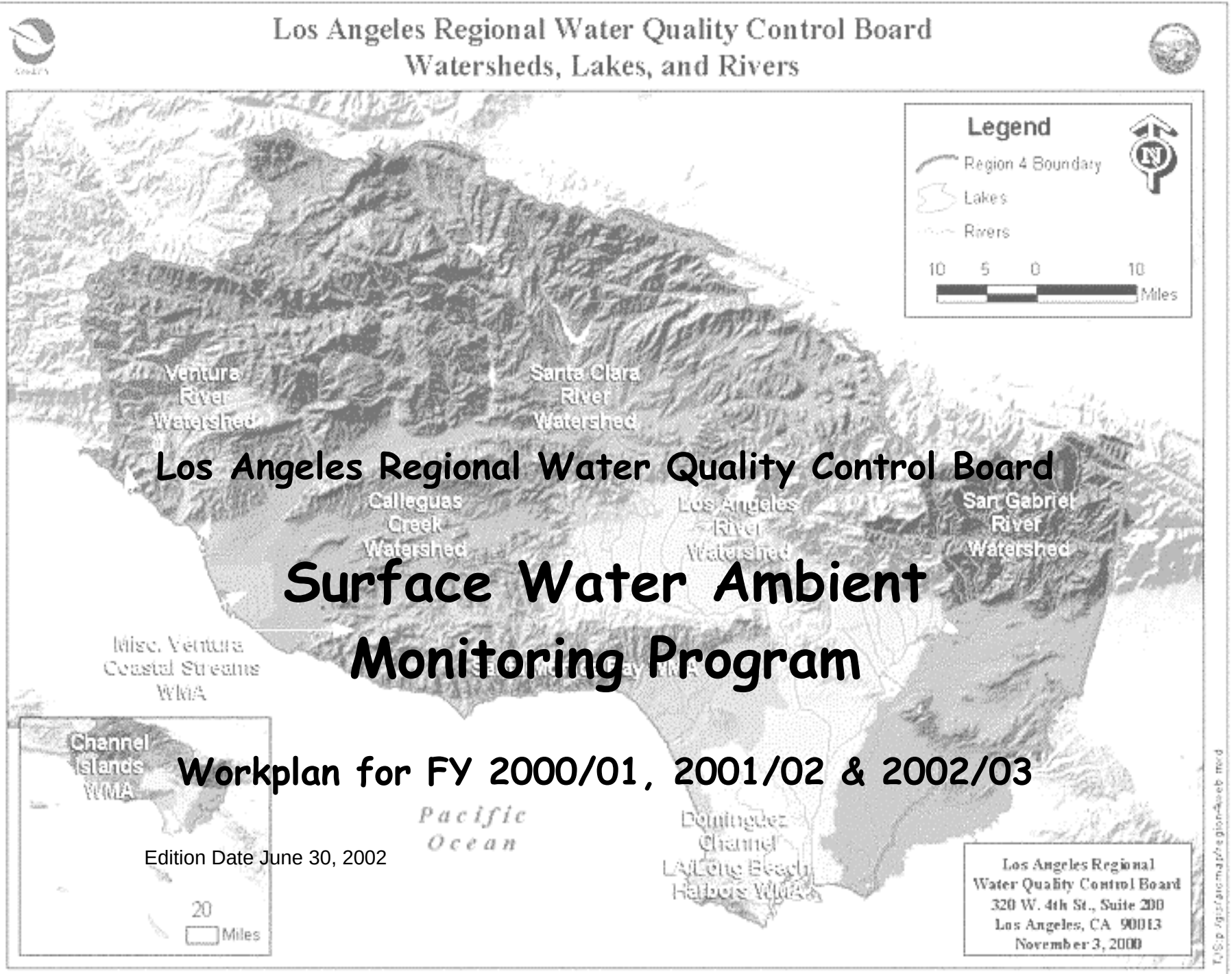

Los Angeles Regional Water Quality Control Board

Surface Water Ambient Monitoring Program

Workplan for FY 2000/01, 2001/02 & 2002/03

Edition Date June 30, 2002

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June 30, 2002

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Executive Summary

Los Angeles Regional Water Quality Control Board
Surface Water Ambient Monitoring Program
Executive Summary

The overall goal of the Site-Specific Monitoring portion of SWAMP is to develop site-specific information on representative sites or water bodies that are (1) known or suspected to have water quality problems and (2) known or suspected to be clean. This portion of SWAMP is focused on collecting information from sites in water bodies of the State that could be potentially listed or delisted under Clean Water Act Section 303(d). This workplan has been developed to implement the Site-Specific Monitoring Requirements of SWAMP per State Board directive. However, in Region 4, both the Site-Specific Monitoring goals and the Regional Monitoring goals have been integrated into one ambient monitoring program. The scope encompasses the regional goals, while still obtaining site-specific information.

Per AB 982, monitoring is required in each hydrologic unit of the State at least once every five years. Region 4 proposes to visit each hydrologic unit one year ahead of the WMI schedule for targeted watersheds, which rotate on a five-year cycle. In this strategy, data will be gathered, analyzed, and interpreted in time to use the following year during NPDES permit renewals and other ongoing activities within the targeted watershed. Ultimately, the information from these analyses will be used in the water quality assessment for the targeted watershed. Other uses of this data include, but are not limited to, development of the 305(b) report and 303(d) List of Water Quality-Limited segments, TMDL development, and NPDES permit renewals.

The sampling and analysis will be used to assess the ambient conditions of the watersheds in Los Angeles and Ventura counties, and will further delineate the nature, extent, and sources of toxic pollutants which have been detected or are suspected to be problematic for this region and its individual watersheds. Where applicable, a triad approach (benthic community analysis, water chemistry, and toxicity testing) is being used. In addition, bioaccumulation tests, historically funded through the statewide Mussel Watch and Coastal Fish Contamination Programs, are being conducted in order to address possible human health concerns (contaminants in edible fish tissue) and ecological concerns (benthic community impacts), which may result if the contaminants at a site are bioavailable for uptake by organisms. These bioaccumulation tests will help to demonstrate the bioavailability of contaminants at these stations and may identify impaired beneficial uses. There is also a large focus on bioassessment, which historically has been overlooked. The bioassessment performed will follow the California Stream Bioassessment Protocol developed by CDFG which focuses on the benthic macroinvertebrate assemblage and a physical habitat assessment. The information gathered will be used in trend analysis, identifying impaired beneficial uses, as well as potentially in the development of an index of biological integrity.

Summary of Watersheds Visited, Timeline, and Budget for FYs 2000-01, 2001-02, & 2002-03

Watershed	Fiscal Year	Budget
Santa Clara River Watershed Calleguas Creek Watershed	2000-2001	$350,000 for both watersheds
Santa Monica Bay Watershed Management Area	2001-2002	$336,526
Dominguez Channel and Los Angeles and Long Beach Harbors	2002-2003	$316,526

Santa Clara River Monitoring Design and Strategy

The primary objective of monitoring in the Santa Clara Watershed is to provide a broad baseline of the overall health of the watershed. Existing data is inconsistent and incomplete for both constituents and sampling locations. The monitoring done in SWAMP will fill in many of the data gaps and provide data where none exists at all. A broad suite of parameters will be tested at the various stations.

Thirty randomly selected sites (following the USEPA Environmental Monitoring and Assessment Program design protocol) have been selected for monitoring in the Santa Clara River. These thirty sites will be sampled for toxicity, bioassessment, and conventional water chemistry, including nutrients (phosphate, nitrate, sulfate, chloride, and nitrite), TDS, boron, ammonia, chlorophyll a, dissolved oxygen, pH, depth,

temperature, flow, conductivity, and turbidity. Additionally, one station at the base of each of the six main subwatersheds (Santa Paula, Sespe, Piru, Castaic, San Francisquito, and Bouquet) will be selected and analyzed for the same parameters listed above, as well as, bioaccumulation, metals chemistry in the water column and sediment, sediment grain size, and ELISA testing for chlorpyrifos and diazinon. One station in the middle of the watershed, at Blue Cut, a hydrologically important site, will be sampled for the same constituents as the 30 random sites. This station was chosen to represent the surface water and ground water interaction in the area. A station at the very bottom of the watershed (prior to meeting the estuary) will be tested for trace organic chemistry (pesticides and aroclors in the sediment) in addition to the parameters listed above.

Calleguas Creek Monitoring Design and Strategy

The Calleguas Creek watershed has been studied much more comprehensively than the Santa Clara River watershed utilizing both an EMAP approach and pre-selected sites. The POTWs in the area have participated in a comprehensive monitoring program, in addition to their separate monitoring programs, that has produced a large database. A number of toxicity studies have been performed in this watershed. Toxicity is a known impairment of the Calleguas Creek watershed. Toxicity has severe consequences for the aquatic life of the area and is therefore a high priority for additional monitoring. Calleguas Creek and the surrounding areas also have other identified impairments such as nutrients and chloride. Monitoring to determine the extent of these parameters and their associated problems is included in this ambient monitoring plan. Current efforts are underway at the Regional Board to address these constituents through TMDL development. However, the main focus in the Calleguas Creek Watershed in relation to the SWAMP will be toxicity. Chlorpyrifos and diazinon are suspected causes of the toxicity. Staff hopes to either verify suspected causes or identify new causes of the toxicity utilizing Toxicity Identification Evaluations (TIEs). Once the true cause is identified, the staff can further define the sources of the toxicant and develop plans to control the toxic events.

The program for this watershed is based on a directed approach and the focus of this is to gather more information on the chronic toxicity problem and the potential causes. A sub-objective of the monitoring design is to obtain and fill in data where it is missing or non-existent. There will be 12 stations and the following analyses will be performed: toxicity, bioassessment, chlorophyll a, ammonia, dissolved oxygen, pH, depth, flow, conductivity, turbidity, temperature, conventional water chemistry including nitrate, nitrite, phosphorous, sulfate, and chloride, TDS, boron, metals chemistry, and organophosphate chemistry including chlorpyrifos and diazinon. One station at the base of the watershed (the 13th station) will have the above mentioned analyses and additionally will be sampled for bioaccumulation. Funding has also been set aside for Phase II Toxicity Identification Evaluation (TIE) work because toxicity is a known problem as documented by previous Regional Board studies conducted by UC Davis.

Santa Monica Bay Watershed Management Area Monitoring Design and Strategy

Regional Board staff have briefly reviewed the availability of current data within the Santa Monica Bay watershed. The Santa Monica Bay itself, and the Malibu Creek watershed, a subwatershed of the Santa Monica Bay watershed, have been sampled rather extensively. The volunteer-based group, Heal the Bay, has a monthly program in Malibu Creek to analyze water quality and map the stream habitat. The Bay has been monitored by major dischargers as required by their NPDES permits and also during the Bight '94 and Bight '98 studies. Both of the Bight efforts aim to provide an integrated assessment of the Southern California Bight through a cooperative regional-scale monitoring program lead by the Southern California Coastal Water Research Project. Additional monitoring is collected by another volunteer group, Santa Monica BayKeeper, which focuses on storm drain outlets and shoreline monitoring. Because the Bay has been monitored thoroughly, Regional Board staff chose to direct the SWAMP funding to the approximately 30 coastal subwatersheds of the Santa Monica Bay watershed. Many of these subwatersheds have not been sampled at all and others have been sampled modestly at best. The focus of the SWAMP sampling will include basic and conventional water column chemistry and bacteriology at all stations and bioassessment at most stations. A subset of these stations will additionally be sampled

for water column toxicity, dissolved metals, and pesticides in the water column. Sampling will occur during both fall 2002 and spring 2003 seasons. Potential reference sites will be resampled during two subsequent spring sampling runs (spring 2004 and spring 2005) for bioassessment and conventional chemistry.

The sampling and analyses will be used to assess the ambient conditions of these watersheds. The sampling and analyses described will further delineate the nature, extent, and sources of pollutants that have been detected or are suspected to be problematic for these areas.

Dominguez Channel and Los Angeles and Long Beach Harbors Monitoring Design and Strategy

Regional Board staff have divided the Dominguez Channel and LA/LB harbor area into the following six subareas based on characteristics of the area in order to simplify sampling design: (1) headwater streams, (2) the inner and outer harbors of LA and LB, (3) Madrona Marsh, (4) Lake Machado, (5) the Dominguez Channel estuary, and (6) the upper channelized Dominguez Channel above normal tidal influence. The sampling design is still under development, however, if funding constraints are not restrictive, each of the six areas will be sampled to fill in the incomplete data relevant to each area.

(1) Headwater streams are not expected to have dry weather flow and therefore will not be sampled.
(2) The inner and outer LA and LB harbors will be sampled in conjunction with the Bight '03 survey. Water column chemistry will be analyzed at the water's surface and again at the bottom. Water column toxicity and bacteriology will be conducted at the water surface only. At these same stations, the Bight '03 project will focus on sediment and benthic community sampling. Regional Board staff, in conjunction with staff from SCCWRP, feel data collected will provide details on the interaction of pollutants between sediment and the water column. Chemical analysis will include PAHs. Funding will be set aside for TIEs because of the suspected water column toxicity. Staff proposes the use of a probabilistic monitoring design with 30 stations. These analyses will further characterize the known impairments of the harbor which is very industrial.
(3) Madrona Marsh is a 40-acre wetland and very little data exists relative to this waterbody. Staff proposes 3 directed stations where bioassessment, water column toxicity, water column chemistry, sediment toxicity, and sediment chemistry will be employed to gather baseline data to determine the status of the waterbody. One of the three stations should be at the outlet of the marsh which drains into the Torrance Lateral.
(4) Lake Machado will be sampled for water column toxicity, water column chemistry, sediment toxicity, sediment chemistry, fish tissue, and pathogens. Staff proposes 5-10 directed stations and believes the information is necessary because the existing data is very old and very limited. The lake is posted for swimming and also offers freshwater beaches. Fish tissue and pathogen monitoring will provide information necessary to protect public health as well as aquatic life.
(5) Monitoring in the Dominguez Channel Estuary is currently done by the existing refineries as well as LA County. Therefore, the goal of this monitoring is to supplement the information currently gathered for ambient water quality assessment. Staff envisions utilizing a total of directed 3-9 stations at the same locations as the current monitoring. Parameters to be sampled include bioassessment, water chemistry, pathogens, and one sediment toxicity station above the refineries. A TSM station was employed during the summer of 2001 and staff hopes funding constraints will not prevent subsequent sampling in summer of 2002. Staff believe this monitoring will, combined with existing efforts, provide a detailed picture of the overall health of the Dominguez Channel Estuary. SWAMP will focus on water column chemistry which has historically not been collected, as well as bioassessment, and the study of pathogens within the estuary.

(6) The upper Dominguez Channel will have one directed station above the tidal influence which will be sampled for water column chemistry, water column toxicity, pathogens, metals, and organics. The goal of this station will be to characterize the water quality coming into the estuary and the water quality of the channel above the heavy industry of the refineries.

Chapter One

Program Wide Activities

I. Introduction

The Porter-Cologne Water Quality Control Act and the federal Clean Water Act (CWA) direct water quality programs to implement efforts intended to protect and restore the integrity of waters of the State. California Assembly Bill (AB) 982 (Water Code Section 13192) requires the State Water Resources Control Board (SWRCB) to assess and report on the State monitoring programs and to prepare a proposal for a comprehensive surface water quality monitoring program. Ambient monitoring is independent of other water quality programs, such as the National Pollutant Discharge Elimination Program, which requires monitoring in direct relation to regulation of point source discharges. Ambient monitoring can serve as a measure of (1) the overall quality of water resources and (2) the overall effectiveness of Regional Water Quality Control Boards' (RWQCBs') prevention, regulatory, and remedial actions. Current monitoring and assessment capability at the SWRCB is limited and tends to be focused on specific program needs. This has led to a fragmentation of monitoring efforts resulting in gaps in needed information and a lack of integrated analysis. AB 982 mandates the SWRCB create and implement a comprehensive surface water quality monitoring program. The SWRCB and the RWQCBs have responded to this mandate with the development and implementation of the Surface Water Ambient Monitoring Program (SWAMP). The program goals of SWAMP are:

1. Identify specific problems preventing the SWRCB, RWQCBs, and the public from realizing beneficial uses in targeted watersheds. (Site-specific throughout the region)

2. Create an ambient monitoring program that addresses all hydrologic units of the State using consistent and objective monitoring, sampling and analysis methods; consistent data quality assurance protocols; and centralized data management. (Regional)

3. Document ambient water quality conditions in potentially "clean" and polluted areas. (Site-specific throughout the region)

4. Provide the data to evaluate the effectiveness of water quality regulatory programs in protecting beneficial uses of waters of the State.[1] (Regional & Statewide)

The overall goal of the Site-Specific Monitoring portion of SWAMP is to develop site-specific information on sites or water bodies that are (1) known or suspected to have water quality problems and (2) known or suspected to be clean. This portion of SWAMP is focused on collecting information from sites in water bodies of the State that could be potentially listed or delisted under Clean Water Act Section 303(d). This workplan has been developed to implement the Site-Specific Monitoring Requirements of SWAMP per State Board directive. In Region 4, both the Site-Specific Monitoring goals and the Regional Monitoring goals have been integrated into one ambient monitoring program. The scope encompasses the regional goals while still obtaining site-specific information.

[1] State of California State Water Resources Control Board; Proposal for A Comprehensive Ambient Surface Water Quality Monitoring Program; Report to Legislature; November 30, 2000.

Per AB 982, monitoring is required in each hydrologic unit of the State at least once every five years. Region 4 proposes to visit each hydrologic unit one-year ahead of the WMI schedule for targeted watersheds that rotate on a five-year cycle. In this strategy, data will be gathered, analyzed, and interpreted in time to use the following year during NPDES permit renewals and other ongoing activities within the targeted watershed. Additional uses of the data include, but are not limited to, development of the 305b report, the 303d Water Quality Assessment report, Basin Plan objectives, and TMDL development. The following table below provides a summary of the schedule for upcoming years:

Hydrologic Unit	WMI Timeline	SWAMP Timeline
Santa Clara River	2001-2002	2000-2001
Calleguas Creek	2001-2002	
Dominguez Channel	2002-2003	2002-2003
LA & LB Harbors	2002-2003	
Santa Monica Bay	2003-2004	2001-2002
Los Angeles River	2004-2005	2003-2004
San Gabriel River	2005-2006	
Los Cerritos Channel	2005-2006	
Channel Islands	2005-2006	2004-2005
Ventura River	2006-2007	
Misc. Ventura Coastal	2006-2007	

The timeline is altered a little from the original intent to provide for the fact that Region 4 is transferring from a 7-year rotating basin schedule to a 5-year schedule. Therefore, slight shuffling of the arrangements of hydrologic units to be visited may occur. For example, Region 4 is working with the Southern California Coastal Water Research Project (SCCWRP) and other agencies on the Southern California Bight studies. The next Bight study is scheduled for July 2003. As was suggested by SCCWRP, the Regional Board agreed to postpone sampling for Los Angeles and Long Beach harbors (LA/LB) that was originally scheduled to be conducted in 2001/2002 until July 2003 so that SWAMP activities and the Bight '03 program may be conducted concurrently. Therefore, staff has postponed all sampling in the Dominguez Channel and LA/LB harbors until 2002/2003 and have moved the sampling for Santa Monica Bay up one year to 2001/2002. Activities are subject to change according to the condition of the waterbody at the time of sampling. If changes are made, the Task Order will be amended to reflect the changes.

II. Objectives of Monitoring Program

A. Background

In the development of a comprehensive monitoring program, the following steps should be followed where applicable:

1. Identify overall objectives and sub-objectives (defined in SWAMP Proposal and Report to Legislature)
2. Identify assessment questions (defined by Regional Board staff)
3. Develop a conceptual model
4. Select indicators (Regional Board staff per SWAMP documents)

5. Design spatial and temporal aspects of an ideal monitoring program (Regional Board staff in conjunction with assistance from US EPA)
6. Assess quality of data needed for results (being done at Statewide level)
7. Examine reporting options (being done at Statewide level)

In the design of objectives, the following guidelines should be remembered:

1. Objectives can be both wide-scale and/or site-specific
2. Objectives can be incorporated into study through a multi-tiered design that addresses:
   a. baseline ecosystem level condition
   b. long term trend analysis
   c. hypothesized environmental problems
   d. flexibility for the future

The indicators chosen should be regionally responsive, unambiguously interpretable, allow for simple quantification (i.e., synoptic sampling), should have index period stability, low year to year variation (especially if used for trend analysis), and represent the environmental impact of concern. Indicators should also have an available EPA approved method, historical use with database of results, be retrospective, anticipatory (provide early warning of widespread change in ecosystem) and cost effective[2].

B. Relationship Between Beneficial Use, Objective, Potential Assessment Questions and Potential Indicators

1. Beneficial Use: Water Contact Recreation – *Is it safe to swim?*

a. SWAMP Objective

At sites influenced by point sources (e.g., storm drains, publicly owned treatment works, etc.) or nonpoint sources of pathogenic contaminants, estimate the concentration of bacteria above screening values, health standards, or adopted water quality objectives.

b. Potential Assessment Questions

- What is the percent of streams in the watershed/region that support their designated beneficial use of water contact recreation? Do they support their designated beneficial uses all year or a majority of the time?

- Is the percent of streams in the watershed/region which support the beneficial use of water contact recreation increasing or decreasing over time? (For region-wide answer, will need to complete 10 year data cycle to answer… for watershed specific answer, can answer for first round of watersheds in year 6)

- What are the barriers to attainment of the beneficial use? What is the nature of the barriers preventing attainment (i.e. chemical, physical, biological)?

[2] United States Environmental Protection Agency, EMAP West Coastal Technology Transfer Workshop; Moss Landing Marine Laboratory, June 13-14, 2001.

c. Potential Indicators: Contaminant exposure: total coliform bacteria, fecal Coliform, bacteria, enterococcus bacteria, enteric viruses. Another potential indicator not mentioned in SWAMP is *E. coli*.

2. Beneficial Use: Municipal and Domestic Water Supply - *Is it safe to drink the water?*

a. SWAMP Objective

At specific locations in lakes, rivers, and streams that are sources of drinking water and suspected to be contaminated, estimate the concentration of or verify previous estimates of the concentration of microbial and chemical contaminants above screening values, drinking water standards, or adopted water quality objectives used to protect drinking water quality.

b. Potential Assessment Questions

- What is the percent of streams that support their designated beneficial use of municipal and domestic water supply?
- Is the percent of streams in the watershed/region which support the beneficial use of municipal and domestic water supply increasing or decreasing over time?
- What are the barriers to attainment of the beneficial use? What is the nature of the barriers preventing attainment (i.e. chemical, physical, biological)?

c. Potential Indicators: Contaminant exposure: inorganic water chemistry, nutrients, organic water chemistry, total coliform bacteria, cryptosporidium, and giardia

3. Beneficial Uses: Commercial and Sport Fishing, Shellfish Harvesting – *Is it safe to eat fish and other aquatic resources?*

a. SWAMP Objective

- At specific sites influenced by sources of bacterial contaminants, estimate the concentration of bacterial contaminants above health standards or adopted water quality objectives to protect shellfish harvesting areas.
- At specific sites influenced by sources of chemical contaminants, estimate the concentration of chemical contaminants in edible aquatic life tissues above advisory levels and critical thresholds of potential human health risk.
- At frequently fished sites, estimate the concentration of or verify previous estimates of chemical contaminants in commonly consumed fish and shellfish target species above advisory levels and critical thresholds of potential human health risk (adapted from USEPA, 1995).
- Throughout water bodies (streams, rivers, lakes, nearshore waters, enclosed bays and estuaries), estimate the concentration of chemical contaminants in fish and aquatic resources from year to year using several critical threshold values of potential human impact (advisory or action levels).
- What are the biggest chemical threats?

b. Potential Assessment Questions

- What is the percent of streams that support their designated beneficial uses of commercial fishing, sport fishing, and shellfish harvesting?

- Is the percent of streams in the watershed/region which support the beneficial uses of commercial fishing, sport fishing, and shellfish harvesting increasing or decreasing over time?

c. Potential Indicators: Contaminant exposure: fish tissue chemistry, shellfish tissue chemistry, coliform bacteria in shellfish

4. Beneficial Uses: Cold Freshwater Habitat, Estuarine Habitat, Marine Habitat, Preservation of Biological Habitats (Preservation of Rare and Endangered Species), Rare, Threatened or Endangered Species, Warm Freshwater Habitat, Wildlife Habitat – *Are aquatic populations, communities, and habitats protected?*

a. SWAMP Objective

- At sites influenced by point sources or nonpoint sources of pollutants, identify specific locations of degraded water or sediments in rivers, lakes, nearshore waters, enclosed bays, or estuaries using several critical threshold values of toxicity, water column or epibenthic community analysis, habitat condition, and chemical concentrations.

- Identify the areal extent of degraded sediment locations in rivers, lakes, nearshore waters, enclosed bays, and estuaries using several critical threshold values of toxicity, benthic community analysis, habitat condition, and chemical concentration.

b. Potential Assessment Questions

- What is the percent of streams that support their designated beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat?

- Is the percent of streams in the watershed/region which support the beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat increasing or decreasing over time?

- What is the distribution of benthic conditions in streams of the watershed?

- What is the distribution of the total number of benthic species per site at each station sampled?

- What is the distribution of exotic species in the benthos in this watershed?

- What proportion of streams have an altered/degraded benthic community structure?

- What is the distribution of sediment contaminants in this watershed?

- What are the barriers to attainment of the beneficial use? What is the nature of the barriers preventing attainment (i.e. chemical, physical, biological)?

c. Potential Indicators:

Biological responses: benthic infauna, fish assemblage, fish pathology, interstitial water toxicity, macroinvertebrate assemblage, periphyton, sediment toxicity, water toxicity

Pollutant exposure: acid volatile sulfides, debris, interstitial water metal chemistry, report gene system (RGS450), organic and inorganic sediment chemistry, shellfish or fish tissue chemistry, nutrients, inorganic and organic water chemistry

Habitat: dissolved oxygen, sediment grain size, sediment organic carbon, water flow, water temperature, channel morphology, wetland vegetation, riparian vegetation

5. Beneficial Uses: Spawning, Reproduction and/or Early Development – *Are aquatic populations, communities, and habitats protected?*

a. SWAMP Objective

At sites influenced by point sources or nonpoint sources of pollutants, identify specific locations of or verify previous measurements identifying specific locations of degraded water or sediments in rivers, lakes, nearshore waters, enclosed bays, or estuaries using several critical threshold values of early life-stage toxicity, chemical concentrations, and physical characteristics.

b. Potential Assessment Questions

- What is the percent of streams that support their designated beneficial use of spawning, reproduction, and/or early development?
- Is the percent of streams in the watershed/region which support the beneficial use of spawning, reproduction, and/or early development increasing or decreasing over time?
- What is the distribution of benthic conditions in streams of the watershed?
- What is the distribution of the total number of benthic species per site at each station sampled?
- What is the distribution of exotic species in the benthos in this watershed?
- What proportion of streams have an altered/degraded benthic community structure?
- What is the distribution of sediment contaminants in this watershed?
- What is the distribution of toxicity in this watershed?
- What are the barriers to attainment of the beneficial use? What is the nature of the barriers preventing attainment (i.e. chemical, physical, biological)?

c. Potential Indicators:

Biological responses: benthic infauna, fish assemblage, fish pathology, interstitial water toxicity, macroinvertebrate assemblage, periphyton, sediment toxicity, water toxicity

Pollutant exposure: acid volatile sulfides, debris, interstitial water metal chemistry, report gene system (RGS450), organic and inorganic sediment chemistry, shellfish or fish tissue chemistry, nutrients, inorganic and organic water chemistry

Habitat: dissolved oxygen, sediment grain size, sediment organic carbon, water flow, water temperature, channel morphology, wetland vegetation, riparian vegetation

6. Beneficial Uses: Migration of Aquatic Organisms; Rare, Threatened or Endangered Species; Wildlife Habitat – *Is water flow sufficient to protect fisheries?*

a. SWAMP Objective

At specific sties influenced by pollution, estimate the presence of conditions or verify previous estimates of the presence of conditions necessary for the migration and survival of aquatic organisms, such as anadromous fish, using measures of habitat condition including water flow, watercourse geomorphology, sedimentation, temperature, and biological communities.

b. Potential Assessment Questions

- What is the percent of streams that support their designated beneficial uses of migration of aquatic organisms, rare, threatened or endangered species, and wildlife habitat?
- Is the percent of streams in the watershed/region which support the beneficial uses of migration of aquatic organisms, rare, threatened or endangered species, and wildlife habitat increasing or decreasing over time?
- What is the distribution of benthic conditions in streams of the watershed?
- What is the distribution of the total number of benthic species per site at each station sampled?
- What is the distribution of exotic species in the benthos in this watershed?
- What proportion of streams have an altered/degraded benthic community structure?
- What is the distribution of sediment contaminants in this watershed?
- What is the distribution of toxicity in this watershed?
- What are the barriers to attainment of the beneficial use? What is the nature of the barriers preventing attainment (i.e. chemical, physical, biological)?

c. Potential Indicators:

Habitat: water flow, suspended solids, channel morphology, water temperature

Another potential indicator not listed in SWAMP is dissolved oxygen level.
Biological response: fish assemblage, macroinvertebrate assemblage, periphyton, wetland habitat, and riparian habitat

7. Beneficial Use: Agricultural Supply – *Is water safe for agricultural use?*

a. SWAMP Objective
At specific locations in lakes, rivers, and streams that are used for agricultural purposes, estimate the concentration of or verify previous estimates of the concentrations of chemical pollutants above screening values or adopted water quality objectives used to protect agricultural uses.

b. Potential Assessment Questions
- What is the percent of streams that support their designated beneficial use of agricultural supply?
- Is the percent of streams in the watershed/region which support the beneficial use of agricultural supply increasing or decreasing over time?
- What are the threats?

c. Potential Indicators: None listed in the SWAMP documents. Alternatives include TDS, chloride, and heavy metals.

8. Beneficial Use: Industrial Source Supply, Industrial Process Supply – *Is water safe for industrial use?*

a. SWAMP Objective
At specific locations in coastal waters, enclosed bays, estuaries, lakes, rivers and streams that are used for industrial purposes, estimate the concentration of or verify previous estimates of the concentration of chemical pollutants above screening values or adopted water quality objectives used to protect industrial use.

b. Potential Assessment Questions
- What is the percent of streams that support their designated beneficial uses of industrial source and process supply?
- Is the percent of streams in the watershed/region which support the beneficial uses of industrial source and process supply increasing or decreasing over time?

c. Potential Indicators: None listed in the SWAMP documents. Alternatives include odor, scum, bacteria, trash, and algae.

9. Beneficial Use: Non-Contact Water Recreation – *Are aesthetic conditions of the water protected?*

a. SWAMP Objective
At specific locations in coastal waters, enclosed bays, estuaries, lakes, rivers and streams, estimate the aesthetic condition or verify previous estimates of the aesthetic

condition above screening values or adopted water quality objectives to protect non-contact water recreation.

b. Potential Assessment Questions

- What is the percent of streams that support their designated beneficial use of non-contact water recreation?
- Is the percent of streams in the watershed/region which support the beneficial use of non-contact water recreation increasing or decreasing over time?
- What are the major problems (i.e. trash, color, algae, other)?

c. Potential Indicators: None listed in the SWAMP documents.

III. General Study Design

Overall General Approach

The sampling and analysis will be used to assess the ambient conditions of the watersheds in the Los Angeles and Ventura counties. The sampling and analyses described in this Workplan will further delineate the nature, extent, and sources of toxic pollutants that have been detected or are suspected to be problematic for this region and its individual watersheds. Where applicable, a triad approach (benthic community analysis, water chemistry, and toxicity testing) has been used. Ultimately, the information from these analyses will be used in the water quality assessment. Other uses of this data include, but are not limited to, 305(b) report development, 303(d) water quality assessment, Total Maximum Daily Load (TMDL) development, and National Pollutant Discharge Elimination System (NPDES) permit renewals. The bioaccumulation tests, included in the Toxic Substances Monitoring (TSM) Program, the Mussel Watch Program, and the Coastal Fish Contamination Program, are being conducted in order to address possible human health concerns (contaminants in edible fish tissue) and ecologic concerns (benthic community impacts) which could result if the contaminants at a site were bioavailable for uptake by organisms. This bioaccumulation test will help to demonstrate the bioavailability of contaminants at these stations and may identify impaired beneficial uses. In many watersheds, there is also a large focus on bioassessment which historically has been overlooked. The bioassessment performed will follow the California Stream Bioassessment Protocol (CSBP) developed by the CDFG which focuses on the benthic macroinvertebrate assemblages and a physical habitat assessment. The information gathered will be used in trend analysis as well as the potential identification of reference sites that could then potentially be used in the development of an index of biological integrity.

A focused, comprehensive sampling for chemistry, toxicity, bioaccumulation, and bioassessment is indicated as shown in the tables “Services to Be Performed at Each Station/Cost” included in Section VII. of each chapter.

