for their work group, they were not prohibited from proposing strategies outside that category.

From this refinement process, 91 *combined* strategies, derived from two or more original strategies, have been identified. All the necessary information from the source strategies is retained in each new strategy. Table 7 shows the number of strategies in each of the original category groups and the resulting number of strategies after the combinations were made.

The table also shows how the strategies were reorganized to be more consistent with the Coastal Zone Act Reauthorization Amendments (CZARA) Section 6217(g) classification. Originally, nonpoint source pollution, agriculture, urban, marinas/water-based, and hydromodification were individual categories. To reflect the CZARA Section 6217 classification, the relevant original categories and two new categories (Forestry, Wetland/Riparian) were added and reorganized as subgroups of nonpoint source pollution. Strategies in the "General" group are those that are programmatic in nature, i.e., they address a

Table 7. *Summary of Original and Current Strategies*

Category	Original	Current
Point Source Pollution*	20	15
Nonpoint Source Pollution*	21	NA
Agricultural *	38	16
Forestry	NA	1
Wetlands/Riparian	NA	6
Urban *	11	13
Marinas/water-based*	44	5
Hydromodification*	17	9
General	NA	1
Water Management	NA	6
General	NA	19
Total	151	91

Abbreviations: NA, Not Applicable.
* Original workshop categories.

number of problems and/or activities and sources, or describe large-scale monitoring, management coordination, or research efforts.

Also during the refinement process, the strategy template was reorganized to better reflect the information gathered at the workshop. The changes to the template include:

- adding a problem designation;
- adding relevant agencies to associated programs;
- separating administrative costs and financing into individual items; and
- dropping the implementation schedule.

Figure 8. *Percentage of Strategies by Type*

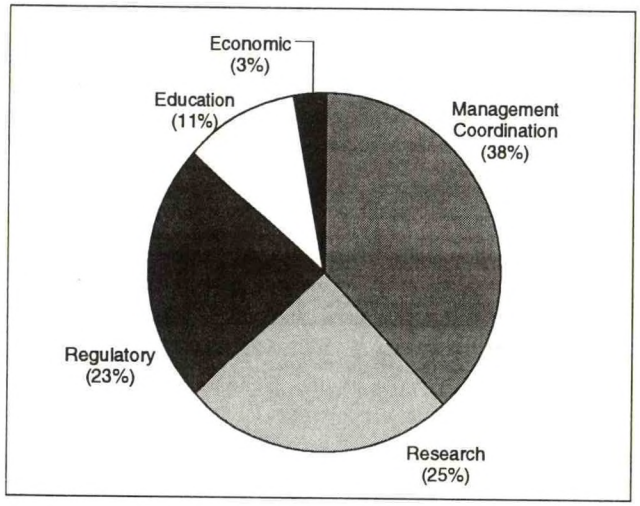


Table 8 (next page) lists the current 91 strategies with an identification number. A full description of each strategy and an identification of its source strategies from the original 151 strategies can be found in Appendix C.

Strategy Summary

The following is a brief summary of the information gathered for each template item.

Strategy Type. Figure 8 shows the breakdown of the current strategies by type. Management Coordination strategies comprised 38% of the total. Research and Regulatory strategies are the next two most common types of strategies, comprising 25 and 23%, respectively. Eleven percent of the strategies are Education strategies, and 3% are Economic strategies.

Pollutant Standards/Objectives to Meet. Information on pollutant standards/objectives is the most incomplete. On some sheets, the present pollutant standards were shown, but new standards reflecting the objectives of the strategy were not given. Pollutant standards and water quality objectives will be addressed in greater detail at future work sessions.

Relevant Agencies/Associated Programs. Relevant agencies had to be added to associated programs to understand the existing agencies and organizational involvement. In the most complete strategies, the agency for each program is listed; however, in many cases only one or the other appears. This information will be refined further.

Geographic Area. Geographic areas on the strategy template were maintained unchanged on the new strategies. Twenty-four of the 91 strategies have been targeted for all watersheds and ocean segments, while 19 strategies identify a subset of watersheds for implementation. Only one (UR-4) of 44 strategies proposed for implementation in ocean segments specifically identifies ocean segments 1 and 2.

Targeted Use(r) and Cost to User. Agricultural activities (23%) and industry (20%) are the top two targeted users. A targeted user was not identified in 21 strategies. Information on the cost to the user in most cases is not complete.

How Administered. The descriptions of how strategies will be administered listed the agencies and/or organizations involved, but did not indicate the level of responsibility by each in most cases.

Administrative Costs. Many of the strategies did not include estimates for administrative costs to implement the strategy. Cost estimates that were included ranged between $0 and hundreds of millions of dollars for a single strategy.

Financing. Many of the strategies did not describe a mechanism for financing the implementation costs.

Implementation Schedule. This item was dropped since implementation timing cannot be assigned until strategy prioritization occurs.

Prerequisites for Implementation. Prerequisites for implementation were described in various levels of detail for almost all of the strategies.

Table 8. *Current Strategies and Identification Numbers*

Point Source Pollution

PS-1 Improve spill response mechanisms
PS-2 Identify and inventory spill sources
PS-3 Reroute shipping traffic
PS-4 Monitor shipping traffic
PS-5 Prohibit new and upgrade existing outfalls
PS-6 Expand pretreatment programs
PS-7 Implement pollutant reduction schemes
PS-8 Ensure enforcement of NPDES permit requirements
PS-9 Require NPDES dischargers to develop spill contingency plans
PS-10 Require NPDES stormwater permits for populations less than 100,000
PS-11 Expand NPDES pretreatment program to include stormwater
PS-12 Develop urban runoff standards
PS-13 Redirect stormwater runoff
PS-14 Improve point source monitoring
PS-15 Develop educational programs on stormwater runoff

Nonpoint Source Pollution

Agricultural

AG-1 Coordinate integrated coastal management (ICM) with regional basin plans
AG-2 Coordinate and improve soil and stormwater management programs
AG-3 Increase funding for soil and water management programs
AG-4 Research and monitor agricultural pesticides
AG-5 Monitor fertilizer use
AG-6 Maintain funding for pesticide enforcement standards
AG-7 Strengthen and enforce county ordinances
AG-8 Investigate best management practices (BMPs)
AG-9 Improve direct communication with the agricultural community
AG-10 Conduct educational workshops for the agricultural community
AG-11 Educate irrigation communities
AG-12 Encourage research and development of pesticide application methods
AG-13 Develop a directory/resource handbook
AG-14 Extend outreach efforts by utilizing various media
AG-15 Improve cost share programs and lease agreements
AG-16 Develop BMP demonstration projects

Forestry

FOR-1 Re-vegetate old timber harvest roads

Wetlands/Riparian

HAB-1 Enhance percolation pond riparian areas
HAB-2 Support and coordinate existing wetland/riparian restoration projects
HAB-3 Identify areas most in need of wetland/riparian restoration
HAB-4 Increase voluntary development of wetland and riparian buffer zones
HAB-5 Develop and implement regulations requiring larger riparian buffer zones
HAB-6 Rezone areas to create new wetlands/riparian habitats

Urban

UR-1 Atmospheric deposition characterization
UR-2 Develop a geographic information system (GIS) as a modeling and monitoring tool
UR-3 Significance of urban runoff as a water quality problem
UR-4 Best management practices (BMP's) for urban runoff problems
UR-5 Sedimentation control through grading regulations
UR-6 Implement a training program for road crews
UR-7 Land use evaluation
UR-8 Landslide debris disposal program
UR-9 Control of wildlife fecal coliform bacteria (FCB)
UR-10 Standardized testing and notification for bacterial contamination
UR-11 Outreach program on impacts of toxic materials
UR-12 Outreach to industries on industrial runoff
UR-13 Sensitive land protection

Marinas/Boating

B-1 Enforce existing regulations on wastewater discharge from boats
B-2 Increase the number of pumpout stations
B-3 Educate users on proper disposal of vessel wastes
B-4 Identify vessels leaking wastewater into the Sanctuary
B-5 Evaluate the impacts of tributyltin on Sanctuary resources

Hydromodification

HY-1 Develop and implement BMPs to reduce sediment loads
HY-2 Reduce the impacts of tidal scour in Elkhorn Slough
HY-3 Construct a sill at the mouth of Elkhorn Slough
HY-4 Increase wetlands at the mouth of the Salinas River
HY-5 Research the impacts of river mouth breakouts
HY-6 Improve flows from large existing reservoirs
HY-7 Revise and remediate present flood control practices

Table 8. *Current Strategies and Identification Numbers (cont.)*

HY-8 Encourage the use of environmentally sensitive flood control techniques
HY-9 Establish regulations requiring the use of gabion baskets where applicable

Nonpoint Source Pollution: General

NPG-1 Determine the applicability and feasibility of 6217 to each watershed

Water Management

WM-1 Golf course water conservation
WM-2 Wastewater reuse
WM-3 Study of water use
WM-4 Water management planning
WM-5 Install water meters on agricultural wells
WM-6 Backflow prevention in water wells

General

GEN-1 Add watershed management and nonpoint source elements to State general plan law
GEN-2 Implement coordinated resource management planning
GEN-3 Programs and policies related to water quality
GEN-4 Scientific research initiative
GEN-5 Scientific research initiative
GEN-6 Coordinate research activities
GEN-7 Coordinate permit review
GEN-8 Ensure evaluation of toxic hot spots
GEN-9 Expand and organize regional monitoring plan
GEN-10 Improve public notification of water quality problems
GEN-11 Determine effects of bioaccumulation
GEN-12 Review and revise water quality standards
GEN-13 Establish an interagency water quality assessment data base
GEN-14 Develop an ecosystem-based monitoring program
GEN-15 Identify and evaluate loading contributions to the Sanctuary
GEN-16 Determine the effects of toxics on marine mammals and birds
GEN-17 Evaluate the effects of mixtures of toxic pollutants
GEN-18 Develop regulations for all unregulated toxic substances
GEN-19 Designate state waters in the Sanctuary an outstanding natural resource

Project Development Team (PDT) Review

The 91 combined strategies and their respective source strategies were distributed to a subcommittee of the PDT for review. The PDT subcommittee further refined and reordered the strategies. The group also edited the source strategies listed at the bottom of each new strategy so that the proper connections were maintained.

Relating Strategies to Problems

Part of the process to refine the strategies included identifying the problem(s) that each strategy addresses based on the priority list of problems developed in Part I of the workshop (Table 9). More than one problem can be addressed by a single strategy. The two top ranking problems are wetland alteration and fish population decline. Wetland alteration is addressed by 10 strategies, while fish population decline is not addressed by any strategies directly. Other high-ranking problems include habitat degradation, sedimentation and adverse levels of toxic pollutants which are addressed by 20 strategies, 18 strategies, and 56 strategies, respectively. Reproductive impairment, another high-ranking problem, is not directly addressed by any strategy. Other

Table 9. *Number of Strategies Addressing Priority Problems*

	Strategy Category											
		Nonpoint Source Pollution										
Problems	Point Source Pollution	Agricultural	Forestry	Wetlands/ Riparian	Urban	Marinas/ Boating	Hydro-modification	General	Water Management	General*	Total
Biotic Effects											
Wetlands Alteration				5	2		1		2		10
Fish Population Decline											
Habitat Degradation	1	5		6	2	1	4		1		20
Reproductive Impairment											
Rare and Endangered Species Impairment					2						2
Impairment of Sensitive Biological Areas					2						2
Elevated Tissue Levels											
Human Health	1				4				3	2	10
Hydro-physical Effects											
Sedimentation		10	1	1	5		1				18
Adverse Levels of Toxic Pollutants	13	13		5	5	5	1	1	3	10	56
Watershed Disturbance					1		5		1	2	9
Groundwater Quality				5			3		3		11
Low Flows		1							4		5
Erosion							2				2

*Five of the 19 General strategies are not tabulated since they did not identify a specific problem.

priority problems, however, that may cause reproductive impairment (e.g., Adverse Levels of Toxic Pollutants) are covered by proposed strategies.

In addition to fish population decline and reproductive impairment, elevated tissue levels in fish and shellfish are not directly addressed by any of the proposed strategies. Rare and endangered species impairment is addressed by one strategy.

Six strategies (UR-2, GEN-3, GEN-4, GEN-5, GEN-6, GEN-19) call for data gathering or management/policy coordination that apply across all watersheds and are not specific to any one priority problem.

Although some problems are not addressed explicitly by strategies, they may benefit from strategies addressing other high-ranking problems. For example, implementation of strategies to reduce adverse levels of toxic pollutants may reduce elevated tissue contaminant levels in fish and shellfish.

Concluding Remarks

If a strategy is to be implemented, it must contain information on cost and financing, administrative involvement, regulatory requirements, staffing and other resource requirements, geographic concentration, and prerequisite activities. This information also will be used to compare and prioritize potential management actions generated over the course of the WQPP process.

The Evolving Program: Priority Needs

The workshop provided a forum for reaching a consensus of opinion among the invited experts on water quality problems that are affecting, or have the potential to affect resources in the Sanctuary. It also provided information on where these problems occur, and sources, activities, and pollutants that may be closely linked to those problems. This information was summarized during and subsequent to the workshop and was used to outline the initial ideas of the experts on potential management actions that may help resolve the problems.

These were the first steps in the process to develop the Water Quality Protection Program (WQPP). Much work remains to be done. Near-term work efforts will include: 1) developing better descriptions of priority problems; 2) refining and prioritizing strategies developed at the workshop; 3) developing a means to assess and utilize existing pollutant standards and water quality objectives through the strategies; 4) connecting CZARA Section 6217 management measures with the strategies; and 5) developing better information on existing programs and policies to help refine strategies.

Long-Term Goals

Once priority problems have been characterized, existing programs and plans have been assessed and refined, and a comprehensive set of strategies has been developed, work will begin to characterize the potential impacts of strategy implementation. This will involve assessing the perceived environmental and socioeconomic impacts. Information will be developed on the costs of implementing the strategies and on the necessary institutional arrangements. This will help in prioritizing the strategies and scheduling their implementation. Work will also be conducted on planning for a continuous management process for implementing, assessing, and revising management actions as needs and problems change. This process requires the integration of programs, policies, and management to fully succeed.

Public Involvement

In addition to the expertise provided by agency staff, this process will require direct participation from the public. Public in this case includes both the citizens that reside in the region, as well as the scientific community and industrial, commercial, and agricultural sectors. From the January workshop through the final program document, and as part of a continuous management process, the public's role is critical to the ultimate success of this program.

The final pages of this document (Appendix D) outline how, in the short run, people can submit ideas for the planners to consider while developing strategies. All working sessions and Project Development Team meetings are open to the public. As the process continues, public input will also be needed to consider the feasibility, institutional arrangements, and implementation of strategies.

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Definition of Acronyms

ACOE ..... U. S. Army Corps of Engineers

AMBAG ..... Association of Monterey Bay Area Governments

ASBS ..... Areas of Special Biological Significance

BMP ..... best management practices

BOD ..... biochemical oxygen demand

CAEPA ..... California Environmental Protection Agency

CCC ..... California Coastal Commission

COG ..... Council of Governments

CWA ..... Clean Water Act

CZARA ..... Coastal Zone Act Reauthorization Amendments

DDT ..... dichloro diphenyl trichloroethane

FCB ..... fecal coliform bacteria

GIS ..... geographic information system

HAZMAT ..... hazardous materials

ICM ..... integrated coastal management

MBNMS ..... Monterey Bay National Marine Sanctuary

MOA ..... Memorandum of Agreement

MRPA ..... Marine Reserve Protection Act

NERR ..... National Estuarine Research Reserve

NOAA ..... National Oceanic and Atmospheric Administration

NMFS ..... National Marine Fisheries Service

NMS ..... National Marine Sanctuary

NPDES ..... National Pollutant Discharge Elimination System

NPS ..... nonpoint source

OCRM ..... Office of Ocean and Coastal Resource Management

ORCA ..... Office of Ocean Resources Conservation and Assessment

OSDS ..... on-site disposal systems

PAH ..... polycyclic aromatic hydrocarbons

PCB ..... polychlorinated biphenyls

PDT ..... Project Development Team

PG&E ..... Pacific Gas and Electric Company

PRC ..... Program Review Committee

RWQCB ..... Regional Water Quality Control Board

SEA ..... Strategic Environmental Assessments

SRD ..... Sanctuaries and Reserves Division

SWRCB ..... State Water Resources Control Board

TPH ..... total petroleum hydrocarbons

TSS ..... total suspended solids

USDA ..... U.S. Department of Agriculture

USEPA ..... U.S. Environmental Protection Agency

USGS ..... U.S. Geological Survey

VOC ..... volatile organic compound

WDR ..... Waste Discharge Requirements

WQPP ..... Water Quality Protection Program

Appendix A. Core Group Structure

Representative	Institution/Affiliation	City/State
PROJECT DEVELOPMENT TEAM		
Papadakis, Nick*	AMBAG	Marina, CA
Strnad, Les	CCC Santa Cruz	Santa Cruz, CA
Johnston, Deborah	Department of Fish and Game	Monterey, CA
Maki, Steven	Monterey County Planning	Salinas, CA
Ueber, Ed	NOAA, Gulf of the Farallones NMS	San Francisco, CA
Jackson, Terry*	NOAA, Monterey Bay NMS	Monterey, CA
Laughlin, Steve	NOAA, Monterey Bay NMS	Monterey, CA
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Appendix C. Current Strategy Sheets

Point Source Pollution

Strategy #: PS-1

Name: Improve spill response mechanisms
Type(s): Management Coordination
Problem: Spills

Description: Improve communication and coordination between spill response agencies. Use the current organizational structure for response while evaluating the need for additional capabilities and resources. Implement joint spill response training exercises. Preparedness activities should be continual.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Coast Guard - Central Coast Area Contingency Plan
EPA Region IX
NOAA - HAZMAT
Department of Fish and Game - Ocean Spill Prevention and Response (OSPR)
Pacific Gas and Electric - Oil Spill Contingency Plan
Local fire departments -
Other programs: California Ocean Plan; Water Quality Control Plan Central Coast HAZMAT Plan

Geographic Area(s):
All ocean segments

Targeted Use(r) and Cost to User:
Federal and State governments; party responsible for the spill

How Administered:
Through designated agency or respondent

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
A cooperative agreement through a memorandum of Understanding (MOU) may be required between spill response agencies. Additional preparedness training may also be required.