IV. Specific Activities Planned for FY 2000-2001, FY 2001-2002, and FY 2002-2003

A. List of Water Bodies to be Sampled

1. FY 2000-2001

Santa Clara River Watershed, Phase I
Calleguas Creek Watershed

2. FY 2001-2002

Santa Monica Bay Watershed Management Area
Santa Clara River Watershed, Phase II

3. FY 2002-2003

Dominguez Channel
Los Angeles and Long Beach Harbors
Santa Monica Bay Watershed Management Area

V. Laboratory Analysis

Actual analytical services that will be performed on each sample are shown on the attached tables "Services to Be Performed at Each Station/Cost," a separate one for each fiscal year located in Section VII. of each chapter.

VI. Data Quality Evaluation and Data Reporting

Results from sampling shall be analyzed and reported in tabular and graphical format. Analyses shall be compared to criteria supplied to CDFG by the Los Angeles Regional Board. These criteria will consist of water quality criteria and water quality objectives. Comparative analyses shall be performed in such a way to present the current state of health of the watershed under study.

Toxicity data will include test mean, standard deviation, and a determination of whether or not a sample is toxic at a statistically significant level of difference from the laboratory control samples.

Data from sampling in the Santa Clara River watershed and the LA/LB Harbors shall be analyzed and interpreted in a method consistent with the EMAP approach and protocol.

The California Stream Bioassessment Protocol developed by CDFG will be followed until a SWAMP-specific bioassessment protocol is established in 2002.

A statewide-standardized SWAMP QAPP is being developed by CDFG and will be adopted by all Regional Boards.

VII. Deliverable Products

A. **Field Report**: A field report will be prepared. This field report will be provided to the Regional Board, with an additional copy provided to the State Board (one copy to each). The field report will include a map with sufficient detail of stations sampled, including latitude and longitude coordinates and GPS coordinates. Digital photographs of each sampling site shall also be included in the report and provided electronically to the Regional Board.

B. **Final Data Report**: All data shall be reported in electronic file (Excel spreadsheet or Access database) on three 3.5" IBM-formatted diskettes, CDs, or zip discs, as well as on hard copy (three one-sided originals for copying, and three bound copies). One of each type--electronic file, one-sided hardcopy original, and bound hardcopy-- shall go to the State Board and the Regional Board and DFG. QA/QC evaluation reports and verification that data met QA criteria set forth in QA Project Plan must be provided with hardcopy data report.

The data report will include the following items, where applicable, but shall not necessarily be limited to the following items:

All station data including CDFG station name, station number, IDORG number, leg number, sample collection date, sample station longitude and latitude, sample GPS coordinates, sample station water depth, sample location characteristics, toxicity test endpoint mean and standard deviation, and all detection limits. In addition to the above data, the following will also be reported for all stations indicated on the attached "Services to be performed at each station/cost" spreadsheet for bioassessment: raw data and computed biological indices. Additionally, data from the bioaccumulation tests will be reported as tissue chemistry data for the specific chemical constituents shown on the attached "Services to be performed at each station/cost" spreadsheet. A map (and GIS shape file) should be included showing the locations of each sampling station and an indication of the overall integrity of that site as excellent, good, marginal, or poor. Another map (and GIS shape file) should further indicate the integrity of each site for biological, chemical, and toxicity data results expressed as a triad for each site.

QA/QC evaluation ranking by each analytical laboratory will be provided in the database. In addition, appendices will include replicate data for toxicity tests, a database description and file structure description. A QA/QC report will also be included in the final data report, containing an evaluation of how the data complied with actual QA/QC parameters.

VIII. Desired Milestone Schedule (significant dates for sample collection & reporting)

The index period is when sampling occurs; in ecoregions where streams are perennial, sampling can occur in the spring or fall, each choice having pros and cons. Sample collection for Santa Clara Phase I of FY 2000-2001 occurred during October through December of 2001. Many streams in the Santa Clara River watershed were dry. Due to the lack of water in many streams, Phase I and Phase II for the Santa Clara River

watershed were switched. 10 random stations in addition to the fixed stations were sampled in fall of 2001 and the 30 random stations will be sampled in July of 2002. The hope was water flow would be present for sampling, however, given the dry winter experienced in Southern California, conditions may prevent sampling. Sampling for the Santa Monica Bay Watershed Management Area is scheduled for both Fall of 2002 and Spring 2003, with some repeat bioassessment and conventional water chemistry sampling occurring in Spring of 2004 and 2005. Dominguez Channel and the LA/LB harbors will be sampled during July 2003. Additionally, follow up studies in Bouquet Canyon, a tributary to the Santa Clara River, and in Calleguas Creek are expected to begin in Spring of 2002. Field reports should follow closely after conclusion of each sampling event. It has not been decided if following years will be sampled during a spring index period or a fall index period. Time constraints and funding issues will impact these decisions in addition to sound science. The table below summarizes significant dates for sample collection:

Upcoming SWAMP Sampling Events in Region 4

July 2002	Santa Clara (30 random sites)
Spring 2003	Santa Monica Bay
Spring 2004	Santa Monica Bay
July 2003	Dominguez Channel and LA/LB Harbors
Spring 2005	Santa Monica Bay follow up
Spring 2006	Santa Monica Bay follow up
Ongoing Summer 2002-2003	Bouquet Canyon follow up – diazinon & chlorpyrifos
TBD – Summer 2002	Calleguas Creek – TIE

IX. Desired "Sample Throughput Schedule"

Need to obtain from Fish and Game

X. Budget

FY 2000/2001

The maximum cost of all SWAMP services specified for FY 2000-2001, as shown in the table "Service to be performed at each station/cost" located in Section VII. of Chapters Two and Three, shall not exceed **$350,000**. This amount of $350,000 is from the Region 4 allocation for FY 2000-2001.

FY 2001/2002

The maximum cost of all SWAMP services specified for FY 2001-2002, as shown in the attached table "Services to Be Performed at Each Station/Cost" located in Section VII. of Chapter Four, shall not exceed **$336,526**. This amount of $336,526 is from the Region 4 allocation for FY 2001-2002.

FY 2002/2003

The maximum cost of all SWAMP services specified for FY 2002-2003 shall not exceed **$316,526**. This amount of $316,526 is from the Region 4 allocation for FY 2002-2003. A table "Service to be performed at each station/cost" is included in draft form in Section VII. of Chapter Five.

XI. Working Relationships

Task	Responsible Organization		
	SWRCB	**RWQCB**	**CDFG**
Develop contract(s) for monitoring services	•	•	•
Identify water bodies or sites of concern and clean sites to be monitored		•	
Identify site-specific locations with potential beneficial uses impacts or unimpacted conditions that will be monitored		•	
Decide if concern is related to objectives focused on location or trends of impacts		•	
Select monitoring objective(s) based on potential beneficial use impact(s) or need to identify baseline conditions		•	
Identify already-completed monitoring and research efforts focused on potential problem, monitoring objective, or clean conditions		•	
Make decision on adequacy of available information		•	
Prepare site-specific study design based on monitoring objectives, the assessment of available information, sampling design, and indicators	• (Work Plan Review Role)	•	•
Implement study design (Collect and analyze samples)			•
Track study progress. Review quality assurance information and make assessments on data quality. Adapt study as needed	• (Review Role)	•	•
Report data through SWRCB web site	•	• (Coordination Role)	•
Prepare written report of data	•	•	•

XII. Other Information and Attachments

A. Statewide Monitoring Efforts

The Toxic Substances Monitoring Program is a statewide program. Each year CDFG in conjunction with Regional Board staff select sites and collect fish from these sites to analyze toxic substances that are being bioaccumulated by these species and stored in their muscle tissue. The following sites were sampled during the summer of 2001:

a. Ventura River
    i. upstream of the Ojai Valley Sanitary District's Wastewater Treatment Plant (near Foster Park)
    ii. downstream of the Ojai Valley Sanitary District's Wastewater Treatment Plant
b. Calleguas Creek
    i. downstream of the Simi Valley Treatment Plant (403.67.04) (Arroyo Simi)
    ii. downstream of the Hill Canyon Treatment Plant (403.64.04) (Arroyo Conejo)
    iii. at Lewis Road (403.12.06)
c. Dominguez Channel
    i. in the tidal prism*
d. Santa Clara River Watershed
    i. on Piru Creek just upstream of the confluence with the Santa Clara*
    ii. on Sespe Creek just upstream of the confluence with the Santa Clara*
    iii. on Santa Paula Creek upstream of the confluence with the Santa Clara at Steckel Park (403.21.10)*
    iv. on Castaic Creek upstream of the confluence with the Santa Clara below Castaic Lagoon (no fish were present)*
    v. on Bouquet Creek just upstream of the confluence with the Santa Clara (no fish were observed)*
    vi. On San Francisquito Creek just upstream of the confluence with the Santa Clara (no water was present)*
    vii. downstream of the Santa Paula Treatment Plant
    viii. in the tidal prism (estuary at the Harbor Bridge) *

* These sites are being sampled in conjunction with the efforts being undertaken for SWAMP activities in FY 2000/01 and FY 2001/02. Staff are waiting for the final data to be released, but have been made aware that some samples were either not recovered (i.e. the bag of mussels was not present when CDFG went to retrieve) or were not able to be analyzed because the data would not be indicative of true conditions (i.e. the mussels died during the 30 day period in the field and would show less than true bioaccumulation results).

It is staff's intention to incorporate sites in the Santa Monica Bay Watershed Management Area and the Dominguez Channel and LA/LB Harbor Complex during the FY 2002/03 TSM and Mussel Watch Program sampling events. Due to budget cuts, the exact location and number of stations has not been determined at this time.

It is the vision of the Los Angeles Regional Board that eventually, each of the SWRCB and RWQCBs existing monitoring programs (e.g., the State Mussel Watch Program,

Toxics Substances Monitoring Program, toxicity studies, and fish/shellfish contamination studies) will be incorporated into the Regional SWAMP efforts to ensure a coordinated approach without duplication. What about Bay Protection and Cleanup Program?

B. Statewide Effort and Identification of Reference Sites in California

Staff at the Los Angeles Regional Board also believes strongly in the necessity of a statewide effort to begin the identification of potential reference sites for a biomonitoring program. Staff from Region 4 are members of and participate in the subcommittee on bioassessment which met in Tahoe in May of 2001 to establish preliminary goals and a guidance document that will be implemented in a pilot project in the Sacramento Region. Reference sites are crucial in order to realize the potential health and community structure of a stream and to have a reference condition to compare other streams to. Categories or levels of impairment can be discerned. Lastly, it is imperative that information is gathered on what a truly healthy benthic biological community structure consists of so that we may have a goal to strive for.

Due to the randomness of the sampling in the Santa Clara, staff has tried to ensure the inclusion of non-impacted sites in the Santa Clara River watershed sampling program. Further, staff have made efforts during the development of the monitoring plan to identify and verify the presence of reference conditions in the Santa Monica Bay Watershed Management Area.

C Funding for Equipment and Additional Studies

As described in detail in the Task Order for FY 2000/01, the Los Angeles Regional Board has opted to set aside funding for both the purchase of equipment for the region's laboratory and to allow for follow-up studies to be conducted at study sites that are identified as impaired sites needing further analysis. Equipment ordered for the Los Angeles Regional Board's laboratory includes equipment and materials necessary to perform bacterial analysis using IDEXX kits, a multiparameter probe, and an ISCO automatic sampler to allow staff to measure pH, conductivity, Chlorophyll a, and temperature in the field. The Los Angeles Board has also purchased a Garmin GPS III Plus hand held unit and National Geographic TOPO software covering the State of California to aid in field studies and graphical interpretation of the data. Further equipment may be ordered as a need is demonstrated.

Chapter Two

Santa Clara River Watershed

I. Sites to be Monitored (Problematic or Clean)

This section will summarize site-specific problems(s), potential problem(s), or clean water locations to be monitored.

A. Background

The Santa Clara River Watershed encompasses approximately 1,200 square miles and 100 miles in river length. This is the largest river system in southern California that remains in a relatively natural state and is a high quality natural resource for much of its length. The river originates in the northern slope of the San Gabriel Mountains in Los Angeles County, traverses Ventura County, and flows into the Pacific Ocean halfway between the cities of San Buenaventura and Oxnard. Extensive patches of high quality riparian habitat are present along the length of the river and its tributaries. The endangered fish, the unarmored stickleback, is a resident of the river. One of the largest of the Santa Clara River's tributaries, Sespe Creek, is designated a wild trout stream by the state of California and supports significant spawning and rearing habitat. The Sespe Creek is also designated a wild and scenic river. Piru and Santa Paula Creeks, which are tributaries to the Santa Clara River, also support good habitat for steelhead. In addition, the river serves as an important wildlife corridor. A lagoon exists at the mouth of the river and supports a large variety of wildlife.

Increasing loads of nitrogen and salts into supplies of ground water threaten beneficial uses including irrigation and drinking water. Other threats to water quality include increasing development in floodplain areas which has necessitated flood control measures such as channelization that results in a cycle of increased runoff volumes and velocities, erosion, and loss of habitat. In many of these highly disturbed areas the exotic giant reed (*Arundo donax*) is gaining a foothold.

Many of the smaller communities in this watershed remain unsewered. In particular, in the Agua Dulce area of the upper watershed, impacts on drinking water wells from septic tanks is a major concern. The community is undertaking a wellhead protection effort, with oversight by Board staff. Development pressure, particularly in the upper watershed, threatens habitat and the water quality of the river. The effects of septic system use in the Oxnard Forebay area is also of concern.[3]

B. Beneficial Uses

Above the estuary: contact and non-contact water recreation, wildlife habitat, migratory habitat, wetlands habitat, municipal supply, industrial service supply, industrial process supply, agricultural supply, groundwater recharge, freshwater replenishment, warm water habitat, cold water habitat, and preservation of rare and endangered species.

In estuary: contact and non-contact water recreation, wildlife habitat, preservation of rare and endangered species, migratory habitat, wetlands habitat, spawning habitat, estuarine

[3] State of California Regional Water Quality Control Board, Los Angeles Region; Watershed Management Initiative Chapter; December 2000.

habitat, marine habitat, navigation, and commercial and sport fishing.

C. Known Impairments

Various reaches of this watershed are 303(d) listed for historic pesticides, chloride, coliform, nitrogen, trash, and eutrophication.

II. Objectives of Monitoring

A. Over-arching Objectives

The main objective of the sampling in the Santa Clara River watershed is to provide a broad baseline of the overall health of the watershed. Existing data is inconsistent and incomplete for both parameters and sampling locations. The monitoring done in SWAMP will fill in many of the data gaps and provide data where none exists at all. A broad suite of parameters will be tested at the various stations. The random design will allow for powerful statistical analysis and will also provide for identification of potential reference sites for the watershed. The design will also be able to determine if beneficial uses are being obtained and will aid in TMDL development.

B. Potential Assessment Questions

Because the design of this section of the monitoring program is a probability-based design, the Regional Board will be able to infer the status of the watershed based on the sampling of the thirty randomly selected stations. The types of questions that we will be able to answer are as follows:

- What is the percent of streams that support their designated beneficial uses of commercial fishing and sport fishing?
- Is the percent of streams in the watershed/region which support the beneficial uses of commercial fishing and sport fishing increasing or decreasing over time?
- What is the percent of streams that support their designated beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat?
- Is the percent of streams in the watershed/region which support the beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat increasing or decreasing over time?
- What is the distribution of benthic conditions in streams of the watershed?
- What is the distribution of the total number of benthic species per site at each station sampled?
- What is the distribution of exotic species in the benthos in this watershed?
- What proportion of streams have an altered/degraded benthic community structure?

- What is the distribution of sediment contaminants in this watershed?

- What is the percent of streams that support their designated beneficial use of spawning, reproduction, and/or early development?

- Is the percent of streams in the watershed/region which support the beneficial use of spawning, reproduction, and/or early development increasing or decreasing over time?

- What is the distribution of toxicity in this watershed?

- What is the percent of streams that support their designated beneficial uses of migration of aquatic organisms, rare, threatened or endangered species, and wildlife habitat?

- Is the percent of streams in the watershed/region which support the beneficial uses of migration of aquatic organisms, rare, threatened or endangered species, and wildlife habitat increasing or decreasing over time?

- What are the biggest threats to water quality in this watershed?

C. Indicators

Santa Clara River

The following indicators will be used: toxicity, bioassessment (macroinvertebrate assemblage includes physical habitat assessment), and conventional water chemistry, including nutrients (phosphate, nitrate, sulfate, chloride, and nitrite), TDS, boron, ammonia, chlorophyll a, dissolved oxygen, pH, depth, temperature, conductivity, turbidity, bioaccumulation (shellfish tissue chemistry), metals chemistry in the water column and sediment, ELISA testing for chlorpyrifos and diazinon, and trace organic chemistry.

III. Specific Activities Planned for FY 2000-2001

A. List of Water Bodies to be Sampled

Santa Clara River Watershed, Phase I (the focus of Chapter Two)
Calleguas Creek Watershed (the focus of Chapter Three)

B. Review of Available Information (analysis of existing data is incomplete at this time)

Please see Appendix A, Applicable Sections of the 1996 & 1998 Water Quality Assessments. This will be updated as soon as the 2002 Water Quality Assessment currently under development is adopted by the State Board, scheduled to occur in fall 2002.

The overall status of the Santa Clara watershed is not well known; historical assessment has been spotty. Most data is limited to nitrogen and minerals. The Santa Clara River Enhancement and Management Plan Steering Committee is a 26-member group currently directing preparation of an Enhancement and Management Plan. Have they done any monitoring? The following reports have been written regarding water quality in the Santa Clara River:

Department of Water Resources. 1989. *Update of Basin Plan for Piru, Sespe, and Santa Paula Hydrologic Areas.*

Department of Water Resources. 1993. *Investigation of Water Quality and Beneficial Uses Upper Santa Clara River Hydrologic Area.*

Reichard, Eric G., Steven M. Crawford, Katherine Schipke Paybins, Peter Martin, Michael Land, and Tracy Nishikawa. 1999. *Evaluation of Surface-Water/Ground-Water Interactions in the Santa Clara River Valley, Ventura County, California.* Water-Resources Investigations Report 98-4208. U.S. Geological Survey.

IV. Monitoring Design and Strategy

In this watershed, CDFG will utilize the information provided by USEPA and perform reconnaissance to narrow down the site selection from 240 potential sites to 30 stations. USEPA provided the potential site population following EMAP procedures in randomly selecting from the following:

- The target population is all streams with flowing water within the Santa Clara watershed as defined by the USGS 4th field hydrologic unit 18070102. The target population is the aquatic resource about which information is wanted – it must be clearly defined to everyone including the field crew whose understanding is critical.

- The sampling frame is RF3 restricted to Strahler 3rd order and higher. Both perennial and non-perennial coded streams were included to make sure streams with flowing water during time of sampling would not be excluded. A comparison was done to compare the difference if only perennial streams were chosen.

EMAP uses a Random Tessellation Stratified (RTS) design to spatially balance the sample across the resource which provides improved precision. This design uses an oversample selection population to address non-target and inaccessible sites. This random design was chosen in order to allow the Regional Board, in a statistically sound manner, to sample the watershed and develop an assessment of

the overall health of the watershed. The watershed is the geographic region of interest. Fulfilling an additional goal of SWAMP, this approach theoretically will provide data both in clean and polluted areas, with sites near areas that have been sampled previously and those that have not. By choosing a random sampling design, bias is removed. The representative 30 sites is the recommended number of sites to provide a statistically defensible summary of the watershed.

The probabilistic design has a spatial component and can potentially have a time component built in as well. EMAP experience has shown that the best design has a five-year cycle with five panels chosen. A subset of the panel conducted in the first year is sampled in year two to tie together the panels and time. In order to incorporate this temporal element into Region 4's monitoring program, the original monitoring plan scheduled 30 random sites to be sampled in Fall of 2001 and ten randomly selected sites, a subset of the original 30, to be sampled again in Fall of 2002. Because the sampling occurred later in the year than expected, many of the streams were dry. Regional Board staff, in consultation with staff from both US EPA and CDFG, decided to sample the 10 randomly selected subset of sites in Fall of 2001 and the 30 original sites are to be sampled in July of 2002. The constituents analyzed will be the same in 2001 and 2002. Due to Southern California experiencing one of the driest winters on record, sampling may be postponed until late Fall of 2002 after some rain is received.

The sampling in the Santa Clara watershed focuses on 30 randomly chosen stations in the EMAP fashion with sampling consisting of toxicity, bioassessment, and conventional water chemistry, including nutrients (phosphate, nitrate, sulfate, chloride, and nitrite), TDS, boron, ammonia, chlorophyll a, dissolved oxygen, pH, depth, flow, temperature, conductivity, and turbidity. The CDFG has complete the necessary field reconnaissance and a map of the locations of the randomly chosen sites and a list of sites with latitude and longitude coordinates have been provided in Sections VIII. and IX. of this chapter. Additionally, one station at the base of each of the six main subwatersheds (Santa Paula Creek, Sespe Creek, Piru Creek, Castaic Creek, San Francisquito Creek, and Bouquet Canyon Creek) will be selected and analyzed for the same parameters listed above, as well as, bioaccumulation, metals chemistry in the water column and sediment, sediment grain size, and ELISA testing for chlorpyrifos and diazinon. One station in the middle of the watershed, at Blue Cut, a hydrologically important site, will be sampled for the same constituents as the 30 random sites. This station was chosen to represent the surface water and ground water interaction in the area. The station at the very bottom of the watershed will be tested for trace organic chemistry in addition to the parameters listed above. Where applicable, a triad approach (benthic community analysis, water chemistry, and toxicity testing) has been used.

The directed stations at the bottom of each major subwatershed in the Santa Clara River Watershed will provide the Regional Board with site specific information and allow a management decision to be made based on the data analysis and determination if each site has an impairment or not. The presence of an impairment will be followed up by further monitoring both at the site already sampled and by monitoring upstream of the location as source identification is pursued.

At the same time, staff believes that a station at the bottom of each major subwatershed (a total of 6 stations plus one in the estuary and one at Blue Cut) will provide valuable information about those said subwatersheds and will constitute the beginnings of a directed tributary-based monitoring program, concurrently assisting in TMDL development. Funding has been set aside to follow up on "hot spot" stations in subsequent years and subwatersheds that have analyses which indicate problem areas.

The sampling effort is randomized to make an inference that is statistically defensible. One of the reasons Region 4 decided to implement a probability based design in the Santa Clara River Watershed is because the area is so large and "A key point in favor of probability based designs is that they allow lower cost sampling programs because a smaller number of sites are able to support conclusions with known accuracy and precision about status and trends of a region."[4] The probability survey design fulfills one of the Regional Board's objectives which is to determine the status of the watershed and to determine trend analysis over time. [5]

At this time, preliminary data suggest a toxicity problem exists in Bouquet Canyon Creek. The suspected cause of toxicity is diazinon. Regional Board staff, in conjunction with staff from Granite Canyon Marine Laboratories, have decided to conduct a TIE at this site and also to conduct analyses for diazinon and chlorpyrifos every other week for one year. Analysis will be by the ELISA method. Staff has reason to believe that the toxicity is not just associated with storm events. Staff hopes this work will begin in summer of 2002.

V. Budget

FY 2000/2001

The maximum cost of all SWAMP services specified for FY 2000-2001, as shown in the attached table "Service to Be Performed at Each Station/Cost", included in Section VII. of this Chapter, shall not exceed **$350,000**. This amount of $350,000 is from the Region 4 allocation for FY 2000-2001 and is for both the Santa Clara River and Calleguas Creek watersheds.

[4] United States Environmental Protection Agency; Environmental Monitoring and Assessment Program: West – Research Strategy, February 2001.
[5] United States Environmental Protection Agency, EMAP West Coastal Technology Transfer Workshop; Moss Landing Marine Laboratory, June 13-14, 2001.

Section VI.
A. Summary Table for Watershed Monitoring
Summary Table of Indicators and Rationale

The primary intent of the sampling in the Santa Clara Watershed is to provide a broad baseline of the overall health of the watershed. Existing data is inconsistent for both parameters and sampling locations. The monitoring performed in SWAMP will fill in many of the data gaps and provide data where none exists at all. A broad suite of parameters will be tested at the various stations including toxicity, bioassessment, nutrients (phosphate, nitrate, chloride, nitrite, and sulfate), boron, TDS, ammonia, chlorophyll a, DO, pH, depth, temperature, conductivity, turbidity, bioaccumulation, metals chemistry in the water column and sediment, sediment grain size analysis, ELISA for Chlorpyrifos and Diazinon, and trace organic chemistry.

River Segment	Parameter/Indicator	Rationale
30 Random Stations	Toxicity	• To provide baseline toxicity data for this watershed; • To define the extent of the problem toxicity may pose.
	Bioassessment	• To provide baseline bioassessment data for this watershed; • To indicate the health and biological integrity of the aquatic invertebrate community.
	Conventional Water Chemistry ([Nutrients: Phosphate, Nitrate, Chloride, Nitrite, & Sulfate], Boron & TDS)	• To provide baseline nutrient data for this watershed; • To define the extent of the problems nutrient enrichment & chloride may pose; • Various reaches of this watershed are 303(d) listed for chloride, nitrogen, and eutrophication.
	Ammonia	• To provide baseline ammonia data for this watershed; • To define the extent of the problem ammonia may pose; • Various reaches of this watershed are 303(d) listed for nitrogen.
	Chlorophyll a	• To provide baseline chlorophyll a data for this watershed; • Chlorophyll a data may be correlated to nutrient enrichment; • Various reaches of this watershed are 303(d) listed for nitrogen and eutrophication.
	DO, pH, depth, temp, conductivity, turbidity & flow	• To provide baseline data for this watershed; • Potential impacts on aquatic life.
6 Subwatershed Stations & Blue Cut	Toxicity	• To provide baseline toxicity data for this subwatershed; • To define the extent of the problem toxicity may pose; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Bioassessment	• To provide baseline bioassessment data for this subwatershed; • To indicate the health and biological integrity of the aquatic invertebrate community; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Conventional Water Chemistry ([Nutrients:	• To provide baseline nutrient data for this watershed; • To define the extent of the problems nutrient

Section VI.
A. Summary Table for Watershed Monitoring
Summary Table of Indicators and Rationale

River Segment	Parameter/Indicator	Rationale
	Phosphate, Nitrate, Chloride, Nitrite, & Sulfate], Boron & TDS)	enrichment & chloride may pose; • Various reaches of this watershed are 303(d) listed for chloride, nitrogen, and eutrophication.
	Ammonia	• To provide baseline ammonia data for this subwatershed; • To define the extent of the problem ammonia may pose; • Various reaches of this watershed are 303(d) listed for nitrogen; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Chlorophyll a	• To provide baseline chlorophyll a data for this subwatershed; • Chlorophyll a data may be correlated to nutrient enrichment; • Various reaches of this watershed are 303(d) listed for nitrogen and eutrophication; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	DO, pH, depth, temp, conductivity, turbidity & flow	• To provide baseline data for this subwatershed; • To define the extent of the problem these parameters may pose; potential impacts on aquatic life; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Bioaccumulation	• To provide baseline bioaccumulation data for this subwatershed; • To address possible human health concerns (contaminants in edible fish tissue) and ecologic concerns (benthic community impacts) which could result if the contaminants at a site were bioavailable for uptake by organisms; • To demonstrate the bioavailability of contaminants at these stations and the extent of the problem this poses; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Metals Chemistry – Water	• To provide baseline water column metals chemistry for this subwatershed; • To define the extent of the problem metals contamination may pose; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Metals Chemistry – Sediment (& Grain Size Analysis)	• To provide baseline sediment metals chemistry for this subwatershed; • To define the extent of the problem sediment metals chemistry may pose; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	ELISA for Chlorpyrifos & Diazinon	• To provide baseline chlorpyrifos and diazinon data for this subwatershed;

Section VI.
A. Summary Table for Watershed Monitoring
Summary Table of Indicators and Rationale

River Segment	Parameter/Indicator	Rationale
		• To define the extent of the problem chlorpyrifos and diazinon may pose; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
Estuary Station (This station represents the cumulative inputs into the watershed.)	Toxicity	• To provide baseline toxicity data for this watershed; • To define the extent of the problem toxicity poses.
	Bioassessment	• To provide baseline bioassessment data for this watershed; • To indicate the health and biological integrity of the aquatic invertebrate community.
	Conventional Water Chemistry ([Nutrients: Phosphate, Nitrate, Chloride, Nitrite, & Sulfate], Boron & TDS)	• To provide baseline nutrient data for this watershed; • To define the extent of the problems nutrient enrichment & chloride may pose; • Various reaches of this watershed are 303(d) listed for chloride, nitrogen, and eutrophication.
	Ammonia	• To provide baseline ammonia data for this watershed; • To define the extent of the problem ammonia may pose; • Various reaches of this watershed are 303(d) listed for nitrogen.
	Chlorophyll a	• To provide baseline chlorophyll a data for this watershed; • Chlorophyll a data may be correlated to nutrient enrichment; • Various reaches of this watershed are 303(d) listed for nitrogen and eutrophication.
	DO, pH, depth, temp, conductivity, turbidity & flow	• To provide baseline data for this watershed; • To define the extent of the problem these parameters may pose; potential impacts on aquatic life; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Bioaccumulation	• To provide baseline bioaccumulation data for this watershed; • To address possible human health concerns (contaminants in edible fish tissue) and ecologic concerns (benthic community impacts) which could result if the contaminants at a site were bioavailable for uptake by organisms; • To demonstrate the bioavailability of contaminants at these stations and the extent of the problem this poses; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Metals Chemistry – Water	• To provide baseline water column metals chemistry for this watershed; • To define the extent of the problem metals

Section VI.
A. Summary Table for Watershed Monitoring
Summary Table of Indicators and Rationale

River Segment	Parameter/Indicator	Rationale
		contamination may pose; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Metals Chemistry – Sediment (& Grain Size Analysis)	• To provide baseline sediment metals chemistry for this watershed; • To define the extent of the problem sediment metals chemistry may pose; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	ELISA for Chlorpyrifos & Diazinon	• To provide baseline chlorpyrifos and diazinon data for this watershed; • To define the extent of the problem chlorpyrifos and diazinon may pose; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Trace Organic Chem	• To provide baseline data of trace organic chemistry for this watershed; • To define the extent of the problem these parameters may pose; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.

Section VI.
B. SWAMP Program Summary Table

Waterbody	Indicator	Beneficial Use	Basin Plan BU	Monitoring Objective	Sampling Design
Santa Clara River Watershed	Toxicity	• Aquatic Life / Biological Response (Basin Plan Objective)	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN	• To provide a broad baseline of the overall health of the watershed. • Determine if beneficial uses are being obtained	Random & Directed
	Bioassessment	• Aquatic Life / Biological Response & Habitat	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN	• To provide a broad baseline of the overall health of the watershed. • Determine if beneficial uses are being obtained	Random & Directed
	Conventional Water Chemistry Organic Water Chemistry Sediment Chemistry	• Aquatic Life / Pollutant Exposure • Drinking Water / Contaminant Exposure	REC2, WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, MUN, IND, AGR, SPWN, COMM	• To provide a broad baseline of the overall health of the watershed. • Determine if beneficial uses are being obtained	Random & Directed
	Dissolved Oxygen	• Aquatic Life / Habitat (Basin Plan Objective)	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN	• To provide a broad baseline of the overall health of the watershed. • Determine if beneficial uses are being obtained	Random & Directed
	PH	• Aquatic Life / Biological Response (Basin Plan Objective)	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN	• To provide a broad baseline of the overall health of the watershed. • Determine if beneficial uses are being obtained	Random & Directed
	Temperature	• Aquatic Life / Habitat (Basin Plan Objective)	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN	• To provide a broad baseline of the overall health of the watershed. • Determine if beneficial uses are being obtained	Random & Directed
	Bioaccumulation	• Fish & Shellfish Contamination / Contaminant Exposure • Aquatic Life / Pollutant Exposure	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN	• To provide a broad baseline of the overall health of the watershed. • Determine if beneficial uses are being obtained	Random & Directed

Section VI.
B. SWAMP Program Summary Table

Waterbody	Indicator	Beneficial Use	Basin Plan BU	Monitoring Objective	Sampling Design
	Metals Chemistry in water and sediment	• Drinking Water / Contaminant Exposure • Aquatic Life / Pollutant Exposure	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, MUN, IND, AGR, FRSH, REC 2, SPWN	• To provide a broad baseline of the overall health of the watershed. • Determine if beneficial uses are being obtained	Random & Directed
	Chlorpyrifos & diazinon	• Aquatic Life / Pollutant Exposure	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN	• To provide a broad baseline of the overall health of the watershed. • Determine if beneficial uses are being obtained	Random & Directed
	Fish Tissue Chemistry	• Fish & Shellfish Contamination / Contaminant Exposure • Aquatic Life / Pollutant Exposure	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN, COMM	• To provide a broad baseline of the overall health of the watershed. • Determine if beneficial uses are being obtained	Random & Directed

SWAMP Task Order No. 00-4-001-am1 (Amendment One)
FY 00/01 Field and Analytical Laboratory Services for RWQCB 4 for SWAMP

1. **Task Order No.**: 00-4-001-Am1 (Amendment One)--in support of SWRCB Contract No.00-111-250.