Source Strategy(ies): *PT-4*

Strategy #: PS-2

Name: Identify and inventory spill sources
Type(s): Management Coordination, Research
Problem: Spills

Description: Develop an oil and oil residue sample data base to trace spilled oil to its point of origin (e.g., fingerprinting). Inventory possible spill sources including: 1) tanker traffic routes and vessel capacities,
2) pipeline locations and capacities, 3) locations of offshore wells, and 4) locations of possible natural oil seeps. The new petroleum chemical lab has the capability of fingerprinting oil and oil residues. This capability could be used to develop the data base.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agency/Associated Program(s):
EPA Region IX-
NOAA-
USCG-
RWQCB -
Department of Fish and Game - Ocean Spill Prevention and Response (OSPR)

Geographic Area(s):
All ocean segments

Targeted Use(r) and Cost to User:
Increase transport fee of each barrel if appropriate

How Administered:
OSPR -

Administrative Costs: To be determined

Financing:
SB2040 or OSPR funds

Prerequisites for Implementation:
Adequate funds allocated from OSPR or generation of additional funds through amendment/modification of SB2040 fee assessment.

Source Strategy(ies): *WB-30*

Strategy #: PS-3

Name: Reroute shipping traffic
Type(s): Research, Regulatory
Problem: Spills

Description: Evaluate San Francisco Bay commercial shipping corridors to determine if major shipping lanes should be moved further offshore. Re-route vessel traffic away from environmentally sensitive areas such as the Farallon Islands. This will help prevent catastrophic oil or other chemical spills and help limit other ongoing oil or sewage pollution from large vessels.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
USCG -
NOAA - International Maritime Agreements
Marteque Administration-
Vessel Captain Association-

Geographic Area(s):
All ocean segments

Targeted Use(r) and Cost to User:
Additional transit time (about 10% for vessels going to Long Beach).

How Administered:
Sanctuary regulations, IMO agreement

Administrative Costs:
Costs to agencies responsible for enforcement activities

Financing:

Prerequisites for Implementation:
Vessel Traffic Study (refer to Strategy PS-2)

Source Strategy(ies): *WB-31, WB-43*

Strategy #: PS-4

Name: Monitor shipping traffic
Type(s): Research, Regulatory, Education
Problem: Spills

Description: 1) Identify potential sites for USCG coastal radar monitoring stations. 2) Develop methods for identifying domestic/foreign tanker, container ships, and tugs in tow. 3) Develop methods to involve industry in education/accurate self-reporting to avoid unnecessary regulation development.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
USCG -
USCG/IMO -
NOAA -

Geographic Area(s):
All ocean segments

Targeted Use(r) and Cost to User:
Shipping Industry

How Administered:
1) USCG to establish and staff coastal radar monitoring stations. 2) Industry - ship transponders or other appropriate/necessary equipment. 3) USCG/NOAA

Administrative Costs:
Moderate radar station development costs if existing USCG lighth se stations are used

Financing: To be determined

Prerequisites for Implementation:
1) Land acquisition (Pt. Sur and Drakes Bay CG lighthouses are possibilities).
2) Strategies PS-2 and PS-3

Source Strategy(ies): *WB-43*

Strategy #:	PS-5
Name:	Prohibit new and upgrade existing outfalls
Type(s):	Regulatory
Problem:	Toxics: Outfalls, Groundwater

Description: Upgrade all existing outfalls within the Sanctuary boundaries to tertiary treatment, and expand water reclamation programs. This includes coordinating with local water agencies to maximize the benefits regarding urban and agricultural water use. Prohibit the placement of new outfalls from municipalities and industry. The ultimate goal is to prohibit the use of outfalls into the Sanctuary by 2005. This will help attain the highest water quality possible and may help problems associated with seawater intrusion.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
NOAA - Marine Protection Research & Sanctuaries Act
MBNMS - Regulations on prohibited activities (no new outfalls)
U.S. EPA - CWA
SWRCB - California Ocean Plan
RWQCBs - NPDES
Local Governments (San Francisco, Half Moon Bay, Pacifica, Daly City, Santa Cruz, Watsonville, Pacific Grove, Paso Robles) and Local water agencies (Monterey Regional Water Pollution Control Agency).

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
All industry and municipal dischargers (all dischargers)
Cost of upgrades from secondary to tertiary treatment will be approximately $5-$10 million.

How Administered:
Through RWQCBs with NOAA's assistance. Revisions to Basin Plans and ocan plans.

Administrative Costs: To be determined

Financing:
Grants from EPA to do upgrade

Prerequisites for Implementation:
1) Education for all dischargers. 2) Funding. 3) Phase out schedule for outfalls.

Source Strategy(ies): *WB-24, WB-26, PT-19*

Strategy #: PS-6

Name: Expand pretreatment programs
Type(s): Regulatory
Problem: Toxics: Pretreatment

Description: Expand current pretreatment programs to bay, estuaries, and ocean water dischargers. Set permit limits and enforcement.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
RWQCB - Pretreatment program discharge permit objectives
EPA - Pretreatment Program

Geographic Area(s):
All ocean segments

Targeted Use(r) and Cost to User:
Dischargers of toxic materials to bays, estuaries, or ocean waters

How Administered:
Program administered/managed by RWQCB's/SWRCB coastal regulatory processes

Administrative Costs: To be determined

Financing:
Responsibility of the industry initially discharging the toxic materials to fund actual pretreatment actions

Prerequisites for Implementation:
To identify and institute funding for expanding the pretreatment program to cover additional administrative and program management budget and enforcement costs.

Source Strategy(ies): *WB-21*

Strategy # PS-7

Name: Implement pollutant reduction schemes
Type(s): Regulatory
Problem: Toxics: Hazardous chemicals in discharge

Description: Develop regulations to eliminate industrial hazardous chemicals prior to discharge. Change industrial processes or eliminate discharge.

Pollutant Standards/Objectives to Meet:
All toxic pollutants

Relevant Agencies/Associated Program(s):
Programs: NPDES Pretreatment Program; NPDES Urban Stormwater Program; Publicly Owned Treatment Works (POTW) notification/permitting programs

Geographic Area(s):
All watershed areas and ocean segments.

Targeted Use(r) and Cost to User:
Industrial and chemical users.
Initial costs to change processes may be high, but savings in chemicals should offset this over the long-term.

How Administered:
A regulatory program required by the state. Local municipalities can then develop programs with their users. A voluntary program could be established if regulations could not be instituted.

Administrative Costs:
Oversight costs will be incurred by the regulatory agency. In the San Francisco Bay RWQCB, two are dedicated to this.

Financing: To be determined

Prerequisites for Implementation:
1) Identify and focus on pollutants that need to be reduced. 2) Coordinate between Stormwater and Wastewater Programs.

Source Strategy(ies) *PT-14*

Strategy #:	PS-8
Name:	Ensure enforcement of NPDES permit Requirements
Type(s):	Management Coordination
Problem:	Toxics: NPDES

Description: Designate a responsible entity to administer and enforce permit limits for pollutant sources covered by NPDES permits. Enforcement efforts are severely constrained by lack of resources at regional water boards. Utilize (wherever possible) an existing government/public entity to administer and enforce NPDES-permitted runoff to the Sanctuary. Field presence is critical.

Pollutant Standards/Objectives to Meet:
Standards/objectives in the California Ocean Plan and Enclosed Bays and Estuaries Plan (if still applicable).
Inland Surface Waters

Relevant Agencies/Associated Program(s):
RWQCB -
Department of Fish and Game - 5650 enforcement
Other programs: NPS Program; Industrial NPDES Program; POTW Pre-treatment Program

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
Regulated community (NPDES permit holders) and the public

How Administered:
Regional Water Boards enforce NPDES permit requirements. Coordinate with other agencies, i.e., City - pre-treatment public works inspectors: Utilities - staff, and engineering divisions: County - environmental health, flood control district, county PW: Regional - CA F&G, RWQCBs.

Administrative Costs:
$3 million/year

Financing: To be determined

Prerequisites for Implementation:
1) Model ordinance, funding mechanism, and commitment of qualified staff.
2) Educate the public and solicit their support.

Source Strategy(ies): *WB-7, NP-15*

Strategy #:	PS-9
Name:	Require NPDES dischargers to develop spill contingency plans
Type(s):	Regulatory
Problem:	Toxics: Human Health

Description: Improve the reliability of collection systems. NPDES permits should require comprehensive spill contingency plans for pump stations and collection systems. Implementation of plans must be enforced to reduce sewage spills and minimize their impacts.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Regional Water Quality Control Board - NPDES

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
Publicly Owned Treatment Works (POTW) and collection system owners.
Cost to develop plans would be minimal.
Cost to implement plans is unknown but should be relatively low cost insurance.

How Administered:
RWQCBs would require plans and then make sure plans were implemented.

Administrative Costs:
Costs to the RWQCB

Financing:
Through NPDES permit holders by higher permit fees

Prerequisites for Implementation: To be determined

Source Strategy(ies): *PT-11*

Strategy #:	PS-10
Name:	Require NPDES stormwater permits for communities with populations less than100,000
Type(s):	Regulatory, Management Coordination
Problem:	Toxics

Description: Currently, the Clean Water Act (CWA) exempts small (<100,000) communities from requiring NPDES permits for stormwater discharges (this exemption does not apply in cases where the discharge is a significant contributor to violations of water quality standards). The state has adequate authority under both the CWA and the Water Code to adopt more restrictive requirements. Review section 304(l) lists and other indicators of impaired waters to see whether stormwater discharges from small cities are major contributors to identified water quality problems. If so, NPDES stormwater permits should be issued and population limits lowered. This could also be accomplished by requiring "area-wide" NPDES permits for the Monterey Bay area.

Pollutant Standards/Objectives to Meet:
Metals (Cu, Pb, and Zn), PAHs, Pesticides, Herbicides, Oil & Grease, BTEX, Solvents, Solid Waste, and Sediments

Relevant Agencies/Associated Program(s):
NPDES Permits (ICS under CWA Sec. 304(l), NPDES - Water Quality Management Plan, NPDES - NPS Program, NPDES - Pretreatment Program, NPDES - Source Control Urban Runoff
Improvement Strategy, FCZMA 6217 (indirectly)
Local governments and AMBAG - Monterey Bay Regional Stormwater Task Force
Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
Compliance costs are impossible to estimate at this time but could be considered. However, since more cities and unicorporated urban areas would come under the regulations, higher costs to these areas and thus higher taxes for their residents would be implemented.

How Administered:
1) RWQCB (2) and RWQCB (3) with input from NOAA and potentially impacted communities. 2) Possibly a MOU among agencies could be implemented to establish core staff reponsibilities at local level. 3) SWPPP could include ordinances and educational programs.

Administrative Costs:
Planning and development costs of $20 K to $50 K per year

Financing:
Through NPDES permit fees to finance planning and development. Funding for capital improvements (sediment traps, grease traps) in critical areas could come from mitigation banks set up for projects affecting wetlands (401 certification).

Prerequisites for Implementation:
1) Agreement among agencies in consolidated areas. 2) Prepare Stormwater Pollution Prevention Programs (build from Bay Area Plans). 3) Educational efforts (expand on existing efforts by local agencies and Monterey Bay Aquarium). 4) Initiate political focus at either the congressional or central coast RWQCB levels. 5) Review existing plans/standards for cities with populations greater than 100,000. 6) Obtain additional funding or redirection of staff (local agencies and RWQCB - Region 3)

Source Strategy(ies): *NP-1, NP-9, WB-40, PT-17*

Strategy #:	PS-11
Name:	Expand NPDES pretreatment program to include stormwater
Type(s):	Regulatory
Problem:	Toxics: NPDES

Description: Expand the NPDES Pretreatment Program to include oversight of stormwater to help reduce/eliminate pollutants from entering stormwater. The NPDES Pretreatment Program is already in place and has been very successful. This strategy will identify and implement Best Management Practices (BMPs) for removing pollutants from stormwater.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Local agencies responsoble for stromwater management.
Programs: NPDES Pretreatment Program

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
Urban and industrial users will have to pay user fees.

How Administered:
Through RWQCB Pretreatment Programs for POTWs

Administrative Costs: To be determined

Financing:
Funding mechanism is in place as mandated by the Clean Water Act by using POTW revenue programs.

Prerequisites for Implementation: To be determined

Source Strategy(ies) *PT-13*

Strategy #:	PS-12
Name:	Develop urban runoff standards
Type(s):	Regulatory, Research
Problem:	Toxics: Human Health

Description: Develop effective, but reasonable, water quality standards and waste discharge requirements for urban runoff.

Pollutant Standards/Objectives to Meet:
Metals (Cu, Pb, Zn), PAHs, and chlorinated pesticides and sediments, possibly nutrients in lagoons and other enclosed waters with limited circulation

Relevant Agencies/Associated Program(s):
U.S. EPA - Individual Control Strategies (ICS) under NPDES Permits; CWA Sec. 304(l) (where applicable)
Other programs: CA Ocean Plan; Inland Surface Waters Plan; Enclosed Bays and Estuaries Plan; Bay Protection & Toxic Hot Spots provisions of the water code (Torres Bill)

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
Costs to stormwater management agencies to achieve standards/Waste Discharge Requirements (WDRs) are unknown at this time but could be considered ($50 million to $500 million) if very restrictive requirements are deemed necessary.

How Administered:
By SWRCB with input from RWQCB(2), RWQCB(3), NOAA, EPA Region IX, and stormwater management agencies

Administrative Costs:
$300,000 to $3,000,000 (Field studies may be required)

Financing:
Costs for development could be financed by fees collected under the NPDES Permit Program and Bay Protection Act.

Prerequisites for Implementation:
Additional funding for RWQCB(3), SWRCB, and EPA staff

Source Strategy(ies): *NP- 3*

Strategy #: PS-13

Name: Redirect stormwater runoff
Type(s): Regulatory, Management Coordination
Problem: Habitat

Description: Direct stormwater runoff to permeable dune areas and recharge areas toimprove water quality and groundwater recharge, and increase habitat.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
RWQCB - Basin Management Plan
Department of Fish and Game -
Other programs: Flow control; NPDES; Management Plans

Geographic Area(s):
MBO4, MBO5, MBO6a-c, MBO7, MBO8

Targeted Use(r) and Cost to User:
Existing control districts and developers

How Administered:
City public works and flood control districts

Administrative Costs: To be determined

Financing:
Through flood control districts, developers, and coastal conservancy

Prerequisites for Implementation:
Develop master drainage plan

Source Strategy(ies): *LU - 8*

Strategy # PS-14

Name: Improve point source monitoring
Type(s): Management Coordination, Research
Problem: Toxics: Heavy Metals

Description: Monitor for heavy metals and other toxins at discharge points. Determine amounts of toxins actually entering the MBNMS from permitted discharge points as both parts per millions/billions of an amount of water and as an estimate of Kg/gr. Conduct monitoring to include post discharge water and sediment analysis to determine actual long-term effects and/or the effects of toxin dilution. Tests should be quarterly.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
RWQCB, Department of Sish and Game, SWRCB - Inland Surface Water
Programs: Toxic monitoring program; NPS; Bay and Estuaries; NPDES; California Ocean Plan; Mussel Watch; WDR.

Geographic Area(s):
All ocean segments

Targeted Use(r) and Cost to User:
Dischargers should pay for the monitoring.
Total combined costs could be significant, approximately $200,000-$300,000/year Sanctuary-wide.

How Administered:
Monitoring should be included in permit requirements for dischargers. The Sanctuary should oversee county compliance.

Administrative Costs: To be determined

Financing:
Dischargers pay for point source monitoring.

Prerequisites for Implementation:
Adoption of new regulations where needed

Source Strategy(ies): *WB-11*

Strategy #:	PS-15
Name:	Develop educational programs on stormwater runoff
Type(s):	Educational
Problem:	Toxics: Stormwater runoff

Description: Develop sanctuary-wide educational programs for public, schools, and industries on causes and impacts of stormwater runoff. Develop outreach programs focusing on community groups and specific commercial and industrial segments. Specific efforts could include: 1) educating people/ students on the impacts of dumping chemicals into storm drains and health of creeks; 2) combining education programs for both "stormwater people" and "wastewater people"; 3) holding environmental education fairs for the general public, treatment plants, and stormwater utilities to share their education material; 4) coordinating storm drain stenciling efforts; and 5) recycling and substituting less hazardous chemicals. Educate all users through multi-lingual radio, television, and newspaper ads.

Pollutant Standards/Objectives to Meet:
Water quality standards and objectives for: pesticides, heavy metals, any toxic pollutants, any hazardous material, coliform bacteria, and suspended solids

Relevant Agencies/Associated Program(s):
Local government - nonpoint source programs
RWQCB -
WDR -
AMBAG -
CA EPA, Department of Environmental Assessment -
Other programs: Urban Runoff Program; NPDES Program; Pollution Prevention Program;Water Quality Management Plan (205J); Mussel Watch Program; Toxic Substance Monitoring Program (TSMP) , and Waste Discharge Requirements

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
All residents and industries.
Education programs are relatively cheap to implement since no physical construction is involved.