2. **Task Order Title**: Field and analytical services for RWQCB 4 for FY 00/01 funds.

3. **Contractor**: California Department of Fish and Game.

4. **Regional Board contact for this Task Order**: Tracy Vergets (213-576-6661)
email: tvergets@rb4.swrcb.ca.gov

5. **Term of this Task Order**: 11/1/2000 through 3/31/2003.

6. **The maximum amount for this Task Order is**: $0 (the $350,000 authorized in the original task order for Region 4's FY00-01 allocation, remains the same; this task order amendment does not add or reduce funds overall. This amendment makes revisions/corrections to the work performed, as shown in attached spreadsheets and narrative text).

7. **Signatures authorizing work to proceed within this Task Order**:

The signatures below indicate that the parties agree to the scope, deliverables, and budget specified in this Task Order. This Task Order is not effective until the Project Director and the Contract Manager sign the Task Order. If the work identified in this Task order can not be completed for the budgeted amount, the Task Order must not be signed. Under no circumstances is any work to be completed in excess of the budgeted amount unless there is a formal written amendment to the Task Order.

For Contractor:

_____ _____
Signature — Date
Max Puckett, Contractor Project Director

For SWRCB:

_____ _____
Signature — Date
Craig J. Wilson, SWRCB Contract Manager

8. Scope of Work:

Purpose and Objectives of the Proposed Work

This Task Order implements Amendment One to the first year of ambient water monitoring and assessment for the Surface Water Ambient Monitoring Program (SWAMP) for the California Regional Water Quality Control Board/Los Angeles (Region 4). This Amendment is necessary in order to make corrections/revisions to the original task order, based on work completed during the first round of sample collection and analysis during Fall 2001. The total task order amount authorized remains the same: $350,000.

The majority of the revisions are based on several minor changes that were authorized by RWQCB 4 staff during the sample collection operations (substituting alternate sites, adding a site, etc.), and shifting the timing of sample collection for the 30 random EMAP stations with the 10-station random EMAP follow-up sites in the Santa Clara watershed. The changes are shown in the attached spreadsheet tables, as well as described in narrative text herein. This work will focus on the Santa Clara and Calleguas Watersheds using contract funding allocated to RWQCB 4 for fiscal year 2000-2001. Other watersheds will be focused on in subsequent years, on a five-year cycle. The goal of this program is to gather ambient water data utilizing water column chemistry, water toxicity, sediment toxicity, bioassessment, physical habitat assessment, and bioaccumulation studies to name a few in order to provide the Regional Board and the State Board with information on these watersheds. The data collected during this program will be used to compose watershed assessment reports, the 305(b) list, and ultimately the 303 (d) list as well as supplementing the data specific to point source discharges the Regional Board obtains through the National Pollutant Discharge Elimination System program. Specific work to be performed at each station is shown on the attached “Services to be Performed at Each Station/Cost” table.

The program goals of SWAMP are:

5. Identify specific problems preventing the SWRCB, RWQCBs, and the public from realizing beneficial uses in targeted watersheds.
6. Create an ambient monitoring program that addresses all hydrologic units of the State using consistent and objective monitoring, sampling and analysis methods; consistent data quality assurance protocols; and centralized data management.
7. Document ambient water quality conditions in potentially clean and polluted areas.
8. Provide the data to evaluate the effectiveness of water quality regulatory programs in protecting beneficial uses of waters of the State.

The sampling in the Santa Clara watershed focuses on 30 randomly chosen stations in the EMAP fashion with sampling consisting of water samples collected for toxicity, bioassessment, and conventional water chemistry (including nutrient anions—chloride, nitrate, nitrite, ortho-phosphate, and sulfate—total ammonia, and chlorophyll a; multiparameter probes will be used to assess instantaneously each station’s dissolved oxygen, pH, depth, temperature, conductivity, flow and turbidity. These 30 random EMAP stations were originally scheduled to be collected during the "dry fall season", but due to a significant number of these sites being void of water (dry) upon actual sample collection, RWQCB 4 staff chose to conduct this effort in the late summer 2002, and instead do the "follow-up 10 random EMAP stations" during the Fall 2001 sample collection effort. Additionally, one station at the base of each of the seven main subwatersheds was selected and analyzed for the same parameters listed above, as well as

sediment grain size full analysis, bioaccumulation (using *Corbicula*), trace metal chemistry in the water column and sediment, and ELISA testing for chlorpyrifos and diazinon. One site, the "Bouquet" station (403STCBQT - Bouquet), will have a water sample collected by RWQCB4 staff every other week for one year, beginning in May 2002 (26 sampling events and samples), using containers and shipping materials supplied by UCD-Granite Canyon, and will have ELISA analysis for chlorpyrifos and diazinon conducted on each sample, upon receipt at the UCD-GC facility. The station at the very bottom of the watershed (prior to meeting the estuary) was also tested for trace organic chemistry. One station in the middle of the watershed, at Blue Cut, was sampled for the same constituents as the 30 random sites. This station was chosen to represent the surface water and ground water interaction in the area.

The Calleguas watershed has been studied much more comprehensively utilizing both an EMAP approach and pre-selected sites. The POTWs in the area have participated in a comprehensive monitoring program, in addition to their separate monitoring programs, that has produced a large database. A number of toxicity studies have been performed in this watershed. Toxicity is a known impairment of the Calleguas Creek watershed. Toxicity has severe consequences for the aquatic life of the area and is therefore a high priority for additional monitoring. Calleguas Creek and the surrounding areas also have other identified impairments such as nutrients and chloride. Monitoring to determine the extent of these parameters and their associated problems is included in this ambient plan. Current efforts are underway at the Regional Board to address these constituents through TMDL development. Therefore, the main focus of the SWAMP program in this watershed will be toxicity. Chlorpyrifos and diazinon are suspected causes of the toxicity. The program for this watershed is based on a directed approach. There will be 12 stations and the following analyses will be performed on water samples collected from these stations: toxicity, anion nutrients (including nitrate, ortho-phosphate, sulfate, chloride, and nitrite), bioassessment, chlorophyll a, total ammonia, multiparameter probe measurements (DO, temperature, pH, depth, conductivity, turbidity), centroid flow, boron, TDS, trace metals chemistry, and an organophosphate scan (including chlorpyrifos and diazinon). One station at the base of the watershed will have the above-mentioned analyses, and additionally will be sampled for bioaccumulation (using *Corbicula*). Half of the funding that was originally set aside for Phase II TIE work because toxicity is a known problem as documented by previous Regional Board studies performed by UC Davis, was instead switched to a site in the Santa Clara Watershed (Bouquet; station number 403STCBQT) that demonstrated toxicity during the Fall 2001 sampling effort, per direction from RWQCB 4 staff. The other half of the funding set aside for Phase II TIE work will be directed towards station 403CAL004 which also demonstrated toxicity during the Fall 2001 sampling effort. This work is planned to commence in February 2002.

The sampling and analysis will be used to assess the ambient conditions of these watersheds. The sampling and analyses described in this Task Order will further delineate the nature, extent, and sources of toxic pollutants that have been detected or are suspected to be problematic for these areas. Where applicable, a triad approach (benthic community analysis, water chemistry, and toxicity testing) has been used. Ultimately, the information from these analyses will be used in the water quality assessment. The bioaccumulation tests are being conducted in order to address possible human health concerns (contaminants in edible fish tissue) and ecologic concerns (benthic community impacts) that could result if the contaminants at a site were bioavailable for uptake by organisms. This bioaccumulation test will help to demonstrate the bioavailability of contaminants at these stations. Bagged bivalve bioaccumulation tests were originally planned to be conducted at 8 stations, and organisms were deployed at the 8 stations during the Fall 2001 sampling effort, but due to bagged bivalves being "vandalized or lost" at two of these stations, tissue analyses will only be able to be conducted on six of the eight stations. There is also a large focus on bioassessment, which historically has been overlooked. The

information gathered will be used in trend analysis as well as the potential identification of reference sites (in the Santa Clara River area) which could potentially be used in the development of an index of biological integrity.

B. Technical Approach:

i. Sampling Design

A focused, comprehensive sampling for chemistry, toxicity, bioaccumulation, and bioassessment is indicated as shown on the attached table “Services to be Performed at Each Station/Cost”.

The overall status of the Santa Clara watershed is not well known; historical assessment has been spotty. In this watershed, Fish and Game will utilize the information provided by USEPA and perform recon to narrow down the site selection from 240 potential sites to 30 stations. USEPA provided the potential site population following EMAP procedures in randomly selecting from the following:

- The target population is all streams with flowing water within the Santa Clara watershed as defined by the USGS 4th field hydrologic unit 18070102.
- The sampling frame is RF3 restricted to Strahler 3rd order and higher. Both perennial and non-perennial coded streams were included to make sure streams with flowing water during time of sampling would not be excluded. A comparison was done to compare the difference if only perennial streams were chosen.

This random design was chosen in order to allow the Regional Board, in a statistically sound manner, to sample the watershed and develop an assessment of the overall health of the watershed. As a secondary goal, this approach theoretically will provide data both in clean and polluted areas, with sites near areas that have been sampled previously and those that have not. By choosing a random sampling design, bias is removed. The representative 30 sites is the recommended number of sites to provide a statistically defensible summary of the watershed.

At the same time, RWQCB4 staff believe that a station at the bottom of each major subwatershed will provide valuable information about those said subwatersheds and the beginnings of a tributary-based monitoring program. Funding has been set aside to follow up on stations in subsequent years and subwatersheds that have analyses that indicate problem areas.

These 30 random EMAP stations were originally scheduled to be collected during the "dry fall season", but due to a significant number of these sites being void of water (dry) upon actual sample collection, RWQCB 4 staff chose to conduct this effort in the late summer 2002, and instead do the "follow-up random 10 EMAP stations" during the Fall 2001 sample collection effort. The shift in collection time of the samples will not alter the conclusions and the original sample design is still statistically valid. Further, the design continues to reflect staff’s best professional

judgement that the monitoring program should include both a spatial and a temporal element. Sampling for two years over these sites meets these objectives. The same constituents shall be sampled and analyzed during FY 2000/2001 and FY 2001/2002.

The Calleguas watershed has been studied much more comprehensively utilizing both an EMAP approach and pre-selected sites. The POTWs in the area have participated in a comprehensive monitoring program, in addition to their separate monitoring programs, that has produced a large database. The program for this watershed is based on a directed approach. There will be 12 stations strategically placed by Regional Board staff in which the following analyses will be performed: toxicity, bioassessment, nutrients including nitrate, phosphate, sulfate, chloride and nitrite, metals chemistry, chlorophyll a, ammonia, DO, pH, temperature, conductivity, turbidity, centroid flow, boron, TDS, and organophosphate chemistry including chlorpyrifos and diazinon. One station at the base of the watershed will have the above-mentioned analyses and additionally will be sampled for bioaccumulation. Funding has also been set aside for Phase II TIE work because toxicity is a known problem as documented by previous Regional Board studies performed by UC Davis.

ii. Sample Collection

The field crew will collect the samples at the latitude and longitude previously recorded during past fieldwork at these stations or as determined during the reconnaissance performed by CDFG. If a new station is being collected, the latitude and longitude, as well as GPS coordinates and cross-reference photographs, shall be provided for the site for future reference. If there is confusion about locating a site, it shall be resolved in consultation with the RWQCB staff member present in the field or by phone. Sufficient volume of water or sediment shall be collected in order to perform the analyses to be conducted at each station, as well as to allow for archiving of samples for future analysis, as shown on the attached "Services to be Performed at Each Station/Cost" table. Sample collection and subsequent processing and testing will be performed according to the most recent version of the SWAMP Quality
Assurance Project Plan (QAPP) and SWAMP Laboratory SOPs. Currently, a five percent field duplicate and trip blank QA/QC level is being achieved statewide in the SWAMP program.

iii. Laboratory Analysis

Actual analytical services that will be performed on each sample are shown on the attached table "Services to be Performed at Each Station/Cost".

iv. Data Analysis

Results from sampling shall be analyzed and reported in tabular and graphical format. Analyses shall be compared to criteria supplied to Fish and Game by the Los Angeles Regional Board. These criteria will consist of water quality criteria and water quality objectives. Comparative analyses shall be performed in such a way to evaluate the present state of health of the Santa Clara River and Calleguas Watersheds.

Toxicity data will include test mean, standard deviation, and a determination of whether or not a sample is toxic at a statistically significant level of difference from the laboratory control samples.

Data from sampling in the Santa Clara River watershed shall be analyzed and interpreted in a method consistent with the EMAP approach and protocol.

Bioassessment data shall be collected, sorted, and taxonomically identified in a manner consistent with the California Stream Bioassessment Protocol developed by the California Department of Fish and Game.

The costs to prepare technical reports which evaluate the laboratory data against other criteria or guidelines is yet to be determined, but funding has been set aside to conduct this work.

v. Data Reporting/Products

1. **Field Report**: A field report will be prepared. A cruise report will be provided to the Regional Board, with an additional copy provided to the State Board (one copy to each). The field report will include a map with sufficient detail of stations sampled, including latitude and longitude coordinates and GPS coordinates. The field report shall also include digital photos of the monitoring sites.

2. **Final Data Report**: All data shall be reported in electronic file (Excel spreadsheet or Access database) on three 3.5" IBM-formatted diskettes, CDs, or zip discs, as well as on hard copy (three one-sided originals for copying, and three bound copies). One of each type--electronic file, one-sided hardcopy original, and bound hardcopy-- shall go to the State Board and the Regional Board and DFG. QA/QC evaluation reports and verification that data met QA criteria set forth in QA Project Plan must be provided with hardcopy data report.

The data report will include the following items, where applicable, but shall not necessarily be limited to the following items:

All station data including CDFG station name, station number, IDORG number, leg number, sample collection date, sample station longitude and latitude, sample GPS coordinates, sample station water depth, sample location characteristics, toxicity test endpoint mean and standard deviation, and all detection limits. In addition to the above data, the following will also be reported for all stations indicated on the attached "Services to be performed at each station/cost" spreadsheet for bioassessment: raw data and computed biological indices. Data from the bioaccumulation tests will be reported as tissue chemistry data for the specific chemical constituents shown on the attached "Services to be performed at each station/cost" spreadsheet. A map should be included showing the locations of each sampling station and an indication of the overall integrity of that site as excellent, good, marginal, or poor.

QA/QC evaluation ranking by each analytical laboratory will be provided in the database. In addition, appendices will include replicate data for toxicity tests, a database description and file structure description. A QA/QC report will also be included in the final data report, containing an evaluation of how the data complied with actual QA/QC parameters.

8. Purchase of Equipment

$38,000 is now included in the budget for equipment purchase using RWQCB 4 FY 2000/01 SWAMP funds. With this money, R4 would like to purchase the following equipment:

Item	Cost
IDEXX and supplies*	$15,000
YSI Multiparameter probe & ISCO**	$20,000
Garmin GPS III Plus unit	$ 350
Laptop computer, per specs provided	$ 2,500
National Geographic TOPO software (state of California)	$ 150
TOTAL	$38,000#

* Details of exact equipment to be purchased will follow separately to DFG.

**The following shall be ordered from YSI: YSI Item Numbers 006090 (6090 Cable); 650-02 (Terminal Display); 006561 (pH probe); 006562 (DO probe); 006025 (Wiped Chlorophyll Prober); and, 6920-0 (Final Assembly – this includes instruction manual, PC6000 EcoWatch software, 6560 Conductivity/Temperature Probe, 6570 Maintenance Kit, Calibration/Transport Cup and Probe Guard). The following shall be ordered from ISCO: 68-6710-0716712C (Compact Portable Sampler which includes controller, top cover, center section, base & distributor arm); 68-6700-022 (Polypropylene 500 ml wedge shaped bottles includes 24 bottles, caps, retaining ring and 2 discharge tubes); 68-7600-106 (750 Module with standard area velocity sensor with 10 ft level measurement and 25 ft. cable); 60-3704-072 (3/8" x 25' vinyl suction line and strainer); 60-1684-040 (Model 934 Ni-Cad Battery rechargeable 12 vdc); 60-3004-059 (Model 961 Battery Charger); 68-6700-056 (Rapid Transfer Device (RTD) retrieves data from ISCO samplers and flow meters); and, 60-2544-052 (Flow link software).

If there is remaining unspent money, it will either be spent on additional equipment included in a future amendment to this task order or be rolled over into the funds set aside for further monitoring needed as determined by the sampling plan as shown on the attached table "Services to be performed at each station/cost".

9. Maximum Cost

The maximum cost of all SWAMP services specified in this Task Order, now including the revisions made herein as a part of Amendment One, shall not exceed $350,000. Field and analytical services costs are shown in the attached "Services to be Performed at Each Station/Cost" budget tables (3 pages total), and those costs are summarized below, as well as additional costs for line-item expense. This amount of $350,000 is from the Region 4 allocation for FY 00/01. Actual billing for this Task Order may be done on a total Task Order cost basis, with the work described and costed out herein as the basis for the cost.

Section VII. SWAMP Workplan

Department of Fish and Game — Surface Waters Ambient Monitoring Program (SWAMP)
SWRCB Contract No. 00-111-250 — Task Order No. 00-4-001-am1 (Amendment One)
RWQCB 4 — Funds from FY 00-01 Allocation

Item	Unit Cost	# items requested	Total Cost
DFG pass through sub-contract fee R4 share FY00-01	$3,643	1	$3,643
Cruise Reports (two separate sampling event reports)	$525	2	$1,050
Technical Reports	To be negotiated	To be negotiated	To be negotiated
10% set aside for equipment	$38,000	1	$38,000
Field and Analytical Services (see attached Budget Tables)			
Santa Clara Watershed Phase 1			$190,732
Calleguas Watershed			$63,472
Santa Clara Watershed Phase 2 (followup at 10 sites)			$34,220
Subtotal for all items above			= $331,117
Unallocated dollars remaining for follow up sampling and interpretive reporting			$18,883
GRAND TOTAL all costs			**= $350,000**

RWQCB 4 SWAMP DFG Task Order 00-04-001 Amendment One for FY 00-01 Funds
Santa Clara Phase One 30 EMAP Sites
SERVICES TO BE PERFORMED AT EACH STATION/COST

Amendment One for Task Order Station-by-Analysis Worksheet for RWQCB 4 FY00-01 Funds--Santa Clara Watershed Phase 1 + 30 EMAP sites originally planned for Fall 2001 collection, but delayed until August 2002 (Additions are shown in yellow background; deletions are shown in grey background).	**Unit cost per sample**	Santa Clara Site 1 (403STC002)	Santa Clara Site 2 (403STC004)	Santa Clara Site 3 (403STC0008)	Santa Clara Site 4 (403STC009)	Santa Clara Site 5 (403STC010)	Santa Clara Site 6 (403STC016)	Santa Clara Site 7 (403STC017)	Santa Clara Site 8 (403STC019)	Santa Clara Site 9 (403STC021)	Santa Clara Site 10 (403STC022)	Santa Clara Site 11 (403STC023)	Santa Clara Site 12 (403STC024)	Santa Clara Site 13 (403STC025)	Santa Clara Site 14 (403STC026)	Santa Clara Site 15 (403STC027)	Santa Clara Site 16 (403STC028)	Santa Clara Site 17 (403STC029)	Santa Clara Site 18 (403STC030)	Santa Clara Site 19 (403STC064)	Santa Clara Site 20 (403STC065)	Santa Clara Site 21 (403STC066)	Santa Clara Site 22 (403STC068)	Santa Clara Site 23 (403STC069)	Santa Clara Site 24 (403STC070)	Santa Clara Site 25 (403STC071)	Santa Clara Site 26 (403STC072)	Santa Clara Site 27 (403STC074)	Santa Clara Site 28 (403STC076)	Santa Clara Site 29 (403STC077)	Santa Clara Site 30 (403STC082)	403STCNRB - Newhall Ranch Blue Cut	403STCBQT - Bouquet	403STCSFO - San Francisquito	403STCCTC - Castaic	403STCPRU - Piru	403STCSSP - Sespe	403STCSTP - Santa Paula	403STCESTU - Estuary*	Total units	Total Cost (Total Units x cost/unit)	5% field duplicates	Rounded up to whole number	Total cost for 5% field dupes
Analysis or Service Performed																																											
Fieldwork		*$500 sample collection charge includes walk-in sediment and/or water sample collect at $360,*																																										
Sediment & Water Sample Collection		*multiparameter probe (D.O., temp, depth, pH, conductivity, turbidity), & centroid flow at $140.*																																									
Sediment &/or water sample collection	$500	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	39	$19,500			
Sample shipping--water	$70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	39	$2,730			
Sample shipping--sediment	$70																																	1	1	1	1	1	1	1	7	$490			
Sample shipping - ELISA's to Granite Canyon	$25																																	26							26	$650			
Fish/Bivalve Collection																																												
Bagged bivalve bioaccum (SMW style)	$1,155																																	1	1	1	1	1	1	1	7	$8,085	0.35	1	$1,155
Trace Organic Chemistry																																												
Tissue Org Chem - pesticides, pcbs, pah	$1,423																																			1	1	1	1	1	5	$7,115	0.25	1	$1,423
Tissue sample digestion	$56																																			1	1	1	1	1	5	$280	0.25	1	$56
for org chem samples only (no metals being done)																																												

Tissue sample prep (dissect & homogenize)	$79																																[redacted]	[redacted]	1	1	1	1	1	5	$395	0.25	1	$79
for org chem samples only (no metals being done)																																												
Water Org Chem - pesticides, pcbs, pah	$798																															2	1	1	1	1	1	1	1	9	$7,182	0.45	1	$798
Sed Org Chem--full scan (pesticides & aroclors)	$830																																						1	1	$830	0.05	1	$830
Trace Metal Chemistry																																												
ICPMS trace metals suite for sediment cost includes: sample digest ($56) + 1st ICPMS element ($79) + 9 add'tl elements (9x$11) = $234																																												
Sediment: ICPMS metals in sediment	$234																															2	1	1	1	1	1	1	1	9	$2,106	0.45	1	$234
Mercury in sediment	$91																															2	1	1	1	1	1	1	1	9	$819	0.45	1	$91
ICPMS trace metals suite for water cost includes: sample filter ($10) + sample digest ($20) + 1st ICPMS element ($79) + 10 add'tl elements (10x$11) = $219																																												
Water: ICPMS metals in water	$219																															2	1	1	1	1	1	1	1	9	$1,971	0.45	1	$219
Mercury in water	$91																															2	1	1	1	1	1	1	1	9	$819	0.45	1	$91
Conventional Water Chemistry																																												
Nutrients: includes sulfate, chloride,	$135	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	39	$5,265	1.95	2	$270
ortho-phosphate, nitrate, nitrite ($27 each anion)																																												
Boron	$35	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	39	$1,365	1.95	2	$70
TDS	$30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	39	$1,170	1.95	2	$60
Total ammonia	$25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	39	$975	1.95	2	$50
Chlorophyll	$40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	39	$1,560	1.95	2	$80
Sediment grain size - full analysis (phl)	$125																															2	1	1	1	1	1	1	1	9	$1,125	0.45	1	$125
Rapid Bioassessment Monitoring																																												
Site collection, sorting, taxonomy, QA, report	$1,221	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	38	$46,398			
(3 replicates @ $407 each)																																												
Recon by F&G for Santa Clara	$15,000																																							1	$15,000			
Toxicity Testing - Fresh Water Origin																																												
Water--Test species may be fresh water or salt water depending on the water chemistry during sampling.																																												

SERVICES TO BE PERFORMED AT EACH STATION/COST

	Cerio 7 - day	$683	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	39	$26,637			
	Minnow 7 - day	$683	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	39	$26,637			
Other Toxicity Testing Services																																													
	ELISA for Diazinon or Chlorpyrifos	$32																																2	2	2	2	2	2	2	14	$448			
	ELISA Diazinon followup	$32																															26								26	$832			
	ELISA Chlorpyrifos followup	$32																															26								26	$832			
	Phase II and Phase III - TIE	$3,885																																1							1	$3,885			
Field QA/QC--5% field duplicates		**$5,631**																																								$5,631			**$5,631**
Total for Amendment One, Santa Clara Watershed Phase 1 + 30 EMAP stations																																	Collected Fall 2001									**$190,732**			
	Not Collected in Fall 2001																																												
	Tentatively scheduled to be collected in July 2002																																												

RWQCB 4 SWAMP DFG Task Order 00-04-001 Amendment One for FY 00-01 Funds
Santa Clara Phase Two – 10 FollowUp Sites
SERVICES TO BE PERFORMED AT EACH STATION/COST

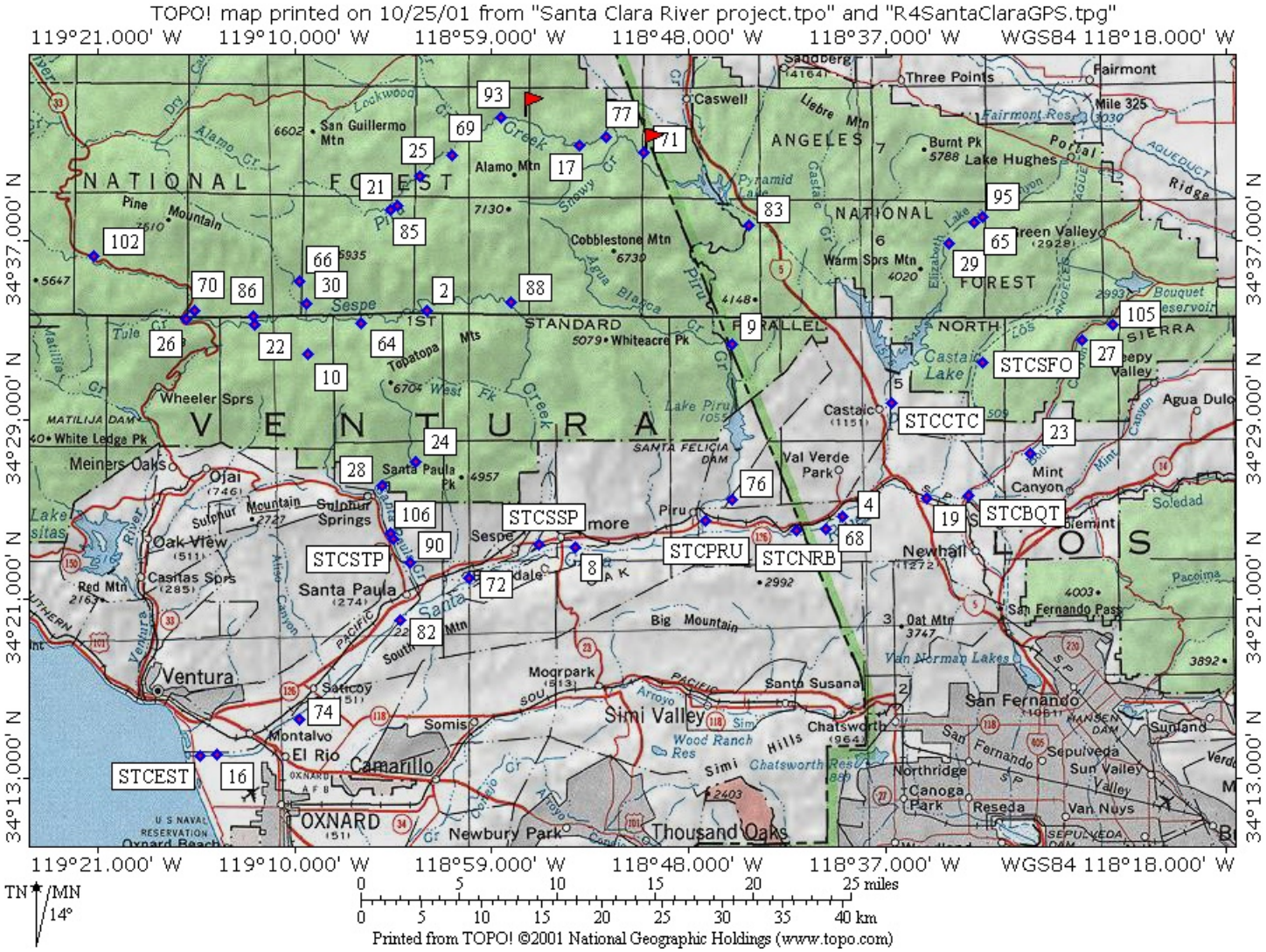
Amendment One to Task Order Station by Analysis Worksheet for RWQCB 4 FY00-01 Funds--Santa Clara Watershed Phase 2 (10 sites initially planned for follow-up, but done in Fall 2001)			403STC004	403STC008	403STC009	403STC016	403STC017	403STC019	403STC021	403STC022	403STC024	403STC027	Total units	Total Cost (Total Units x cost/unit)
Analysis or Service Performed		**Unit Cost**												
		(per sample)												
Sample collection and other fieldwork														
Sediment & water		$500	1	1	1	1	1	1	1	1	1	1	10	$5,000
Includes walk-in sediment and/or water sample collect														
at $360, multiparameter probe & centroid flow at $140														
(depth, pH, temp, conductivity, turbidity, d.o).														
Sample shipping														
$70 per media type per station (no charge for tissue)														
Sediment		$70												
Water		$70	1	1	1	1	1	1	1	1	1	1	10	$700
Conventional Water Chemistry														
	Nutrients: ortho-phosphate, nitrate, chloride,	$135	1	1	1	1	1	1	1	1	1	1	10	$1,350
	nitrite, sulfate ($27 each)													
	Boron	$35	1	1	1	1	1	1	1	1	1	1	10	$350
	TDS	$30	1	1	1	1	1	1	1	1	1	1	10	$300
	Ammonia	$25	1	1	1	1	1	1	1	1	1	1	10	$250
	Chlorophyll	$40	1	1	1	1	1	1	1	1	1	1	10	$400
Rapid Bioassessment Monitoring														
	Site collection, sorting, taxonomy, QA, report	$1,221	1	1	1	1	1	1	1	1	1	1	10	$12,210
	(3 replicates @ $407 each)													
Toxicity Testing - Fresh Water Origin														
	Water													
	Cerio 7 - day	$683	1	1	1	1	1	1	1	1	1	1	10	$6,830
	Minnow 7 - day	$683	1	1	1	1	1	1	1	1	1	1	10	$6,830
Field QA/QC														

Santa Clara Phase Two – 10 FollowUp Sites

SERVICES TO BE PERFORMED AT EACH STATION/COST

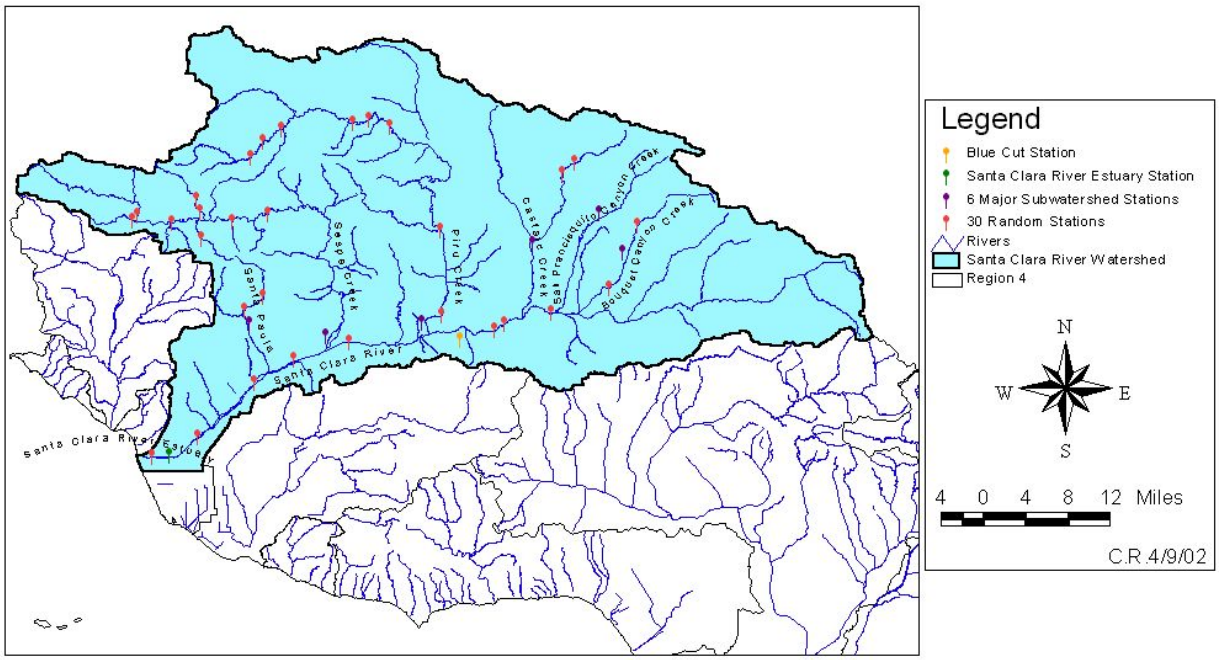
	NOTE: 5% field dupes will be collected/analyzed in conjunction with the 30 EMAP random stations next August.													
Total for Amendment One, Santa Clara Watershed Phase 2 (follow-up)														**$34,220**
collected Fall 2001														

Section VIII.



Section VIII.