How Administered:
Through school programs, volunteer groups, program modules developed by nonprofit groups, AMBAG, and the Monterey Bay Aquarium. All activities could be coordinated by the Sanctuary Education Coordinator and subcommittee.

Administrative Costs
Estimated costs less than $200,000

Financing:
Costs are usually born by counties or cities implementing stormwater or pollution prevention programs. Costs are covered through stormwater assessment fees or sewer fees. Fees could be applied to the sale of toxic materials.

Prerequisites for Implementation:
1) Identify of important resources to protect. 2) Identify of problem pollutants to be reduced.
3) Meet with local groups and agencies to set specific goals.

Source Strategy(ies): *PT-9, PT-15, WB-41, NP-19*

Agriculture

Strategy #: **AG-1**

Name: Coordinate integrated coastal management (ICM) with regional plans

Type(s): Management Coordination

Problem: Sediment, Toxics: Pesticides

Description: ICM needs to be aware of the plans and their impact to water quality in order to influence policy regarding agricultural irrigation water management. Basin management plans, county general plans, pesticide permits process, etc., all can influence agricultural irrigation water management. Growers in most water management areas submit irrigation conservation plans. These plans could be used to coordinate management of inputs into the Sanctuary.

Pollutant Standards/Objectives to Meet:
Policy can be shaped that will preserve the Sanctuary's fitness and enhance it without destroying any socio-economic value in this area.

Relevant Agencies/Associated Program(s):
Monterey County general plan -
Santa Cruz general plan -
Monterey County Water Resources Agency: Salinas Valley BMP -
PV-BMP -
Other county plans -
Flood plans -
Irrigation management plans -
AMBAG - 208 Water Quality Management Plan and Lower Salinas Riv Waters Initiative Pilot Project
US SCS/Agriculture Stabilization and Conservation Service

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Decision-making agencies and boards going beyond policy to implementation

How Administered:
MBNM Sanctuary

Administrative Costs
Two to four hours a week - MBNMS

Financing:
Through MBNMS funds

Prerequisites for Implementation:
None

Source Strategies: AG-13, AG-14

Strategy #:	AG-2
Name:	Coordinate and improve soil and stormwater management programs
Type(s):	Management Coordination
Problem:	Sediment

Description: Increase coordination among agencies, land owners and operators, grazing/livestock operators, and others involved in soil and stormwater management programs. Control sediment loading of pesticides, coliform bacteria, pesticides, and nutrients. Reduce degradation of various habitats (fisheries, spawning, wildlife).

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Regional Water Quality Control Board-
Soil Conservation Service -
Department of Fish and Game -
Santa Cruz County - Agriculture Resources Enactment
California Coastal Commission -
Local county -
US SCS/Resource Conservation District (RCD) -
Nongovernment organizations -
Farm Bureaus -
Cattlemen's Association -
County Agriculture Commissioners -
State and regional water control boards -
Other Programs: Coordinated Resources Management Plan (CRMP)

Geographic Area(s):
MB01, MB02, MB03, MB04, MB05, MB06a, MB06b, MB06c, MB07, MB08, MB09

Targeted Use(r) and Cost to User:
Farmers, ranchers, growers, horticulture industry, pesticide and fertilizer advisers, pest control advisors and consultants

How Administered:
US SCS/RCD, CRMP, SCC, EPA or other watershed-level coordinating groups which include sanctuary representation; EPA 319; PL-566-08 (Watershed Management)
Perhaps sanctuary led.

Administrative Costs:
Personnel time for each agency? Facilitation? Staff time for coordinating? Cost of incentives for ranchers? No cost if research is conducted by students, or up to $2,000,000 for more expert research, evaluation, and demonstration projects.

Financing: To be determined

Prerequisites for Implementation:
1) Need a contact at each appropriate agency and a lead person to get the ball rolling.
2) Locate funds. 3) Establish interagency task force lead by SCS or other appropriate agency. 4) Develop and implement BMPs.

Source Strategies: AG-4, AG-9, AG-10

Strategy #: **AG-3**

Name: Increase funding for soil and water management programs

Type(s): Management Coordination

Problem: Sediment

Description: Increase funding for soil management and agricultural stormwater management programs. Identify all applicable sources of grants, develop more effective means of writing grants, and acknowledge funding agencies that direct funds at cost-effective implementation procedures for the most important problems in specific watersheds. Increase applicants awareness of funding programs. Consider organizing grant programs on a watershed basis in coordination with other agencies at the federal, state, and regional level. EPA is organizing such a framework internally for its own programs.

Pollutant Standards/Objectives to Meet:
Certain pesticides, nutrients, sediments
Once management strategies are identified, increased funding will be available for completing pilot projects, demonstrations, and full-scale management practices.

Relevant Agencies/Associated Program(s):
U.S. EPA - CWA Sec. 319, 205(j)
Soil Conservation Service (SCS)/Resource Conservation District (RCD) - Resource Conservation Districts -

Geographic Area(s):
MB01, MB02, MB03, MB04, MB05, MB06a, MB06b, MB06c, MB07, MB08, MB09

Targeted Use(r) and Cost to User:
Growers, county agencies, council of governments, RCDs, etc.
The cost to users is hard to estimate before fully identifying funding sources.

How Administered:
One agency or CRMP should be assigned the lead for carrying out each program type and producing more effective grants applications. Activities include:

1) survey Federal, state and private foundation funding sources (6 months);
2) create a nonprofit foundation for accepting funds from all sources (1 year);
3) train Federal, state and local agency staff on methods of applying for grants (1 year);
4) hire staff to organize fund raising activities (1 year);
5) identify priority areas within each watershed where stormwater and soil management are most needed - use US SCS soil surveys and GIS;
6) develop a package of project pre-proposals that are ready to go, with containing objectives, background, tasks to be performed, deliverables, and estimated budget (1 year, update yearly); and
7) organize workshops on agricultural NPS projects conducted in the sanctuary, inviting funding agencies,and presenting unfunded projects from #6 above (Every Year).

Administrative Costs:
Depends on project being implemented

Financing:
Through funding agencies: State and Regional Boards, SCS, EPA, and NOAA to pay for contracts for demonstration projects, as well as projects and revolving funds for building improvements.

Prerequisites for Implementation: To be determined

Source Strategies: AG-2, AG-32

Strategy #: AG-4

Name: Research and monitor agricultural pesticides

Type(s): Management Coordination, Research

Problem: Toxics: Pesticides

Description: Identify polluted areas and pollution sources, and obtain sound scientific data for characterizing risk and impacts. Focus pesticide monitoring efforts on currently registered pesticides, and high-use areas (Pajaro and Salinas), using fixed (constant) stations, fixed relevant local species, and fixed sampling intervals so that long-term trends and actual risks can be characterized and evaluated. This strategy could assist in developing new water quality objectives and determining the fate and effects of pesticides in streams, rivers, estuaries, coastal lagoons, and the ocean. Reduce pesticide loading in aquatic environment, meet endosulfan water quality standards, and improve pesticide-use techniques so that pesticides get to crop effectively.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Department of Pesticide Regulation -
State and Regional WRCBs -
Other programs: State Mussel Watch Program; Bay Protection & Toxic Cleanup Program; Toxic Substance Monitoring Program; Environmental Hazards Assessment Program
U.C. Agricultural Extension, County Agricultural Commissions, and AMBAG - Lower Salinas River Near Coastal Waters Initiative Pilot Project

Geographic Area(s):
MB01, MB02, MB03, MB04, MB05, MB06a, MB06b, MB06c, MB07, MB08, MB09, Ocean Segment 1, Ocean Segment 2, Ocean Segment 3. Especially impaired waterbodies of Pajaro River, Watsonville Slough;, Salinas River, and Elkhorn Slough in MBO.

Targeted Use(r) and Cost to User:
Regulators and agricultural community

How Administered:
Activity 1: Develop regional monitoring program for bays, estuaries, nearshore coastal waters
- A. Identify monitoring objectives
- B. Identify indicators
- C. Develop sampling strategy
- D. Develop data base

Activity 2: Implement monitoring (annual)
- A. Complete field work
- B. Complete chemical and biological lab work
- C. Enter data into data base
- D. Report data on Sanctuary

Activity 3: Research Program
- A. Fate of pesticides
  1. Identify pollutants
  2. Identify study objectives
  3. Design studies
  4. Establish priority of studies
  5. Implement most important studies
  6. Report data
  7. Integrate results into management activities
- B. Dose-response studies on pesticides
  1. Identify pollutants
  2. Identify study objectives
  3. Design studies
  4. Establish priority of studies
  5. Implement most important studies
  6. Report data

Administrative Costs:
Plus or minus $2 million per year

Financing: To be determined

Prerequisites for Implementation:
Consensus between agencies

Source Strategies: AG-15, AG-16, AG-20

Strategy #: AG-5

Name: Monitor fertilizer use
Type(s): Research, Management Coordination
Problem: Toxics: Fertilizer

Description: Identify fertilizer use and improve efficiency while minimizing impacts to ground and surface waters. Monitor timing of fertilizer application and techniques to minimize runoff; application rates should be consistent with crop needs. Reduce nitrates in soil.

Pollutant Standards/Objectives to Meet:
Nutrients, NO_3, NH_4 in ground water and surface water; California Department of Fish and Game Nitrate standards; CZMA management measures in (g) guidance; dxrinking water standards.

Relevant Agencies/Associated Program(s):
CDFA - fertilizer regulations and research program
California Farm Bureau -
Soil Conservation Service -
U.S. EPA - Clean Water Act Sections 319 and 205j
California Alliance Family Farmers/CA Extension -
Other programs: Coastal Zone Act reauthorization amendments/EPA; Water Quality objectives in ocean plan

Geographic Area(s):
MB01, MB02, MB03, MB04, MB05, MB06a, MB06b, MB06c, MB07, MB08, MB09, Ocean Segment 1, Ocean Segment 2, Ocean Segment 3

Targeted Use(r) and Cost to User:
1) Increased labor costs to growers, crop advisers, applicators, fertilizer dealers and manufacturers. with possible savings on fertilizer use; 2) Increased labor to crop advisors; 3) Possible decreased fertilizer use and sales; 4) Reduced runoff and possible increased efficiency. Up to $10M/yr. for watershed.

How Administered:
1) Obtain $500,000 from CDFA research program to pay for tracking and analysis. 2) Develop a tracking mechanism (reportable possibly) as an added field to the CAC data base (1.0. if areas of concern. 3) Apply resources of at least one agriculture extension crop advisor to survey and assess needs and practices in a given area and extrapolate to other areas. 4) Survey with outreach on CZMP and propose BMPs to be practiced.

Administrative Costs:
$250,000 - State and county agriculture regulations - extra tracking be filed with CAC or CDFA (Regulatory). $100,000 - Advisory - increased personnel resources to evaluate and make recommendations for plans.

Financing:
Funding administered through CDFA research program and CA Fertilizer Association. (Have CA Fertilizer Association contribute) $150,000 - to file plans and monitor BMP use and results.

Prerequisites for Implementation:
Knowledge of: release rates of fertilizers; soil amendments; crop nutrient needs; irrigation system technology, including scheduling; and drip irrigation technology

Source Strategies: AG-30, AG-38, HM-15

Strategy #: AG-6

Name: Maintain funding for pesticide enforcement standards
Type(s): Regulatory
Problem: Toxics: Pesticides and Nutrients

Description: Encourage adequate funding for Department of Pesticide Regulation and California Agriculture Commission to continue existing programs and incorporate future Integrated Pesticide Managememt (IPM) programs and nutrient-use tracking in the California Regulatory Systems.

Pollutant Standards/Objectives to Meet:
Standards provided in US EPA and California EPA laws and regulations

Relevant Agencies/Associated Program(s):
Department of Pesticide Regulation (DPR): a subdepartment of CA EPA -
CA Agricultural Commissioners -
Other state and federal agencies -

Geographic Area(s):
MB01, MB02, MB03, MB04, MB05, MB06a, MB06b, MB06c, MB07, MB08, MB09

Targeted Use(r) and Cost to User:
Regulatory agencies

How Administered:
Department of Pesticide Regulation and California Agriculture Commission

Administrative Costs:
Current funding levels plus adequate additional budget increases to meet current and future standards

Financing: To be determined

Prerequisites for Implementation:
Adequate funding

Source Strategies AG-19

Strategy #: AG-7

Name: Strengthen and enforce county ordinances
Type(s): Management Coordination, Regulatory
Problem: Sediment, Toxics: Pesticides and Nutrients

Description: Enforce existing county ordinances regarding sediment basins and borders and, where necessary, increase enforcement of county erosion control ordinances. Reduce offsite transport of sediment, nutrients, and pesticides.

Pollutant Standards/Objectives to Meet:
Standards: Existing county ordinances on soil control

Relevant Agencies/Associated Program(s):
Department of Pesticide Regulation -
CA Agricultural Commissioners -
Other state and federal agencies -
US SCS/RCD
Other programs: County Erosion Control Plans; potentially - CZARA Section 6217

Geographic Area(s):
MB06a, MB06b, MB06c, and all others to a lesser extent

Targeted Use(r) and Cost to User:
Agriculture community
Payment of county fines for violating ordinace (about $100/day) and cost of implementing corrective measures

How Administered:
Through county planning departments State Water Resources Control Board, and California Coastal Commission for 6217

Administrative Costs:
Additional staff time unknown

Financing: To be determined

Prerequisites for Implementation:
None

Source Strategies: AG- 35, HM-7

Strategy #: **AG-8**

Name: Investigate best management practices (BMPs) for soil management, agricultural runoff, livestock/grazing

Type(s): Management Coordination, Research

Problem: Sediment, Toxics: Pesticides, Nutrients, Fecal Coliform

Description: Survey local, state and national literature on applicable BMPs and determine which are adequate or need modification, and evaluate whether new ones are needed. Construct demonstration projects using those BMPs determined to be suitable; and monitor and evaluate over the long term. Reduce nonpoint source pollutants such as sediment, nutrients, fecal coliform count and pesticides (old and current use).

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
U.S. Department of Agriculture/Soil Conservation Service/RCD -
University of California Coop Extension -
USDA Agriculture Research Service -
CDFA -
Coastal Conservancy -

Geographic Area(s):
MB01, MB02, MB03, MB04, MB05, MB06a, MB06b, MB06c, MB07, MB08, MB09

Targeted Use(r) and Cost to User:
Farmers, ranchers, growers, horticulture industry, pesticide and fertilizer advisers, and pest control advisors and consultants

How Administered:
Conduct research with interagency cooperation. Establish interagency task force lead by SCS or other appropriate agency. Use 6217g legislation.

Administrative Costs:
No cost if research is conducted by students or up to $2,000,000 for more expert research, evaluation, and demonstration projects.

Financing: To be determined

Prerequisites for Implementation:
Locate funds

Source Strategies *AG-5*

Strategy #:	AG-9
Name:	Improve direct communication with the agricultural community
Type(s):	Education
Problem:	Sediment, Toxics - Pesticides and Nutrients, Habitat

Description: Improve and extend efforts to educate the agricultural community by developing a network for one-on-one contact between managers and growers. Educating growers, ranchers, and others in the agricultural community to utilize BMPs to benefit water quality and the environment will help alleviate current problems involving excess nutrients, sediment, and other pollutants. The agricultural community should also be educated about the Sanctuary and the connections between their activities and the marine environment. Subjects can include, but will not be limited to, erosion and runoff; pesticide/fertilizer application and "Integrated Pesticide Management" (IPM); irrigation techniques; and new technologies and practices.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Soil Conservation Service (SCS)/RCD - Technical Assistance Program
University of CA -
Coastal Conservancy - Comprehensive Watershed Plan Grants Program
CA Dept. of Fish & Game -
Dept. of Pesticide Regulations (DPR) - Training Programs
DPR Pesticide Management Advisory Committee -
County Agricultural Commissions -
Monterey County WRA -
PVWMA -
Other programs: CA Water Act 319 section 205(j)

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
The agricultural community

How Administered:
SWRCB.
Task forces and steering committees could also be established.

Administrative Costs:
Less than $100,000 per year

Financing: To be determined

Prerequisites for Implementation:
1) Conduct surveys to establish contact with individual growers to determine their concerns. 2) Train people to conduct workshops and other sessions. 3) Research existing outreach programs to determine what needs improvement. 4) Funding.

Source Strategies *AG-1, AG-33, AG-12*

Strategy #:	AG-10
Name:	Conduct educational workshops for the agricultural community
Type(s):	Education
Problem:	Sediment, Toxics - Pesticides and Nutrients, Habitat

Description: Improve and extend efforts to educate the agricultural community by conducting workshops and "tailgate" sessions; training shippers, lenders, and others to help educate growers; developing exhibits for trade shows; and by establishing a process for recognizing and rewarding growers who help improve water quality conditions through BMPs. This will help reduce sedimentation and make growers more aware of their impact on existing natural resources. Workshops could be conducted on: erosion and runoff, pesticide/fertilizer application and "Integrated Pesticide Management" (IPM), irrigation techniques, and new technologies and practices.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Soil Conservation Service (SCS)/RCD - Technical Assistance Program
University of CA -
Coastal Conservancy - Comprehensive Watershed Plan Grants (e.g., grants for RCDs) Program
CA Dept. of Fish & Game -
Dept. of Pesticide Regulations (DPR) - Training Programs
DPR Pesticide Management Advisory Committee -
County Agricultural Commissions -
Other programs: CA Water Act 319 section 205(j)

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Agricultural community

How Administered:
Establish integrated task forces and steering committees composed of federal, state, and local government agencies and NGOs.