Surface Water Ambient Monitoring Program
Santa Clara River Watershed



Section IX. **Santa Clara River Sampling Locations**

Site #	Long	Lat	Waterbody	County	Location
404STC002	119.044192	34.565685	SESPE CR	VENTURA	Topatopa Mountains
404STC004	118.657688	34.411898	SANTA CLARA R	LOS ANGELES	Val Verde
404STC008	118.913509	34.389372	SANTA CLARA R	VENTURA	Fillmore
404STC009	118.760332	34.54035	PIRU CR	VENTURA	Cobblestone Mountain
404STC010	119.155557	34.532712		VENTURA	Lion Canyon
404STC016	119.240444	34.235145	SANTA CLARA R	VENTURA	Oxnard
404STC017	118.902675	34.688857	PIRU CR	VENTURA	Alamo Mountain
404STC019	118.579249	34.425544	SANTA CLARA R	LOS ANGELES	Newhall
404STC021	119.07195	34.644034	PIRU CR	VENTURA	Lockwood Valley
404STC022	119.204678	34.555087	SESPE CR	VENTURA	Lion Canyon
404STC023	118.483698	34.459209	BOQUET CANYON	LOS ANGELES	Mint Canyon
404STC024	119.054796	34.452773	*D	VENTURA	Santa Paula Peak
404STC025	119.051086	34.66546	PIRU CR	VENTURA	Lockwood Valley
404STC026	119.268716	34.559014		VENTURA	Wheeler Springs
404STC027	118.435424	34.543643	BOQUET CANYON	LOS ANGELES	Green Valley
404STC028	119.085642	34.435351	*D	VENTURA	Santa Paula Peak
404STC029	118.558491	34.615422		LOS ANGELES	Warm Springs Mountain
404STC030	119.157198	34.570162	Piedra Blanca Creek	VENTURA	Lion Canyon
404STC064	119.105149	34.55569		VENTURA	Topatopa Mountains
404STC065	118.536069	34.630534		LOS ANGELES	Burnt Peak
404STC066	119.163105	34.587432	Piedra Blanca Creek	VENTURA	Lion Canyon
404STC068	118.673803	34.403074	SANTA CLARA R	LOS ANGELES	Val Verde
404STC069	119.021175	34.681299	PIRU CR	VENTURA	Lockwood Valley
404STC070	119.261343	34.565628	SESPE CR	VENTURA	Wheeler Springs
404STC071	118.842305	34.682933	PIRU CR	VENTURA	Black Mountain
404STC072	119.005243	34.366004	SANTA CLARA R	VENTURA	Santa Paula
404STC074	119.163445	34.261191	SANTA CLARA R	VENTURA	Saticoy
404STC076	118.76084	34.424761	PIRU CR	VENTURA	Piru
404STC077	118.87732	34.694135	PIRU CR	VENTURA	Alamo Mountain
404STC082	119.069764	34.335032	SANTA CLARA R	VENTURA	Santa Paula

404STCEST	Santa Clara River Estuary
404STCSTP	at the confluence of Santa Clara River and Santa Paula Creek
404STCSSP	at the confluence of Santa Clara River and Sespe Creek
404STCPRU	at the confluence of Santa Clara River and Piru Creek
404STCNRB	at Blue Cut which is a hydrologically significant area of surface water and ground water interaction
404STCCTC	at the confluence of Santa Clara River and Castaic Creek
404STCBQT	at the confluence of Santa Clara River and Bouquet Creek
404STCSFO	as close to the confluence of Santa Clara River and San Francisquito Creek as possible

Random stations to be sampled in Fall 2002 only
Random stations to be sampled in Fall 2001 and Fall 2002
Fixed Station Sampled in Fall 2001

Chapter Three

Calleguas Creek Watershed

I. Sites to be Monitored (Problematic or Clean)

This section will summarize site-specific problems(s), potential problem(s), or clean water locations to be monitored.

A. Background

Calleguas Creek and its major tributaries, Revolon Slough, Conejo Creek, Arroyo Conejo, Arroyo Santa Rosa, and Arroyo Simi drain an area of 343 square miles in southern Ventura County and a small portion of western Los Angeles County. This watershed, which is elongated along an east-west axis, is about 30 miles long and 14 miles wide. The northern boundary of the watershed is formed by the Santa Susana Mountains, South Mountain, and Oak Ridge; the southern boundary is formed by the Simi Hills and Santa Monica Mountains.

Land uses vary throughout the watershed. Urban developments are generally restricted to the city limits of Simi Valley, Moorpark, Thousand Oaks, and Camarillo. Although some residential development has occurred along the slopes of the watershed, most upland areas are still open space, however, golf courses are becoming increasingly popular to locate in these open areas. Agricultural activities, primarily cultivation of orchards and row crops, are spread out along valleys and on the Oxnard Plain.

Mugu Lagoon, located at the mouth of the watershed, is one of the few remaining significant saltwater wetland habitats in southern California. The Point Mugu Naval Air Base is located in the immediate area and the surrounding Oxnard Plain supports a large variety of agricultural crops. These fields drain into ditches which either enter the lagoon directly or through Calleguas Creek and its tributaries. Other fields drain into tile drain systems which discharge to drains or creeks. Also in the area of the base are freshwater wetlands created on a seasonal basis to support duck hunting clubs. The lagoon borders on an Area of Special Biological Significance (ASBS) and supports a great diversity of wildlife including several endangered birds and one endangered plant species. Except for the military base, the lagoon area is relatively undeveloped.

Supplies of ground water are critical to agricultural operations and industry (sand and gravel mining) in this watershed. Moreover, much of the population in the watershed relies upon ground water for drinking water supply.

Aquatic life in both Mugu Lagoon and the inland streams of this watershed has been impacted by pollutants from nonpoint sources. DDT, PCBs, other pesticides, and some metals have been detected in both sediment and biota collected from surface waterbodies of this watershed. Additionally, ambient toxicity has been revealed in several studies from periodic toxicity testing in the watershed (ammonia from POTWs and pesticides such as diazinon and chlorpyrifos are implicated). Fish collected from Calleguas Creek and Revolon Slough exhibit skin lesions and have been found to have other histopathologic abnormalities. High levels of minerals and nitrates are common in the water column as well as in the groundwater. Sediment toxicity is also elevated in some parts of the lagoon. Reproduction is impaired in the resident endangered species, the light-footed clapper rail due to elevated levels of DDT and PCBs. Overall, this is a very impaired watershed. It appears that the sources of many of these pollutants are agricultural activities (mostly through continued disturbance and erosion of historically

contaminated soils), which cover approximately 25% of the watershed along the inland valleys and coastal plain, although the nearby naval facility has also been a contributor. Other nonpoint sources include residential and urban activities, which are present over approximately 25% of the watershed. The remaining 50% of the watershed is still open space although there is a severe lack of benthic and riparian habitat.

Mugu Lagoon as well as the Calleguas Creek Estuary is considered a candidate toxic hot spot under the Bay Protection and Toxic Cleanup Program for reproductive impairment (the endangered clapper rail), exceedance of the state Office of Environmental and Health Hazard Assessment (OEHHA) advisory level for mercury in fish, and exceedance of the National Academy of Science (NAS) guideline level for DDT in fish, sediment concentrations of DDT, PCB, chlordane, chlorpyrifos, sediment toxicity and degraded benthic infaunal community.

Primary issues related to POTW discharges include ammonia toxicity and high mineral content (i.e., salinity), the latter, in part, due to imported water supplies.[6]

B. Beneficial Uses

Above the estuary: wildlife habitat, contact and non-contact water recreation, Industrial service supply, industrial process supply, preservation of rare and endangered species, agricultural supply, groundwater recharge, wetlands habitat, freshwater replenishment, and warm water habitat.

In estuary: wildlife habitat, contact and non-contact water recreation, estuarine habitat, marine habitat, preservation of rare and endangered species, navigation, preservation of biological habitats, wetlands habitat, migratory and spawning habitat, and shellfish harvesting.

C. Known Impairments

Various reaches of this watershed are 303(d) listed for nitrogen, water-soluble pesticides, salts, historic pesticides, metals, PCBs, sediment-bound organics, and trash.

II. Objectives of Monitoring

A. Over-arching Objectives

The main objective of the SWAMP monitoring in the Calleguas Creek Watershed is to gather more information on the chronic toxicity problem and the potential causes. Other sub-objectives include obtaining and filling in data gaps or where data is non-existent, gathering data to assist in the TMDL process, and to determine if beneficial uses are being obtained.

B. Potential Assessment Questions

[6] State of California Regional Water Quality Control Board, Los Angeles Region; Watershed Management Initiative Chapter; December 2000.

A directed study design has been selected for Calleguas Creek because a large sample data set already exists for this watershed. The directed study will provide answers to questions regarding specific sites. Because of the directed study design of the monitoring to be conducted in the Calleguas Creek area, potential watershed-wide assessment questions such as those mentioned above cannot be answered with any statistical confidence for the watershed as a whole. The questions this program can answer are directed to a single site. Examples are as follows:

- Does this site support its designated beneficial use of shellfish harvesting?
- Is the ability of this site to support the beneficial use of shellfish harvesting increasing or decreasing over time?
- Does this site support its designated beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat?
- Is the ability of this site to support the beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat increasing or decreasing over time?
- What is the distribution of benthic conditions at this site?
- What is the distribution of the total number of benthic species at this site?
- What is the distribution of exotic species in the benthos at this site?
- Does this site have an altered/degraded benthic community structure?
- Does this site support its designated beneficial use of spawning, reproduction, and/or early development?
- Is the ability of this site to support the beneficial use of spawning, reproduction, and/or early development increasing or decreasing over time?
- What is the distribution of toxicity at this site?
- What is the distribution of nutrients at this site?
- Does this site support its designated beneficial uses of migration of aquatic organisms, rare, threatened or endangered species, and wildlife habitat?
- Is the ability of this site to support the beneficial uses of migration of aquatic organisms, rare, threatened or endangered species, and wildlife habitat increasing or decreasing over time?

C. Indicators

The following indicators will be used: toxicity, bioassessment (macroinvertebrate assemblage includes physical habitat assessment), metals chemistry, organophosphate

chemistry including chlorpyrifos and diazinon, bioaccumulation (shellfish tissue chemistry), ammonia, chlorophyll a, dissolved oxygen, pH, depth, temperature, conductivity, turbidity, boron, TDS, nutrients including phosphate, nitrate, chloride, sulfate, and nitrite, and Phase II TIE work because toxicity is a known problem as documented by previous Regional Board studies performed by UC Davis.

III. Specific Activities Planned for FY 2000-2001

A. List of Water Bodies to be Sampled

1. FY 2000-2001

Santa Clara River Watershed, Phase I (the focus of Chapter Two)
Calleguas Creek Watershed (the focus of Chapter Three)

B. Review of Available Information (analysis of existing data is incomplete at this time)

Please see Appendix A Applicable Sections of the 1996 & 1998 Water Quality Assessments. This will be updated as soon as the 2002 Water Quality Assessment currently under development is adopted by the State Board, scheduled to occur in fall 2002.

The Calleguas Creek watershed has been studied much more comprehensively utilizing both an EMAP approach and pre-selected sites. The POTWs in the area have participated in a comprehensive monitoring program, the "Calleguas Creek Characterization Study", in addition to their separate monitoring programs, that has produced a large database. As part of the "Calleguas Creek Characterization Study", CDFG performed a bioassessment study of the area entitled, "Calleguas Creek Characterization Study Benthic Macroinvertebrates" which was published in November of 1998. Toxicity is a known problem as documented by previous Regional Board studies performed by UC Davis. A report entitled "Calleguas Creek Watershed Erosion and Sediment Control Plan for Mugu Lagoon" was published in May of 1995 by the USDA Natural Resources Conservation Service and Forest Service Water Resources Planning Staff. Data can be found in relation to this watershed in the "Sediment Chemistry, Toxicity, and Benthic Community Conditions in Selected Water Bodies of the Los Angeles Region Final Report" regarding the BPTCP findings released in August of 1998 jointly by the State Water Resources Control Board, the Los Angeles Regional Water Quality Control Board, CDFG, University of California, Santa Cruz and San Jose State University Moss Landing Marine Labs. Lastly, information can be found in the Regional Toxic Hot Spot Cleanup Plan for Mugu Lagoon (released in May of 1999 by the LARWQCB) in response to the findings of the final BPTCP report.

IV. Monitoring Design and Strategy

As previously mentioned, the Calleguas Creek watershed has been studied much more comprehensively than the Santa Clara River watershed utilizing both an EMAP approach and pre-selected sites. A number of toxicity studies have been performed in this watershed, in addition to the studies conducted by the POTWs located in the area. Toxicity is a known impairment of the Calleguas Creek watershed. Toxicity has severe

consequences for the aquatic life of the area and is therefore a high priority for additional monitoring. Calleguas Creek and the surrounding areas also have other identified impairments such as nutrients and chloride. Monitoring to determine the extent of these parameters and their associated problems is included in this ambient monitoring plan. Current efforts are underway at the Regional Board to address these constituents through TMDL development. However, the main focus in the Calleguas Creek Watershed in relation to the SWAMP will be toxicity. Chlorpyrifos and diazinon are suspected causes of the toxicity. Staff hope to either identify new causes or verify suspected causes of the toxicity utilizing Toxicity Identification Evaluations (TIEs). Once the true cause is identified, the staff can further define the sources of the toxicant and develop plans to control the toxic events.

Because the focus of the monitoring program is on known toxicity problems and the potential source identification, the program for this watershed is based on a directed approach. There will be 12 stations and the following analyses will be performed: toxicity, bioassessment, boron, TDS, nutrients including phosphate, nitrate, sulfate, chloride and nitrite, metals chemistry, chlorophyll a, ammonia, dissolved oxygen, pH, flow, temperature, conductivity, turbidity, depth, and organophosphate chemistry including chlorpyrifos and diazinon. The thirteenth station at the base of the watershed will have the above mentioned analyses and additionally will be sampled for bioaccumulation.

A map of station locations within the watershed has been included in Section VIII of this Chapter. A document consisting of directions to the stations and photographs of the stations is included in Section IX. within this Chapter.

Funding set aside for TIE work will be devoted towards the Bouquet Canyon Creek site in the Santa Clara River Watershed and the Calleguas Creek estuary. Preliminary, unpublished data suggest this site also experienced toxicity and staff believes a TIE should be conducted here. Staff hopes this work will begin in summer of 2002.

IV. Budget

FY 2000/2001

The maximum cost of all SWAMP services specified for FY 2000-2001, as shown in the attached table “Service to Be Performed at Each Station/Cost”, included in Section VII. of this Chapter, shall not exceed **$350,000**. This amount of $350,000 is from the Region 4 allocation for FY 2000-2001 and is for both the Santa Clara River and Calleguas Creek watersheds.

Section VI.
A. Summary Table for Watershed Monitoring
Summary Table of Indicators and Rationale

Toxicity is a known impairment of the Calleguas Creek watershed. Toxicity has severe consequences for the aquatic life of the area and is therefore a high priority for additional monitoring. Calleguas Creek and the surrounding areas also have other identified impairments such as nutrients and chloride. Monitoring to determine the extent of these parameters and their associated problems is included in this ambient monitoring plan. Current efforts are underway at the Regional Board to address these constituents through TMDL development. However, the main focus in the Calleguas Creek Watershed in relation to the SWAMP will be toxicity. Chlorpyrifos and diazinon are suspected causes of the toxicity. Sampling will be focused around toxicity testing, chlorpyrifos and diazinon testing, and metals chemistry. Bioassessment will also be conducted to supplement information previously gathered in the region. Furthermore, a directed approach has been utilized in the development of the Calleguas Creek study design because the size of the watershed is so much smaller than the Santa Clara River watershed and because a large data set already exists for this watershed. The directed study will provide answers to questions regarding specific sites.

River Segment	Parameter/Indicator	Rationale
12 Directed Stations	Toxicity	• Previous studies indicate toxicity is a known problem; • To further define the extent of the toxicity problem and identify the causes of toxicity within this watershed; • If impaired at this station, further testing may be conducted upstream to potentially identify the source.
	Bioassessment	• To provide baseline bioassessment data for this watershed; • Current data focuses on the effects of the POTWs in the area; goal is to expand sampling to provide information on ambient conditions; • To indicate the health and biological integrity of the aquatic invertebrate community.
	Metals Chemistry	• To determine if metals concentrations are a potential cause of known toxicity problems within the watershed; • If impaired at this station, further testing will be conducted upstream to potentially identify the source. • Various reaches of this watershed are 303(d) listed for metals.
	Conventional Water Chemistry ([Nutrients: Phosphate, Nitrate, Chloride, Nitrite, & Sulfate], Boron & TDS)	• To provide baseline nutrient data for this watershed; • To define the extent of the problems nutrient enrichment & chloride may pose; • Various reaches of this watershed are 303(d) listed for chloride, nitrogen, and eutrophication.
	Organophosphate Chemistry (including diazinon and chlorpyrifos)	• To determine if organophosphates are a potential cause of known toxicity problems within this watershed. • To provide baseline chlorpyrifos and diazinon data for this watershed; • To define the extent of the problem chlorpyrifos and diazinon may pose; they are suspected causes of known toxicity impairment; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Chlorophyll a	• To provide baseline chlorophyll a data for this watershed;

Section VI.
A. Summary Table for Watershed Monitoring
Summary Table of Indicators and Rationale

River Segment	Parameter/Indicator	Rationale
		• Chlorophyll a data may be correlated to nutrient enrichment; • Various reaches of this watershed are 303(d) listed for nitrogen.
	Ammonia	• To provide baseline ammonia data for this watershed; • To define the extent of the problem ammonia may pose; • Various reaches of this watershed are 303(d) listed for nitrogen.
	DO, pH, temperature, depth, conductivity, turbidity & flow	• To provide baseline data for this watershed; • To define the extent of the problem these parameters may pose; potential impacts on aquatic life; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Phase II TIE (At 2 stations TBD)	• Previous studies indicate toxicity is a known problem. • Phase II TIEs will further define sources of toxicity.
Estuary Station	Bioaccumulation	• To provide baseline bioaccumulation data for this watershed; • To address possible human health concerns (contaminants in edible fish tissue) and ecologic concerns (benthic community impacts) which could result if the contaminants at a site were bioavailable for uptake by organisms; • To demonstrate the bioavailability of contaminants at these stations and the extent of the problem this poses; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Metals Chemistry	• To determine if metals concentrations are a potential cause of known toxicity problems within the watershed; • If impaired at this station, further testing will be conducted upstream to potentially identify the source. • Various reaches of this watershed are 303(d) listed for metals.
	Conventional Water Chemistry ([Nutrients: Phosphate, Nitrate, Chloride, Nitrite, & Sulfate], Boron & TDS)	• To provide baseline nutrient data for this watershed; • To define the extent of the problems nutrient enrichment & chloride may pose; • Various reaches of this watershed are 303(d) listed for chloride, nitrogen, and eutrophication.
	Organophosphate Chemistry (including diazinon and chlorpyrifos)	• To determine if organophosphates are a potential cause of known toxicity problems within this watershed. • To provide baseline chlorpyrifos and diazinon data for this watershed; • To define the extent of the problem chlorpyrifos and diazinon may pose; they are suspected causes of known toxicity impairment; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.

Section VI.
A. Summary Table for Watershed Monitoring
Summary Table of Indicators and Rationale

River Segment	Parameter/Indicator	Rationale
	Bioassessment	• To provide baseline bioassessment data for this watershed; • Current data focuses on the effects of the POTWs in the area; goal is to expand sampling to provide information on ambient conditions; • To indicate the health and biological integrity of the aquatic invertebrate community.
	Toxicity	• Previous studies indicate toxicity is a known problem; • To define the extent of the toxicity problem and identify the causes of toxicity within this watershed; • If impaired at this station, further testing may be conducted upstream to potentially identify the source.
	Chlorophyll a	• To provide baseline chlorophyll a data for this watershed; • Chlorophyll a data may be correlated to nutrient enrichment; • Various reaches of this watershed are 303(d) listed for nitrogen.
	Ammonia	• To provide baseline ammonia data for this watershed; • To define the extent of the problem ammonia may pose; • Various reaches of this watershed are 303(d) listed for nitrogen.
	DO, pH, temperature, depth, conductivity, turbidity & flow	• To provide baseline data for this watershed; • To define the extent of the problem these parameters may pose; potential impacts on aquatic life; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.

Section VI.
B. Summary Table for Watershed Monitoring
Summary Table of Indicators and Rationale

Calleguas Creek Watershed	Toxicity	• Aquatic Life / Biological Response (Basin Plan Objective)	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SHELL, SPWN	• To gather more information on the chronic toxicity problem and the potential causes • To obtain and fill in data where data gaps exist or data is non-existent • Determine if beneficial uses are being obtained	Directed
	Bioassessment	• Aquatic Life / Biological Response & Habitat	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN	• To gather more information on the chronic toxicity problem and the potential causes • To obtain and fill in data where data gaps exist or data is non-existent • Determine if beneficial uses are being obtained	Directed
	Conventional Water Chemistry Metals Chemistry Organophosphate Chemistry	• Aquatic Life / Pollutant Exposure • Drinking Water / Contaminant Exposure	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, MUN, REC 1& 2, SHELL, SPWN	• To gather more information on the chronic toxicity problem and the potential causes • To obtain and fill in data where data gaps exist or data is non-existent • Determine if beneficial uses are being obtained	Directed
	Bioaccumulation	• Fish & Shellfish Contamination / Contaminant Exposure • Aquatic Life / Pollutant Exposure	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SHELL, SPWN	• To gather more information on the chronic toxicity problem and the potential causes • To obtain and fill in data where data gaps exist or data is non-existent • Determine if beneficial uses are being obtained	Directed
	Dissolved Oxygen	• Aquatic Life / Habitat (Basin Plan Objective)	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SHELL, SPWN	• To gather more information on the chronic toxicity problem and the potential causes • To obtain and fill in data where data gaps exist or data is non-existent • Determine if beneficial uses are being obtained	Directed
	PH	• Aquatic Life / Biological Response (Basin Plan	WARM, COLD, WILD, BIOL,	• To gather more information on the chronic toxicity problem and the	Directed

Section VI.
B. Summary Table for Watershed Monitoring
Summary Table of Indicators and Rationale

		Objective)	RARE, MIGR, WET, EST, MAR, SHELL, SPWN	potential causes • To obtain and fill in data where data gaps exist or data is non-existent • Determine if beneficial uses are being obtained	
	Temperature	• Aquatic Life / Habitat (Basin Plan Objective)	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SHEL, SPWN L	• To gather more information on the chronic toxicity problem and the potential causes • To obtain and fill in data where data gaps exist or data is non-existent • Determine if beneficial uses are being obtained	Directed

SWAMP Task Order No. 00-4-001-am1 (Amendment One)
FY 00/01 Field and Analytical Laboratory Services for RWQCB 4 for SWAMP

1. **Task Order No.**: 00-4-001-Am1 (Amendment One)--in support of SWRCB Contract No.00-111-250.

2. **Task Order Title**: Field and analytical services for RWQCB 4 for FY 00/01 funds.

3. **Contractor**: California Department of Fish and Game.

4. **Regional Board contact for this Task Order**: Tracy Vergets (213-576-6661)
email: tvergets@rb4.swrcb.ca.gov

5. **Term of this Task Order**: 11/1/2000 through 3/31/2003.

6. **The maximum amount for this Task Order is**: $0 (the $350,000 authorized in the original task order for Region 4's FY00-01 allocation, remains the same; this task order amendment does not add or reduce funds overall. This amendment makes revisions/corrections to the work performed, as shown in attached spreadsheets and narrative text).

7. **Signatures authorizing work to proceed within this Task Order**:

The signatures below indicate that the parties agree to the scope, deliverables, and budget specified in this Task Order. This Task Order is not effective until the Project Director and the Contract Manager sign the Task Order. If the work identified in this Task order can not be completed for the budgeted amount, the Task Order must not be signed. Under no circumstances is any work to be completed in excess of the budgeted amount unless there is a formal written amendment to the Task Order.

For Contractor:

_____ _____
Signature — Date
Max Puckett, Contractor Project Director

For SWRCB:

_____ _____
Signature — Date
Craig J. Wilson, SWRCB Contract Manager

8. Scope of Work:

A. Purpose and Objectives of the Proposed Work

This Task Order implements Amendment One to the first year of ambient water monitoring and assessment for the Surface Water Ambient Monitoring Program (SWAMP) for the California Regional Water Quality Control Board/Los Angeles (Region 4). This Amendment is necessary in order to make corrections/revisions to the original task order, based on work completed during the first round of sample collection and analysis during Fall 2001. The total task order amount authorized remains the same: $350,000.

The majority of the revisions are based on several minor changes that were authorized by RWQCB 4 staff during the sample collection operations (substituting alternate sites, adding a site, etc.), and shifting the timing of sample collection for the 30 random EMAP stations with the 10-station random EMAP follow-up sites in the Santa Clara watershed. The changes are shown in the attached spreadsheet tables, as well as described in narrative text herein. This work will focus on the Santa Clara and Calleguas Watersheds using contract funding allocated to RWQCB 4 for fiscal year 2000-2001. Other watersheds will be focused on in subsequent years, on a five-year cycle. The goal of this program is to gather ambient water data utilizing water column chemistry, water toxicity, sediment toxicity, bioassessment, physical habitat assessment, and bioaccumulation studies to name a few in order to provide the Regional Board and the State Board with information on these watersheds. The data collected during this program will be used to compose watershed assessment reports, the 305(b) list, and ultimately the 303 (d) list as well as supplementing the data specific to point source discharges the Regional Board obtains through the National Pollutant Discharge Elimination System program. Specific work to be performed at each station is shown on the attached “Services to be Performed at Each Station/Cost” table.

The program goals of SWAMP are:

1. Identify specific problems preventing the SWRCB, RWQCBs, and the public from realizing beneficial uses in targeted watersheds.
2. Create an ambient monitoring program that addresses all hydrologic units of the State using consistent and objective monitoring, sampling and analysis methods; consistent data quality assurance protocols; and centralized data management.
3. Document ambient water quality conditions in potentially clean and polluted areas.
4. Provide the data to evaluate the effectiveness of water quality regulatory programs in protecting beneficial uses of waters of the State.

The sampling in the Santa Clara watershed focuses on 30 randomly chosen stations in the EMAP fashion with sampling consisting of water samples collected for toxicity, bioassessment, and conventional water chemistry (including nutrient anions—chloride, nitrate, nitrite, ortho-phosphate, and sulfate—total ammonia, and chlorophyll a; multiparameter probes will be used to assess instantaneously each station’s dissolved oxygen, pH, depth, temperature, conductivity, flow and turbidity. These 30 random EMAP stations were originally scheduled to be collected during the "dry fall season", but due to a significant number of these sites being void of water (dry) upon actual sample collection, RWQCB 4 staff chose to conduct this effort in the late summer 2002, and instead do the "follow-up 10 random EMAP stations" during the Fall 2001 sample collection effort. Additionally, one station at the base of each of the seven main subwatersheds was selected and analyzed for the same parameters listed above, as well as

sediment grain size full analysis, bioaccumulation (using *Corbicula*), trace metal chemistry in the water column and sediment, and ELISA testing for chlorpyrifos and diazinon. One site, the "Bouquet" station (403STCBQT - Bouquet), will have a water sample collected by RWQCB4 staff every other week for one year, beginning in May 2002 (26 sampling events and samples), using containers and shipping materials supplied by UCD-Granite Canyon, and will have ELISA analysis for chlorpyrifos and diazinon conducted on each sample, upon receipt at the UCD-GC facility. The station at the very bottom of the watershed (prior to meeting the estuary) was also tested for trace organic chemistry. One station in the middle of the watershed, at Blue Cut, was sampled for the same constituents as the 30 random sites. This station was chosen to represent the surface water and ground water interaction in the area.

The Calleguas watershed has been studied much more comprehensively utilizing both an EMAP approach and pre-selected sites. The POTWs in the area have participated in a comprehensive monitoring program, in addition to their separate monitoring programs, that has produced a large database. A number of toxicity studies have been performed in this watershed. Toxicity is a known impairment of the Calleguas Creek watershed. Toxicity has severe consequences for the aquatic life of the area and is therefore a high priority for additional monitoring. Calleguas Creek and the surrounding areas also have other identified impairments such as nutrients and chloride. Monitoring to determine the extent of these parameters and their associated problems is included in this ambient plan. Current efforts are underway at the Regional Board to address these constituents through TMDL development. Therefore, the main focus of the SWAMP program in this watershed will be toxicity. Chlorpyrifos and diazinon are suspected causes of the toxicity. The program for this watershed is based on a directed approach. There will be 12 stations and the following analyses will be performed on water samples collected from these stations: toxicity, anion nutrients (including nitrate, ortho-phosphate, sulfate, chloride, and nitrite), bioassessment, chlorophyll a, total ammonia, multiparameter probe measurements (DO, temperature, pH, depth, conductivity, turbidity), centroid flow, boron, TDS, trace metals chemistry, and an organophosphate scan (including chlorpyrifos and diazinon). One station at the base of the watershed will have the above-mentioned analyses, and additionally will be sampled for bioaccumulation (using *Corbicula*). Half of the funding that was originally set aside for Phase II TIE work because toxicity is a known problem as documented by previous Regional Board studies performed by UC Davis, was instead switched to a site in the Santa Clara Watershed (Bouquet; station number 403STCBQT) that demonstrated toxicity during the Fall 2001 sampling effort, per direction from RWQCB 4 staff. The other half of the funding set aside for Phase II TIE work will be directed towards station 403CAL004 which also demonstrated toxicity during the Fall 2001 sampling effort. This work is planned to commence in February 2002.

The sampling and analysis will be used to assess the ambient conditions of these watersheds. The sampling and analyses described in this Task Order will further delineate the nature, extent, and sources of toxic pollutants that have been detected or are suspected to be problematic for these areas. Where applicable, a triad approach (benthic community analysis, water chemistry, and toxicity testing) has been used. Ultimately, the information from these analyses will be used in the water quality assessment. The bioaccumulation tests are being conducted in order to address possible human health concerns (contaminants in edible fish tissue) and ecologic concerns (benthic community impacts) that could result if the contaminants at a site were bioavailable for uptake by organisms. This bioaccumulation test will help to demonstrate the bioavailability of contaminants at these stations. Bagged bivalve bioaccumulation tests were originally planned to be conducted at 8 stations, and organisms were deployed at the 8 stations during the Fall 2001 sampling effort, but due to bagged bivalves being "vandalized or lost" at two of these stations, tissue analyses will only be able to be conducted on six of the eight stations. There is also a large focus on bioassessment, which historically has been overlooked. The

information gathered will be used in trend analysis as well as the potential identification of reference sites (in the Santa Clara River area) which could potentially be used in the development of an index of biological integrity.

B. Technical Approach:

i. Sampling Design

A focused, comprehensive sampling for chemistry, toxicity, bioaccumulation, and bioassessment is indicated as shown on the attached table “Services to be Performed at Each Station/Cost”.

The overall status of the Santa Clara watershed is not well known; historical assessment has been spotty. In this watershed, Fish and Game will utilize the information provided by USEPA and perform recon to narrow down the site selection from 240 potential sites to 30 stations. USEPA provided the potential site population following EMAP procedures in randomly selecting from the following:

- The target population is all streams with flowing water within the Santa Clara watershed as defined by the USGS 4th field hydrologic unit 18070102.
- The sampling frame is RF3 restricted to Strahler 3rd order and higher. Both perennial and non-perennial coded streams were included to make sure streams with flowing water during time of sampling would not be excluded. A comparison was done to compare the difference if only perennial streams were chosen.

This random design was chosen in order to allow the Regional Board, in a statistically sound manner, to sample the watershed and develop an assessment of the overall health of the watershed. As a secondary goal, this approach theoretically will provide data both in clean and polluted areas, with sites near areas that have been sampled previously and those that have not. By choosing a random sampling design, bias is removed. The representative 30 sites is the recommended number of sites to provide a statistically defensible summary of the watershed.

At the same time, RWQCB4 staff believe that a station at the bottom of each major subwatershed will provide valuable information about those said subwatersheds and the beginnings of a tributary-based monitoring program. Funding has been set aside to follow up on stations in subsequent years and subwatersheds that have analyses that indicate problem areas.

These 30 random EMAP stations were originally scheduled to be collected during the "dry fall season", but due to a significant number of these sites being void of water (dry) upon actual sample collection, RWQCB 4 staff chose to conduct this effort in the late summer 2002, and instead do the "follow-up random 10 EMAP stations" during the Fall 2001 sample collection effort. The shift in collection time of the samples will not alter the conclusions and the original sample design is still statistically valid. Further, the design continues to reflect staff’s best professional

judgement that the monitoring program should include both a spatial and a temporal element. Sampling for two years over these sites meets these objectives. The same constituents shall be sampled and analyzed during FY 2000/2001 and FY 2001/2002.