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
1) Train people to conduct workshops and other sessions. 2) Research existing outreach programs to determine what needs improvement. 3) Funding. 4) Determine which agricultural activities need to be considered.

Source Strategies: AG-1

Strategy #: AG-11

Name: Educate irrigation communities
Type(s): Education
Problem: Toxics - Pesticides and Nutrients, Low Flows

Description: Educate irrigation communities on the merits of applying water consistent with the consumptive requirements of crops. This will help reduce the amount of chemicals, fertilizers, and pesticides introduced to ground and surface waters. It will also help conserve groundwater.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Agricultural Commission -
Mobile Lab Program -
Other programs: CIMIS

Geographic Area(s):
MB05, MB06b.

Targeted Use(r) and Cost to User:
The irrigation community including golf courses and other large turf areas in flood plains, as well as residential users.

How Administered:
Through the Water Resource and Water Management Agency, MCWRA, PVWRA, and Water Conservation Staff

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
Identify pre-irrigation needs, antecedent soil moisture, germination of seed stock, and salt management in root zone.

Source Strategies: HM-17

Strategy #: AG-12

Name: Encourage research and development of pesticide application methods
Type(s): Research
Problem: Toxics - Pesticides and Nutrients

Description: Encourage research and development on more efficient, improved pesticide application methods and equipment. This will help reduce pesticide loadings to the aquatic environment, help meet state water quality standards (focus on endosulfan), and benefit crops. This should include encouraging the ongoing R&D activities at UC and in industries, and encouraging regulatory flexibility to avoid discouraging the development and use of safer, more efficient methods such as ultra-low volume sprayers.

Pollutant Standards/Objectives to Meet:
Endosulfan

Relevant Agencies/Associated Program(s):
Agricultural Commission -

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Agricultural producers, pesticide control businesses, pesticide control operators, and pesticide control advisors/consultants

How Administered:
Through UC, DPR, CA Fish & Game, and CAC

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation: To be determined

Source Strategies: AG-18

Strategy #: AG-13

Name: Develop a directory/resource handbook
Type(s): Education
Problem: Sediment, Toxics, Habitat

Description: Develop and distribute a directory/resource handbook that lists and explains policies and regulations governing agricultural activities, and the agencies and programs available to help the agricultural community meet water quality objectives in an economically feasible manner. This will help meet water quality goals and objectives.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
County Agricultural Commissions -
Local Governments -
SCS -
U.C. Agricultural Extension -
State Agricultural Commission -
RWQCB -
Farm Bureaus -

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Agricultural community

How Administered:
Federal, state, and local government agencies, and NGOs.

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
Funding

Source Strategies: AG-1

Strategy #: AG-14

Name: Extend outreach efforts by utilizing varous media
Type(s): Education
Problem: Sediment, Toxics - Pesticides and Nutrients, Habitat

Description: Develop and distribute bilingual newsletters, brochures, and fact sheets to inform the agricultural community about the relationship between their activities and the environment, water quality, and the Sanctuary. PSAs should also be utilized. Messages will contain information on BMPs and other ideas to improve/protect the environment. Subjects can include, but will not be limited to: erosion and runoff, pesticide/fertilizer application and "Integrated Pesticide Management" (IPM), irrigation techniques, and new technologies and practices. The existing permit process can be used for disseminating educational materials to the agricultural community to establish direct contact with growers.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Soil Conservation Service (SCS) -
Coastal Conservancy -
CA Dept. of Fish & Game -
Dept. of Pesticide Regulations (DPR) -
DPR Pesticide Management Advisory Committee -
County Agricultural Commissions -

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Agricultural community

How Administered:
Federal, state, and local government agencies, nd NGOs

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
1) Develop a list of priority issues to address. 2) Funding

Source Strategies: AG-1, AG-33, AG-17

Strategy #:	AG-15
Name:	Improve cost share programs and lease agreements
Type(s):	Education
Problem:	Habitat

Description: Develop new cost share programs and lease agreements or improve existing ones. This will enable the implementation of other conservation strategies such as establishing larger setbacks from wetlands and riparian areas, or converting to more expensive, environmentally sensitive technologies and practices.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
US Soil Conservation Service (SCS) - Land Treatment Programs
CA Dept. of Fish & Game -
Dept. of Pesticide Regulations (DPR) -
DPR Pesticide Management Advisory Committee -
County Agricultural Commissions -
Water Resources Agency -
PVWRA (?) -

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Agricultural community

How Administered:
Federal, state, and local government agencies, and NGOs.

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
Funding

Source Strategies: AG-1

Strategy #:	AG-16
Name:	Develop best management practices (BMPs) demonstration projects
Type(s):	Education
Problem:	Sediment, Toxics: Pesticides and Nutrients, Habitat

Description: Develop demonstration projects to encourage the use of environmentally sensitive agricultural practices. This may include the development of "Showcase" properties. Such projects can be used to assess the environmental and economic impacts of beneficial practices. This will encourage growers to use practices that will help reduce pollutant inputs into waterways, and help them meet California Standards and Objectives.

Pollutant Standards/Objectives to Meet:
State standards and objectives

Relevant Agencies/Associated Program(s):
Department of Pesticide Regulation - Regulatory and training programs
UC Agricultural Extension - IPA/sustainable agriculture programs
CA Fish & Game - Biocontrol Dept. programs
CA Fish & Game - Office of Analysis & Consultation
CA Coastal Conservancy - Enhancement/Ag Program Bond Fund
EPA - CWA 319 Section 205(j)
County Agricultural Commissioners -
DPR Management Advisory Committee -
Soil Conservation Service -
Resource Conservation District -

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
The agricultural community, including pesticide control operators, control advisors, and consultants

How Administered:
See Relevant Agencies/Associated Program(s)

Administrative Costs:
0-$1,000,000/year

Financing: To be determined

Prerequisites for Implementation:
1) Identify problems and grower needs that best relate to demonstration projects. 2) Funding. 3) Coordination among existing programs.

Source Strategies: AG-1, AG-3, AG-17

Forestry

Strategy #:	FOR-1

Name: Re-vegetate old timber harvest roads
Type(s): Management Coordination
Problem: Sediment

Description: Re-vegetate old timber harvest roads.

Pollutant Standards/Objectives to Meet:
Sediment/Turbidity standards

Relevant Agencies/Associated Program(s):
NOAA - CWA Grants Program
CA Department of Forestry and Fire Prevention
US SCS/Central Coast RCD
Agricultural Stabilization and Conservation Service
Other Programs: CA Forest Improvement Program (CFIP); Stewardship Incentive Program (SIP)

Geographic Area(s):
1) MB02, MB03, MB04, MB05, MB09
2) Both public and private land areas that have been impacted by abandoned roads would be targeted.

Targeted Use(r) and Cost to User: To be determined

How Administered:
Coordinated Resource Management Plan (CRMP) managers would solicit candidate projects in various watersheds. Managers would submit proposals to the Sanctuary manager or to respective funding agencies. CRMP managers would assist sanctuary manager in prioritizing projects.

Administrative Costs:
Part of the CRMP manager proposal

Financing:
1) Project costs conditioned with requirements for local cost-share. 2) Project costs provided with NOAA or CWA Federal Grants. 3) Support legislation to reinstate funding for CFIP and SIP.

Prerequisites for Implementation:
Identify seriously eroded or potential erosion problems from abandoned roads

Source Strategies: NP-16

Wetlands/Riparian

Strategy #:	HAB-1

Name: Enhance percolation pond riparian areas
Type(s): Management Coordination
Problem: Wetlands, Habitat, Groundwater

Description: Salinas Valley may be using percolation ponds for water transfer projects. The health and fitness of the riparian areas act as a natural filter into the Marine Sanctuary, therefore riparian areas should be developed around percolation ponds that are being considered/planned. This will also enhance aquifer recharge.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Monterey County Water Resources Agency - Salinas River Basin Management Plan
US SCS/RCD

Geographic Area(s):
MB06c

Targeted Use(r) and Cost to User: To be determined

How Administered:
The Sanctuary should coordinate with the Monterey County Water Resources Agency and other local/regional water resources agencies that are considering such ponds.

Administrative Costs:
Cost of a person to be involved in project implementation for approximately 1 hour per week

Financing:
Through NOAA using Sanctuary funds

Prerequisites for Implementation:
None

Source Strategies: AG-29

Strategy #:	HAB-2
Name:	Support and coordinate existing wet land/riparian restoration projects
Type(s):	Management Coordination, Education, Research
Problem:	Wetlands, Habitat, Groundwater, Toxics

Description: Local agencies have a wealth of knowledge on the use and maintenance of wetland and riparian areas. This strategy will support existing efforts to restore, enhance, and create wetland and riparian buffers, primarily along waterways in agricultural areas. These efforts currently include educating growers, initiating demonstration projects, funding of restoration efforts, etc. Support efforts can include: 1) collecting information through surveys; 2) talking to growers, fish/wildlife experts, etc.; 3) conducting research on existing information; 4) identifying problems and needs; and 5) preparing plans and constructing projects.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
1) California Coastal Conservancy Watershed Restoration Programs - These programs have been successfully implementing many coastal watershed plans. Staff works frequently with growers and other stakeholders on a voluntary basis. Implementation involves funding and constructing all types of watershed improvements (many on agricultural lands) such as riparian restoration, demonstrate dairy waste treatment programs, erosion control projects, etc.
2) Soil Conservation Service, Agricultural Stabilization and Conservation Service Cost Share Programs - Activities encompassing these programs include: a) water bank (cost/shares), b) Food Security Act (does not allow conversion of wetlands), c) wetland preservation areas (pay a farmer per acre to take a parcel out of production and leave it in a wetland), d) technical assistance (nominal) to establish a wetland for specified wildlife, and e) provide pamphlets, job sheets, etc. on wetlands, fish and wildlife, agricultural conservation program (cost share in some counties to develop wetlands for duck clubs, etc.)
3) Department of Fish and Game - Wildlife Conservation Board Riparian Conservancy
4) Monterey Salmon-Trout Enhancement Project (specific to fish habitat)
5) Dept. of Fish and Game - Anadromous Fisheries Program Act
Other Programs: California Riparian Habitat Conservation Program.

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
Cost for growers and ranchers to take land out of production

How Administered: To be determined

Administrative Costs:
No cost if growers do it themselves

Financing: To be determined

Prerequisites for Implementation:
1) Identify existing agency contributions to protecting and restoring these areas and determine if resources could be more effectively used through coordination. 2) coordinate meetings with stakeholders. 3) Develop problem statements. 4) Locate funding.

Source Strategies: AG-25, AG-28, HM-1

Strategy #:	HAB-3
Name:	Identify areas most in need of wetland/ riparian restoration
Type(s):	Management Coordination, Research
Problem:	Wetlands, Habitat, Groundwater, Toxics

Description: Identify critical wetland/riparian areas that could be restored to improve water quality in the Sanctuary. Restoration will help trap sediments, nutrients and pollutants, increase recharge, improve habitat, and improve flood control.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Dept. of Fish and Game - Inland Wetlands Conservation Program; Ecological Reserves
US SCS - Hydrologic Unit Areas
Other programs: Basin Management Plan; CA Coastal Conservancy

Geographic Area(s):
All watershed areas
Targeted Use(r) and Cost to User:
Acquisition of fallow agriculture lands may impact growers.

How Administered:
Land conservancy, parks and wildlife agencies, city and county flood control agencies, county permitting agencies

Administrative Costs:
Could be very high for the development of a working map to use as a baseline for determining where restoration should occur.

Financing:
Through grants from land conservancy.

Prerequisites for Implementation:
1) Use existing maps from the National Wetlands Inventory, Soil Conservation Service, and Army Corps of Engineers to generate GIS map of existing wetlands/riparian areas; 2) field truth for accuracy; and 3) determine where new buffer zones will be most successful.

Source Strategies: LU-10, HM-2, NP-6

Strategy #: **HAB-4**

Name: Increase voluntary development of wetland and riparian buffer zones

Type(s): Management Coordination, Economic, Education

Problem: Wetlands, Habitat, Groundwater, Toxics

Description: Encourage larger setbacks to increase the distance between agricultural land and wetland areas. Increase incentives for restoration of wetlands/riparian areas to help reduce the amount of soil, pesticides, and nutrients reaching wetland areas, and increase fish and wildlife habitat. Provide cost sharing and tax incentives to help alleviate the burden to the agricultural community. In addition, Salinas Valley may be using percolation ponds to enhance water transfer projects. The health and fitness of the riparian areas act as a natural filter into the Sanctuary; therefore, riparian areas should be developed around percolation ponds that are being considered/planned. This will also enhance aquifer recharge.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
State Water Resources Control Board - Section 319
Department of Fish and Game - Inland Wetlands Conservation Program
Monterey County WRA - Salinas River Basin Management Plan
SCC -
US Soil Conservation Service (SCS)/RCD -
Army Corps of Engineers -
EPA -
Regional Boards -
LCP -
State Coastal Program -
US Fish and Wildlife Service; -
County -
NOAA -
NGO -
Agricultural Stabilization and Conservation Service -
Nature Conservancy -
Coastal Conservancy -
Agriculture Stabilization and Conservation Service - Cost sharing
Other programs: CZARA Section 6217; Food Security Act; California Riparian Habitat Conservation Program

Geographic Area(s):
All watershed areas, but focus on MB06a, MB06b, MB06c

Targeted Use(r) and Cost to User:
Cost to growers to take land out of production

How Administered:
Grower outreach programs - SCS; Agriculture extension; RCDs; CRMP groups; and NGOs

Administrative Costs:
Funding for easement purchase, reduction of tax base, educational materials

Financing:
Coordinate program through SWRCB Section 319 grant. Grower incentives through ASCS and possibly land trust agencies. Administer other grants through SCC, SCS, EPA, and NOAA.

Prerequisites for Implementation:
1) Determine the most important wetland areas which could benefit; target a few areas for outreach, grower incentive efforts (see Strategy # HAB-3). 2) Review existing programs. 3) Obtain additional funding.

Source Strategies: AG-36, AG-24, AG-27, AG-29

Strategy #:	HAB-5
Name:	Develop and implement regulations requiring larger riparian buffer zones
Type(s):	Management Coordination, Regulatory
Problem:	Wetlands, Habitat, Groundwater, Toxics

Description: Adopt, implement, and enforce regulations and incentives to create riparian buffer zones along stream channels to include regulations requiring larger setbacks to increase the distance between agricultural land and wetlands/waterways. This will decrease the amount of sediment and pollutants from entering the Sanctuary and provide for better groundwater recharge. Larger buffers will improve flow characteristics of streams, and enhance fish and wildlife habitat. Tax incentives could be used to alleviate some of these costs. The optimal buffer width should be weighed against this cost.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
CZMA - DFG 1600
Soil Conservation Service - Farm practices
Army Corps of Engineers - 404
Dept. of Fish and Game - Riparian Conservation Program and Inland Wetlands Conservation Program
ASCS -
SCC -
Nature Conservancy -
Coastal Conservancy -
SES
Other programs: CZARA Section 6217; Wetlands Reserve Program

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Growers, land owners, and developers.
The cost of taking land out of production.

How Administered:
Local, county, and state planning offices; county land use ordinances and assessors; CCC/SWRCB; ASCS; Wetlands Reserve Program; SCC; Nature Conservancy; Coastal Conservancy; SES. Sanctuary office should coordinate staff time.

Administrative Costs:
Additional costs for enforcement offices

Financing: To be determined

Prerequisites for Implementation:
1) Review existing documents, demostration sites, and other localities to determine more appropriate setback distances. 2) Set priorities for wetlands/waterways requiring restoration.

Source Strategies: HM-4, HM-6, AG-22, AG-34

Strategy #:	HAB-6
Name:	Rezone areas to create new wetlands/ riparian habitats
Type(s):	Management Coordination, Regulatory
Problem:	Habitat, Sediment

Description: Re-zone (if necessary) and change land use from agricultural (or other) to open spare wetland/riparian habitat. This will increase wildlife habitat and reduce sedimentation and sediment load to rivers and streams. Users would need to be compensated for losses.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Coastal Conservancy -
Other programs: Local land use plans; County master plans; Local area plans

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Growers and landowners.
Cost will include loss of agricultural production and possible reduction in property values.

How Administered:
County planning departments

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
This is a politically sensitive issue. Funds need to be made available to compensate landowners for losses.

Source Strategies: AG-23

Urban

Strategy #:	UR-1
Name:	Atmospheric deposition characterization
Type(s):	Research
Problem:	Toxics, Human Health

Description: Determine whether atmospheric transport (AT) is a significant mechanism for bringing critical pollutants (metals, pesticides, PAHs) to ocean waters.

Pollutant Standards/Objectives to Meet:
Metals, chlorinated pesticides, and possibly PAHs

Relevant Agencies/Associated Program(s):
California Department of Health - Mussel Watch
Air Quality Management Districts (AQMD) - long-term monitoring programs
Environmental Protection Agency (EPA) - Environmental Monitoring and Assessment Program (EMAP)
PG&E - Control Data Site and Source Study
US SCS -
Other Programs: Bay Protection Program

Geographic Area(s):
All ocean segments

Targeted Use(r) and Cost to User: To be determined

How Administered: To be determined

Administrative Costs:
Compilation and analysis of existing air quality data, AT data (if any) and meteorological data would cost $10 K to $30 K and could be completed within three to five months. Field monitoring for AT is estimated to cost $10 K to $25 K per station per year. Costs to develop control strategies are estimated at $50 K to $100 K. Implementation costs could be significant (multimillion dollars).

Financing: To be determined

Prerequisites for Implementation:
1) AT data collected by the AQMD should be compiled and reviewed along with wind rose data collected by NWS, NOAA, and others agencies. 2) If existing data indicates that AT is not a significant mechanism, then abatement strategies are not necessary. 3) Conversely, if existing data indicates that AT is a major input then appropriate control strategies need to be developed and implemented. 4) If existing data is inadequate, a field monitoring program for AT needs to be developed and implemented.

Source Strategies: NP-4

Strategy #:	UR-2
Name:	Geographic information system (GIS) as a nonpoint source (NPS) modeling and monitoring tool
Type(s):	Research, Management Coordination
Problem:	None Apply

Description: GIS can feed land-use and other geographic information into NPS models, making preliminary evaluations of Best Management Practices (BMPs), characterizing NPS, and identifying potential hotspots. NPDES/WDR Permits can be georeferenced for urbanized areas that need to comply with an NPDES Permit or CZARA Section 6217. By using an NPS model, costs for monitoring can be reduced which would reduce the cost of municipal NPDES permit compliance. Modeling would be used in the NPS reduction planning stage for both urban and rural areas. This strategy will potentially be implemented through the CZARA Section 6217g Nonpoint Source Program.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Environmental Protection Agency (EPA) - National Pollutant Discharge Elimination System (NPDES),
NOAA/EPA - CZARA Section 6217
RWQCBs -
SWRCB -
CCC -
AMBAG -

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User: To be determined

How Administered:
The GIS model could be administered on a regional level and could support county/city-wide GIS efforts.

Administrative Costs:
After location selection, the cost for compatible hardware/software, personnel, and system administration would be approximately $750,000.

Financing:
Such a model might be funded through Clean Water Act (CWA) 205(J) funds. A regional "start up" GIS has already been funded through 205(j) (the AMBAG "CAMPITS" project).

Prerequisites for Implementation:
1) Some flexibility may need to be written into the municipal NPDES permitting regulations to allow NPS modeling as a substitute for extensive and costly water quality monitoring. 2) Selection of representative monitoring sites/transects, representative sites for different NPS loadings, and control monitoring sites will require multi-agency coordination to ensure enforceable compliance with federal and state nonpoint source pollution programs. 3) Other GIS efforts at the Federal, state, and local level should be fully coordinated to avoid duplication.

Source Strategies: NP-8

Strategy #: UR-3

Name: Significance of urban runoff as a water quality problem
Type(s): Research, Management Coordination
Problem: Toxics

Description: Determine significance of urban runoff as a water quality problem via baseline monitoring and mass balance budget modeling. This effort would include determining the components of runoff (especially first flush or flush after periods of no precipitation).

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Environmental Protection Agency (EPA) - 205J and National Pollutant Discharge Elimination System (NPDES) (stormwater program)
Regional Water Quality Control Board (RWQCB) -Non-point Source Program (NPS)
AMBAG - Urban Runoff Water Quality Management Plan for the MB Region
Other Programs: Toxic Substance Monitoring (TSM) Program

Geographic Area(s):
All ocean segments

Targeted Use(r) and Cost to User: To be determined

How Administered:
Federal and state agencies - municipalities can assist with the local knowledge; representatives from local water districts can be collectors and disseminators of information.

Administrative Costs:
Millions of dollars for monitoring, assessments, modeling and evaluation

Financing: To be determined

Prerequisites for Implementation:
1) Review existing data/programs monitoring runoff. 2) Review existing marine water quality standards. 3) Assess present mass balance budget models. 4) Establish agreement between agencies on specific standards, components, tests, and protocols. 5) Initiate implementation and correction measures.

Source Strategies: WB-38, WB-39

Strategy #: UR-4

Name: Best management practices (BMPs) for urban runoff problems
Type(s): Regulatory, Management Coordination
Problem: Toxics

Description: Establish regulations for implementing BMPs for urban runoff. This effort would address activities such as: 1) control of oil, grease, and other pollutant discharges into sewers; 2) overflows (i.e., need properly cleaned, functioning drainage systems); 3) reduction of direct conduits to ocean; 4) identification of runoff sources. As a mandated function of CA's CZARA Section 6217g, the Nonpoint Source Pollution Program should be coordinated.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Environmental Protection Agency (EPA) - National Pollutant Discharge Elimination System (NPDES), pretreatment programs, and discharge standards

Geographic Area(s):
MB01; ocean segments 1 and 2

Targeted Use(r) and Cost to User:
Municipalities; Water Districts; areas and activities that produce toxic and polluting substances (i.e., car repairs, photography, boat ramps, vessel areas). Small costs to citizens (less than $5/year).

How Administered:
Through local, county and state agencies.

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
1) Common purpose of programs. 2) Media cooperation.

Source Strategies: WB-37

Strategy #: UR-5

Name: Sedimentation control through grading regulations

Type(s): Regulatory, Management Coordination

Problem: Sediment

Description: Minimize sedimentation from roads by reviewing and upgrading city, county, and state grading ordinances and establishing new ones when necessary. All ordinances should have a minimum level of stringency, mitigation, etc. to prevent sedimentation problems from public and private roads. Enforce existing or revised grading ordinances as part of the; 1) Watershed Management Plan, and 2) CRMP for Watershed and Basin Management Plan. This strategy should be coordinated with CA's CZARA Section 6217g, Nonpoint Source Pollution Program.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
AMBAG - 208 Water Qualtiy Management Plan.
Other Programs: Watershed Management Plan; CRMP for Watershed and Basin Management Plan; State General Plan Law; County grading ordinances; County administrative procedure manuals.

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Road developers/graders. Any land disturbances (i.e., grading, clearing, etc.) would increase the cost of associated operations (i.e., development).

How Administered:
1) Local agency regulations and 2) city and county ordinances addressing roads. AMBAG and ABAG should work with local departments to carry out the program. If local governments do not respond, suggest changes to legislation.

Administrative Costs:
1) Administration, inspection, and enforcement. 2) Approximately $100,000 to review and make recommendations to Reg. C.O.G. 3) Approximately $100,000 for legislative activities. 4) $100,000 per year to AMBAG and ABAG to fund a training program for road crews.

Financing:
AMBAG/ABAG training program could be funded through a state or federal grant. Agency(s) could recover costs through permit fees.

Prerequisites for Implementation:
1) Initiate/increase public awareness concerning the negative impacts roads are having on water quality. 2) Review consistency of road installation requirements by local governments. 3) Establish a program for private roads.

Source Strategies: LU-4, NP-10

Strategy #:	UR-6
Name:	Implement a training program on sedi ment control for road crews
Type(s):	Educational, Management Coordination
Problem:	Sediment

Description: Establish a training program on sediment control measures for road crews.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Other Programs: County grading ordinances; County Administrative Procedures Manuals; existing training programs for operators and supervisors.

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Road developers

How Administered:
AMBAG and ABAG will work with appropriate local departments to carry out the program and review existing training programs.

Administrative Costs:
$100,000/year for AMBAG and ABAG to fund the training program

Financing:
Through State and Federal grants to develop the training program; internal funding mechanisms thereafter.

Prerequisites for Implementation:
Include private road developers

Source Strategies: NP-11

Strategy #:	UR-7
Name:	Land use evaluation
Type(s):	Research
Problem:	Sediment; Watershed Disturbance, Habitat, Wetlands

Description: Evaluate land use, zoning, and development guidelines for adequate watershed protection (re: preexisting entitlement). A primary objective would be to minimize development in rural/agricultural lands to diminish impacts of grading and human habitation in the more remote (non-urban) areas of the MBNMS watersheds.

Pollutant Standards/Objectives to Meet: To be determined

Relevant AgenciesAssociated Program(s):
Local land use plans, (i.e., general plans, land use elements, settlement strategies)

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Cost to users (in evaluation of general plans) may be returned in avoided costs of remote development

How Administered:
Through local land use authorities, assisted by cooperating agencies of the MBNMS partnership. Tools include agriculture preservation programs, conservation and open space, easements, transfer-of-development programs, and general plan amendments.

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation: To be determined

Source Strategies: LU-5

Strategy #: **UR-8**

Name: Landslide debris disposal program
Type(s): Management Coordination, Research
Problem: Sediment; ASBS

Description: Establish landslide debris program since landslides occur regularly along Monterey and San Luis Obispo county coasts, leading to the dumping of debris over the side of Highway 1 to keep it open. This can cause sediment build-up in Areas of Special Biological Significance (ASBS). Similar problems are also occurring in the near-coastal waters of Marin, San Mateo, and Santa Cruz Counties.

Pollutant Standards/Objectives to Meet:
Reduce sedimentation rate

Relevant Agencies/Associated Program(s):
California Department of Transportation - Erosion and Sediment Control Plans and Transportation Planning, Development, and Maintenance Management Program
Other Programs: Local government certified local coastal programs.

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User: To be determined

How Administered:
Through Caltrans and local government public works departments, National Marine Fisheries Service (NMFS), California Department of Fish and Game, Fish and Wildlife Service, Army Corps of Engineers, and various counties.

Administrative Costs: To be determined

Financing:
1) Research funded through environmental enhancement grants.
2) Actual work funded through emergency federal monies.
3) Grant programs include: ISTEA (research), Federal and environmental enhancement grants, Sea Grants, Tolls.

Prerequisites for Implementation:
1)Research and identification of sites. 2) Increase working group.

Source Strategies: LU-9

Strategy #:	UR - 9
Name:	Control of wildlife fecal coliform bacteria (FCB)
Type(s):	Regulatory, Educational, Research
Problem:	Human Health

Description: Control excess fecal coliform bacteria loading to MBNMS through public education, regulations, and research activities. Excess bacteria reduces recreational water contact activities within the Sanctuary. This should include a review and ranking element in order to add other impaired waterbodies.

Pollutant Standards/Objectives to Meet:
Fecal coliform bacteria (<200 MPN FCB)

Relevant Agencies/Associated Program(s):
Regional Water Quality Control Board (RWQCB) - Basin Plans; SWRCB - Impaired Waterbodies Designations; Title 22 California Code of Regulations (CCR), CZARA Section 6217g.

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
People who: 1) feed wildlife in enclosed coastal ponds, lagoons, lakes, estuaries; and 2) come into contact with coastal enclosed waterbodies for recreation as described by RWQCB - Basin Plan (Beneficial Uses). Agricultural grazing lands adjacent to waterbodies are designated as impaired. No cost to users.

How Administered:
Education - Department of Fish and Game (DFG), SCS, NOAA, MBNMS, Elkhorn Slough NERR public education coordinators develop handouts, PSA's, RCDs.
Regulatory - RWQCB set WDR and NPDES for dischargers (set standards on priority). Focus on: 1) most used recreation areas; 2) impact on shellfish beds; 3) impact on other prey species of flood control impaired waterbodies. RWQCB coordinate with Environmental Health Departments.
Research - RWQCB and County Health Departments use Neary Lagoon (city of Santa Cruz Management Plan) and NPDES, Soquel Creek (city of Capitola, Lagoon Management Plan), Seaside/Monterey - Joint Powers Authority Laguna Madre Management Plan, as task forces for baseline.

Administrative Costs:
Education - Develop through existing outreach programs; distribute through parks and existing recreation locations.
Regulatory - NPDES/WDR paid by discharges as per the following ranking : 1) San Lorenzo; 2) Soquel; 3) Elkhorn Slough; 4) Pajaro; 5) Carmel; 6) Salinas; 7) Scott Creek; these are ranked from the highest human use to the lowest for listed impaired waterbodies, frequency of human controlled breaching, pumping or other mechanical means that control water levels & shellfish locations.
Research - Academic institutions should develop technique that differentiates between human and nonhuman FCB. Monitoring costs should decrease (due to coordination between RWQCB and EHS programs) unless more frequent monitoring is needed during high usage.

Financing: To be determined

Prerequisites for Implementation:
1) Field check criteria of strategy against impaired waterbodies
2) Investigate cost of existing monitoring
3) Academic knowledge available to develop new testing

Source Strategies: NP - 2

Strategy #: UR-10

Name: Standardized testing and notification for bacterial contamination
Type(s): Regulatory, Management Coordination
Problem: Human Health

Description: Require standardized testing for bacterial contamination in ocean waters. In addition, develop specific criteria for when public notification is required (e.g., sewage spills to water). Improve/expand on a regional, multilingual notification system to alert the public through the media.

Pollutant Standards/Objectives to Meet:
< 200 MPN FCB

Relevant Agencies/Associated Program(s):
County Department of Environmental Health -
California Department of Fish and Game (notifications are in regs.) -
RWQCBs -

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
General public and municipalities

How Administered:
RWQCBs; County Health Departments; NOAA (only for Sanctuary standards)

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
1) Federal law/Sanctuary regulations governing standard practices for testing and notification. 2) Develop Spanish speaking/writing capabilities within the county health program.

Source Strategies: NP-20, WB-35

Strategy #: UR-11

Name: Outreach program on impacts of toxic materials
Type(s): Education, Regulatory
Problem: Human Health, Toxics

Description: Establish a regional education/outreach program which educates the public on the impacts of toxic materials (including sales). This effort involves developing mutilingual PSAs, brochures for distribution to the public, and a curriculum for school programs addressing household toxics.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
California Environmental Protection Agency -
Department of Environmental Assessment Human Health Hazard -
NOAA - Sea Grant
Department of Fish and Game - Elkhorn Slough NERR

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Public

How Administered:
Administered on a regional basis by AMBAG/ABAG in cooperation with Air Quality Districts and EPA.

Administrative Costs:
Fees could be applied to the sale of toxic materials.

Financing: To be determined

Prerequisites for Implementation: To be determined

Source Strategies: PT - 9

Strategy #: UR-12

Name: Outreach to industries on industrial runoff
Type(s): educational
Problem: Toxics

Description: Provide educational outreach to industries regarding impacts of industrial runoff on the Monterey Bay Sanctuary.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
U.S. Environmental Protection Agency (EPA) - National Pollutant Discharge Elimination System (NPDES) and NPS Program (e.g., SCV NPS program outreach)
NOAA -
AMBAG -
Other Programs: Existing city and county public information programs.

Geographic Area(s):
MB02, MB03, MB04, MB05, MB06a, MB06b, MB06c, MB07, MB08

Targeted Use(r) and Cost to User:
Industrial, commercial and institutional (hospitals, military, universities) workers.
Costs would depend on scope of overall program.

How Administered:
NOAA (through Sanctuary Program); city/county Non-Point Source (NPS) program.

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
1) Funding mechanism. 2) Commitment of qualified staff; bilingual capabilities.

Source Strategies: NP- 12

Strategy #: UR-13

Name: Sensitive land protection
Type(s): Regulatory, Management Coordination
Problem: Habitat, ASBS, Biodiversity, Endangered Species, Wetlands, Erosion, Sediment

Description: Identify sensitive lands that should not be developed while developing mechanisms for protection through public acquisition, conservation easements, Transfer Development Credits (TDC's), or down zoning. Primary objectives are: 1) to protect the natural role of wetlands to filter sediments and reduce nutrients; 2) to prevent grading/construction on steep slopes; 3) to reduce sediment inputs/soil erosion; 4) to prevent loss of habitat and native plant/animal populations; and 5) to protect rare and endangered species and their habitats.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Department of Fish and Game - Wildlife Conservation Board which can give permission to purchase land; Nature Conservancy; Coastal Conservancy.
Other Programs: Wildlife Heritage Lands; Inland Wetland Conservation Program; California Riparian Habitat Conservation Program.

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Landowners/developers

How Administered:
Inventory and identify sensitive lands and zone appropriately

Administrative Costs: To be determined

Financing:
Through Coastal Conservancy, land trusts, and local government planning agencies.

Prerequisites for Implementation:
Identify sensitive areas and designate through general plan or zoning designation.

Source Strategies: LU-6

Marinas/Boating

Strategy #:	B-1
Name:	Enforce existing regulations on wastewa ter discharge from boats
Type(s):	Regulatory, Management Coordination
Problem:	Spills, Toxics

Description: Increase enforcement of Federal and State laws governing the discharge of wastewater from vessels into marine waters. Users must be made aware of the impacts of wastewater and the importance of using pump-out stations.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
US Coast Guard - regulations for head discharge -
NOAA - Sanctuary regulations (no discharge in Sanctuary) -
California state law - no discharge within 3 miles -
Dept. of Fish & Game - Oil Spill Prevention

Geographic Area(s):
Ocean Segments 1, 2, and 3

Targeted Use(r) and Cost to User:

How Administered:
Through cooperation of harbors and the Sanctuary

Administrative Costs:
≈ $1,000

Financing:

Prerequisites for Implementation:
Identify boat traffic patterns.

Source Strategies: WB-27

Strategy #:	B-2
Name:	Increase the number of pumpout stations
Type(s):	Management Coordination
Problem:	Spills, Toxics, Habitat

Description: Increase the accessibility to, and number of pumpout stations or alternative systems available to boaters. Users must be made aware of the impacts of wastewater and the importance of using pumpout stations. Pumpout stations must be operational year-round. Funds could also be provided to alleviate the cost of retrofitting vessels.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
US Coast Guard - regulations for head discharge
NOAA - Sanctuary regulations (no discharge in Sanctuary)
California state law - no discharge within 3 miles
Dept. of Fish & Game - Oil Spill Prevention
RWQCBs - grants.

Geographic Area(s):
Ocean Segments 1, 2, and 3

Targeted Use(r) and Cost to User: To be determined

How Administered: To be determined

Administrative Costs:
≈ $2,000 - $3,000 per station

Financing: To be determined

Prerequisites for Implementation:
Identify boat traffic patterns and obtain funding.