The Calleguas watershed has been studied much more comprehensively utilizing both an EMAP approach and pre-selected sites. The POTWs in the area have participated in a comprehensive monitoring program, in addition to their separate monitoring programs, that has produced a large database. The program for this watershed is based on a directed approach. There will be 12 stations strategically placed by Regional Board staff in which the following analyses will be performed: toxicity, bioassessment, nutrients including nitrate, phosphate, sulfate, chloride and nitrite, metals chemistry, chlorophyll a, ammonia, DO, pH, temperature, conductivity, turbidity, centroid flow, boron, TDS, and organophosphate chemistry including chlorpyrifos and diazinon. One station at the base of the watershed will have the above-mentioned analyses and additionally will be sampled for bioaccumulation. Funding has also been set aside for Phase II TIE work because toxicity is a known problem as documented by previous Regional Board studies performed by UC Davis.

ii. Sample Collection

The field crew will collect the samples at the latitude and longitude previously recorded during past fieldwork at these stations or as determined during the reconnaissance performed by CDFG. If a new station is being collected, the latitude and longitude, as well as GPS coordinates and cross-reference photographs, shall be provided for the site for future reference. If there is confusion about locating a site, it shall be resolved in consultation with the RWQCB staff member present in the field or by phone. Sufficient volume of water or sediment shall be collected in order to perform the analyses to be conducted at each station, as well as to allow for archiving of samples for future analysis, as shown on the attached "Services to be Performed at Each Station/Cost" table. Sample collection and subsequent processing and testing will be performed according to the most recent version of the SWAMP Quality
Assurance Project Plan (QAPP) and SWAMP Laboratory SOPs. Currently, a five percent field duplicate and trip blank QA/QC level is being achieved statewide in the SWAMP program.

iii. Laboratory Analysis

Actual analytical services that will be performed on each sample are shown on the attached table "Services to be Performed at Each Station/Cost".

iv. Data Analysis

Results from sampling shall be analyzed and reported in tabular and graphical format. Analyses shall be compared to criteria supplied to Fish and Game by the Los Angeles Regional Board. These criteria will consist of water quality criteria and water quality objectives. Comparative analyses shall be performed in such a way to evaluate the present state of health of the Santa Clara River and Calleguas Watersheds.

Toxicity data will include test mean, standard deviation, and a determination of whether or not a sample is toxic at a statistically significant level of difference from the laboratory control samples.

Data from sampling in the Santa Clara River watershed shall be analyzed and interpreted in a method consistent with the EMAP approach and protocol.

Bioassessment data shall be collected, sorted, and taxonomically identified in a manner consistent with the California Stream Bioassessment Protocol developed by the California Department of Fish and Game.

The costs to prepare technical reports which evaluate the laboratory data against other criteria or guidelines is yet to be determined, but funding has been set aside to conduct this work.

v. Data Reporting/Products

1. **Field Report**: A field report will be prepared. A cruise report will be provided to the Regional Board, with an additional copy provided to the State Board (one copy to each). The field report will include a map with sufficient detail of stations sampled, including latitude and longitude coordinates and GPS coordinates. The field report shall also include digital photos of the monitoring sites.

2. **Final Data Report**: All data shall be reported in electronic file (Excel spreadsheet or Access database) on three 3.5" IBM-formatted diskettes, CDs, or zip discs, as well as on hard copy (three one-sided originals for copying, and three bound copies). One of each type--electronic file, one-sided hardcopy original, and bound hardcopy-- shall go to the State Board and the Regional Board and DFG. QA/QC evaluation reports and verification that data met QA criteria set forth in QA Project Plan must be provided with hardcopy data report.

The data report will include the following items, where applicable, but shall not necessarily be limited to the following items:

All station data including CDFG station name, station number, IDORG number, leg number, sample collection date, sample station longitude and latitude, sample GPS coordinates, sample station water depth, sample location characteristics, toxicity test endpoint mean and standard deviation, and all detection limits. In addition to the above data, the following will also be reported for all stations indicated on the attached "Services to be performed at each station/cost" spreadsheet for bioassessment: raw data and computed biological indices. Data from the bioaccumulation tests will be reported as tissue chemistry data for the specific chemical constituents shown on the attached "Services to be performed at each station/cost" spreadsheet. A map should be included showing the locations of each sampling station and an indication of the overall integrity of that site as excellent, good, marginal, or poor.

QA/QC evaluation ranking by each analytical laboratory will be provided in the database. In addition, appendices will include replicate data for toxicity tests, a database description and file structure description. A QA/QC report will also be included in the final data report, containing an evaluation of how the data complied with actual QA/QC parameters.

8. Purchase of Equipment

$38,000 is now included in the budget for equipment purchase using RWQCB 4 FY 2000/01 SWAMP funds. With this money, R4 would like to purchase the following equipment:

Item	Cost
IDEXX and supplies*	$15,000
YSI Multiparameter probe & ISCO**	$20,000
Garmin GPS III Plus unit	$ 350
Laptop computer, per specs provided	$ 2,500
National Geographic TOPO software (state of California)	$ 150
TOTAL	$38,000#

* Details of exact equipment to be purchased will follow separately to DFG.

**The following shall be ordered from YSI: YSI Item Numbers 006090 (6090 Cable); 650-02 (Terminal Display); 006561 (pH probe); 006562 (DO probe); 006025 (Wiped Chlorophyll Prober); and, 6920-0 (Final Assembly – this includes instruction manual, PC6000 EcoWatch software, 6560 Conductivity/Temperature Probe, 6570 Maintenance Kit, Calibration/Transport Cup and Probe Guard). The following shall be ordered from ISCO: 68-6710-0716712C (Compact Portable Sampler which includes controller, top cover, center section, base & distributor arm); 68-6700-022 (Polypropylene 500 ml wedge shaped bottles includes 24 bottles, caps, retaining ring and 2 discharge tubes); 68-7600-106 (750 Module with standard area velocity sensor with 10 ft level measurement and 25 ft. cable); 60-3704-072 (3/8" x 25' vinyl suction line and strainer); 60-1684-040 (Model 934 Ni-Cad Battery rechargeable 12 vdc); 60-3004-059 (Model 961 Battery Charger); 68-6700-056 (Rapid Transfer Device (RTD) retrieves data from ISCO samplers and flow meters); and, 60-2544-052 (Flow link software).

If there is remaining unspent money, it will either be spent on additional equipment included in a future amendment to this task order or be rolled over into the funds set aside for further monitoring needed as determined by the sampling plan as shown on the attached table "Services to be performed at each station/cost".

9. Maximum Cost

The maximum cost of all SWAMP services specified in this Task Order, now including the revisions made herein as a part of Amendment One, shall not exceed $350,000. Field and analytical services costs are shown in the attached "Services to be Performed at Each Station/Cost" budget tables (3 pages total), and those costs are summarized below, as well as additional costs for line-item expense. This amount of $350,000 is from the Region 4 allocation for FY 00/01. Actual billing for this Task Order may be done on a total Task Order cost basis, with the work described and costed out herein as the basis for the cost.

Section VII. SWAMP Workplan

Department of Fish and Game — Surface Waters Ambient Monitoring Program (SWAMP)
SWRCB Contract No. 00-111-250 — Task Order No. 00-4-001-am1 (Amendment One)
RWQCB 4 — Funds from FY 00-01 Allocation

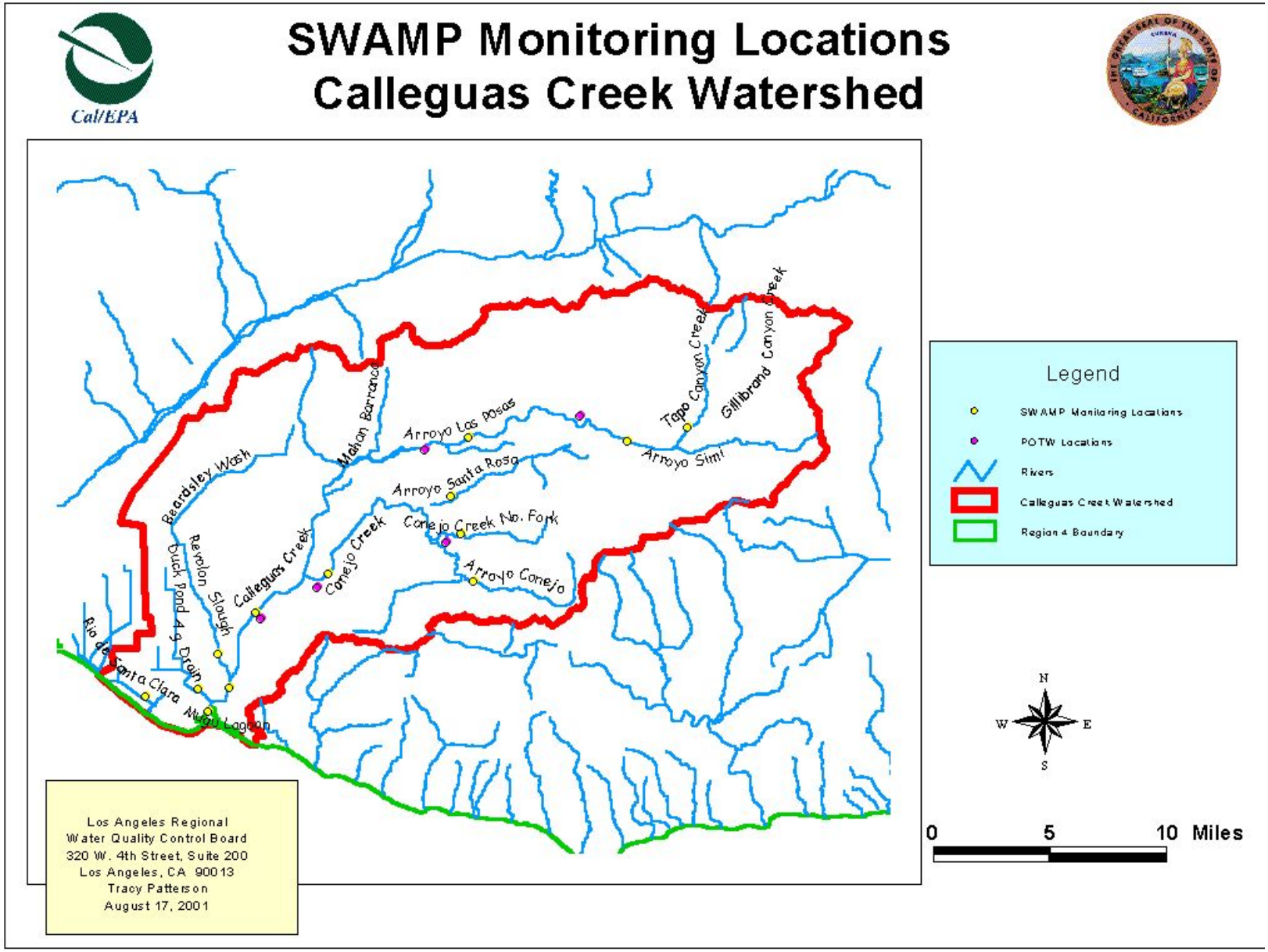
Item	Unit Cost	# items requested	Total Cost
DFG pass through sub-contract fee R4 share FY00-01	$3,643	1	$3,643
Cruise Reports (two separate sampling event reports)	$525	2	$1,050
Technical Reports	To be negotiated	To be negotiated	To be negotiated
10% set aside for equipment	$38,000	1	$38,000
Field and Analytical Services (see attached Budget Tables)			
Santa Clara Watershed Phase 1			$190,732
Calleguas Watershed			$63,472
Santa Clara Watershed Phase 2 (followup at 10 sites)			$34,220
Subtotal for all items above			= $331,117
Unallocated dollars remaining for follow up sampling and interpretive reporting			$18,883
GRAND TOTAL all costs			**= $350,000**

Section VII.

Amendment One to Task Order Station-by-Analysis Worksheet for RWQCB 4 FY00-01 Funds--Calleguas Watershed. (Additions are shown in yellow background; deletions are shown in grey background).	**Unit cost per sample**		403 CA LB WC -for 001	403 CA L002	403 CA L003	403 CA L005	403 CA L006	403 CA L007	403 CA L008	403 CA L009	403 CA L010	403 CA L011	403 CA L012	403 CA L013	403 CAL 004 - Estuary	Total units	Total Cost (Total Units x cost/unit)	5% field duplicates	Rounded up to whole number	Total cost of 5% field dupes
Analysis or Service Performed																				
Fieldwork	*$500 sample collection charge includes walk-in sediment and/or water sample collect at $360,*																			
Water & Sediment Sample Collection	*multiparameter probe (D.O., temp, depth, pH, conductivity, turbidity), & centroid flow at $140.*																			
Walk-in water &/or sed sample collect	$500		1	1	1	1	1	1	1	1	1	1	1	1	1	13	$6,500			
Sample shipping--water	$70		1	1	1	1	1	1	1	1	1	1	1	1	1	13	$910			
Sample shipping--sediment	$70														1	1	$70			
Fish/Bivalve Sample Collection																				5% field dupe for bivalves is included in Sta Clara Phase 1 5% field dupes
Bagged bivalve bioaccum (SMW style)	$1,155														1	1	$1,155	0.05	1	
Trace Organic Chemistry																				
Tissue Org Chem - pesticides, pcbs, pah	$1,423														1	1	$1,423	0.05	1	
Tissue sample digestion--	$56														1	1	$56	0.05	1	
for org chem samples only (no metals being done)																				
Tissue sample prep (dissect & homogenize)	$79														1	1	$79	0.05	1	
for org chem samples only (no metals being done)																				
Water Org Chem - pesticides, pcbs, pah	$798														1	1	$798	0.05	1	$798
Water Org Chem - OP scan	$452		1	1	1	1	1	1	1	1	1	1	1	1	1	13	$5,876	0.65	1	$452
Trace Metal Chemistry																				
ICPMS trace metals suite for water cost includes: sample filter ($10) + sample digest ($20) + 1st ICPMS element ($79)																				
+ 10 add'tl elements (10x$11) = $219																				
Water: ICPMS metals in water	$219		1	1	1	1	1	1	1	1	1	1	1	1	1	13	$2,847	0.65	1	$219
Mercury in water	$91		1	1	1	1	1	1	1	1	1	1	1	1	1	13	$1,183	0.65	1	$91
Conventional Water Chemistry																				
Nutrients: ortho-phosphate, nitrate, chloride,	$135		1	1	1	1	1	1	1	1	1	1	1	1	1	13	$1,755	0.65	1	$135
nitrite, sulfate ($27 each)																				
Boron	$35		1	1	1	1	1	1	1	1	1	1	1	1	1	13	$455	0.65	1	$35
TDS	$30		1	1	1	1	1	1	1	1	1	1	1	1	1	13	$390	0.65	1	$30
Ammonia	$25		1	1	1	1	1	1	1	1	1	1	1	1	1	13	$325	0.65	1	$25

Section VII.

	Chlorophyll	$40		1	1	1	1	1	1	1	1	1	1	1	1	1	13	$520	0.65	1	$40
Rapid Bioassessment Monitoring																					
	Site collection, sorting, taxonomy, QA, report	$1,221	1		1	1	1	1	1	1	1	1	1	1	1	1	13	$15,873			n/a
	(3 replicates @ $407 each)																				
Toxicity Testing - Salt Water Origin																					
	Water																				
	Sea Urchin Fertilization	$630														1	1	$630			n/a
	Mysid Juvenile 96-h Survival	$525														1	1	$525			n/a
Toxicity Testing - Fresh Water Origin																					
	Water																				
	Cerio 7 - day	$683		1	1	1	1	1	1	1	1	1	1	1	1		12	$8,196			n/a
	Minnow 7 - day	$683		1	1	1	1	1	1	1	1	1	1	1	1		12	$8,196			n/a
Other Toxicity Testing Services																					
	Phase II and Phase III - negotiable	$3,885														1	1	$3,885			n/a
Field QA/QC: 5% field duplicates		$1,825																$1,825			$1,825
Total for Amendment One, Calleguas Watershed																		**$63,472**			
	Not Collected in Fall 2001																				


SWAMP Monitoring Locations
Calleguas Creek Watershed
Cal/EPA
Legend
SWAMP Monitoring Locations
POTW Locations
Rivers
Calleguas Creek Watershed
Region 4 Boundary
Beardsley Wash
Mahon Barranca
Arroyo Las Posas
Arroyo Santa Rosa
Conejo Creek No. Fork
Arroyo Conejo
Arroyo Simi
Tapo Canyon Creek
Gillibrand Canyon Creek
Revlon Slough
Calleguas Creek
Conejo Creek
Buck Pond Ag Drain
Rio de Santa Clara
Mugu Lagoon
N
W
E
S
0
5
10 Miles
Los Angeles Regional
Water Quality Control Board
320 W. 4th Street, Suite 200
Los Angeles, CA 90013
Tracy Patterson
August 17, 2001

Section VII.

Section IX. Calleguas Creek Watershed
Directions to SWAMP Sampling Sites FY 00/01

These directions are to the sites from the top of the watershed down to the lagoon. I have tried to organize the directions for simplicity and to minimize backtracking. Please note: if at all possible, we need to get samples at or as near as possible to the sampling locations detailed below. If this is not possible, there is a list of alternate sites attached as back up sites.

Site 13 – Tapo Canyon Tributary (Thomas Guide page 498)

Exit 118 freeway at Tapo Canyon Rd. Turn left if exiting 118 W and turn right if exiting 188 E onto Tapo Canyon Rd in a southerly direction. Turn right on Los Angeles Ave. The sampling site is where Los Angeles Ave. crosses Tapo Canyon Creek between Sycamore and Sequoia (park in lot for Simi Valley Cycles). This is a concrete lined Ventura County Flood Control District (VCFCD) channel.

Facing to the south

Facing to the north

.

Sites 12 – Arroyo Simi (Thomas Guide page 497)

From Site 13, go west on Los Angeles Ave. The intersection of 1st St. and Los Angeles Ave will cross over Arroyo Simi. Sample here. The site is just east of the intersection. Park on the right in the driveway just before the overpass. Access is via the bike path.

If approaching the site from the 118 freeway, exit 1st St. and go south (Left on 1st St. if exit 118 W. and Right on 1st St. if exit 118 E.) Take 1st St. down to the intersection of 1st St. and Los Angeles Ave. Arroyo Simi will flow underneath. See above instructions.

Facing to the north

Facing to the south

Section IX. Calleguas Creek Watershed
Directions to SWAMP Sampling Sites FY 00/01

Site 1 – Fox Barranca (Thomas Guide page 494)

From site 12, take Los Angeles Rd west and turn right on Madera Rd to the 118 freeway west. The 118 freeway will turn into Los Angeles Avenue after the 23 interchange. From the 118 freeway which is Los Angeles Avenue at this point, exit at Bradley Road (turn right) which will very quickly cross over Fox Barranca where you can sample. Parking on the right hand side of Bradley is possible.

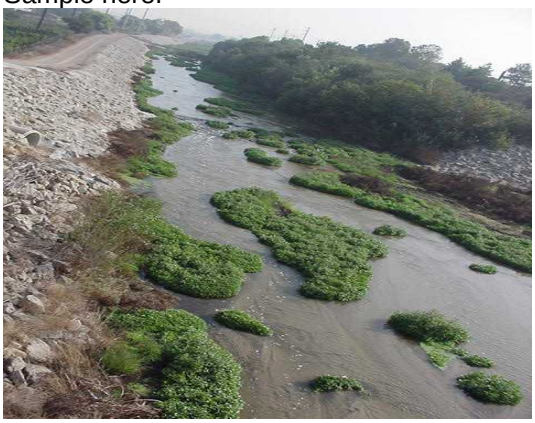
Facing to the east

Facing to the west

Site 8 – Simi Las Posas (map reads Arroyo Simi) (Thomas Guide page 496)

Take the 118 freeway E from Site 12 and turn right onto Tierra Rejada. This road will cross over Simi Las Posas. Access is via VCFCD channel.

Alternate route: From the 118 freeway go to the 23 southbound freeway. Exit at Tierra Rejada and turn west (right). Tierra Rejada veers to the north and then will cross over Simi Las Posas. Sample here.



Facing to the east

Section IX. Calleguas Creek Watershed
Directions to SWAMP Sampling Sites FY 00/01

Site 9 – Arroyo Santa Rosa (Thomas Guide page 496)

From Site 8, take Tierra Rejada back towards the 23 freeway. Turn right on Moorpark and right on Santa Rosa Road. Santa Rosa Road will cross over Arroyo Santa Rosa between Applewood/Penelope Streets and Glenside. Sample here. This channel is natural to the north and concrete to the south.

Alternate route from the 101 freeway: exit at Santa Rosa Road and go east towards the 23 freeway (exit 101 W and turn right, exit 101 E and turn Left.) Follow Santa Rosa Road to the tributary crossing as described above.


Facing to the north

Site 10 – North Fork Arroyo Conejo (Thomas Guide page 526)

From site 9, take Santa Rosa Road east towards the 23 freeway. Turn right onto Moorpark Rd. and then take another right onto Olsen Road. Olsen Road will turn into Lynn Road. The site is located at the overpass where Lynn Road goes over the North Fork Arroyo Conejo. The easiest place to park is to turn right onto Avenida de los Flores and then walk to Lynn and go south; the open access is to the right.

Alternate route from the 23 freeway: Exit at Avenida de los Arboles and go west (Left if on 23 N and right if on 23 S). Turn left on Olsen Road and follow to tributary crossing as described above.


East side of the road via VCFCD channel


West side of road – open access

Section IX. Calleguas Creek Watershed
Directions to SWAMP Sampling Sites FY 00/01

Site 11 – Arroyo Conejo (Thomas Guide page 526)

From site 10, continue south on Lynn Road. Turn right onto Hillcrest Drive. The sampling site is where Hillcrest passes over Arroyo Conejo just past Citation Drive. Access via VCFCD gate.

Alternate route from the 101 freeway: Exit on Lynn Road from the 101 and go north (Left if 101 E and Right if 101 W). Turn left onto Hillcrest Drive. See notes above.

On south side of Hillcrest

Site 7 – Conejo Creek (Thomas Guide page 524)

From site 11, go back to the 101 freeway (see above if you need help) and go west on the 101 (north). Exit at Pleasant Valley Road and go east (left from 101 W/N and right from 101 E/S). Turn left on Pancho and left on Howard Road. There will be a fork in the road. To the right it remains Howard Road and to the left it becomes Sanitation Road. Turn left onto Sanitation Road. Sample upstream of the discharge point at the Camarillo Treatment Plant.

Looking east upstream

Looking east upstream

Section IX. Calleguas Creek Watershed
Directions to SWAMP Sampling Sites FY 00/01

Site 6 – Calleguas Creek Main Stem (between Revolon Slough and Conejo Creek) (Thomas Guide page 524)

From site 7, get back to Pleasant Valley Road and head west. Turn left at Las Posas Road and then turn left on Hueneme Road. The sampling location is where Hueneme Road crosses Calleguas Creek. Two options to park: just before bridge there is a driveway and VCFCD access gate or go over the bridge and turn right on Portrero and then right on the bike path.

Alternate route from the 101 freeway: Exit at Las Posas Road and head in a southeast direction (left if exit 101 W and right if exiting 101 E). Turn left on Hueneme Road. The sampling location is where Hueneme Road crosses Calleguas Creek.

View from VCFCD access gate

Site 3 – Mugu Drain (AKA Duck Pond Ag Drain) (Thomas Guide page 553)

From Site 6, take Hueneme Road in a westerly direction (backtracking way came from). You will cross Hwy 1 and then look for Mugu Drain. The drain is most easily seen on the right hand side of the street and is just before a giant row of Eucalyptus trees. Sample at the overpass.

Alternate route from Hwy 1: Exit at Hueneme Road and go west to Mugu Drain.

Looking north

Looking south

Section IX. Calleguas Creek Watershed
Directions to SWAMP Sampling Sites FY 00/01

Site 2 – Rio de Santa Clara (AKA: Oxnard Drain Ditch #2) (Thomas Guide page 583)

From site 3, continue on Hueneme Road west. Turn left on Arnold. After a curve in the road to the right and past the organic compost facility, this road will dead end at a barricade. The military base will also be fenced off. The drain should be at the end of the barricade. Access to the right.

Alternate route from Hwy 1: Exit at Hueneme Road and go west. Turn left onto Arnold. Follow directions above.

Looking to the north

Site 5 – Revolon Slough (Thomas Guide page 553)

From Site 3, take Hueneme Road east to Wood Road and turn left on Wood Road. Sample at the overpass where Wood Road crosses over Revolon Slough in the natural part of channel (unlined). This is just before DJ Farms. Another landmark is a row of eucalyptus trees on the left side of the road will begin just before the sample location. Access is via VCFCD gate.

Looking towards natural unlined channel (east)

Looking northwest in concrete lined channel

Section IX. Calleguas Creek Watershed
Directions to SWAMP Sampling Sites FY 00/01

Site 4 – Calleguas Creek Main Stem (downstream of the confluence with Revolon Slough) (Thomas Guide page 583)

From Site 5, take Wood Road to Hwy 1. Hwy 1 will cross over Revolon Channel and then Calleguas Creek. There is a pullout just past the overpass by a callbox where you can park. Go under the bridge and just downstream of the confluence of Calleguas Creek with Revolon Slough. This will be the sampling point. You should still be outside of the property of the military base. If access is not available, sample under the bridge.

Looking west towards the ocean

Looking east across PCH / Hwy 1

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ALTERNATE SITES

Beardsley Wash at Central Ave. (Thomas Guide page 523)

From the 101, exit Central Ave and turn east (Right if 101 N/B and left if 101 S/B), you will cross over Beardsley Wash. Turn right onto Beardsley Road and park. Access is via VCFCD gate.

Section IX. Calleguas Creek Watershed
Directions to SWAMP Sampling Sites FY 00/01

Calleguas Creek at Pleasant Valley (Thomas Guide page 524)

101 freeway towards Ventura, exit Pleasant Valley Road and turn left. Sample at the overpass of Pleasant Valley Road and Calleguas Creek.

Chapter Four

Santa Monica Bay Watershed Management Area

I. Sites to be Monitored (Problematic or Clean)

This section will summarize site-specific problems(s), potential problem(s), or clean water locations to be monitored.

A. Background

The Santa Monica Bay Watershed Management Area (WMA), which encompasses an area of 414 square miles, is quite diverse. Its borders reach from the crest of the Santa Monica Mountains on the north and from the Ventura-Los Angeles County line to downtown Los Angeles. From there it extends south and west across the Los Angeles plain to include the area east of Ballona Creek and north of the Baldwin Hills. South of Ballona Creek the natural drainage area is a narrow strip of wetlands between Playa del Rey and Palos Verdes. The WMA includes several watersheds, the two largest being Malibu Creek to the north and Ballona Creek to the south. The Malibu Creek area contains mostly undeveloped mountain areas, large acreage residential properties and many natural stream reaches while Ballona Creek is predominantly channelized, and highly developed with both residential and commercial properties.

As a nationally significant water body, Santa Monica Bay was included in the National Estuary Program in 1989. It has been extensively studied by the Santa Monica Bay Restoration Project (SMBRP) and a watershed plan was developed in 1995. The Santa Monica Bay Watershed Council was formed in 1994 to oversee implementation of the Plan. The Restoration Project staff will be coordinating with Regional Board staff to carry out the Board's watershed approach in the Santa Monica Bay Watershed.

Though relatively small in its size compared with watersheds in other parts of the country, the Santa Monica Bay WMA embraces a high diversity in geological and hydrological characteristics, habitat features, and human activities. Almost every beneficial use defined in the Basin Plan is identified in water bodies somewhere in the WMA. Yet many of these beneficial uses have been impaired for years. While some of the impaired areas are showing signs of recovery, beneficial uses that are in relatively good condition still face the threat of degradation.

Existing and potential beneficial use impairment problems in the watershed fall into two major categories: human health risk, and natural habitat (wildlife) degradation. The former are issues primarily associated with recreational uses of the Santa Monica Bay. The latter are issues associated with terrestrial, aquatic, and marine environments. Pollutant loadings that originate from human activities are common causes of both human health risks and habitat degradation.

Of the major NPDES dischargers in the Santa Monica Bay WMA, the three POTWs (particularly the two direct ocean discharges) are the largest point sources of pollutants to Santa Monica Bay. Pollutants from the minor discharges have been estimated to contribute less than two percent of the total pollutants being discharged to the Bay. The majority of the 191 NPDES discharges to the Santa Monica Bay WMA go to Ballona Creek (157). Of the 103 dischargers enrolled under the general industrial storm water permit in the watershed, the largest numbers are located in the cities of Los Angeles and Torrance. Maintenance yards, recycling facilities, and electronics are a large component of these businesses. About half of the facilities are greater than one acre in size and about one-third of them are larger than 10 acres.

There are a total of 113 construction sites enrolled under the construction storm water permit. Twenty-eight of these sites are in the Malibu Creek Watershed. The sites are fairly evenly divided between commercial and residential. About one-half of them occur on sites that are larger than ten acres.

A considerable number of monitoring programs have been implemented in the Santa Monica Bay WMA, particularly over the last twenty years. Sampling efforts tend to center around assessing urban runoff effects in general along the coastline and reservoirs of PCBs and DDT contaminated sediment in the area of the Palos Verdes Shelf. Four statewide monitoring programs, State Mussel Watch, Bay Protection and Toxic Cleanup, Coastal Fish Contamination Program and Toxic Substances Monitoring, focus on biological measurements.

The data from these programs indicate that in general the open coastline is much cleaner than the Bay's enclosed waters, except with regards to DDT and PCBs on the Palos Verdes Shelf. Pollutants of particular concern are chlordane, DDT, copper, and zinc. The BPTCP has listed the Santa Monica Bay - Palos Verdes Shelf area as a toxic hot spot for DDT and PCBs, human health advisories (fishing) and NAS exceedances of DDT levels in fish. Marina Del Rey is listed as a toxic hot spot due to sediment concentrations of DDT, PCB, copper, mercury, nickel, lead, zinc and chlordane, and sediment toxicity; Ballona Creek Entrance Channel is listed due to sediment concentrations of DDT, zinc, lead, chlordane, dieldrin, and chlorpyrifos, and sediment toxicity. The BPTCP listed King Harbor as a site of concern, due to sediment concentrations of DDT and PCB and sediment toxicity (not recurrent).

Urbanization has had a significant impact on the riparian and wetland resources of the watershed, primarily through filling, alteration of flows, and decrease in water quality. It is estimated that 95% of the historic wetlands of the Santa Monica Bay WMA have been destroyed, with the remaining wetlands significantly degraded.

Greater Santa Monica Bay

Santa Monica Bay is heavily used for fishing, swimming, surfing, diving etc., activities classified as water contact recreation (REC-1). However, the ability for people to enjoy these activities has been lost to a certain degree because of the real or perceived risk to human health. The primary, and also the best documented, problems are acute health risk associated with swimming in runoff-contaminated surfzone waters, and chronic (cancer) risk associated with consumption of certain sport fish species in areas impacted by DDT and PCB contamination.

The general public has also been concerned about potential health risks associated with the consumption of contaminated seafood from Santa Monica Bay. This is the primary pathway through which humans are exposed to toxic chemicals found in the marine environment. Recent studies, however, have shown that health risks are limited to consumption of certain seafood species found at certain locations.

One of the most evident impacts in marine habitats is sediment contamination and damage to marine life that the contaminants cause when they are released from the sediment (through natural fluctuations or through disturbance of the sediment) into the food chain. Organic compounds such as DDT, PCBs, polycyclic aromatic hydrocarbons

(PAHs), chlordane, and tributyltin (TBT) are found in sediments in concentrations that are harmful to marine organisms at various locations in the Bay. Also found in Bay sediments are heavy metals such as cadmium, copper, chromium, nickel, silver, zinc, and lead. The major historic sources of sediment contamination have been wastewater treatment facilities; thus the accumulations are highest near treatment plant outfalls off of Palos Verdes and Playa del Rey.

Bioaccumulation of DDT in white croaker, dover sole, and California brown pelicans are well-known examples of the impacts caused by sediment contamination. Prior to the 1980s, high concentrations of DDT were found in muscle tissues of these organisms. DDT in these organisms was implicated in fin erosion and other diseases in fish as well as eggshell thinning and subsequent species decline in the California brown pelican.

Malibu Creek Watershed

The most recent Water Quality Assessment Report finds water quality in some streams within the Malibu Creek Watershed is impaired by nutrients and their effects, coliform and their effects, trash, and, in some instances, metals. While natural sources contribute, nonpoint source pollution from human activities is strongly implicated including ill-placed or malfunctioning septic systems and runoff from horse corrals. Nutrient inputs are also contributed by urban runoff and the POTW which discharges tertiary-treated effluent into the Creek about five miles upstream of Malibu Lagoon.

A nutrient TMDL for the mainstem of the Creek is in progress although ecologically relevant nutrient objectives are lacking. A study recently completed by UCLA provided recommendations which should lead to more effective management of the Lagoon and its resources as the restoration process continues.

Historically, the Lagoon was much larger than its current day size. Although the flow dynamics of the Creek as well as the ocean's influence on the Lagoon in the past can only be extrapolated, it is likely Creek flow was much less than today during the dry season, partially due to increased imported water demands upstream. Marine influence may have dominated, keeping the lagoon entrance open much of the year as occurs in the larger Mugu Lagoon to the north. An open Lagoon would have facilitated migration of the now endangered steelhead trout. And though continual Creek flow was likely less, more of the watershed was available for the trouts' use, at least prior to the construction of Rindge Dam in the 1920's. Most important, during the dry season there would be access to deep shaded pools in many parts of the watershed where the fish could mature until rain created the flows needed to reach the ocean.