Source Strategies: WB-27, WB-29

Strategy #:	B-3
Name:	Educate users on proper disposal of vessel wastes
Type(s):	Management Coordination
Problem:	Spills, Toxics

Description: Educate the boating public on existing disposal regulations, accessibility to pumpout stations, and the adverse impacts of improper waste disposal.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
US Coast Guard - regulations for head discharge
NOAA - Sanctuary regulations (no discharge in Sanctuary)
California state law - no discharge within 3 miles
Dept. of Fish & Game - Oil Spill Prevention
RWQCBs - grants.

Geographic Area(s):
Ocean Segments 1, 2, and 3

Targeted Use(r) and Cost to User:
The boating public

How Administered: To be determined

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
Funding

Source Strategies: WB-7, WB-27, WB-29

Strategy #:	B-4
Name:	Identify vessels leaking wastewater into the Sanctuary
Type(s):	Regulatory, Management Coordination
Problem:	Spills, Toxics

Description: Live aboards and long-term visitor vessels in harbors often leak wastewater. This strategy will identify these vessels by placing a colored substance in the heads. If the colored substance appears in the water, the vessel is leaking wastewater. Once identified, these types of discharges can be eliminated. This will help keep the beaches and harbors free of wastewater pollution.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Clean Water Act
Local harbor regulations
Coast Guard regulations

Geographic Area(s):
Ocean Segments 1-3

Targeted Use(r) and Cost to User:
Vessel owners

How Administered:
Harbor Master and staff will determine when and which boats to target. This will be done randomly.

Administrative Costs: To be determined

Financing:
Initial costs recoverable through fines. Cleaner beaches and harbors would increase visitation and draw in additional dollars.

Prerequisites for Implementation:
1) Educate boat owners. 2) Determine if a problem exists through regular monitoring. 3) Review the southern CA - San Diego Port - for success and cost of their existing program.

Source Strategies: WB-28

Strategy #:	B-5
Name:	Evaluate the impacts of tributyl tin (TBT) on Sanctuary resources
Type(s):	Management Coordination, Research
Problem:	Toxics

Description: Evaluate ecological impacts of TBT on the Monterey Bay Sanctuary. Evaluate current monitoring data and regulatory programs to seek alternatives to TBT.

Pollutant Standards/Objectives to Meet: To be determined

Relevant AgenciesAssociated Program(s):
RWQCB -
Dept. of Fish and Game -
US EPA -
Dept. of Pesticide Regulation -
NOAA -

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
Boat and ship owners

How Administered:
Coordinated through US EPA and the Dept. of Pesticide - registration/regulatory process.
NOAA should research alternatives to TBT

Administrative Costs:
Unknown

Financing: To be determined

Prerequisites for Implementation:
1) Coordination between US EPA/CA EPA/Dept. of Fish and Game/NOAA.
2) Assess necessity of continuing monitoring and effectiveness of current regulatory program.

Source Strategies: AG-21

Hydromodification

Strategy#:	HY-1
Name:	Develop and implement BMPs to reduce sediment loads
Type(s):	Management Coordination, Research
Problem:	Watershed Disturbance, Sediment

Description: Implement BMPs (from g-Guidance). This includes alternative land management practices, water barriers, and diversions that will reduce sediment loads to streams, wetlands, and coastal waters. This will help protect resources.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Coastal Conservancy; Soil Conservation Service; Resources Conservation District; Regional Water Quality Control Boards

Geographic Area(s):
All watershed areas.

Targeted Use(r) and Cost to User: To be determined

How Administered: To be determined

Administrative Costs: To be determined

Financing:
Grants.

Prerequisites for Implementation: To be determined

Source Strategy(s): NP-21

Strategy#:	HY-2
Name:	Reduce the impacts of tidal scour in Elkhorn Slough
Type(s):	Management Coordination, Research
Problem:	Erosion - Tidal Scour

Description: Reduce tidal volume and currents in Elkhorn Slough via existing but unused tide gates, adding new dikes with tide gates, and by constructing new and repairing old levees. This will help: 1) reduce/eliminate loss of salt marsh habitat; 2) create fresh water wetlands to buffer Elkhorn Slough and MBNMS from agricultural runoff; 3) enhance groundwater recharge and reduce saltwater intrusion; and 4) will convert three large salt marsh areas to freshwater/brackish wetlands.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Elkhorn Slough NERR; Army Corp of Engineers (ACOE) - 404
Other Programs: North Monterey County Management Plan

Geographic Area(s):
MB06a

Targeted Use(r) and Cost to User:
1)Bloom/Porter Marsh - repair of tide flaps (<$20,000); 2) North Marsh - use of existing gates ($0); 3) Construction of short dike to close mouth of Parson's Slough under SPRR Bridge and installation of weir/culvert ($100,000).

How Administered:
Through Elkhorn Slough NERR, ACOE, MBNMS, Moss Landing Harbor District, county support, and the Nature Conservancy.

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
Feasibility study and permits.

Source Strategy(s): HM-10

Strategy#:	HY-3
Name:	Construct a sill at the mouth of Elkhorn Slough
Type(s):	Management Coordination, Research
Problem:	Erosion - Tidal Scour

Description: Eliminate the continuing loss of salt marsh habitat in Elkhorn Slough by constructing a sill at its mouth. This will help reduce ersion by reducing tidal volume.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
ACOE - Section 10

Geographic Area(s):
MB06a

Targeted Use(r) and Cost to User:
$1,000,000 for sill construction, $500,000 local match to the ACOE.

How Administered:
ACOE, Moss Landing Harbor District.

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
Feasibility study; control structures on Parson Slough, North Marsh, and Bloom Porter Marsh; and permits. This is a long-term, public works project that will require an EIS.

Source Strategy(s): HM-11

Strategy#:	HY-4
Name:	Increase wetlands at the mouth of the Salinas River
Type(s):	Management Coordination, Economic, Research
Problem:	Wetlands

Description: Close the levee slide gate from the Salinas River into the Moss Landing Harbor. This would return the Salinas River mouth to a more natural setting with more wetlands by increasing the level of water. The Salinas River is diverted now into the Moss Landing Harbor at all times except high river flow. This strategy would increase wetland areas. However, Conservation easements would need to be provided to farmers to compensate them for seasonally flooded lands, unless the lands are determined to be subject to public trust. This requires a State Lands Commission review.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Monterey County Water Resources Agency
Other Programs: Salinas Valley Water Resources Management Study; Existing estuary planning documents

Geographic Area(s):
MB06c

Targeted Use(r) and Cost to User:
Some farm land would seasonally be inundated with fresh/brackish water.

How Administered: To be determined

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
Designation of a Flood/Resource Management authority. Agreement by farmers to apply for and accept conservation easements. The possible adverse impacts to the U.S. Salinas Wildlife Refuge would have to be researched.

Source Strategy(s): HM-8

Strategy#:	HY-5
Name:	Research the impacts of river mouth breakouts
Type(s):	Research, Management Coordination
Problem:	Toxics

Description: Agricultural pesticides are extensively used in the watersheds surrounding the Sanctuary. These chemicals enter waterways from runoff and agricultural return flow and make their way towards the Sanctuary water as nonpoint source pollution. Through much of the year, the mouths of all regional rivers are blocked by berms, forming lagoons. The lagoons can act as natural sedimentation basins, with chemicals accumulating in the bottom sediment. When the berms are breached, either by natural runoff or through mechanical means as flood control measures, the sediment and associated chemicals may enter the Sanctuary. The objectives of this strategy are to address the following questions: What is the timing of rivermouth breakout?; Do the chemicals go out in one major pulse, or are discharges spread out over time?; How does the timing of mechanical breaching of berms effect the amount of chemicals entering the Sanctuary? This research strategy can be used to better manage the timing of rivermouth breaching to minimize the potential impact of chemical discharges into the Sanctuary, and to help determine action levels for discharge permits. The questions addressed by this strategy are fundamental to understanding many of the other Sanctuary wide marine pollution issues, including the fate of pesticides in the Sanctuary, and are essential in developing an overall pollution budget for the Sanctuary. These are not easy questions to answer, and will require innovative techniques to produce useful results. A strong research background will therefore be a necessity in the group performing the work.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Soil Conservation Service - Erosion-control programs; CCC; ACOE; CA Dept. of Fish & Game; U.S. Fish & Wildlife Service.
Other Programs: State Mussel Watch; Toxic Substances Monitoring Program; Bay Protection Program

Geographic Area(s):
Rivers and major creek drainages associated with Ocean Segment 2.

Targeted Use(r) and Cost to User:
The major groups potentially affected by the results of the research are the agencies (Flood Control Districts and County/local maintenance groups) responsible for opening rivermouths. Although they already are required to have permits, many still operate under emergency permit authority. Additional permit conditions concerning timing may be instituted. Additional costs would probably be minimal. Research could also indirectly result in recommendations for changes in farming practices.

How Administered:
The program should be administered through the funding agency. Since the research would require significant numbers of laboratory analyses, the involvement of Fish and Game's analytical labs will be critical.

Administrative Costs:
A 3 year budget of $50K-$100K/year would allow both collection of multi-year data and a phased approach to field experiments.

Financing:
Possible funding agencies include the EPA, the State and Regional Water Quality Control Boards, and the various water management districts.

Prerequisites for Implementation:
Funding

Source Strategy(s): AG-37

Strategy#: HY-6

Name: Improve flows from large existing reservoirs

Type(s): Regulatory

Problem: Watershed Disturbance, Habitat

Description: Improve duration and discharge of flows downstream from large existing reservoirs. This will increase the area of wetted perimeter/hydraulic radius of streams below impoundment structures and help improve degraded rearing habitat. This will provide protection for juveniles, smolts, and "Young of the Year" steelhead on critical streams with large existing reservoirs.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Department of Fish andGame - water rights (allocation of water); CA Division of Water Rights
Other Programs: Anadromous Fisheries Program Act

Geographic Area(s):
MB04, MB06b, MB08

Targeted Use(r) and Cost to User: To be determined

How Administered:
Through local water management agencies, California Department of Fish and Game and/or private companies owning reservoirs. Memorandums of Agreement.

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
Ability to commit greater percentage of impounded waters for downstream habitat needs. Knowledge of I.F.I.M. process.

Source Strategy(s): HM-12

Strategy#: HY-7

Name: Revise and remediate present flood control practices

Type(s): Regulatory, Research

Problem: Watershed Disturbance, Groundwater, Habitat

Description: Revise current flood control practices which channelize and devegetate riparian corridors. These practices divert water from infiltrating and recharging aquifers. Dechannelize and vegetate impacted rivers and streams. (Also see Strategy HY-1).

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Department of Fish andGame - 1600; CA Riparian Habitat Conservation Program (AC OE, EPA, U.S. Fish & Wildlife, CCC)
US SCS/RCD
Other Programs: Anadromous Fisheries Program Act

Geographic Area(s):
All watershed areas.

Targeted Use(r) and Cost to User: To be determined

How Administered:
Flood Control Agencies, ACOE

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
Update and redesign flood control protocols.

Source Strategy(s): HM-5

Strategy#:	HY-8
Name:	Encourage the use of environmentally sensitive flood control techniques
Type(s):	Education, Research
Problem:	Watershed Disturbance, Habitat, Groundwater

Description: Encourage the use of more environmentally sensitive flood control measures such as terraced channels, non-armored channels, use of flood plains, levee setbacks, etc. This will help limit the use of armored (concrete, rip rap) channelization and allow for revegetation of riparian areas. It will also help increase the rate of groundwater recharge. (Also see Strategy HY-1).

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Army Corps of Engineers; Local (County), Coastal programs; Department of Fish and Game - 1600;
Santa Cruz County - Watershed Programs on alternative flood control; Public Works Department
Other Programs: Salinas and Pajaro River/Lagoon Management Plans, San Lorenzo River Enhancement Plan

Geographic Area(s):
All watershed areas.

Targeted Use(r) and Cost to User:
Farmers, dairy owners, nursery owners, grazeland owners, anyone who owns rural land that has a riparian area. Most of the alternatives discussed will result in a cost savings to the land owner. Traditional flood control techniques such as concrete channels, rip rap channels and **gabion baskets** are very expensive. Cost increases as more land is needed to accommodate the alternative.

How Administered:
If the sanctuary supports the concept of Coordinated Resource Management Plans (CRMP), and assists in the establishment of CRMPs throughout the region, they would be the tool to distribute materials and educate.

Administrative Costs:
Outreach and education is fairly inexpensive.

Financing: To be determined

Prerequisites for Implementation:
1) Compile information from agencies and consultants (if possible) concerning alternatives to concrete/rip rap channelization; 2) distribute to landowners and anyone (e.g. SCS engineers, Flood Control Engineers) involved in tackling flood control problems; and 3) a thorough understanding of traditional and non-traditional flood control techniques.

Source Strategy(s): AG-26

Strategy#:	HY-9
Name:	Establish regulations requiring the use of gabion baskets where applicable
Type(s):	Regulatory
Problem:	Watershed Disturbance, Groundwater, Habitat

Description: Gabion baskets allow flood waters to spread while stabilizing channel banks. This enhances groundwater recharge by increasing the ponding of water, and helps restore wetland/riparian habitats.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Department of Fish and Game - 1600

Geographic Area(s):
MB05, MB06b

Targeted Use(r) and Cost to User: To be determined

How Administered:
Through local jurisdictions responsible for stream bank stabilization and/or levee maintenance.

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
1) Look at uses of lands adjacent to existing levees; 2) decide on areas acceptable for diversion of waters; and
3) design concept plans incorporating public amenities for levee areas.

Source Strategy(s): HM-3

Nonpoint Source General

Strategy#: NPG-1

Name: Determine the applicability and feasibility of CZARA Section 6217 to each watershed

Type(s): Management Coordination, Research

Problem: Toxics

Description: Research applicability and feasibility of the new CZARA Section 6217 coastal nonpoint pollution control program to each watershed adjacent to the Sanctuary specific to management measures regarding: 1) sediment/erosion control; 2) grazing and other livestock operations; 3) pesticide and fertilizer use; 4) wetland and riparian area alteration; 5) agricultural runoff (irrigation and stormwater), and 6) hydromodification. These include the development of individual management plans for each issue. Encourage and implement demonstration projects to test performance/cost of specific management practices. Expand public information program to explain program goals and development to the general public and other local, state, and Federal agencies in the Monterey region.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
State Water Boards (Regional and State) - NPS Programs
Coastal Commission & Local Coastal Programs - Coastal Program
Santa Cruz County US SCS/RCD -
County - Agriculture programs
Farm Bureau -
Regional committees/associations -
BMP Advisory Committee -
Army Corps of Engineers - Flood Control Program
Other programs: Bays and Estuary Programs; Environmental Health requirements; NPDES Program; CWAC sections 404/401 requirements

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Any operationhaving the potential for impacting coastal waters/resources

How Administered:
Through inter-agency coordination. Ensure regional participation in Technical Advisory Committees for the development of the program, and explore possibility of conducting a regional workshop to discuss specific management measures contained in EPA's guidance document.

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
1) Identify local and regional programs already involved with implementing similar management measures. 2) Establish which programs already implement the management measures and practices contained in the EPA guidance and evaluate their effectiveness in protecting resources in the region. 3) Determine if geographic or programmatic gaps exist in management programs.

Source Strategies: AG-6, AG-7, AG-8

Strategy #: WM-1

Name: Golf course water conservation
Type(s): Economic, Research
Problem: Low Flows

Description: Coastal golf courses and adjacent parks need to convert to nonpotable water like nine Pebble Beach courses are doing in 1994. A combination of recycled stormwater and reclaimed sewer water can almost completely reduce the amount of drinking water used, avoiding much of the rationing stress during droughts. Effluent mixed with recycled stormwater in a joint-use reservoir will double available irrigation water in coastal areas, while economically reducing total costs needed to produce turf for golf courses and parks. Health Department standards need to be used for irrigation. New courses should use PGA adopted standards.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Programs: Sewage plant reclamation; State Stormwater Quality Task Force specifications of 1993-1994.

Geographic Area(s):
MB01, MB02, MB03, MB04, MB05, MB06c, MB07, MB08

Targeted Use(r) and Cost to User:
In the long run, both private and public golf courses, parks and cemeteries will have approximately a 10-20% decrease in water costs by converting to reclaimed water.

How Administered:
Water and sewer districts can facilitate this conversion through integrated resource management. Northern California Golf Association (NCGA) in Pebble Beach can also assist with this effort.
The Pebble Beach or Southern California Recycling Projects could be used as models.

Administrative Costs: To be determined

Financing:
The Fort Ord Reuse Program may get special funds for recycling stormwater.

Prerequisites for Implementation:
Develop workshops and outreach like the MPWMB rainwater symposium of January 6, 1979 and DWR bulletin May 2-3, 1981.

Source Strategy: *NP-17*

Strategy #: WM-2

Name: Wastewater reuse
Type(s): Regulatory, Management Coordination
Problem: Toxics, Wetlands, Habitat, Human Health, Low Flows

Description: Reuse treated wastewater to: 1) supplement water supply; 2) reduce mass of pollutants discharged to receiving water; 3) irrigate recreational areas and cropland; 4) use for industrial activities; and 5) enhance and create wetlands. Water reuse should be required with any treatment plant expansion proposal to tie growth to reuse. Local zoning ordinances should include a requirement for dual piping of potable and nonpotable water. Nonpotable reclaimed water should be used for all nondrinking purposes.

Pollutant Standards/Objectives to Meet:
Toxic pollutants, heavy metals, mass limits; reclamation standards (e.g. Carmel WWTP); upgrades to tertiary standards.

Relevant Agencies/Associated Program(s):
Environmental Protection Agency (EPA) - National Pollutant Discharge Elimination System (NPDES), Title 22: water use standards, ground water recharge;
EPA - Clean Water Act;
Regional boards - revision of Basin Plans;
MPRSA - coordination with local water agencies to maximize benefits regarding agricultural use and seawater intrusion.

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
POTW's; WWTP's discharging directly or indirectly into sanctuary; recreational users; and oil dischargers.
Industry also has to construct facilities.
Costs could be substantial to construct reuse facilities (pumping, piping, distribution).
Cost of upgrading from secondary to tertiary treatment level could be $5-10 million.

How Administered:
1) DOHS establishes use standards.
2) Through Regional Water Quality Control Board (RWQCB) NPDES Permit Program with encouragement and discussions with NOAA and MBNMS
3) Utilities regulate individual users.

Administrative Costs:
Costs should be passed down to utilities as much as possible.

Financing:
Through Federal grant or procurement

Prerequisites for Implementation:
1) User acceptance of the concept of reusing treated wastewater for beneficial purposes; 2) funding for upgrades; 3) educational cooperation with agricultural community and all dischargers; and 4) development of programs where wastewater is used for specific purposes (e.g. irrigation needs, low water periods, etc.)

Source Strategies: PT-16, PT-19, WB-25

Strategy #: WM-3

Name: Study of water use
Type(s): Research
Problem: Low Flows, Habitat, ASBS, Biodiversity, Toxics, Human Health, Wetlands, Water shed Disturbance

Description: Identify sources and conduct study of water use to determine its impact on water-bodies. Objectives should include: 1) increase stream flows; 2) increase and enhance aquatic habitat; 3) increase pollution dilution; 4) identify sensitive areas; and 5) enhance conservation.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
DWR;
State Water Resources Control Board (SWRCB);
Regional Water Quality Control Boards (RWQCB);
United States Geological Survey (USGS)
US SCS - Watershed Planning Program

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Landowners

How Administered:
Through local water agencies, USGS, and watershed planning efforts

Administrative Costs:
Costs for data synthesis, staff time to compile/review data, equipment to be purchased, and publication of final document

Financing: To be determined

Prerequisites for Implementation:
Identify study protocol

Source Strategy: *AG-31*

Strategy #: WM-4

Name: Water management planning
Type(s): Regulatory, Management Coordination, Research
Problem: Groundwater, Low Flows

Description: Identify areas where direct diversion or groundwater pumping is responsible for drying up streams and tributaries to Monterey Bay. Create water management planning and strategies which protect and/or oversee downstream and instream beneficial uses and reduce groundwater overdraft. Identify groundwater recharge areas.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Habitat Restoration and Water Quantity, and Quality Management Planning

Geographic Area(s):
MB04, MB05, MB06b, MB08

Targeted Use(r) and Cost to User: To be determined

How Administered:
Through Memorandums of Agreement (MOA); county water agencies; agreements with California Department of Fish and Game, mosquito abatement, and flood control districts; watershed and groundwater basin management plans; and existing water resource staff

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
1) Support for in-stream beneficial uses. 2) Funding sources for water management planning.
3) Ability to achieve consensus on problems. 4) Use Interim Relief Plan and Monterey Peninsula Water Management District plans as models.

Source Strategy: *HM-9*

Strategy #: WM-5

Name: Install water meters on agricultural wells
Type(s): Regulatory, Economic
Problem: Groundwater, Low Flows

Description: Install water meters on all nonregulated agricultural wells. This effort would allow total groundwater management in all areas where runoff occurs into the Sanctuary. Better management might lead to a more efficient use of water and nutrients, increasing water quality in the Sanctuary.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Monterey County and Santa Cruz County - ordinances;
PVWMA;
MCWRH;
Monterey Peninsula Water Management District (MPWMD)

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
Estimated $3,000 - $10,000 per well for metering system; approximately $17 million in Salinas Valley

How Administered:
Administered by the County Water Resource Agency

Administrative Costs:
Cost of administering a meter ordinance of this magnitude is over $1,000,000 per year.

Financing:
Through county governments with funds coming from property taxes

Prerequisites for Implementation: To be determined

Source Strategy: *AG-11*

Strategy #: WM-6

Name: Back-flow prevention in water wells
Type(s): Regulatory
Problem: Toxics, Human Health, Groundwater

Description: Retrofit existing wells to prevent back siphonage of chemicals introduced through chemigation and fertigation. Reduce introduction of chemicals, fertilizers and pesticides into groundwater bodies, especially those providing base flow to streams.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
Regional Water Quality Control Board (RWQCB) - groundwater contamination programs;
? - flow meter installation programs

Geographic Area(s):
MB05, MB06b

Targeted Use(r) and Cost to User: To be determined

How Administered:
Through environmental health, water resource agencies (Memorandums of Agreement), water conservation staff and sanitarians

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
Need for consensus on back-flow prevention associated with water wells.

Source Strategy: *HM-16*

General

Strategy #: GEN-1

Name: Add watershed management and nonpoint source elements to State general plan law
Type(s): Management Coordination
Problem: Watershed Disturbance

Description: Change the State General Plan Law to include watershed management and NPS elements. The Coastal Act could also be amended to require the same for all LCPs. The objectives of this strategy should be similar to those of the National Pollutant Discharge Elimination System (NPDES) and the Coastal Zone Act Reauthorization Amendment (CZARA), Section 6217 to increase and improve water quality for all streams and the Sanctuary. All local ordinances, CIPs, plans, codes, etc. must be consistent with the General Plan, according to the General Plan Law.

Pollutant Standards/Objectives to Meet:
All, specifically those addressed by NPDES and CZARA Section 6217

Relevant Agencies/Associated Program(s):
U.S. EPA - NPDES Program
CZARA - Section 6217 Requirements
RWQCB - Basin Plans

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
All local jurisdictions for General Plan Law amendments and coastal jurisdictions for Coastal Act amendments. Costs to jurisdictions and developers would likely increase.

How Administered:
If the General Plan adopted watershed management and NPS elements, all planning and development activities would have to address watershed management and NPS pollution, and mitigate for it.

Administrative Costs: To be determined

Financing:
SWRCB, U.S. EPA, and General funds

Prerequisites for Implementation:
1) Political will at state level. 2) Encouragement by EPA and NOAA. 3) State Program recommendation by SWRCB & CCC for CZARA Section 6217 NPS implementation strategy. 4) Arbitration at the COG level if resistance and disputes result.

Source Strategies: NP-7, LU-2

Strategy #: GEN-2

Name: Implement coordinated resource management planning

Type(s): Management Coordination

Problem: Watershed Disturbance

Description: Implement Coordinated Resource Management Planning (CRMP) for each major watershed in the planning area. This will ensure communication, cooperation and coordination between Federal, state, and local government agencies, nonprofit groups, and landowners associated with the watersheds. Provide a process by which multi-jurisdictional, multi-disciplinary phenomena can be addressed, monitored, and managed. The purpose of CRMP plans is to: 1) gather information on resource management issues/problems; 2) determine which actions can best address those problems; 3) evaluate and build on existing successful programs; and 4) investigate funding and other implementation resources.

Pollutant Standards/Objectives to Meet:
All

Relevant Agencies/Associated Program(s):
CA Dept. of Conservation - MOU with various state agencies
CA Dept. of Fish & Game - Local watershed restoration plans
RWQCB - Basin Plans
US SCS/RCD
Other programs: Existing CRMPs

Geographic Area(s):
All watershed areas

Targeted Use(r) and Cost to User:
All users and landowners at a minimal cost

How Administered:
NOAA should take the lead in funding the start-up of each CRMP. The MBNMS or a "rotating chair" lead agency could provide overall coordination. Each watershed will have its own coordinator. Management actions and projects should be reviewed in regularly scheduled general meetings.

Administrative Costs:
NOAA should fund the CRMP Coordinators - approximately $100,000/year for each watershed. The Coastal Commission should provide an administrator at approximately $75,000/year. SWRCB (319) funds can be used to develop supporting educational materials.

Financing:
NOAA, SWRCB, and CCC funds

Prerequisites for Implementation:
1) Funding; 2) support by general public; and 3) political leverage

Source Strategies: LU-3, NP-14, NP-18

Strategy #: GEN-3

Name: Programs and policies related to water quality
Type(s): Management Coordination
Problem: All

Description: Compile existing program, including policy descriptions and contacts. Evaluate their strengths and weaknesses. Determine the potential for improvement.

Pollutant Standards/Objectives to Meet:
All

Relevant Agencies/Associated Program(s):
AMBAG

Geographic Area(s):
All watershed areas and ocean segments except MB06a-MB06c

Targeted Use(r) and Cost to User: To be determined

How Administered:
Administered by the research coordinator with oversight by the MBNMS manager

Administrative Costs:
Salary for the research coordinator

Financing: To be determined

Prerequisites for Implementation:
1) Funding; 2) filling the research coordinator position (see Strategy GEN-4); and 3) site characterization (see Strategy GEN-6)

Source Strategy: WB-14

Strategy #: GEN-4

Name: Scientific research initiative
Type(s): Administrative, Research
Problem:

Description: Encourage and coordinate research activities within the MBNMS

Pollutant Standards/Objectives to Meet:
Not applicable

Relevant AgenciesAssociated Program(s):
Multiagency/Multiprogram

Geographic Area(s):
MBO1-MBO3;MBO7-MBO9; Ocean Segment 1-3

Targeted Use(r) and Cost to User:
Scientists and agencies. Cost not applicable

How Administered:
Through research coordinator position

Administrative Costs:
Funding for research coordinator position

Financing: To be determined

Prerequisites for Implementation:
Position funding/filling

Source Strategy: WB-13

Strategy #: GEN-5

Name: Scientific research initiative
Type(s): Administrative, Research
Problem: All

Description: Identify existing information and data

Pollutant Standards/Objectives to Meet:
Not applicable

Relevant Agencies/Associated Program(s):
NOAA - Sanctuary Program

Geographic Area(s):
MBO1-MBO3;MBO7-MBO9; Ocean Segment 1-3

Targeted Use(r) and Cost to User: To be determined

How Administered:
Administered by MBNMS and contracted accordingly

Administrative Costs:
$100,000/year until objectives met

Financing: To be determined

Prerequisites for Implementation:
1) Funding and 2) contractor selection

Source Strategy: WB-16

Strategy #: GEN-6

Name: Coordinate research activities
Type(s): Management Coordination
Problem: All

Description: Encourage and coordinate all research activities within the MBNMS. This should include identifying existing information and data to formulate a site characterization.

Pollutant Standards/Objectives to Meet:
All

Relevant Agencies/Associated Program(s):
NOAA - Sanctuary Program
MBNMS Research Advisory Committee -

Geographic Area(s):
All watershed areas and ocean segments except MB06a-MB06c

Targeted Use(r) and Cost to User: To be determined

How Administered:
Administered by the the Sanctuary and the research coordinator

Administrative Costs:
Approximately $100,000/year

Financing:
NOAA

Prerequisites for Implementation:
1) Funding; 2) filling the research coordinator position; and 3) selecting a contractor for conducting the site characterization.

Source Strategies: WB-13, WB-16

Strategy #: GEN-7

Name: Coordinate permit review
Type(s): Management Coordination
Problem: Toxics

Description: Develop methods to increase coordination of responsible State and Federal agencies and interested parties relating to toxic pollution enforcement, permit review, existing contamination, and electronic coordination.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
NOAA -
Department of Fish and Game -
California Coastal Commission -

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
Appropriate Federal and State agencies

How Administered:
By Research Coordinator in cooperation with NOAA, EPA, Army Corps of Engineers, CA Department of Fish and Game, and CA Coastal Commission

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation:
Create an interagency task force, to include interested parties, facilitated by Sanctuary management.

Source Strategies: *WB-3, WB-4, WB-15*

Strategy #: GEN-8

Name: Ensure evaluation of toxic hot spots
Type(s): Management Coordination
Problem: Toxics: Heavy metals

Description: Support the Bay Protection and Toxic Clean up Program (BPTCP). This program ranks known and potential toxic hot spots (THS) as to severity, identifies sources, then develops cleanup plans. Ranking of THS is required by legislation authorizing BPTCPs for enclosed bays/estuaries and Monterey Bay.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
SWRCB - BPTCP

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User: To be determined

How Administered:
SWRCB/RWQCB staff develop the information to rank the sites

Administrative Costs: To be determined

Financing:
Through annual fees paid by dischargers to estuary, bay, and coastal lagoons (Monterey Bay included in BPTCP)

Prerequisites for Implementation:
Authorize legislation in place and a schedule for program implementation.

Source Strategy: *WB-22*

Strategy #:	GEN-9
Name:	Expand and organize regional monitoring plan
Type(s):	Management Coordination, Monitoring
Problem:	Toxics: Heavy metals, nutrients, pesticides

Description: Coordinate and expand regional monitoring efforts to be more inclusive, consistent, and better targeted. Assure monitoring programs extend over a useful time period to generate years of data. Make sure all areas are sampled frequently and efficiently, and nonduplicate, user-friendly data base is established for all existing monitoring data by research institutions, the discharger, and county and city monitoring programs.

Pollutant Standards/Objectives to Meet:
Narrative standards in the Bays and Estuaries Water Quality Control Plans and Ocean Waters WQCP (i.e., no acute toxicity in mixing zones); no chronic toxicity in other waters.

Relevant Agencies/Associated Program(s):
U.S. EPA - EMAP; CWA
SWRCB/RWQCB - Basin Plan Regional Monitoring Program (unfunded)
Department of Fish and Game -
State Environmental Health -
Municipality Water Districts -
State Health -
Other programs: State Mussel Watch Program

Geographic Area(s):
Ocean Segments 1-3

Targeted Use(r) and Cost to User:
For urban areas already supporting effluent and Regional Wastewater Management Programs, cost could decrease. For other communities (San Lorenzo Valley and Cambria/San Simeon), cost would increase.

How Administered:
Federal and State agencies cooperative effort: EPA (lead agency?), NOAA, SWRCB/RWQCB, etc. Fish and Game on contract to SWRCB. Each agency would assign someone to comment and coordinate tasks.
Data collection from various local research institutions and state and local agencies. Coordinated by MBNMS Research Coordinator/Water Quality Specialist and Research Subcommittee. Coordinate meetings with all parties currently monitoring Sanctuary waters.

Administrative Costs:
MBNMS - staff costs to collect and organize data ($100,000-$500,000/yr).
Additional costs for development and maintenance of new monitoring stations.
State Health - doubling of current money spent on this activity.

Financing:
Refine or better target monitoring efforts for STP outfall and industrial outfalls so funds could be diverted to a Sanctuary Monitoring Program. Divert some of RWQCB lab contract funds to Sanctuary Monitoring Program. Divert some of existing NPDES monitoring funds to Sanctuary Monitoring Program. Provide funds with contributions from Cambria, San Lorenzo Valley communities and others that don't currently fund RWM. Provide funds with Federal Sanctuary money. Apply funds (or part of savings) to kitty for Sanctuary Monitoring Program. Nonurban areas (county areas) should also be tagged due to agricultural runoff, etc.
Use BPTCP fee system for dischargers to enclosed bays, estuaries, and Monterey Bay.

Prerequisites for Implementation:
1) Participation of Federal, State and regional agencies currently (or planning to) monitoring in California bays, estuaries, and ocean waters. 2) Phone list and up-to-date news and numbers.

Source Strategies: PT-18, WB-23, WB-34, WB-44

Strategy #:	GEN-10
Name:	Improve public notification of water quality problems
Type(s):	Management Coordination
Problem:	Human Health

Description: Human health must be protected from excessive exposure to toxic chemicals in fish tissue and water and from bacterial contamination (FCB). Improve coordination and communication between existing programs addressing human health. Develop specific criteria when public notification is required (i.e., sewage spills to water). Improve/expand on regional (multilingual) notification systems to alert the public (media). Utilize the existing Surf Rider and Save-Our -Shores telephone hotlines.

Pollutant Standards/Objectives to Meet:
All constituents

Relevant Agencies/Associated Program(s):
County Department of Environmental Health -
NOAA - MBNMS Act, CZMA
Surf Rider -
Bluewater -
EPA -
SWRCB -
County DHS -
Cal/EPA-DEHHA -
California DHS, Food and Drug Branch - Shellfish Program
Department of Fish & Game - (as a resource); relevant public group representation
Other programs: State Environmental Assessment Health Hazards; State Mussel Watch (data); Toxic Substances Monitoring Program (data)

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
Costs could be minimized by improving existing notification systems

How Administered:
NOAA to administer Sanctuary-wide action items. NPDES permits could require POTW's and collection system owners to utilize established phone notification systems and to notify media. ALso through County health departments.

Administrative Costs:
Administrative costs are minimal and could be absorbed by phone system owners (i.e., Surf Rider).

Financing: To be determined

Prerequisites for Implementation:
1) Meeting/workshop of relevant agencies/groups to develop action items and an implementation schedule.
2) Multi-lingual staffing/capabilities.

Source Strategies: PT-12, WB-1, WB-35

Strategy #:	GEN-11
Name:	Determine the effects of toxic bioaccumulation in marine organisms on human health
Type(s):	Research
Problem:	Toxics: Human Health

Description: Determine the effects of toxic pollutant bioaccumulation in marine aquatic life on human health from consumption of fish and shellfish. This information can be used to improve and/or develop new standards (Water Quality objectives) to protect beneficial uses of ocean waters (Strategy GEN-10). Human health protection objectives currently include considerations of bioaccumulation from the water column to fish and shellfish tissue. However, effects of elevated tissue burdens on marine organisms is an area about which little is known; hence, research efforts are needed to evaluate effects.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
County Departments of Environmental Health -
SWRCB - Standards development section

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
Regulated community - both point and nonpoint sources of toxic pollution. Costs of NPDES permits and implementation of best management practices for nonpoint sources.