Today, the flow regime is quite different and now a major issue of concern. Both increased urban runoff from the more developed upper watershed and discharges from the POTW have increased baseline flows. However, recently the POTW which discharges to Malibu Creek came under a discharge prohibition starting each April 15 through November 15 of each year, except during times of plant upset, storm events, or the existence of minimal streamflow conditions that require flow augmentation in Malibu Creek to sustain endangered species. In the long run, this discharge prohibition may have many other implications on water quality and quantity in the Creek and Lagoon.

The lagoon size is much reduced from historic times and it currently remains closed much of the year except for during the winter when ocean influences breach the sandbar

and Creek flows help maintain the opening. This had led to decreasing salinity or, at times, greatly fluctuating salinity which has disturbed efforts to restore the Lagoon. This also leads to elevated groundwater levels adjacent to the lagoon, assuring failure of septic systems in the area. Additionally, surfing and swimming is popular off the beaches in the immediate area and there is considerable concern over contaminated Lagoon water reaching these people.

Ballona Creek Watershed

The most recent Water Quality Assessment Report indicates impairment in this watershed due to coliform and its effects such as shellfish harvesting advisories; trash; PCBs and pesticides of historical origin such as DDT, chlordane, and dieldrin, as well as their effects such as sediment toxicity; metals such as lead, silver, arsenic, copper, cadmium, and zinc, as well as their effects such as water column toxicity; and tributyltin.

Ballona Creek is completely channelized to the ocean except for the estuarine portion which has a soft bottom. While at one time it drained into a large wetlands complex, it now has no direct connection to the few wetlands remaining in the area, although tide gates exist in the channel which connect to Ballona Wetlands. However, Ballona Creek may more often affect the nearby wetlands due to wave action moving trash, suspended material and dissolved contaminants from the ocean to the nearby Ballona Wetlands and Marina del Rey Harbor within which complex Ballona Lagoon is located.

The U.S. Army Corps of Engineers (USACE) and Los Angeles County Department of Beaches and Harbors have several times conducted dredging operations in order to keep the entrance to Ballona Creek and Marina del Rey Harbor open although this is not a routine procedure. Led by the Los Angeles Basin Contaminated Sediment Task Force, the USACE is conducting a study to identify sources of heavy metals loadings within the watershed. The results of the study could provide useful information to develop a TMDL for selected heavy metals.

Both dry weather and storm runoff from the main channel and two major tributaries were found to be toxic to marine organisms. Toxicity was also found during storms in the ocean near the mouth of Ballona Creek. Preliminary investigations showed that the sources of toxicity varied, and were associated with metals on one occasion and with organic chemicals on another occasion. Further efforts are needed to identify the sources of toxicity.

Bacterial indicator levels measured at stations near the mouth of Ballona Creek frequently exceed the level of concern. As a result, warning signs are posted permanently on each side of the Creek. The number of beach closures due to sewage spills rose again in 1998 after a long declining trend over the last ten years. The standards used to determine whether a beach should be closed are now based on AB411 and, since its passage, a greater number of beach closures have been seen statewide.

The BPTCP lists the Ballona Creek Entrance Channel and Marina del Rey back channels as Toxic Hot Spots; however, since they are not high priority sites, the Regional Board has not yet developed preliminary remediation plans or cost estimates.

Other Urban Watersheds

The most recent Water Quality Assessment Report indicates impairment in many of these smaller drainages, which discharge directly to the ocean, due to one or several of the following: coliform, ammonia, lead, copper (and toxicity likely associated with metals), trash, and low dissolved oxygen. Due to the frequency of high bacterial indicator levels, warning signs are posted permanently at many of these locations (i.e., storm drain outlets). It should be noted that there are plans to divert many of these storm drains to the sewer system during dry weather.

B. Beneficial Uses

All of the beneficial uses defined in the Basin Plan for the Los Angeles Region occur somewhere in this Watershed Management Area except for BIOL (preservation of biological habitats).

C. Known Impairments

Various reaches of this watershed are 303(d) listed for beach closures, swimming restrictions, shellfish harvesting advisories, enteric viruses, pathogens, coliform, algae, eutrophication, unnatural scum/foam, ammonia, odors, low DO and/or organic enrichment, trash, mercury, lead, cadmium, copper, nickel, silver, arsenic, zinc, selenium, tributyl tin, toxicity, benthic community effects, fish consumption advisories, sediment toxicity, Chem A, PAHs, DDT, pesticides, PCBs, dieldrin, chlordane, exotic vegetation, habitat alteration, hydromodification, reduced tidal flushing, debris, chloride, and specific conductance.

II. Objectives of Monitoring

A. Over-arching Objectives

The main goal of the sampling in the Santa Monica Bay WMA is to obtain an overall view of the health of the watershed. Additionally, the monitoring plan has been designed to provide information on potential reference sites in the watershed, and beneficial use attainment or non-attainment.

B. Potential Assessment Questions

Although a directed study design has been chosen for the Santa Monica Bay Watershed Management Area, staff feels that both site specific and comprehensive watershed-wide questions will be answered. Even though the design is not random, staff believe the ability to assess approximately 60 + sites over approximately 30 streams gives the statistical power to make conclusions in regard to the watershed as a whole, when the analysis is conducted at all sites. Examples are as follows:

- What is the percent of streams in the watershed management area that support their designated beneficial uses?

- Is the percent of streams in the watershed management area which support their beneficial uses increasing or decreasing over time?

- At specific sites influenced by sources of bacterial contaminants, estimate the concentration of bacterial contaminants above health standards or adopted water quality objectives in order to protect Rec 1 / Rec 2 and shellfish harvesting beneficial uses.

- At specific sties influenced by sources of bacterial contaminants, estimate the concentration of chemical contaminants in edible aquatic life tissues above advisory levels and critical thresholds of potential human health risk.

- At frequently fished sites, estimate the concentration of or verify previous estimates of chemical contaminants in commonly consumed fish and shellfish target species above advisory levels and critical threshold values of potential human health risk.

- At sites influenced by point sources or nonpoint sources of pollutants, identify specific location of degraded water or sediments in rivers, lakes, nearshore waters or enclosed bays or estuaries using several critical threshold values of toxicity, water column or epibenthic community analysis, habitat condition and chemical concentrations.

- Identify the areal extent of degraded water column chemistry locations in rivers, lakes, nearshore waters or enclosed bays or estuaries using several critical threshold values of toxicity, water column or epibenthic community analysis, habitat condition and chemical concentrations.

- What is the distribution of benthic conditions in streams of the watershed management area?

- What is the distribution of the total number of benthic species per site at each station sampled?

- What is the distribution of exotic species in the benthos in this watershed management area?

- What proportion of stream shave an altered/degraded benthic community structure?

- What is the distribution of toxicity in this watershed management area?

- What is the distribution of nutrients in this watershed management area?

- What is the percent of algae cover in this watershed management area?

- What is the percent of sedimentation in this watershed management area?

C. Indicators

The following indicators will be used: coliform and enterococcus bacteria; nutrients; convention water chemistry which includes ortho-phosphate, nitrate, nitrite, chloride, sulfate, total phosphate, boron, TKN, TDS, ammonia, chlorophyll-a, alkalinity, fluoride, total nitrogen, and hardness; fish tissue chemistry; bioaccumulation (shellfish tissue chemistry); bioassessment (macroinvertebrate assemblage includes physical habitat assessment); water column toxicity; ELISA for both diazinon and chlorpyrifos;

organophosphate scan for water; dissolved metals, dissolved oxygen; pH; depth; conductivity; turbidity and water temperature.

III. Specific Activities Planned for FY 2001-2002

A. List of Water Bodies to be Sampled

Santa Monica Bay Watershed Management Area (the focus of Chapter Four)
Santa Clara River Watershed, Phase II (the focus of Chapter Two)

B. Review of Available Information (analysis of existing data is incomplete at this time)

Please see Appendix A: Applicable Sections of the 1996 & 1998 Water Quality Assessments. This will be updated as soon as the 2002 Water Quality Assessment currently under development is adopted by the State Board, scheduled to occur in fall 2002.

Regional Board staff have briefly reviewed the availability of current data within the Santa Monica Bay watershed. The Santa Monica Bay itself, and the Malibu Creek watershed, a subwatershed of the Santa Monica Bay watershed, have been sampled rather extensively. The volunteer-based group, Heal the Bay, has a monthly program in Malibu Creek to analyze water quality and map the stream habitat (data is available on their website, www.healthebay.org). The Bay has been monitored by major dischargers as required by their NPDES permits. These requirements related to the Bay currently include sediment chemistry, sediment infauna, fish and invertebrate community analysis from trawling, bioaccumulation in fish, invertebrate community analysis by trap, bioaccumulation in invertebrates, and seafood safety for human health consumption. The Bay has also been monitored extensively during the Bight '94 and Bight '98 studies. Both of the Bight efforts "aim to provide an integrated assessment of the Southern California Bight through a cooperative regional-scale monitoring program lead by the Southern California Coastal Water Research Project"[7]. Additional monitoring is collected by another volunteer group, Santa Monica BayKeeper, which focuses on storm drains and shoreline monitoring. Data can be found in relation to this watershed in the "Sediment Chemistry, Toxicity, and Benthic Community Conditions in Selected Water Bodies of the Los Angeles Region Final Report" regarding the BPTCP findings released in August of 1998 jointly by the State Water Resources Control Board, the Los Angeles Regional Water Quality Control Board, CDFG, University of California, Santa Cruz and San Jose State University Moss Landing Marine Labs. Lastly, other references that are related to data in the SMBWMA include the following:

Ambrose, R.F., I.H. Suffet, and S.S. Que Hee. 1995. *Enhanced Environmental Monitoring Program at Malibu Lagoon and Malibu Creek.* Prepared for Las Virgenes Municipal Water District. Environmental Science & Engineering Program, University of California, Los Angeles.

Ambrose, R.F., A.R. Orme, J. Feddema, C. Gerba, P. Rundel, I.H. Suffet, M.I. Venkatesan, G. Coffman, S. Dallman, P. Finnemore, M. Kuhlman, C. Liban, J. Lilien, J.

[7] Bay, S.M., D. Lapota, J. Anderson, J. Armstrong, T. Mikel, A.W. Jirik, and S. Asato. 2000. Southern California Bight 1998 Regional Monitoring Program: IV. Sediment Toxicity. Southern California Coastal Water Research Project. Westminster, CA.

Maramjo, P. Orosz-Coghlan, S. Sheehan, K. Schwarz, and T. Trejo. 2000. *Lower Malibu Creek and Lagoon Resource Enhancement and Management.* University of California, Los Angeles. For California State Coastal Conservancy.

CH2HILL. 2000. *Evaluation of Nutrient Standards for Malibu Creek and Malibu Lagoon.* Prepared for Las Virgenes Municipal Water District and Triunfo Sanitation District.

Chapman, D.J. 1979. *Algae of the Malibu Creek and Changes in the Algae Populations in the Creek, May 1978-July 1979.* Department of Biology. University of California, Los Angeles.

Finney, V. 1995. *Malibu Creek Watershed Nitrogen and Phosphorus Analysis.* Natural Resources Conservation Service.

Los Angeles Regional Water Quality Control Board. 2000. *Regional Board Report on Wastewater Disposal Issues and Malibu Technical Investigation in the City of Malibu.*

Lund, L.J., M.A. Anderson, and C. Amrhein. 1994. *Evaluation of Water Quality for Selected Lakes in the Los Angeles Hydrologic Basin.* Dept. of Soil and Environmental Sciences, University of California, Riverside. For California Regional Water Quality Control Board, Los Angeles Region.

Manion, B.S. and J.H. Dillingham. 1989. *Malibu Lagoon: A Baseline Ecological Survey.* Prepared for Los Angeles County Department of Beaches and Harbors.

IV. Monitoring Design and Strategy

Because the Bay has been monitored thoroughly, Regional Board staff has decided to direct the SWAMP funding to the approximately 30 coastal subwatersheds of the Santa Monica Bay watershed. Many of these subwatersheds have not been sampled at all and others have been sampled modestly at best. The focus of the SWAMP sampling will include basic and conventional water column chemistry and bacteriology at all stations and bioassessment at most stations. A subset of these stations will additionally be sampled for water column toxicity, dissolved metals, and pesticides in the water column. Sampling will occur during both spring 2003 and spring 2004 seasons. Potential reference sites will be resampled during two subsequent spring sampling runs (spring 2005 and spring 2006) for bioassessment and conventional chemistry.

Sixty directed stations, on the average of 2 in each of the 30 subwatersheds, will be sampled. In most cases, one of the stations will be in the upper watershed and the other station will be in the lower watershed near its intersection with Pacific Coast Highway. In both spring 2003 and spring 2004, sampling and analyses will include: orthophosphate, nitrate-n, nitrite-n, chloride, sulfate, total phosphorous, boron, TKN, TDS, ammonia-n, chlorophyll a, alkalinity, hardness, bacteriology, fluoride, organic nitrogen, pH, temperature, conductivity, turbidity, and dissolved oxygen. Total nitrogen and organic nitrogen will be calculated based on the other nitrogen species. The spring sampling will also include bioassessment at 45 sites (all the upper sites and half of the lower sites) and ELISA analyses for chlorpyrifos and diazinon at 40 sites. During the two following spring seasons, 2005 and 2006, bioassessment, conventional chemistry, and bacteriology will be repeated at the 6 most likely candidates for potential reference sites in order to incorporate temporal variability and to verify reference condition status.

During the initial spring sampling run, a subset of 20 stations will be sampled for water column toxicity, dissolved metals, and organophosphate chemistry. Additionally, 2 lower subwatershed stations located near gas stations will be tested for MTBE.

Malibu Creek has been monitored extensively by the Heal the Bay. Staff do not propose additional sites at this time, however, at 5 of the existing sites, staff proposes to have dissolved metals analyses conducted as this is the only component that would be missing to complete the data being collected on the watershed as a whole.

Please see "Table B: Subwatersheds to be Sampled" included in the Task Order in Section VII. of this Chapter for a list of the subwatersheds included in the SWAMP monitoring program. Final site selection is pending and will be forwarded with the appropriate datasheets at a later date.

V. Budget

FY 2001/2002

The maximum cost of all SWAMP services specified for FY 2001-2002, as shown in the attached table "Services to Be Performed at Each Station/Cost", in Section VII. of this Chapter, shall not exceed **$336,526**. This amount of $336,526 is from the Region 4 allocation for FY 2001-2002.

Section VI.
A. Summary Table for Watershed Monitoring
Summary Table of Indicators and Rationale

Regional Board staff has decided to direct the SWAMP funding to the approximately 30 coastal subwatersheds of the Santa Monica Bay watershed. Many of these subwatersheds have not been sampled at all and others have been sampled modestly at best. The focus of the SWAMP sampling will include basic and conventional water column chemistry and bacteriology at all stations and bioassessment at most stations. A subset of these stations will additionally be sampled for water column toxicity, dissolved metals, and pesticides in the water column. Sampling will occur during both fall 2002 and spring 2003 seasons. Potential reference sites will be resampled during two subsequent spring sampling runs (spring 2004 and spring 2005) for bioassessment and conventional chemistry.

River Segment	Parameter/Indicator	Rationale
60 Fall 2002 / 60 Spring 2003	DO, pH, temperature, conductivity, turbidity, TDS, depth & flow	• To provide baseline data for this watershed; • To define the extent of the problem these parameters may pose; potential impacts on aquatic life; • Various reaches of this watershed are 303(d) listed for low DO and/or organic enrichment, hydromodification, and specific conductance. • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Conventional Water Chemistry ([Nutrients: Ortho-Phosphate, Nitrate, Chloride, Nitrite, & Sulfate], Total P, Boron, TKN, Fluoride, Total Nitrogen	• To provide baseline nutrient data for this watershed; • To define the extent of the problems nutrient enrichment, algae & eutrophication may pose; • Various reaches of this watershed are 303(d) listed for algae, eutrophication, unnatural foam/scum, ammonia, organic enrichment and chloride.
	Chlorophyll a	• To provide baseline chlorophyll a data for this watershed; • Chlorophyll a data may be correlated to nutrient enrichment; • Various reaches of this watershed are 303(d) listed for algae, eutrophication, and unnatural foam/scum.
	Ammonia	• To provide baseline ammonia data for this watershed; • To define the extent of the problem ammonia may pose; • Various reaches of this watershed are 303(d) listed for ammonia.
	Alkalinity & Hardness	• To provide baseline alkalinity and hardness data for this watershed; and, • To define the extent of the problem alkalinity and/or hardness may pose.
	Bacteria / Pathogens	• To provide baseline bacteria data for this watershed; • To define the extent of the problem bacteria may pose; and, • Various reaches of this watershed are 303(d) listed for beach closures, swimming restrictions, shellfish harvesting advisories, enteric viruses, pathogens and coliform.

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Summary Table of Indicators and Rationale

45 Spring 2003 Stations	Bioassessment	• To provide baseline bioassessment data for this watershed; • To indicate the health and biological integrity of the aquatic invertebrate community; and, • Various reaches of this watershed are 303(d) listed for benthic community effects.
6 Spring 2004 & Spring 2005 Stations	Bioassessment	• To provide baseline bioassessment data for this watershed; • To indicate the health and biological integrity of the aquatic invertebrate community; and, • Various reaches of this watershed are 303(d) listed for benthic community effects.
	Conventional Water Chemistry ([Nutrients: Ortho-Phosphate, Nitrate, Chloride, Nitrite, & Sulfate], Total P, Boron, TKN, Fluoride, Total Nitrogen	• To provide baseline nutrient data for this watershed; • To define the extent of the problems nutrient enrichment & chloride may pose; • Various reaches of this watershed are 303(d) listed for chloride, nitrogen, and eutrophication.
	Chlorophyll a	• To provide baseline chlorophyll a data for this watershed; • Chlorophyll a data may be correlated to nutrient enrichment; • Various reaches of this watershed are 303(d) listed for algae, eutrophication, and unnatural foam/scum.
	Ammonia	• To provide baseline ammonia data for this watershed; • To define the extent of the problem ammonia may pose; • Various reaches of this watershed are 303(d) listed for ammonia.
	Alkalinity & Hardness	• To provide baseline alkalinity and hardness data for this watershed; and, • To define the extent of the problem alkalinity and/or hardness may pose.
	DO, pH, temperature, conductivity, turbidity, TDS, depth & flow	• To provide baseline data for this watershed; • To define the extent of the problem these parameters may pose; potential impacts on aquatic life; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
Subset of 20 Randomly Chosen Spring 2003 Stations	Trace Organic Chem – Full scan to include pesticides, PCBs, and PAHs (water)	• To determine if organophosphates are a potential cause of known toxicity problems within this watershed. • To provide baseline chlorpyrifos and diazinon data for this watershed; and, • To define the extent of the problem chlorpyrifos and diazinon may pose; they are suspected causes of known toxicity impairment.

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A. Summary Table for Watershed Monitoring
Summary Table of Indicators and Rationale

	Metals Chemistry	• To determine if metals concentrations are a potential cause of known toxicity problems within the watershed; • If impaired at this station, further testing will be conducted upstream to potentially identify the source; and, • Various reaches of this watershed are 303(d) listed for metals (lead, cadmium, copper, nickel, silver, arsenic, zinc, selenium, and tributyl tin).
	Toxicity	• To define the extent of the toxicity problem and identify the causes of toxicity within this watershed.
	ELISA – chlorpyrifos & diazinon	• To provide baseline chlorpyrifos and diazinon data for this watershed.
Subset of 2 directed Spring 2003 Stations	MTBE	• To determine if MTBE is leaking from underground gas stations into the lower creeks of this watershed.

Section VI.
A. Summary Table for Watershed Monitoring
Summary Table of Indicators and Rationale

Santa Monica Bay WMA	Coliform and Enterococcus	• Water Contact / Contaminant Exposure • Fish and Shellfish Contamination / Contaminant Exposure	REC 1, WARM, COLD, SHELL, COMM	• Obtain and overall view of the state of the health of the watershed • Identify reference sites • Determine if beneficial uses are being obtained	Directed
	Conventional Water Chemistry Metals Chemistry Organophosphate Chemistry	• Aquatic Life / Pollutant Exposure • Drinking Water / Contaminant Exposure	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN, SHELL, COMM	• Obtain and overall view of the state of the health of the watershed • Identify reference sites • Determine if beneficial uses are being obtained	Directed
	Bioassessment	• Aquatic Life / Biological Response & Habitat	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN	• Obtain and overall view of the state of the health of the watershed • Identify reference sites • Determine if beneficial uses are being obtained	Directed
	Bioaccumulation	• Fish & Shellfish Contamination / Contaminant Exposure • Aquatic Life / Pollutant Exposure	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN, SHELL, COMM	• Obtain and overall view of the state of the health of the watershed • Identify reference sites • Determine if beneficial uses are being obtained	Directed
	Fish Tissue Chemistry	• Fish & Shellfish Contamination / Contaminant Exposure • Aquatic Life / Pollutant Exposure	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN, SHELL, COMM	• Obtain and overall view of the state of the health of the watershed • Identify reference sites • Determine if beneficial uses are being obtained	Directed
	Dissolved Oxygen	• Aquatic Life / Habitat (Basin Plan Objective)	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN	• Obtain and overall view of the state of the health of the watershed • Identify reference sites • Determine if beneficial uses are being obtained	Directed
	PH	• Aquatic Life / Biological Response (Basin Plan Objective)	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN	• Obtain and overall view of the state of the health of the watershed • Identify reference sites • Determine if beneficial uses are being obtained	Directed

Section VI.
A. Summary Table for Watershed Monitoring
Summary Table of Indicators and Rationale

	Temperature	• Aquatic Life / Habitat (Basin Plan Objective)	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN	• Obtain and overall view of the state of the health of the watershed • Identify reference sites • Determine if beneficial uses are being obtained	Directed
	Toxicity	• Aquatic Life / Biological Response (Basin Plan Objective)	WARM, COLD, WILD, BIOL, RARE, MIGR, WET, EST, MAR, SPWN	• Obtain and overall view of the state of the health of the watershed • Identify reference sites • Determine if beneficial uses are being obtained	Directed

SWAMP Task Order No. 01-4-001
FY 01/02 Field and Analytical Laboratory Services for RWQCB 4 for SWAMP

1. **Task Order No.**: 01-4-001 (in support of SWRCB Contract No.00-111-250).

2. **Task Order Title**: Field and analytical services for RWQCB 4 for FY 01/02 funds.

3. **Contractor**: California Department of Fish and Game.

4. **Regional Board contact for this Task Order**: Tracy Vergets (213-576-6661)
   email: tvergets@rb4.swrcb.ca.gov

5. **Term of this Task Order**: 2/15/02 through 06/30/2003.

6. **The maximum amount for this Task Order is**: $336,526 (Region 4 FY 01-02 allocation)

7. **Signatures authorizing work to proceed within this Task Order**:

The signatures below indicate that the parties agree to the scope, deliverables, and budget specified in this Task Order. This Task Order is not effective until the Project Director and the Contract Manager sign the Task Order. If the work identified in this Task order can not be completed for the budgeted amount, the Task Order must not be signed. Under no circumstances is any work to be completed in excess of the budgeted amount unless there is a formal written amendment to the Task Order.

For Contractor:

_____ _____
Signature — Date
Max Puckett, Contractor Project Director

For SWRCB:

_____ _____
Signature — Date
Craig J. Wilson, SWRCB Contract Manager

8. Scope of Work:

A. Purpose and Objectives of the Proposed Work

This Task Order implements the second year of ambient water monitoring and assessment for the Surface Water Ambient Monitoring Program (SWAMP) for the California Regional Water Quality Control Board/Los Angeles (Region 4). This work will focus on the Santa Monica Bay watershed using contract funding allocated to RWQCB 4 for fiscal year 2001-2002. Other watersheds will be focused on in subsequent years, on a five-year cycle. The goal of this program is to gather ambient water quality data in order to provide the Regional Board and the State Board with information on these watersheds. Examples of the type of analyses the Los Angeles Regional Board utilizes to obtain the ambient water quality data include water column chemistry, water toxicity, sediment toxicity, bioassessment, physical habitat assessment, and bioaccumulation studies to name a few. The data collected during this program will be used to compose watershed assessment reports, the 305 (b) list, and ultimately the 303 (d) list as well as supplementing the data specific to point source discharges the Regional Board obtains through the National Pollutant Discharge Elimination System (NPDES) program. Data may also be used to support standards development, TMDL development, NPDES permit issues, and other uses. Specific work to be performed at each station is shown on the attached "Table A: Services to be Performed at Each Station/Cost".

The program goals of SWAMP are:

1. Identify specific problems preventing the SWRCB, RWQCBs, and the public from realizing beneficial uses in targeted watersheds.
2. Create an ambient monitoring program that addresses all hydrologic units of the State using consistent and objective monitoring, sampling and analysis methods; consistent data quality assurance protocols; and centralized data management.
3. Document ambient water quality conditions in potentially clean and polluted areas.
4. Provide the data to evaluate the effectiveness of water quality regulatory programs in protecting beneficial uses of waters of the State.

Regional Board staff have briefly reviewed the availability of current data within the Santa Monica Bay watershed. The Santa Monica Bay itself, and the Malibu Creek watershed, a subwatershed of the Santa Monica Bay watershed, have been sampled rather extensively. The volunteer-based group, Heal the Bay, has a monthly program in Malibu Creek to analyze water quality and map the stream habitat. The Bay has been monitored by major dischargers as required by their NPDES permits (details to be discussed in the Workplan) and also during the Bight '94 and Bight '98 studies. Both of the Bight efforts aim "to provide an integrated assessment of the Southern California Bight through a cooperative regional-scale monitoring program lead by the Southern California Coastal Water Research Project"[8]. Additional monitoring is collected by another volunteer group, Santa Monica BayKeeper. Because the Bay has been monitored thoroughly, Regional Board staff has decided to direct the SWAMP funding to the approximately 30 coastal subwatersheds of the Santa Monica Bay watershed. Many of these subwatersheds have not been sampled at all and others have been sampled modestly at best. The focus of the SWAMP

[8] Bay, S.M., D. Lapota, J. Anderson, J. Armstrong, T. Mikel, A.W. Jirik, and S. Asato. 2000. Southern California Bight 1998 Regional Monitoring Program: IV. Sediment Toxicity. Southern California Coastal Water Research Project. Westminster, CA.

sampling will include basic and conventional water column chemistry and bacteriology at all stations and bioassessment at most stations. A subset of these stations will additionally be sampled for water column toxicity, dissolved metals, and pesticides in the water column. Sampling will occur during both spring and fall seasons. Potential reference sites will be sampled during a second spring sampling run for bioassessment.

The sampling and analyses will be used to assess the ambient conditions of these watersheds. The sampling and analyses described in this Task Order will further delineate the nature, extent, and sources of toxic pollutants which have been detected or are suspected to be problematic for these areas. Other uses of the data have been described above. Where applicable, a triad approach (benthic community analysis, water chemistry, and toxicity testing) has been used.

Ultimately, the information from these analyses will be used in the water quality assessment. In addition, the bioaccumulation tests (funded through Mussel Watch Program and the Coastal Fish Contamination Program historically and again during FY 01/02) are being conducted in order to address possible human health concerns (contaminants in edible fish tissue) and ecologic concerns (benthic community impacts) which may result if the contaminants at a site were bioavailable for uptake by organisms. These bioaccumulation tests will help to demonstrate the bioavailability of contaminants at these stations and may identify impaired beneficial uses. There is also a large focus on bioassessment which historically has been overlooked. The bioassessment performed will follow the California Stream Bioassessment Protocol developed by CDFG which focuses on the benthic macroinvertebrate assemblage and a physical habitat assessment. The information gathered will be used in trend analysis as well as the potential to use the data in the development of an index of biological integrity.

B. Technical Approach:

i. Sampling Design

A focused, comprehensive sampling for chemistry, toxicity, bioaccumulation, and bioassessment is indicated as shown on the attached table “Table A: Services to be Performed at Each Station/Cost”.

As described earlier, Regional Board staff has divided the Santa Monica Bay watershed into approximately 30 subwatersheds and intends to focus the SWAMP sampling on these coastal drainages of the Santa Monica Bay. The bay is currently extensively monitored and this coverage will be enhanced during the Bight ’03 project. Malibu Creek has been monitored extensively by the Heal the Bay. Staff do not propose additional sites at this time, however, at 5 of the existing sites, staff proposes to have dissolved metals analyses conducted as this is the only component that would be missing to complete the data being collected on the watershed as a whole.

Sixty directed stations, on the average of 2 in each subwatershed, will be sampled. In most cases, one of the stations will be in the upper watershed and the other station will be in the lower watershed near its intersection with Pacific Coast Highway. In both the spring and the fall, sampling and analyses will include: orthophosphate, nitrate-n, nitrite-n, chloride, sulfate, total phosphorous, boron, TKN, TDS, ammonia-n, chlorophyll a, alkalinity, hardness, bacteriology, fluoride, organic nitrogen, pH, temperature, conductivity, turbidity, and dissolved

oxygen. Total nitrogen and organic nitrogen will be calculated based on the other nitrogen species. The spring sampling will also include bioassessment at 45 sites (all the upper sites and half of the lower sites) and ELISA analyses for chlorpyrifos and diazinon at 40 sites. During the following spring, bioassessment, conventional chemistry, and bacteriaology will be repeated at the 12 most likely candidates for potential reference sites in order to incorporate temporal variability and to verify reference condition status. During the initial spring sampling run, a subset of 20 stations will be sampled for water column toxicity, dissolved metals, and organophosphate chemistry. Additionally, 2 lower subwatershed stations located near gas stations will be tested for MTBE. Please see "Table B: Subwatersheds to be Sampled" for a list of the subwatersheds included in the SWAMP monitoring program. Final site selection is pending and will be forwarded with the appropriate datasheets at a later date.

ii. Sample Collection

The field crew will collect the samples at the latitude and longitude previously recorded during past fieldwork at these stations or as determined during the reconnaissance performed by R4 staff. Station lists, locations, names, maps, access issues, and detailed site-by-site information will be provided by R4 staff to CDFG under separate cover. R4 staff shall provide DFG with a sample reconnaissance form for each site where sample collection is to be conducted. The form shall be provided by CDFG, and should be completed and submitted by R4 staff to CDFG not later than one month prior to sample collection commencing. If a new station is being sampled, the latitude and longitude, as well as GPS coordinates and cross-referenced photographs, shall be provided for the site for future reference. If there is ambiguity about locating a site, it shall be resolved in consultation with the RWQCB staff member present in the field or by phone. Sufficient volume of water or sediment shall be collected in order to perform the analyses to be conducted at each station as shown on the attached "Table A: Services to be Performed at Each Station/Cost" table. Sample collection and subsequent processing and testing will be performed according to the most recent version of the SWAMP Quality Assurance Project Plan (QAPP) and SWAMP Laboratory SOPs. Currently, a five percent field duplicate and trip blank QA/QC level is being achieved statewide in the SWAMP program.

iii. Laboratory Analysis

Actual analytical services that will be performed on each sample are shown on the attached "Table A: Services to be Performed at Each Station/Cost".

iv. Data Analysis

Results from sampling shall be analyzed and reported in tabular and graphical format. Analyses shall be compared to criteria supplied to CDFG by the Los Angeles Regional Board. These criteria will consist of water quality criteria and water quality objectives. Upon negotiated format, content, and cost for preparing reports, comparative analyses shall be performed in such a way to evaluate the present state of health of the Santa Monica Bay Watershed.

Toxicity data will include test mean, standard deviation, and a determination of whether or not a sample is toxic at a statistically significant level of difference from the laboratory control samples.

Bioassessment data shall be collected, sorted, and taxonomically identified in a manner consistent with the California Stream Bioassessment Protocol developed by the California Department of Fish and Game.

The costs to prepare technical reports which evaluate the laboratory data against other criteria or guidelines is yet to be determined, but funding has been set aside to conduct this work.

v. Data Reporting/Products

1. Field Report: A field sampling "cruise" report will be prepared. A cruise report will be provided to the Regional Board, with an additional copy provided to the State Board (one copy to each). The field report will include a map with sufficient detail of stations sampled, including latitude and longitude coordinates and GPS coordinates. The field report shall also include digital photos of the monitoring sites.

2. Final Data Report: All data shall be reported in electronic file (Excel spreadsheet or Access database) on three 3.5'' IBM-formatted diskettes, CDs, or zip discs, as well as on hard copy (three one-sided originals for copying, and three bound copies). One of each type--electronic file, one-sided hardcopy original, and bound hardcopy-- shall go to the State Board and the Regional Board and CDFG. QA/QC evaluation reports and verification that data met QA criteria set forth in QA Project Plan must be provided with hardcopy data report.