How Administered:
Ideally such work would be pursued on the Federal level, perhaps jointly by EPA's ORD labs and NOAA. However, it should also involve the input of the State and regional water quality control boards.

Administrative Costs:
Staff and other costs associated with researching the problem, and if need be, developing and implementing new standards.

Financing: To be determined

Prerequisites for Implementation:
Permit fees (or other funding source) are necessary to provide effective implementation of this project.

Source Strategy: *WB-9*

Strategy #: GEN-12

Name: Review and revise water quality stan dards

Type(s): Management Coordination, Monitoring

Problem: Toxics: Heavy Metals, Pesticides, Nutrients

Description: Determine the impact of current water quality standards and objectives. This should be done using standard protocols and evaluation criteria, and should include defining a testing schedule and allowing for emergency possibilities. Monitoring should be based on scientific criteria. This information can lead to the development of new standards, and would include revising the permit limits to reduce loadings by dischargers if they are high compared to natural sources.

Pollutant Standards/Objectives to Meet:
All constituents

Relevant Agencies/Associated Program(s):
U.S. EPA - CWA; NPDES
RWQCBs - Basin Plans
U.S. Dept. of Health and Human Services -
FDA -
SWRCB/RWQCBs - Bay Protection and Toxic Clean Up Program
Other programs: California Ocean Plan

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
All regulated dischargers to bays, estuaries, and ocean waters including industry, boat yards, and municipalities.

How Administered:
Use the existing SWRCB and RWQCB permit issuing and enforcement programs. NOAA should obtain data from NPDES loading contract and river/stream loading project from USGS to help evaluate the impact of current standards.

Administrative Costs: To be determined

Financing:
Old Bold Funds, Bay Protection and Toxic Clean Up fee system.

Prerequisites for Implementation:
1) Additional funding. 2) Evaluation of NPDES and river/stream loadings to determine source inputs to the MBNMS. 3) Increased funding for overseeing permit compliance and performing enforcement.

Source Strategies: WB-2, WB-19, WB-36, PT-7

Strategy #:	GEN-13
Name:	Establish an interagency water quality assessment data base
Type(s):	Management Cooperation
Problem:	Toxics: Heavy Metals, Pesticides, Nutrients

Description: Establish an interagency task force to develop a framework for collecting and transfering data including: 1) existing ambient monitoring data; 2) current water quality studies; 3) point source discharge data; 4) information on enforcement/compliance programs; 5) permit violations; and 6) enforcement action status. This will provide a comprehensive means for developing a better understanding of the base-line situation. This should incorporate the development of a "clearinghouse" for all data and information. This information should be updated periodically (monthly).

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s): To be determined

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
Interested parties and responsible State and Federal agencies. Cost sharing based on usage (?) none (?)

How Administered:
Managed by the interagency task force and facilitated by Sanctuary management

Administrative Costs: To be determined

Financing: To be determined

Prerequisites for Implementation: To be determined

Source Strategies: PT-1, PT-2, WB-5, WB-20

Strategy #:	GEN-14
Name:	Develop an ecosystem-based monitoring program
Type(s):	Research, Management Cooperation
Problem:	Toxics

Description: Develop an ecosystem-based monitoring program based on the evaluation of base-line information provided by the data base developed in strategy GEN-13. This will help experts: 1) identify key constituents of concern for biota in the Sanctuary; 2) assess the potential for local and regional cumulative impacts; and 3) identify new monitoring strategies to address problems as they are identified. These strategies could include the following:
- Expanding existing monitoring programs
- Using special species as indicators of bioaccumulation/bioconcentration of specific toxicants
- Increasing the number of sampling stations and frequency of sampling
- Standardizing sampling and analysis techniques
- Establishing inter-calibration
- Using powerful statistical analyses to identify proper station locations and sampling frequency
- Improving methods to evaluate data in a timely, efficient manner
- Reevaluating the effectiveness of existing programs
- Incorporating citizen sampling efforts
- Evaluating the potential for joint funding

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s): To be determined

Geographic Area(s): All ocean segments

Targeted Use(r) and Cost to User: To be determined

How Administered:
The Sanctuary Program should administer this program, with possible help from RWQCBs. The interagency task force established in Strategy GEN-13 should donate time and expertise.

Administrative Costs: $200,000

Financing: To be determined

Prerequisites for Implementation:
Political will/resolve.

Source Strategy: PT-3

Strategy #:	GEN-15
Name:	Identify and evaluate loading contribu tions to the Sanctuary
Type(s):	Research
Problem:	Toxics: Heavy Metals, Nutrients, Pesticides

Description: Identify sources of toxic pollutants and evaluate loading contributions of each river/stream to the Sanctuary. This will include evaluating all NPDES dischargers and assessing nonpoint contributions. This information will be valuable for assessing current standards (Strategy GEN-12). Data obtained could be developed using Excel or a D-Base program and should be formatted to use in Arc-Info for GIS efforts.

Pollutant Standards/Objectives to Meet: To be determined

Associated Program(s):
U.S. EPA - CWA section 40L ; NPDES Program
RWQCB - Basin Plans
USGS - River Reach & Hydrology Programs
SWRCB - Water Quality Standards
Soil Conservation Service -
Other programs: Toxic Substances Monitoring Program

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
Dischargers, approximately $25,000 each

How Administered:
EPA, SWRCB and RWQCB, with possible help from NOAA and/or USGS. Project could be done by an outside contractor familiar with the data base.

Administrative Costs:
Approximately $100,000-$200,000

Financing: To be determined

Prerequisites for Implementation:
1) Access to all permits. 2) Access to STORET, California State Plans, and RWQCB Plans. 3) Access to USGS River Reach files.

Source Strategies: *PT-5, PT-6, PT-10*

Strategy #:	GEN-16
Name:	Determine the effects of toxics on marine mammals and birds
Type(s):	Research
Problem:	Toxics

Description: Document the effects of elevated concentrations of trace metals, toxic organic compounds, and viruses on marine mammals and birds. Negative effects can be used to develop standards relating to tissue burdens (Strategy GEN-11). This strategy would: 1) determine the effects of elevated pollutant levels on marine mammals and birds; 2) determine if bioaccumulation is occurring in these species at locations where high pollutant levels are measured (Monitoring, GEN-14); 3) establish safe levels/adverse levels relating bioaccumulation at hot spots to elevated tissue levels; 4) determine the level at which adverse effects occur in marine birds and mammals; and 5) determine the impacts of viruses on the immune systems of species. No current standards exist relating tissue burdens of toxic substances to the effects on the organisms. Before standards can be established, research is necessary to link tissue burdens with adverse effects. No microbiological standards exist for protecting aquatic life.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s): To be determined
RWQCB -
NMFS/U.S.FWS - Endangered Species Act
NMFS/Marine Mammal Commission - Marine Mammal Protection Act

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
Federal, State, and local government

How Administered:
Through EPA/NOAA research labs, UC Santa Cruz Long Marine Lab, and/or DFG Marine Pollution Studies Lab

Administrative Costs:
$500,000/yr for monitoring and laboratory studies (chemical); $100,000/yr microbiology and viral assays

Financing: To be determined

Prerequisites for Implementation:
Resources ($) for a sustained 10-year effort

Source Strategy: *WB-6*

Strategy #: GEN-17

Name: Evaluate the effects of toxic pollutant mixtures
Type(s): Research
Problem: Toxics: Chemical Mixtures

Description: Develop and implement a program to evaluate the effects toxic pollutant mixtures. This will involve monitoring for mixtures of toxic pollutants in Sanctuary waters. Standards are currently based on laboratory studies (e.g., bioassays of the effects of individual chemicals on marine organisms). However, toxic conditions are evident in some areas where standards for individual chemicals are being met. This strategy will not address potential problems such as bioaccumulation, carcinogenicity, mutagenicity, or terrogenicity. Regional monitoring would be conducted for toxicity, the mixture of pollutants causing the toxicity would be identified, the sources or sources would be located, and management strategies/standards could be invoked.

Pollutant Standards/Objectives to Meet:
This may help establish new standards.

Relevant Agencies/Associated Program(s):
SWRCB -

Geographic Area(s):
All ocean segments

Targeted Use(r) and Cost to User: To be determined

How Administered:
Through the RWQCB, CA F&G's Marine Pollution Studies Lab, and the UC Santa Cruz Long Marine Lab

Administrative Costs:
$300,000/year for sampling and toxicity assessment and $200,000/year for chemical identification and determination of sources.

Financing: To be determined

Prerequisites for Implementation:
1) An experienced research staff familiar with toxicity methods and advanced toxicity identification/evaluation. 2) A chemical laboratory setup (e.g., HPLC/MS/computerized system). 3) A team of chemists and biologists.

Source Strategy: *WB-8*

Strategy #: GEN-18

Name: Develop regulations for all unregulated toxic substances
Type(s): Regulatory, Research
Problem: Toxics

Description: Identify all toxic substances entering Sanctuary waters not currently regulated, and develop appropriate regulations/standards. This should include the identification of all original and intermediate sources of unregulated toxics ending up in the MBNMS. Review regulatory programs should be applied to each source.

Pollutant Standards/Objectives to Meet: To be determined

Relevant Agencies/Associated Program(s):
WDR
RWQCB - Mine study
Other programs: Toxic Monitoring Program NPS; Bay and Estuary; 205J; California Ocean Plan; Mussel Watch;
SB2040

Geographic Area(s):
All Sanctuary waters and entire Sanctuary drainage

Targeted Use(r) and Cost to User:
Industries/agencies, and landowners who contribute toxics

How Administered:
RWQCB or the Sanctuary office to conduct a general review to identify all toxic sources for the purpose of making sure nothing is missed and that all toxics and their sources are regulated.

Administrative Costs: To be determined

Financing:
Review paid for through individual permit fees

Prerequisites for Implementation:
A thorough development of a data base from existing information

Source Strategies: *WB-12, PT-10*

Strategy #: GEN-19

Name: Designate State waters in the Sanctuary as an outstanding natural resource

Type(s): Regulatory

Problem: All

Description: 1) Evaluate whether state waters in the MBNMS could be designated as an outstanding natural resource under the Clean Water Act, Section 303(c). 2) Designate state waters as an outstanding natural resource to provide a higher degree of protection inside the MBNMS. 3) Help change state standards as suggested in MBNMS, June 1992 MOA.

Pollutant Standards/Objectives to Meet:

Relevant Agencies/Associated Program(s):
U.S. EPA - Clean Water Act, Section 303(c)
NOAA, MBNMS - MOA, June 1992

Geographic Area(s):
All watershed areas and ocean segments

Targeted Use(r) and Cost to User:
All users of the Sanctuary

How Administered:
NOAA should do legal research and coordinate with state agencies to determine feasibility.

Administrative Costs:
NOAA and EPA HQ legal counsel and staff, plus EPA Regional and MBNMS field staff. Costs are minimal.

Financing:

Prerequisites for Implementation:
1) Cooperation between NOAA and EPA, and 2) the willingness of the SWRCB and RWQCBs to explore the idea.

Source Strategy: *PT-8*

Appendix D. How to Contribute

Those who work or recreate in or on the waters of the Sanctuary have a special perspective on its health and vitality. Equally important is the knowledge of those who work the land, produce goods and services, or simply live in the area that drains into the Sanctuary. Many of these people did not have an opportunity to participate at the Workshop this document summarizes. The Project Development Team (PDT) is asking for input from everyone reading this document to help broaden the range of ideas available to the planners constructing the program.

This section provides a means to comment on and recommend changes to the strategies developed at the Workshop, develop new strategies to help resolve priority water quality problems, and describe existing programs that are actively addressing those problems. The public must continue to play an active role in the evolution of the Sanctuary and its Water Quality Protection Program (WQPP). Their involvement will help ensure that water quality protection is obtained and preserved through the most efficient and appropriate means possible.

Strategies

The PDT wants to broaden the scope of strategies that will be considered as the WQPP moves forward. It is important to the ultimate success of the WQPP that the process of issue identification and strategy development and implementation remain open to all those working to maintain a healthy sanctuary. By providing the managers with a range of options to achieve the program's goals, the public can play a pivotal role in determining the outcome of this effort.

The strategies included in this summary report are only "raw material" that must be examined and refined by the PDT and those they bring in to assist them in various focus groups and workshops. At this early stage in the process of program development there are no "good" or "bad" ideas, all are welcome. The strategies will be evaluated after more information has been collected on their impacts and implementation requirements.

The following instructions describe how to submit your ideas for water quality protection strategies.

Instructions

The Strategy Description Sheet (pages 89 & 90) is to be used to capture pertinent information on suggested management approaches to address the problems outlined at the January Workshop. It is important to make a good effort at completing the information below. Use the sheets to enhance/improve strategies developed at the Workshop, or to develop your own strategy ideas. Below are brief descriptions of the information needed for each of the Strategy Description Sheet components.

Name: Give your strategy a short name that is descriptive of what it is going to do.

Author(s): Provide your name.

Type(s): List all the categories that apply to your strategy. The categories include Education, Regulation, Research, Economic, and Management Coordination.

Problem(s): Identify which problem(s) the strategy will address.

Description: Describe the strategy. What are the activities it will generate? What are the targeted sources/activities causing the problem(s) and how will the strategy address them? Describe how the strategy will help solve the problem(s); do not describe the problem.

Pollutant Standards/Objectives to Meet: If applicable, identify the specific Federal, State or local water quality standards/objectives the strategy will help meet.

Relevant Agencies/Associated Program(s): Identify the institutions and their programs that may play a significant role in implementing the strategy or are performing functions similar to those proposed in the strategy. You do not need to describe these programs, just list them.

Geographic Area(s): Where should the strategy be implemented? Throughout the State, specific sites (i.e. power plants on the coast), particular systems (i.e. coastal lagoons), uplands, wetlands, or submerged lands?

Targeted Use(r) and Cost to User: Identify the user group(s) that will be affected by implementing the strategy (the group or sector of the community

involved with the sources/activities contributing to the problem(s)). Describe how they will be affected.

How Administered: What agency or group should be responsible for implementing the strategy? What institutional procedures should be evaluated and possibly modified to effectively implement the strategy?

Administrative Costs: How much will it cost to implement the strategy? What are the capital costs and/or annual operations and maintenance expenditures? Precise figures are not expected; ranges of possible costs are sufficient at this time.

Financing: What are the known and possible sources of funding for the strategy? All potential sources should be considered.

Prerequisites for Implementation: What specific concerns, including data and research needs, must be addressed and resolved before the strategy is implemented?

Your strategy can be handwritten or you may draft your strategy on a computer as long as each component is addressed. Please transmit your completed strategy sheet to:

Monterey Bay National Marine Sanctuary
Water Quality Protection Program Director
299 Foam Street, Suite D
Monterey, CA 93940

Monterey Bay National Marine Sanctuary
Water Quality Protection Program
Strategy Description Sheet

Name:

Author(s):

Type(s):

Problem(s):

Description:

Pollutant Standards/Objectives to Meet:

Relevant Agencies/Associated Program(s):

Geographic Area(s):

Monterey Bay National Marine Sanctuary
Water Quality Protection Program
Strategy Description Sheet (Continued)

Targeted Use(r) and Cost to User:

How Administered:

Administrative Costs:

Financing:

Prerequisites for Implementation:

Return to:
Monterey Bay National Marine Sanctuary
Water Quality Protection Program Director
299 Foam Street, Suite D
Monterey, CA 93940

Existing Water Quality Management Programs

To develop a viable WQPP, it is important not to duplicate existing efforts to manage resources or solve water quality problems. The WQPP is intended to enhance existing actions, and implement strategies to resolve problems not currently addressed.

To accomplish this, it is important to understand the extent to which existing Federal, State, local or private organization programs address the water quality problems identified at the Workshop. The PDT is compiling a comprehensive assessment of the relevant programs to arrive at this understanding. They want to supplement their work with information from stakeholders in the region knowledgeable about water quality management programs. The completed assessment will help achieve one of the WQPP's main goals; to better integrate water quality management activities across agencies and groups.

The following instructions describe how to submit your ideas pertaining to existing programs.

Instructions

The Existing Programs Form (page 92) is to be used to provide pertinent information on existing programs that address water quality problems, and how well they accomplish their goals. It also can be used to help you develop ideas for improving programs which then can be written as strategies. Below are brief descriptions of the information needed for each of the Existing Programs Form components.

Author(s): Provide your name.

Program: Identify the program to be described.

Problem(s): Identify which problem(s) the program addresses.

Description: Briefly describe how the program addresses the problem(s). How well is the program resolving the problem(s)?

Improvements: What are your suggestions for improving the program to accomplish its goals? Can your suggestion be developed as a strategy? If so, please use the Strategy Description Sheet provided in this section.

Institutional Arrangements: What agencies or other institutions should become involved in the program? How?

Information on existing programs can be handwritten or you may draft it on a computer as long as each component is addressed. Please transmit your completed form to:

Monterey Bay National Marine Sanctuary
Water Quality Protection Program Director
299 Foam Street, Suite D
Monterey, CA 93940.

Monterey Bay National Marine Sanctuary
Water Quality Protection Program
Existing Program Form

Author(s):_____

Program:_____

Problem(s):_____

Description:_____

Improvements:_____

Institutional Arrangements:_____

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