The data report will include the following items, where applicable, but shall not necessarily be limited to the following items:

All station data including CDFG station name, station number, IDORG number, leg number, sample collection date, sample station longitude and latitude, sample GPS coordinates, sample station water depth, sample location characteristics, toxicity test endpoint mean and standard deviation, and all detection limits. In addition to the above data, the following will also be reported for all stations indicated on the attached “Table A: Services to be performed at each station/cost” spreadsheet for bioassessment: raw data and computed biological indices. Data from the bioaccumulation tests will be reported as tissue chemistry data for the specific chemical constituents shown on the attached “Table A: Services to be performed at each station/cost” spreadsheet. A map should be included showing the locations of each sampling station and an indication of the overall integrity of that site as excellent, good, marginal, or poor.

QA/QC evaluation ranking by each analytical laboratory will be provided in the database. In addition, appendices will include replicate data for toxicity tests, a database description

and file structure description. A QA/QC report will also be included in the final data report, containing an evaluation of how the data complied with actual QA/QC parameters.

9. Maximum Cost

The maximum cost of all SWAMP services specified in this Task Order shall not exceed $336,526. Field and analytical services costs are shown in the attached "Table A: Services to be Performed at Each Station/Cost" budget table (one page total). This amount of $336,526 is from the Region 4 allocation for FY 01/02. Actual billing for this Task Order may be done on a total Task Order cost basis, with the work described and costed out herein as the basis for the cost.

Table B: Subwatersheds to be Sampled

1. Arroyo Sequit
2. San Nicholas Canyon Creek
3. Los Alisos Canyon Creek
4. Lachusa Canyon Creek
5. Encinal Canyon Creek
6. Trancas Canyon Creek
7. Dume Creek / Zuma Canyon Creek
8. Ramirez Canyon Creek
9. Escondido Canyon Creek
10. Latigo Canyon Creek
11. Solstice Canyon Creek
12. Puerco Canyon Creek
13. Marie Canyon
14. Malibu Canyon
15. Cold Creek
16. Las Virgenes Creek
17. Medea Creek
18. Triunfo Creek
19. Malibu Lagoon
20. Corral Canyon Creek
21. Carbon Canyon Creek
22. Sweetwater Canyon Creek
23. Las Flores Canyon Creek
24. Piedra Gorda Canyon Creek
25. Pena Canyon Creek
26. Tuna Canyon Creek
27. Topanga Canyon Creek
28. Topanga Lagoon
29. Santa Ynez Canyon
30. Santa Monica Canyon Creek
31. Rustic Canyon Creek
32. Sullivan Canyon Creek
33. Mandeville Canyon Creek
34. Ballona Creek
35. Agua Amarga draining into Lunada Bay
36. Stream draining into Malaga Cove
37. Stream draining into Abalone Cove

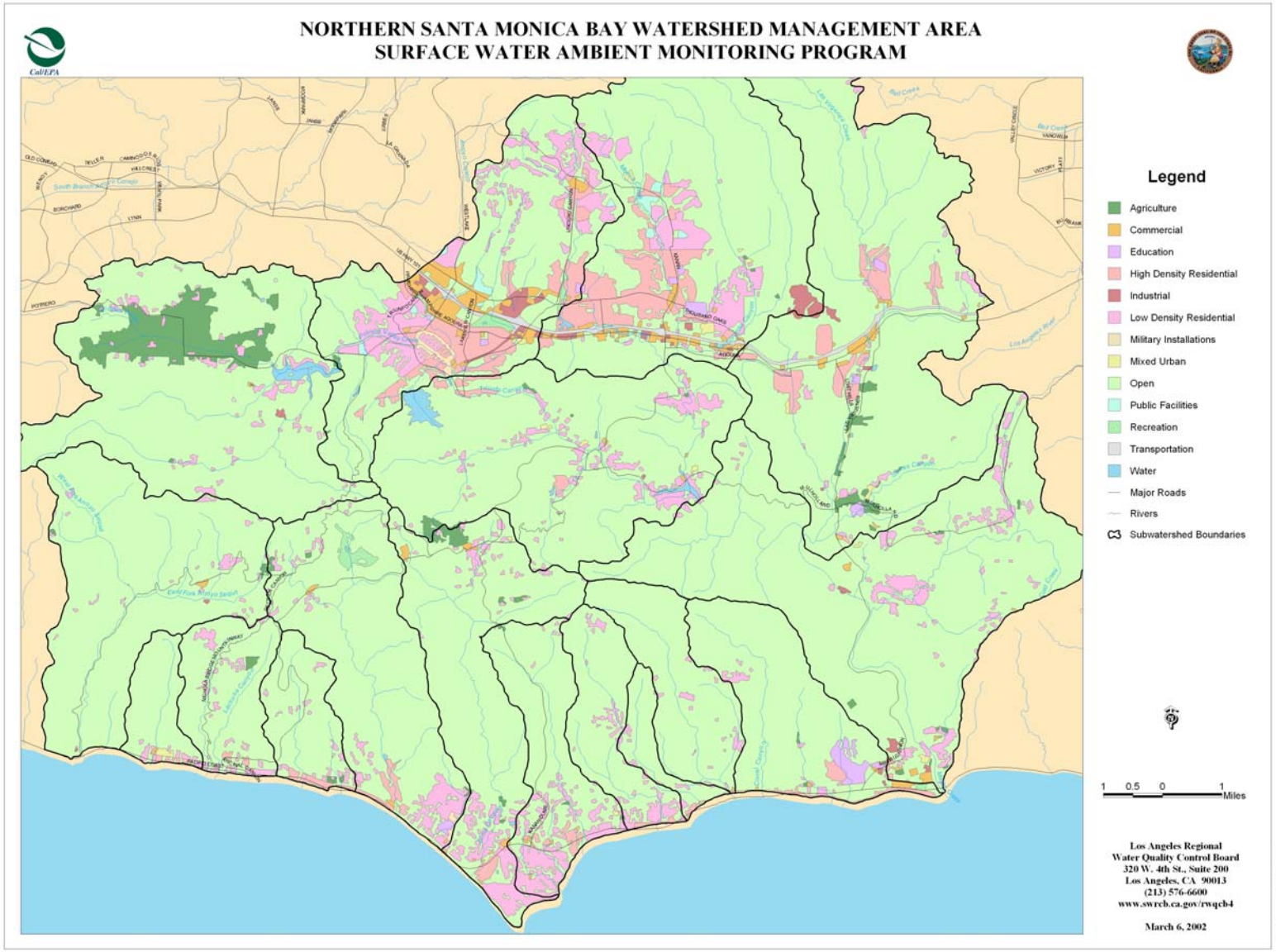
Section VII.

SWAMP FY01-02 RWQCB 4 Funds-- Task Order No. 01-4-001	**Task Order Title: "Field and Lab Services for RWQCB 4 for FY01-02 funds"**	**SWAMP Station Name and Number ------>**	Santa Monica Bay upper watershed stations - spring 2003	Santa Monica Bay lower watershed stations - spring 2003	SMB upper watershed stations spring 2004 (30 + 5 Malibu)	SMB lower watershed stations spring 2004	SMB reference sites repeat spring 2005 & 2006 (6 stations each spring = 12 total)	Total units	Total Cost (Total Units x cost/unit)	Calculate 5% Field Duplicate QA/QC Samples	Round up to nearest whole number	Cost of 5% Field Duplicates QA/QC Samples			
Analysis or Service to be Performed	**Description**	**Unit Cost (per sample)**													
Sediment and/or Water Sample Collection *(all costs shown are estimated costs; actual costs will be negotiated with Regional Board staff for Task Order)*	Collect sed and/or water samples; conduct centroid velocity measurement; conduct multiparameter probe reading; includes all sample shipping. For close access, drive-up sites only. Estimated cost.	$750	30	30	35	30	12	137	$102,750	6.85	7	$5,250			
Trace Organic Chemistry	Organophosphate Scan (incl chlorpyrifos and diazinon) - water	$452			10	10		20	$9,040	1	1	$452			
	MTBE & BTEX - water	$150				2		2	$300	0.1	1	$150			
Trace Metal Chemistry	**Water ICPMS metals suite--filtered "dissolved"** (Includes Al, Cr, Mn, Ni, Cu, Zn, Ag, Cd, Pb, As, Se--al costs)	$219			15	10		25	$5,475	1.25	2	$438			
Conventional Water Chemistry	Major anions nutrient scan: ortho-phosphate, nitrate, nitrite, chloride, sulfate	$135	30	30	30	30	12	132	$17,820	6.6	7	$945			
	Total Phosphate	$38	30	30	30	30	12	132	$5,016	6.6	7	$266			
	Boron	$35	30	30	30	30	12	132	$4,620	6.6	7	$245			

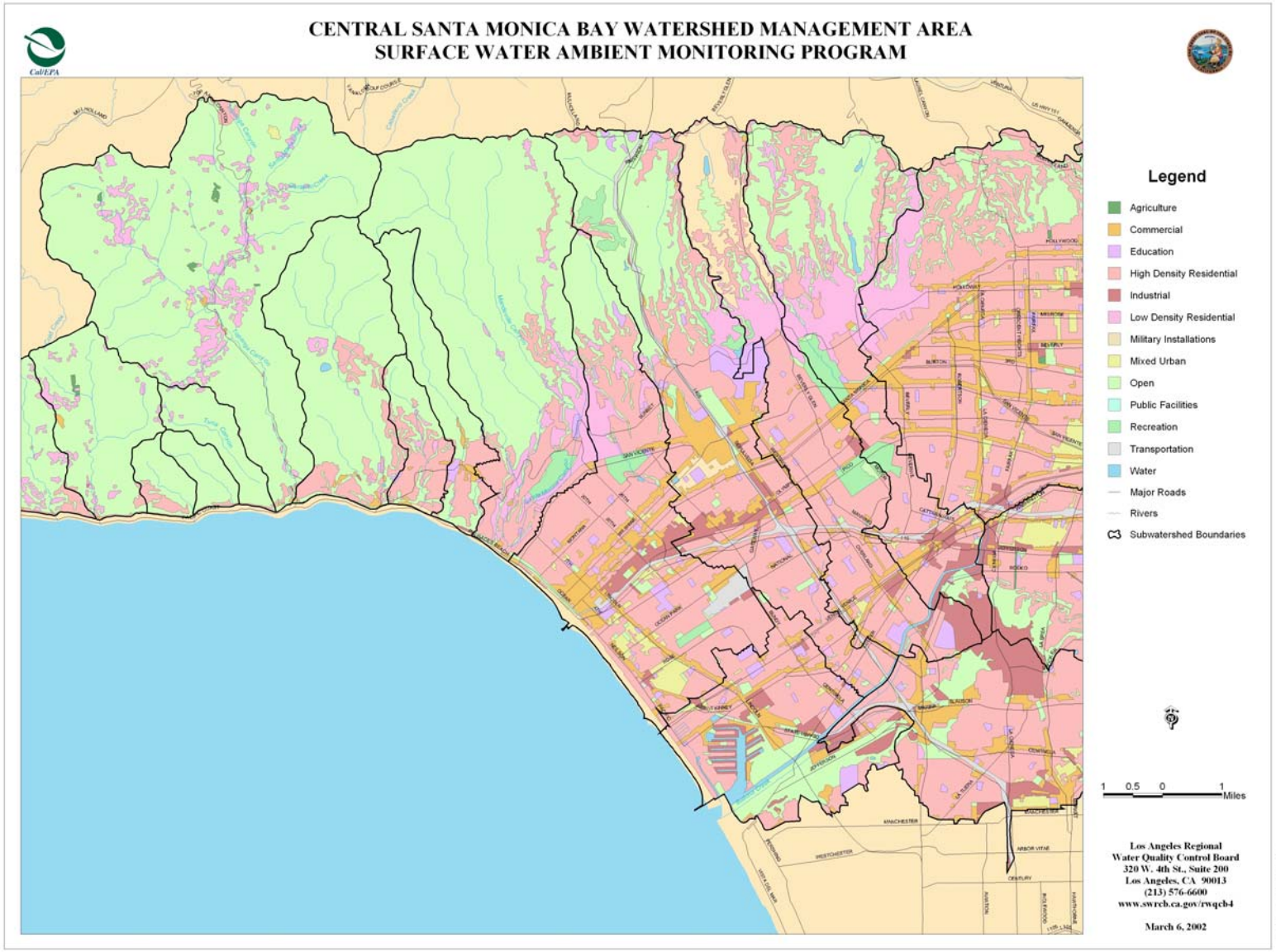
	TKN	$45	30	30	30	30	12	132	$5,940	6.6	7	$315			
	TDS	$30	30	30	30	30	12	132	$3,960	6.6	7	$210			
	Ammonia	$25	30	30	30	30	12	132	$3,300	6.6	7	$175			
	Chlorophyll-a	$50	30	30	30	30	12	132	$6,600	6.6	7	$350			
	Alkalinity	$25	30	30	30	30	12	132	$3,300	6.6	7	$175			
	Flouride	$20	30	30	30	30	12	132	$2,640	6.6	7	$140			
	Total N	$25	30	30	30	30	12	132	$3,300	6.6	7	$175			
	Hardness	$25	30	30	30	30	12	132	$3,300	6.6	7	$175			
Bacteriology and Pathology	To be negotiated, based on actual analyses requested							0	$0	0	0	$0			
								0	$0	0	0	$0			
	estimated to be using Colilert & Enterolert	$75	30	30	30	30	12	132	$9,900	6.6	7	$525			
								0	$0	0	0	$0			
Biological Assessment	Site collection, sorting, taxonomy, QA, report (3 replicates at $407 each)	$1,221			30	15	12	57	$69,597	2.85	3	$3,663			
	Sample sorting, taxonomy, QA, report (no sample collection; sample must be provided by RWQCB per ABL protocols)	$353						0	$0	0	0	$0			
Toxicity Testing - Salt Water Origin	**Water**														
	Larval Development (sea urchin, abalone, bivalve)	$630						0	$0	0	0	$0			
	Larval Development at Sediment Water Interface	$656						0	$0	0	0	$0			
	Sea Urchin Fertilization	$630						0	$0	0	0	$0			
	Mysid Juvenile 96-h Survival	$525						0	$0	0	0	$0			
	Additional Sample Dilutions	$420						0	$0	0	0	$0			
	Sediment														
	Amphipod 10-d Survival (*Rhepoxynius* or *Euhaustorius*)	$814						0	$0	0	0	$0			
	Amphipod 10-d Survival (*Ampelisca*)	$919						0	$0	0	0	$0			
	Polychaete 20-d Growth & Survival (*Neanthes*)	$998						0	$0	0	0	$0			
Toxicity Testing - Fresh Water Origin	**Water**														
	Ceriodaphnia 7-day Survival & Reproduction	$683			10	10		20	$13,660	1	1	$683			
	Pimephales (fathead minnow) 7 - day	$683			10	10		20	$13,660	1	1	$683			
Other Toxicity Testing Services	ELISA for Diazinon	$32			20	20		40	$1,280	2	2	$64			

	ELISA for Chlorpyrifos	$32			20	20		40	$1,280	2	2	$64			
5% Field Duplicate QA/QC Sample Cost	Calculated based on columns at far right on spreadsheet	$15,143						**$15,143**		**$15,143**					
DFG Miscellaneous	Regional proportional share of statewide cost of DFG pass-thru subcontract ovrhd, coordination/logistics/management cost	$11,809		1				1	$11,809						
	Sampling/Cruise Reports - $525 per sampling seasonal event	$525		3				3	$1,575						
	Interpretive Report / Publication	Negotiate		1				1	$21,000						
TOTAL COST FOR ALL SERVICES/ANALYSES DESCRIBED ABOVE:								**$321,122**							
Total available for R4 in DFG Contract for FY 01-02 swamp funded work:									**$336,526**						
Total cost for all services/analyses described above:									**$321,122**						
Amount not yet allocated for R4 FY01-02 work:									**$15,404**						
QA/QC:									$15,301						
Amount left over:									$103						

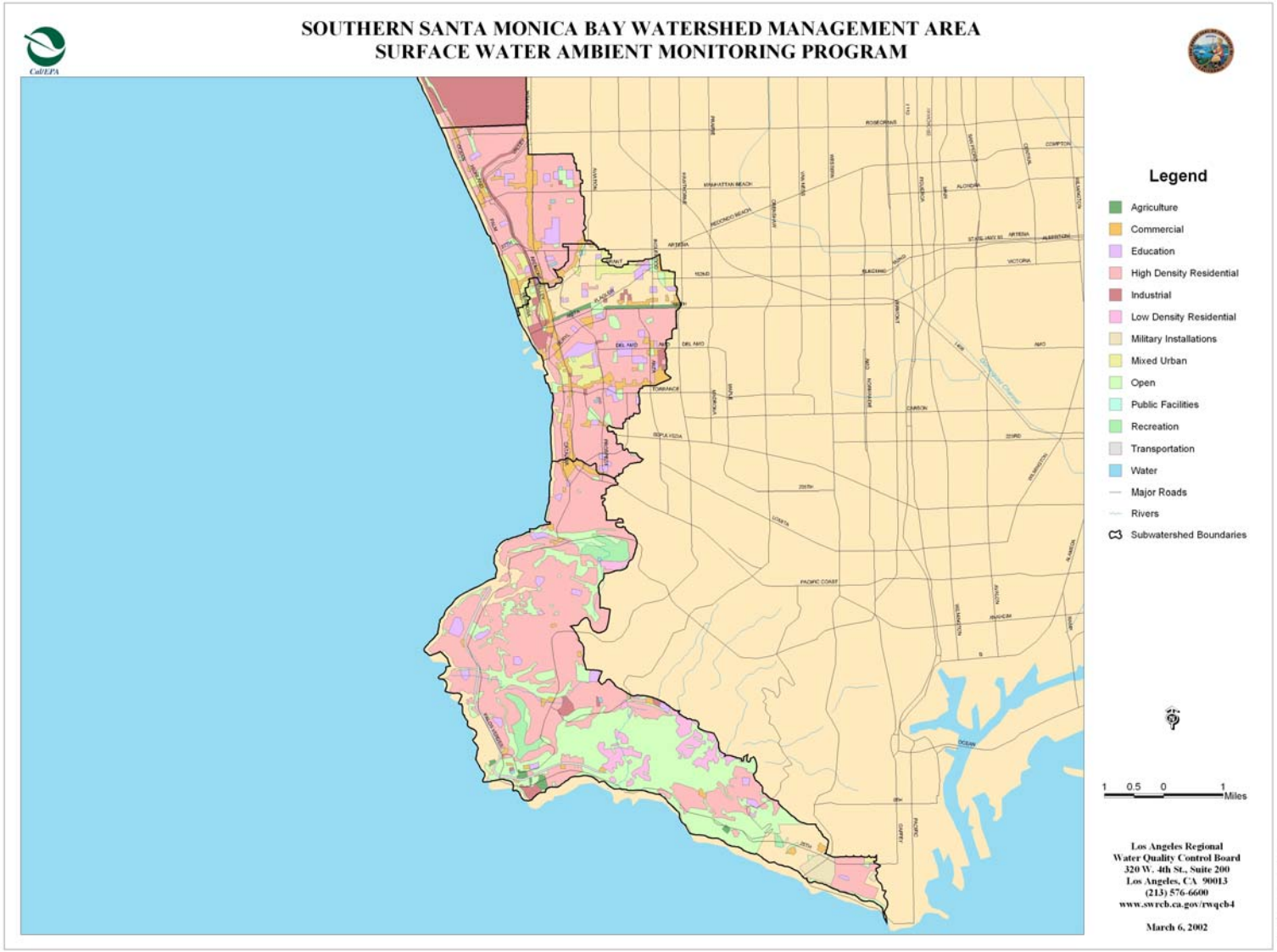
Section VIII.



Section VIII.



Section VIII.



Chapter Five

Dominguez Channel and LA/LB Harbor Watershed

I. Sites to be Monitored (Problematic or Clean)

This section will summarize site-specific problems(s), potential problem(s), or clean water locations to be monitored.

A. Background

The Los Angeles (LA) and Long Beach (LB) Harbors are located in the southern portion of the Los Angeles Basin. Along the northern portion of San Pedro Bay is a natural embayment formed by a westerly extension of the coastline which contains both harbors, with the Palos Verdes Hills the dominant onshore feature. Historically, the area consisted of marshes and mudflats with a large marshy area, Dominguez Slough, to the north, and flow from the Los Angeles River entering where Dominguez Channel now drains. During the late 1800's and beginning of the early 1900's, channels were dredged, marshes were filled, wharves were constructed, the Los Angeles River was diverted, and a breakwater was constructed in order to allow deep draft ships to be directly offloaded and products be swiftly moved. The Dominguez Slough was completely channelized and became the drainage endpoint for runoff from a highly industrialized area. Eventually, the greater San Pedro Bay was enclosed by two more breakwaters and deep entrance channels were dredged to allow for entry of ships with need of 70 feet of clearance. The LA/LB Harbor complex together is now one of the largest ports in the country.

Both harbors are considered to be one oceanographic unit. Despite its industrial nature, contaminant sources, and low flushing ability, the inner harbor area supports fairly diverse fish and benthic populations and provides a protected nursery area for juvenile fish. The California least tern, an endangered species, nests in one part of the harbor complex.

Similar to LA Inner Harbor in many respects, LB Inner Harbor is dissimilar to the other Port in the higher number of privately owned waterfront parcels which the Port has recently been in the process of buying up and converting to Port-related uses, generally container terminals. Also, basins and slips in LB Inner Harbor are somewhat more separated from each other than in LA Inner Harbor which may possibly prevent contamination from spreading easily.

The outer part of both harbors (the greater San Pedro Bay) has been less disrupted and supports a great diversity of marine life. It is also open to the ocean at its eastern end and receives much greater flushing than the inner harbors.

A POTW discharges secondary-treated effluent to the outer LA/LB Harbor and is under a time schedule order to remove the discharge. The discharger's plan consists of achieving full reclamation (mostly for industrial reuse purposes) by 2020 which would eliminate the discharge completely. They plan on achieving about 80% reclamation by 2005. Two generating stations discharge to the inner harbor areas. Many smaller, non-process waste discharges also occur into the harbors and Dominguez Channel drains a highly industrialized area of the city resulting in very poor water quality.

Two areas within Los Angeles Harbor are considered to be toxic hot spots under the Bay Protection and Toxic Cleanup Program (BPTCP): Dominguez Channel/Consolidated Slip, based on sediment concentrations of DDT, PCB, cadmium, copper, lead, mercury,

zinc, dieldrin, chlordane (all exceed sediment quality guidelines), sediment toxicity, and degraded benthic infaunal community; and Cabrillo Pier area, based on sediment concentrations of DDT, PCB and copper, sediment toxicity and issuance of a human health (fishing) advisory for DDT and PCB in white croaker and exceedances of NAS guidelines for DDT in fish and shellfish. Several locations have been listed as sites of concern under the BPTCP: Inner Fish Harbor, due to sediment concentrations of DDT, PCB, copper, mercury and zinc and sediment toxicity (not recurrent); Kaiser International, due to sediment concentrations of DDT, PCB, PAH, copper and endosulfan; Hugo Neu-Proler, due to PCB sediment concentrations; Southwest Slip, due to sediment concentrations of DDT, PCB, PAH, mercury, and chromium, and sediment toxicity (not recurrent); Shoreline Marina, due to sediment concentrations of zinc, DDT, PCB, chlordane and PAH, and sediment toxicity (not recurrent); Long Beach Outer Harbor, due to sediment concentrations of DDT and chlordane and sediment toxicity (not recurrent); West Basin, due to sediment concentrations of DDT and PCB, sediment toxicity (not recurrent) and accumulation in clam tissue; Alamitos Bay, due to sediment concentrations of DDT and chlordane. There is need for further monitoring in all of these areas to clarify their status. Potential sources of these materials are considered to be historical deposition, discharges from the nearby POTW (especially for metals), spills from ships and industrial facilities, as well as stormwater runoff. Many areas of the harbors have experienced soil and/or groundwater contamination, which may result in possible transport of pollutants to the harbors' surface waters. Dredging and disposal of contaminated sediments and source control of pollutants in the harbors will be a major focal point for the Contaminated Sediment Task Force.

Los Angeles Inner Harbor

Although the area is dramatically cleaner now than twenty-five years ago, parts of LA Inner Harbor are still suffering the effects of historic deposits of pollutants in the sediment and current point and nonpoint source discharges. Fish caught in the East Basin have exhibited histopathological abnormalities (liver lesions). The abnormalities are indicative of aromatic and chlorinated hydrocarbon contamination. There is also significant degradation in the biological community of a part of Inner Harbor with high levels of PCB and DDT; and toxicity of the surface water microlayer of one part of the harbor to a test fish species (larval kelp bass). Additionally, Cal-EPA's Office of Environmental Health Hazard Assessment now advises against consumption of white croaker in the harbor and recommends no more than one meal every two weeks of black croaker, queenfish, and surfperches if caught in the harbor. On the other hand, the benthic community in many other areas of the inner harbor are healthy and sediments, though high in many pollutants, do not cause a great deal of toxicity in controlled lab tests.

LA Inner Harbor is on the 1998 303(d) list due to DDT, metals, PAHs, chlordane, TBT, and PCBs. Some of the contamination in sediment is historic with resuspension potential. Dominguez Channel was the recipient of runoff from the Montrose Chemical Facility which manufactured DDT several decades ago. There are also mostly nonpoint source inputs from several problem sites, spills, and storm drain runoff. The problems tend to be exacerbated by the poor circulation and flushing. The Port is in the process of filling in a large part of Outer Harbor and deepening some channels as part of their "2020 Plan". Pier 400, a 590-acre site of new land created by diking and filling harbor waters, was completed in April 2000. As a result, the potential exists for greater stagnation and more problems from deposition of new contaminants.

Data from the State Mussel Watch (SMW) Program have documented high levels of metals, PCBs, TBT, and PAHs in mussel tissue at several locations in LA Inner Harbor. The BPTCP has found a number of inner harbor areas with elevated pollutant levels but a smaller number of those have exhibited sediment toxicity.

Sediment data collected by Regional Board staff, the Port of LA, and various other researchers, have revealed several areas of heavy contamination with metals, PCBs, and DDT, and occasionally PAHs. Regional Board data show that the level of contamination within particular regions of the inner harbor vary considerably from site to site. Additionally, it is difficult to separate the effects of historic contamination from current inputs. Bight'98 included samples within harbors, including a number of stations in LA/LB Harbor; toxicity, sediment chemistry, and benthic data reports should be available in 2001.

Dominguez Channel

Little recent data exist for the Channel itself even though considerable heavy industrial facilities (including the old Montrose site) are located within the watershed. However, a consultant for Montrose conducted sediment sampling for DDT in the Channel during 1990. EPA, in a letter to Montrose, cited this data and provided a comparison of those values with NOAA's "identified concentrations of DDT in sediment associated with adverse impacts. A sediment level of 3 ppb was associated with adverse impacts in 10% (ER-L) of the data reviewed by NOAA and a level of 350 ppb total DDT was associated with adverse impacts in 50% (ER-M) of the data reviewed by NOAA" (EPA letter to Montrose Chemical Corporation, November 27, 1991). The consultant found DDT levels of 300 - 13,000 ppb in the Channel. EPA stated that adverse impacts in the biological community of Dominguez Channel and Consolidated Slip would be expected.

A Regional Board study conducted in 1975 found that the aquatic biota of the Channel were largely marine in origin and were a continuation of LA Inner Harbor biota. The number and abundance of aquatic species declined with distance inland from the harbor. A fairly abrupt decline in benthic species between Alameda and Wilmington Streets was attributed to the effects of pollution. *Capitella capitata* was one of the most abundant benthic species in the area and is generally associated with polluted areas. An absence of benthic fish species adjacent to one oil refinery was considered to be indicative of oxygen-poor bottom water. There was a degraded benthic community at several stations in Consolidated Slip during BPTCP sampling.

Of major concern in the mid-1980s was discharge of zinc chromate as an additive in cooling water/boiler blowdown. There may have been some justification for that concern. Sediment sampling conducted by Regional Board staff in 1988 revealed zinc levels as high as 447 ppm, chromium as high as 67 ppm, and lead as high as 231 ppm.

Long Beach Inner Harbor

While historic contamination is a definite problem in the older parts of the harbor (including the naval base), Pier J has only recently been constructed, utilizing some highly contaminated dredge material. Some other likely problem sites include: Cerritos Channel with its inputs at times from Consolidated Slip (water generally flows from LB to LA Harbors), a creosote manufacturing site, several oil terminals, a defunct ship repair

yard (and several active ones), and the naval base, which is closed, while the attached shipyard remains open.

Contamination in the LB Inner Harbor is known to be sporadic. Little information is available on contamination in Southeast Basin except for TBT water concentrations of up to 380 PPT found in a 1988 statewide study of harbors and low levels of PCBs found in mussel tissue in 1986. The most recent SMW data for the Inner Harbor show some areas of elevated DDT, most notably at those stations located in or near Cerritos Channel.

Moderate PCB levels were found in mussel tissue in front of the creosote facility located in Channel 2 and somewhat higher levels were found in Cerritos Channel which is likely related to its proximity to Consolidated Slip and other LA Harbor point and nonpoint sources. Long Beach Inner Harbor is on the 1998 303(d) list for DDT, PAHs, and PCBs, while San Pedro Bay is listed for DDT, PAHs, PCBs, and some metals.[9]

B. Beneficial uses

Above the estuary: non-contact recreation, preservation of rare and endangered species

In estuary: contact and non-contact recreation, preservation of rare and endangered species, industrial water supply, navigation, commercial and sport fishing, marine habitat, estuarine habitat, wildlife habitat, migratory and spawning habitat.

C. Known Impairments

The area is 303(d) listed for PCBs, DDT, historic pesticides, PAHs, coliforms, metals, nitrogen, ammonia, TBT, and trash. Currently, a TMDL is being developed to address the coliform contamination and is scheduled to be completed during fiscal year 2001-2002.

II. Objectives of Monitoring

A. Overarching Objectives

The main objectives of the sampling program in the Dominguez Channel and LA/LB Harbor watershed are to collect current baseline data to replace old data, fill in data gaps, determine if beneficial uses are being obtained, and potentially to help in the development of TMDLs. Other objectives are to determine the status of the water coming into the Dominguez Channel Estuary above the refinery industry, to supplement information currently gathered by NPDES permittees for ambient water quality sampling, and to obtain details on the interactions of pollutants between sediment and the water column within the context of the harbor complex.

[9] State of California Regional Water Quality Control Board, Los Angeles Region; Watershed Management Initiative Chapter; December 2000.

B. Potential Assessment Questions

The sampling design for this area is going to be a mix of both directed and probabilistic. Numerous sediment contamination and toxicity data presently exists and SWAMP monitoring efforts will be focused on directed sampling to follow up on the existing data. However, water chemistry data is almost non-existent and SWAMP efforts will be designed in a random fashion for this effort in the inner and outer harbor areas. Therefore, the Regional Board will be able to answer a mix of questions as evidenced above in both the Santa Clara and Calleguas Creek sections.

- Does this site support its designated beneficial use of water contact recreation?
- Is the ability of this site to support the beneficial use of water contact recreation increasing or decreasing over time?
- Does this site support its designated beneficial uses of commercial fishing and sport fishing?
- Is the ability of this site to support the beneficial uses of commercial fishing and sport fishing increasing or decreasing over time?
- What is the percent of streams that support their designated beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat? (May also be site-specific.)
- Is the percent of streams in the watershed/region which support the beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat increasing or decreasing over time? (May also be site specific.)
- What is the distribution of benthic conditions at this site in the watershed? (May be the estuary, lake, or wetlands.)
- What is the distribution of the total number of benthic species per site at each station sampled? (May be the estuary, lake or wetlands.)
- What is the distribution of exotic species in the benthos in this watershed? (May be the estuary, lake or wetlands.)
- Does this site have an altered/degraded benthic community structure? (May be the estuary, lake or wetlands.)
- What is the distribution of sediment contaminants at this site or in this watershed?
- What is the percent of streams that support their designated beneficial use of spawning, reproduction, and/or early development? Does this site meet its designated beneficial use of spawning, reproduction, and/or early development?
- Is the percent of streams in the watershed/region which support the beneficial use of spawning, reproduction, and/or early development increasing or decreasing over time? Is the ability of this site to support this beneficial use increasing or decreasing over time?

- What is the distribution of toxicity in the harbors or at a specific site?

- What is the percent of the harbor that support their designated beneficial uses of migration of aquatic organisms, rare, threatened or endangered species, and wildlife habitat? Does this site support its designated beneficial use?

- Is the percent of the harbors in the watershed/region which support the beneficial uses of migration of aquatic organisms, rare, threatened or endangered species, and wildlife habitat increasing or decreasing over time? (Can be site specific too.)

C. Indicators

The following indicators will be used: bacteria, bioassessment (macroinvertebrate assemblage), toxicity (sediment and water), sediment chemistry, nutrients, water chemistry, bioaccumulation (shellfish tissue chemistry), DO, sediment grain size, flow, temperature, and physical habitat assessment.

III. Specific Activities Planned for FY 2002-2003

A. List of Water Bodies to be Sampled

Dominguez Channel (focus of Chapter Five)
Los Angeles and Long Beach Harbors (focus of Chapter Five)
Santa Monica Bay Watershed Management Area (focus of Chapter Four)

B. Review of Available Information (analysis of existing data is incomplete at this time)

Please see Appendix A Applicable Sections of the 1996 & 1998 Water Quality Assessments. This will be updated as soon as the 2002 Water Quality Assessment currently under development is adopted by the State Board, scheduled to occur in fall 2002.

This area has been sampled for sediment chemistry and toxicity during the Southern California Bight projects in 1994 and 1998 as well as in the BPTCP. However, water column chemistry has been largely overlooked. Additionally, data does exist from the monitoring program that the refineries in the area partake in. One source of data in relation to this watershed is the “Sediment Chemistry, Toxicity, and Benthic Community Conditions in Selected Water Bodies of the Los Angeles Region Final Report” regarding the BPTCP findings released in August of 1998 jointly by the State Water Resources Control Board, the Los Angeles Regional Water Quality Control Board, CDFG, University of California, Santa Cruz and San Jose State University Moss Landing Marine Labs.

IV. Monitoring Design and Strategy

Staff proposes to continue focusing on a randomized probabilistic design as modeled after the EPA EMAP program, especially for the inner and outer harbor areas. The triad approach will be utilized where possible. Sediment chemistry and toxicity studies will most likely be directed to sites, which have previous data, or to sites to fill in information where it does not exist today. Analysis of sampling points will consist of bacteria,

bioassessment, toxicity (sediment and water column), sediment chemistry, water chemistry, fish tissue studies, pathogens, DO, sediment grain size, flow, temperature, and physical habitat assessment, with the potential for TIE studies.

Regional Board staff have divided the Dominguez Channel and LA/LB harbor area into the following six subareas based on characteristics of the area in order to simplify sampling design: (1) headwater streams, (2) the inner and outer harbors of LA and LB, (3) Madrona Marsh, (4) Lake Machado, (5) the Dominguez Channel estuary, and (6) the upper channelized Dominguez Channel above normal tidal influence. The sampling design is still under development, however, if funding constraints are not restrictive, the following is a summary of monitoring goals:

(1) Headwater streams are not expected to have dry weather flow and therefore will not be sampled.
(2) The inner and outer LA and LB harbors will be sampled in conjunction with the Bight '03 survey. Water column chemistry will be employed at the water's surface and again at the bottom. Water column toxicity and bacteriology will be conducted at the water surface only. At these same stations, the Bight '03 project will focus on sediment and benthic community sampling. Regional Board staff, in conjunction with staff from SCCWRP, feel data collected will provide details on the interaction of pollutants between sediment and the water column. Chemical analysis will include PAHs. Funding will be set aside for TIEs because of the suspected water column toxicity. Staff proposes the use of a probabilistic monitoring design with 30 stations. These analyses will further characterize the known impairments of the harbor which is very industrial as described above.
(3) Madrona Marsh is a 40-acre wetland and very little data exists relative to this waterbody. Staff proposes 3 directed stations where bioassessment, water column toxicity, water column chemistry, sediment toxicity, and sediment chemistry will be employed to gather baseline data to determine the status of the waterbody. One of the three stations should be at the outlet of the marsh that drains into the Torrance Lateral.
(4) Lake Machado will be sampled for water column toxicity, water column chemistry, sediment toxicity, sediment chemistry, fish tissue, and pathogens. Staff proposes 5 directed stations and believes the information is necessary because the existing data is very old and very limited. The lake is posted for swimming and also offers freshwater beaches. Fish tissue and pathogen monitoring will provide information necessary to protect public health as well as aquatic life.
(5) Monitoring in the Dominguez Channel Estuary is currently done by the existing refineries as well as LA County. Therefore, the goal of this monitoring is to supplement the information currently gathered for ambient water quality assessment. Staff envisions utilizing a total of directed 9 stations at the same locations as the current monitoring. Parameters to be sampled include bioassessment, water chemistry, pathogens, and one sediment toxicity station above the refineries. A TSM station was employed during the summer of 2001 and staff hopes funding constraints will not prevent subsequent sampling in summer of 2002. Staff believe this monitoring will, combined with existing efforts, provide a detailed picture of the overall health of the Dominguez Channel Estuary. SWAMP will focus on water column chemistry that has historically not been collected, as well as bioassessment, and the study of pathogens within the estuary.
(6) The upper Dominguez Channel will have one directed station above the tidal influence which will be sampled for water column chemistry, water column toxicity,

pathogens, metals, and organics. The goal of this station will be to characterize the water quality coming into the estuary and the water quality of the channel above the heavy industry of the refineries.

The ability to break down this watershed into subareas based on characteristics of the area identified allow staff to devise sampling plans and monitor for constituents in relation to each area.

A list of the specific sites and a map of the sampling locations is unavailable at this time, but will be provided in the near future.

V. Budget

FY 2002/2003

The maximum cost of all SWAMP services specified for FY 2002-2003 shall not exceed **$316,526**. This amount of $316,526 is from the Region 4 allocation for FY 2002-2003. A draft table "Service to Be Performed at Each Station/Cost" is included in Section VII. of this Chapter, however, it is still under development and is subject to revision.

Section VI.
A. Summary Table for Watershed Monitoring
Summary Table of Indicators and Rationale

Regional Board staff have divided the Dominguez Channel and LA/LB harbor area into the following six subareas based on characteristics of the area in order to simplify sampling design: (1) headwater streams, (2) the inner and outer harbors of LA and LB, (3) Madrona Marsh, (4) Lake Machado, (5) the Dominguez Channel estuary, and (6) the upper channelized Dominguez Channel above normal tidal influence. The sampling design is still under development, however, if funding constraints are not restrictive, each of the six areas will be sampled to fill in the incomplete data relevant to each area. For example, the data for Lake Machado is old and limited and the lake is posted for fishing, therefore, studies will include fish tissue analysis in conjunction with water column chemistry and toxicity, sediment chemistry and toxicity, and pathogens. The LA/LB harbor complex is another example which represents a different sampling strategy than the one proposed for Lake Machado. The sampling of the harbor complex will include water column toxicity and chemistry, metals chemistry, bacteriology, PAH analysis, and potential TIEs. The ability to break down this watershed into subareas based on characteristics of the area identified allow staff to devise sampling plans and monitor for constituents in relation to each area.

Inner & Outer Harbors (30 stations)	DO, pH, temperature, conductivity, turbidity, TDS, depth & flow	• To provide baseline data for this watershed; • To define the extent of the problem these parameters may pose; potential impacts on aquatic life; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Trace Organic Chemistry – Full scan to include pesticides, PCBs, and PAHs (water)	• To determine if organs are a potential cause of known toxicity problems within this watershed. • To provide organic chemistry data for this watershed; and, • To define the extent of the problem PCBs, DDT, historic pesticides and PAHs may pose; various reaches of this watershed are 303(d) listed for these parameters.
	Conventional Water Chemistry: Nutrients [ortho-phosphate, nitrate, nitrite, chloride, sulfate], TSS, Oil and Grease, TOC	• To provide baseline nutrient data for this watershed; • To define the extent of the problems nutrient enrichment & chloride may pose; • Various reaches of this watershed are 303(d) listed for chloride, nitrogen, and eutrophication.
	Chlorophyll a	• To provide baseline chlorophyll a data for this watershed; • Chlorophyll a data may be correlated to nutrient enrichment (nitrogen); • Various reaches of this watershed are 303(d) listed for nitrogen.
	Ammonia	• To provide baseline ammonia data for this watershed; • To define the extent of the problem ammonia may pose; • Various reaches of this watershed are 303(d) listed for ammonia.
	Alkalinity & hardness	• To provide baseline alkalinity and hardness data for this watershed; and, • To define the extent of the problem alkalinity and/or hardness may pose.
	Bacteriology / Pathogens	• To provide baseline bacteria data for this watershed; • To help define the extent of the problem bacteria poses; and, • Various reaches of this watershed are 303(d) listed

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		for coliform and a TMDL is already under development.
	Toxicity (water column) & TIE	• To define the extent of the toxicity problem and identify the causes of toxicity within this watershed.
	Metals Chemistry (water column – dissolved)	• To provide baseline water column metals chemistry for this watershed; • To further define the extent of the problem metals contamination may pose; and, • Various reaches of this watershed are 303(d) listed for metals.
Madrona Marsh (3 stations)	DO, pH, temperature, conductivity, turbidity, TDS, depth & flow	• To provide baseline data for this watershed; • To define the extent of the problem these parameters may pose; potential impacts on aquatic life; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Trace Organic Chemistry – Full scan to include pesticides, PCBs, and PAHs (sediment)	• To determine if organs are a potential cause of known toxicity problems within this watershed. • To provide organic chemistry data for this watershed; and, • To define the extent of the problem PCBs, DDT, historic pesticides and PAHs may pose; various reaches of this watershed are 303(d) listed for these parameters.
	Conventional Water Chemistry: Nutrients [ortho-phosphate, nitrate, nitrite, chloride, sulfate], TSS, TOC	• To provide baseline nutrient data for this watershed; • To define the extent of the problems nutrient enrichment & chloride may pose; • Various reaches of this watershed are 303(d) listed for chloride, nitrogen, and eutrophication.
	Chlorophyll a	• To provide baseline chlorophyll a data for this watershed; • Chlorophyll a data may be correlated to nutrient enrichment (nitrogen); • Various reaches of this watershed are 303(d) listed for nitrogen.
	Ammonia	• To provide baseline ammonia data for this watershed; • To define the extent of the problem ammonia may pose; • Various reaches of this watershed are 303(d) listed for ammonia.
	Alkalinity & hardness	• To provide baseline alkalinity and hardness data for this watershed; and, • To define the extent of the problem alkalinity and/or hardness may pose.
	Sediment TOC & Full Grain Size Analysis	• To provide sediment characteristic data for this watershed (it is recommended to obtain this information when conducting sediment chemistry).
	Toxicity (water column & sediment)	• To define the extent of the toxicity problem and identify the causes of toxicity within this watershed.
	Bioassessment	• To provide baseline bioassessment data for this watershed; and, • To indicate the health and biological integrity of the

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		aquatic invertebrate community.
Lake Machado (5 stations)	DO, pH, temperature, conductivity, turbidity, TDS, depth & flow	• To provide baseline data for this watershed; • To define the extent of the problem these parameters may pose; potential impacts on aquatic life; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Trace Organic Chemistry – Full scan to include pesticides, PCBs, and PAHs (sediment & tissue)	• To determine if organs are a potential cause of known toxicity problems within this watershed. • To provide organic chemistry data for this watershed; and, • To define the extent of the problem PCBs, DDT, historic pesticides and PAHs may pose; various reaches of this watershed are 303(d) listed for these parameters.
	Conventional Water Chemistry: Nutrients [ortho-phosphate, nitrate, nitrite, chloride, sulfate], TSS, TOC	• To provide baseline nutrient data for this watershed; • To define the extent of the problems nutrient enrichment & chloride may pose; • Various reaches of this watershed are 303(d) listed for chloride, nitrogen, and eutrophication.
	Chlorophyll a	• To provide baseline chlorophyll a data for this watershed; • Chlorophyll a data may be correlated to nutrient enrichment (nitrogen); • Various reaches of this watershed are 303(d) listed for nitrogen.
	Ammonia	• To provide baseline ammonia data for this watershed; • To define the extent of the problem ammonia may pose; • Various reaches of this watershed are 303(d) listed for ammonia.
	Alkalinity & hardness	• To provide baseline alkalinity and hardness data for this watershed; and, • To define the extent of the problem alkalinity and/or hardness may pose.
	Sediment TOC & Full Grain Size Analysis	• To provide sediment characteristic data for this watershed (it is recommended to obtain this information when conducting sediment chemistry).
	Toxicity (water column & sediment)	• To define the extent of the toxicity problem and identify the causes of toxicity within this watershed.
	Metals Chemistry (sediment)	• To provide baseline sediment metals chemistry for this watershed; • To further define the extent of the problem metals contamination may pose; and, • Various reaches of this watershed are 303(d) listed for metals.
	Bacteriology / Pathogens	• To provide baseline bacteria data for this watershed; • To help define the extent of the problem bacteria poses; and, • Various reaches of this watershed are 303(d) listed for coliform and a TMDL is already under development.

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	Metals Chemistry (tissue – bioaccumulation)	• To provide baseline sediment and tissue metals chemistry for this watershed; • To provide baseline bioaccumulation data for this watershed; • To address possible human health concerns (contaminants in edible fish tissue) and ecological concerns (benthic community impacts) which could result if the contaminants at a site were bioavailable for uptake by organisms; • To demonstrate the bioavailability of contaminants at these stations and the extent of the problem this poses; • To further define the extent of the problem metals contamination may pose; and, • Various reaches of this watershed are 303(d) listed for metals.
Dominguez Channel Estuary (9 stations)	DO, pH, temperature, conductivity, turbidity, TDS, depth & flow	• To provide baseline data for this watershed; • To define the extent of the problem these parameters may pose; potential impacts on aquatic life; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Trace Organic Chemistry – Full scan to include pesticides, PCBs, and PAHs (water)	• To determine if organs are a potential cause of known toxicity problems within this watershed. • To provide organic chemistry data for this watershed; and, • To define the extent of the problem PCBs, DDT, historic pesticides and PAHs may pose; various reaches of this watershed are 303(d) listed for these parameters.
	Conventional Water Chemistry: Nutrients [ortho-phosphate, nitrate, nitrite, chloride, sulfate], TSS, TOC, BOD, COD	• To provide baseline nutrient data for this watershed; • To define the extent of the problems nutrient enrichment & chloride may pose; • Various reaches of this watershed are 303(d) listed for chloride, nitrogen, and eutrophication.
	Chlorophyll a	• To provide baseline chlorophyll a data for this watershed; • Chlorophyll a data may be correlated to nutrient enrichment (nitrogen); • Various reaches of this watershed are 303(d) listed for nitrogen.
	Ammonia	• To provide baseline ammonia data for this watershed; • To define the extent of the problem ammonia may pose; • Various reaches of this watershed are 303(d) listed for ammonia.
	Alkalinity & hardness	• To provide baseline alkalinity and hardness data for this watershed; and, • To define the extent of the problem alkalinity and/or hardness may pose.
	Toxicity	• To define the extent of the toxicity problem and

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	(sediment)[station to be above the refineries]	identify the causes of toxicity within this watershed.
	Bioassessment	• To provide baseline bioassessment data for this watershed; and, • To indicate the health and biological integrity of the aquatic invertebrate community.
	Bacteriology / Pathogens	• To provide baseline bacteria data for this watershed; • To help define the extent of the problem bacteria poses; and, • Various reaches of this watershed are 303(d) listed for coliform and a TMDL is already under development.
Upper Dominguez Channel (1 station)	DO, pH, temperature, conductivity, turbidity, TDS, depth & flow	• To provide baseline data for this watershed; • To define the extent of the problem these parameters may pose; potential impacts on aquatic life; • If impaired at this station, further testing will be conducted upstream to potentially identify the source.
	Trace Organic Chemistry – Full scan to include pesticides, PCBs, and PAHs (water)	• To determine if organs are a potential cause of known toxicity problems within this watershed. • To provide organic chemistry data for this watershed; and, • To define the extent of the problem PCBs, DDT, historic pesticides and PAHs may pose; various reaches of this watershed are 303(d) listed for these parameters.
	Conventional Water Chemistry: Nutrients [ortho-phosphate, nitrate, nitrite, chloride, sulfate], TSS, TOC	• To provide baseline nutrient data for this watershed; • To define the extent of the problems nutrient enrichment & chloride may pose; • Various reaches of this watershed are 303(d) listed for chloride, nitrogen, and eutrophication.
	Chlorophyll a	• To provide baseline chlorophyll a data for this watershed; • Chlorophyll a data may be correlated to nutrient enrichment (nitrogen); • Various reaches of this watershed are 303(d) listed for nitrogen.
	Ammonia	• To provide baseline ammonia data for this watershed; • To define the extent of the problem ammonia may pose; • Various reaches of this watershed are 303(d) listed for ammonia.
	Alkalinity & hardness	• To provide baseline alkalinity and hardness data for this watershed; and, • To define the extent of the problem alkalinity and/or hardness may pose.
	Metals Chemistry (water – dissolved)	• To provide baseline water column metals chemistry for this watershed; • To further define the extent of the problem metals contamination may pose; and, • Various reaches of this watershed are 303(d) listed

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		for metals.
	Toxicity (water column)	• To define the extent of the toxicity problem and identify the causes of toxicity within this watershed.
	Bacteriology / Pathogens	• To provide baseline bacteria data for this watershed; • To help define the extent of the problem bacteria poses; and, • Various reaches of this watershed are 303(d) listed for coliform and a TMDL is already under development.

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Dominguez Channel & LA/LB Harbor Complex	Coliform	• Water Contact / Contaminant Exposure	REC 1	• Gather baseline data • Supplement existing data • Determine if beneficial uses are being obtained • Determine the status of the water coming into the estuary above the area of heavy industry • Obtain details on the interactions of pollutants between sediment and the water column	Random & Directed
	Bioassessment	• Aquatic Life / Biological Response & Habitat	WARM, EST, MAR, RARE, MIGR, SPWN	• Gather baseline data • Supplement existing data • Determine if beneficial uses are being obtained • Determine the status of the water coming into the estuary above the area of heavy industry • Obtain details on the interactions of pollutants between sediment and the water column	Random & Directed
	Toxicity (Sediment & Water)	• Aquatic Life / Biological Response (Basin Plan Objective)	WARM, EST, MAR, RARE, MIGR, SPWN	• Gather baseline data • Supplement existing data • Determine if beneficial uses are being obtained • Determine the status of the water coming into the estuary above the area of heavy industry • Obtain details on the interactions of pollutants between sediment and the water column	Random & Directed
	Sediment Chemistry	• Aquatic Life / Pollutant Exposure	WARM, EST, MAR, RARE, MIGR, SPWN	• Gather baseline data • Supplement existing data • Determine if beneficial uses are being obtained • Determine the status of the water coming into the estuary above the area of heavy industry • Obtain details on the interactions of	Random & Directed

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				pollutants between sediment and the water column	
	Conventional Water Chem	• Aquatic Life / Pollutant Exposure • Drinking Water / Contaminant Exposure	WARM, EST, MAR, RARE, MIGR, SPWN, MUN	• Gather baseline data • Supplement existing data • Determine if beneficial uses are being obtained • Determine the status of the water coming into the estuary above the area of heavy industry • Obtain details on the interactions of pollutants between sediment and the water column	Random & Directed
	Bioaccumulation	• Fish & Shellfish Contamination / Contaminant Exposure • Aquatic Life / Pollutant Exposure	WARM, EST, MAR, RARE, MIGR, SPWN	• Gather baseline data • Supplement existing data • Determine if beneficial uses are being obtained • Determine the status of the water coming into the estuary above the area of heavy industry • Obtain details on the interactions of pollutants between sediment and the water column	Random & Directed
	DO	• Aquatic Life / Habitat (Basin Plan Objective)	WARM, EST, MAR, RARE, MIGR, SPWN	• Gather baseline data • Supplement existing data • Determine if beneficial uses are being obtained • Determine the status of the water coming into the estuary above the area of heavy industry • Obtain details on the interactions of pollutants between sediment and the water column	Random & Directed
	Sediment Grain Size Analysis	• Aquatic Life / Habitat	WARM, EST, MAR, RARE, MIGR, SPWN	• Gather baseline data • Supplement existing data • Determine if beneficial uses are being obtained • Determine the status of the water coming into the estuary above the area of heavy industry	Random & Directed

				• Obtain details on the interactions of pollutants between sediment and the water column	
	Temperature	• Aquatic Life / Habitat (Basin Plan Objective)	WARM, EST, MAR, RARE, MIGR, SPWN	• Gather baseline data • Supplement existing data • Determine if beneficial uses are being obtained • Determine the status of the water coming into the estuary above the area of heavy industry • Obtain details on the interactions of pollutants between sediment and the water column	Random & Directed

SWAMP Task Order No. 01-4-001
FY 02/03 Field and Analytical Laboratory Services for RWQCB 4 for SWAMP

1. **Task Order No.**: 01-4-001 (in support of SWRCB Contract No.00-111-250).

2. **Task Order Title**: Field and analytical services for RWQCB 4 for FY 02/03 funds.

3. **Contractor**: California Department of Fish and Game.

4. **Regional Board contact for this Task Order**: Tracy Vergets (213-576-6661)
   email: tvergets@rb4.swrcb.ca.gov

5. **Term of this Task Order**: 2/15/02 through 06/30/2003.

6. **The maximum amount for this Task Order is**: $336,526 (Region 4 FY 02-03 allocation)

7. **Signatures authorizing work to proceed within this Task Order**:

The signatures below indicate that the parties agree to the scope, deliverables, and budget specified in this Task Order. This Task Order is not effective until the Project Director and the Contract Manager sign the Task Order. If the work identified in this Task order can not be completed for the budgeted amount, the Task Order must not be signed. Under no circumstances is any work to be completed in excess of the budgeted amount unless there is a formal written amendment to the Task Order.

For Contractor:

_____ _____
Signature — Date
Max Puckett, Contractor Project Director

For SWRCB:

_____ _____
Signature — Date
Craig J. Wilson, SWRCB Contract Manager

8. Scope of Work:

A. Purpose and Objectives of the Proposed Work

This Task Order implements the second year of ambient water monitoring and assessment for the Surface Water Ambient Monitoring Program (SWAMP) for the California Regional Water Quality Control Board/Los Angeles (Region 4). This work will focus on the Dominguez Channel and Los Angeles and Long Beach (LA/LB) Harbors watersheds using contract funding allocated to RWQCB 4 for fiscal year 2002-2003. Other watersheds will be focused on in subsequent years, on a five-year cycle. The goal of this program is to gather ambient water quality data in order to provide the Regional Board and the State Board with information on these watersheds. Examples of the type of analyses the Los Angeles Regional Board utilizes to obtain the ambient water quality data include water column chemistry, water toxicity, sediment toxicity, bioassessment, physical habitat assessment, and bioaccumulation studies to name a few. The data collected during this program will be used to compose watershed assessment reports, the 305 (b) list, and ultimately the 303 (d) list as well as supplementing the data specific to point source discharges the Regional Board obtains through the National Pollutant Discharge Elimination System program. Specific work to be performed at each station is shown on the attached "Table A: Services to be Performed at Each Station/Cost".

The program goals of SWAMP are:

1. Identify specific problems preventing the SWRCB, RWQCBs, and the public from realizing beneficial uses in targeted watersheds.
2. Create an ambient monitoring program that addresses all hydrologic units of the State using consistent and objective monitoring, sampling and analysis methods; consistent data quality assurance protocols; and centralized data management.
3. Document ambient water quality conditions in potentially clean and polluted areas.
4. Provide the data to evaluate the effectiveness of water quality regulatory programs in protecting beneficial uses of waters of the State.

Regional Board staff have divided the Dominguez Channel and LA/LB harbor area into the following six subareas based on characteristics of the area in order to simplify sampling design: (1) headwater streams, (2) the inner and outer harbors of LA and LB, (3) Madrona Marsh, (4) Lake Machado, (5) the Dominguez Channel estuary, and (6) the upper channelized Dominguez Channel above normal tidal influence. The sampling design is still under development, however, if funding constraints are not restrictive, each of the six areas will be sampled to fill in the incomplete data relevant to each area. For example, the data for Lake Machado is old and limited and the lake is posted for fishing and consumption, therefore, studies will include fish tissue analysis (funded through the Toxic Substances Monitoring Program (TSMP)) in conjunction with water column chemistry and toxicity, sediment chemistry and toxicity, and pathogens. The LA/LB harbor complex is another example which represents a different sampling strategy than the one proposed for Lake Machado. It is intended that the sampling design for the LA/LB harbor complex will consist of a stratified random sampling design developed by either the USEPA EMAP staff or the SCCWRP. The sampling of the harbor complex will include conventional water quality, trace metals chemistry (dissolved), pesticides, PCBs, and PAH organic chemistry analysis at both the surface and the bottom of the water column. These analyses are to be conducted once in the summer of 2003 at each of the 30 sites in conjunction with the Bight '03 project. Additionally, water column toxicity & bacteriology will be conducted during this collection period, but only at one depth. Funding has also bee set aside for two potential TIEs. The ability

to break down this watershed into subareas based on characteristics of each subarea identified allows staff to devise unique sampling plans and monitor for constituents in relation to each individual subarea.

The sampling and analysis will be used to assess the ambient conditions of these watersheds. The sampling and analyses described in this Task Order will further delineate the nature, extent, and sources of toxic pollutants which have been detected or are suspected to be problematic for these areas. Where applicable, a triad approach (benthic community analysis, water chemistry, and toxicity testing) has been used. Ultimately, the information from these analyses will be used in the water quality assessment. In addition, the bioaccumulation tests (funded through TSM program during FY 01/02) are being conducted in order to address possible human health concerns (contaminants in edible fish tissue) and ecologic concerns (benthic community impacts) which could result if the contaminants at a site were bioavailable for uptake by organisms. This bioaccumulation test will help to demonstrate the bioavailability of contaminants at these stations. There is also a limited focus on bioassessment which historically has been overlooked. The information gathered will be used in trend analysis as well as the potential to use the data in the development of an index of biological integrity.

B. Technical Approach:

i. Sampling Design

A focused, comprehensive sampling for chemistry, toxicity, bioaccumulation, and bioassessment is indicated as shown on the attached table "Table A: Services to be Performed at Each Station/Cost".

As described earlier, Regional Board staff have divided the Dominguez Channel and LA/LB harbor area into the following six subareas based on characteristics of the area in order to simplify sampling design: (1) headwater streams, (2) the inner and outer harbors of LA and LB, (3) Madrona Marsh, (4) Lake Machado, (5) the Dominguez Channel estuary, and (6) the upper channelized Dominguez Channel above normal tidal influence. The following is a summary of monitoring goals:

(1) Headwater streams are not expected to have dry weather flow and therefore will not be sampled.
(2) The inner and outer LA and LB harbors will be sampled for water column toxicity (at the surface only) and contaminant chemistry (at the surface and the bottom of the water column) will be employed at the water's surface. Chemical analysis will include oil and grease, BTEX, PAHs, pesticides, and PCBs. Conventional water quality analyses will be conducted on water samples collected from the 30 LA/LB Harbor sites during summer sample collection only. Funding will be set aside for TIEs because of the known toxicity contamination. Staff proposes the use of a probabilistic monitoring design with 30 stations. These analyses will further characterize the known impairments of the harbor, which is very industrial.
(3) Madrona Marsh is a 40-acre wetland and very little data exist relative to this waterbody. Staff proposes 3 directed stations where bioassessment, water column toxicity, water column chemistry, sediment toxicity, and sediment chemistry will be employed to gather baseline data to determine the status

of the waterbody. One of the three stations should be at the outlet of the marsh which drains into the Torrance Lateral.

(4) Lake Machado will be sampled for water column toxicity, water column chemistry, sediment toxicity, sediment chemistry, fish tissue, and pathogens. Staff proposes 5 directed stations and believes the information is necessary because the existing data is very old and very limited. The lake is posted for swimming and also offers freshwater beaches. Fish tissue and pathogen monitoring at 3 stations will provide information necessary to protect public health as well as aquatic life, and will be collected as part of the Toxic Substances Monitoring Program in the summer of 2002.

(5) Monitoring in the Dominguez Channel Estuary is currently done by the refineries, as well as LA County. Therefore, the goal of the SWAMP monitoring here is to supplement the information currently gathered for ambient water quality assessment. Staff envisions utilizing a total of 9 directed stations at the same locations as the current monitoring. Parameters to be sampled include bioassessment, water chemistry, BOD, COD, pathogens, and one sediment toxicity station above the refineries. The refineries currently monitor sediment toxicity in their area and below. A Toxic Substances Monitoring (TSM) station was employed during the summer of 2001 and staff hope to add to this station during the summer of 2002. Staff believe this monitoring will, combined with existing efforts, provide a detailed picture of the overall health of the Dominguez Channel Estuary. SWAMP will focus on water column chemistry, which has historically not been collected, as well as bioassessment, and the study of pathogens within the estuary.

(6) The upper Dominguez Channel will have one directed station above the tidal influence, which will be sampled for water column chemistry, water column toxicity, pathogens, metals, and organics. The goal of this station will be to characterize the water quality coming into the estuary and the water quality of the channel above the heavy industry of the refineries.

ii. Sample Collection

The field crew will collect the samples at the latitude and longitude previously recorded during past fieldwork at these stations or as determined during the reconnaissance performed by R4 staff. Station lists, locations, names, maps, access issues, and detailed site-by-site information will be provided by R4 staff to DFG under separate cover. R4 staff shall provide DFG with a sample reconnaissance form for each site where sample collection is to be conducted. The form shall be provided by CDFG, and should be completed and submitted by R4 staff to DFG not later than one month prior to sample collection commencing. If a new station is being sampled, the latitude and longitude, as well as GPS coordinates and cross-referenced photographs, shall be provided for the site for future reference. If there is ambiguity about locating a site, it shall be resolved in consultation with the RWQCB staff member present in the field or by phone.
Sufficient volume of water or sediment shall be collected in order to perform the analyses to be conducted at each station as shown on the attached "Table A: Services to be Performed at Each Station/Cost" table. Sample collection and subsequent processing and testing will be performed according to the most recent version of the SWAMP Quality Assurance Project Plan (QAPP) and SWAMP Laboratory SOPs. Currently, a five percent field duplicate and trip blank QA/QC level is being achieved statewide in the SWAMP program.

iii. Laboratory Analysis

Actual analytical services that will be performed on each sample are shown on the attached "Table A: Services to be Performed at Each Station/Cost".

iv. Data Analysis

Results from sampling shall be analyzed and reported in tabular and graphical format. Analyses shall be compared to criteria supplied to Fish and Game by the Los Angeles Regional Board. These criteria will consist of water quality criteria and water quality objectives. Upon negotiated format, content, and cost for preparing reports, comparative analyses shall be performed in such a way to evaluate the present state of health of the Dominguez Channel and LA/LB Harbor Watersheds.

Toxicity data will include test mean, standard deviation, and a determination of whether or not a sample is toxic at a statistically significant level of difference from the laboratory control samples.

Data from sampling in the harbors shall be analyzed and interpreted in a method consistent with the Southern California Bight '94 and Bight '98 approach and protocol and the EMAP approach and protocol.

Bioassessment data shall be collected, sorted, and taxonomically identified in a manner consistent with the California Stream Bioassessment Protocol developed by the California Department of Fish and Game.

The costs to prepare technical reports which evaluate the laboratory data against other criteria or guidelines is yet to be determined, but funding has been set aside to conduct this work.

v. Data Reporting/Products

1. **Field Report**: A field sampling "cruise" report will be prepared. A cruise report will be provided to the Regional Board, with an additional copy provided to the State Board (one copy to each). The field report will include a map with sufficient detail of stations sampled, including latitude and longitude coordinates and GPS coordinates. The field report shall also include digital photos of the monitoring sites.

2. **Final Data Report**: All data shall be reported in electronic file (Excel spreadsheet or Access database) on three 3.5" IBM-formatted diskettes, CDs, or zip discs, as well as on hard copy (three one-sided originals for copying, and three bound copies). One of each type--electronic file, one-sided hardcopy original, and bound hardcopy-- shall go to the State Board and the Regional Board and DFG. QA/QC evaluation reports and verification that data met QA criteria set forth in QA Project Plan must be provided with hardcopy data report.

The data report will include the following items, where applicable, but shall not necessarily be limited to the following items:

All station data including CDFG station name, station number, IDORG number, leg number, sample collection date, sample station longitude and latitude, sample GPS coordinates, sample station water depth, sample location characteristics, toxicity test endpoint mean and standard deviation, and all detection limits. In addition to the above data, the following will also be reported for all stations indicated on the attached "Services to be performed at each station/cost" spreadsheet for bioassessment: raw data and computed biological indices. Data from the bioaccumulation tests will be reported as tissue chemistry data for the specific chemical constituents shown on the attached "Services to be performed at each station/cost" spreadsheet. A map should be included showing the locations of each sampling station and an indication of the overall integrity of that site as excellent, good, marginal, or poor.

QA/QC evaluation ranking by each analytical laboratory will be provided in the database. In addition, appendices will include replicate data for toxicity tests, a database description and file structure description. A QA/QC report will also be included in the final data report, containing an evaluation of how the data complied with actual QA/QC parameters.

9. Maximum Cost

The maximum cost of all SWAMP services specified in this Task Order shall not exceed $336,526. Field and analytical services costs are shown in the attached "Table A: Services to be Performed at Each Station/Cost" budget table (one page total). This amount of $336,526 is from the Region 4 allocation for FY 01/02. Actual billing for this Task Order may be done on a total Task Order cost basis, with the work described and costed out herein as the basis for the cost.

SWAMP FY02-03 RWQCB 4 Funds-- Task Order No. 01-4-001	Task Order Title: "Field and Lab Services for RWQCB 4 for FY02-03 funds"	SWAMP Station Name and Number ------>	Inner & Outter Harbors (30 stations)	Madrona Marsh (3 stations)	Lake Machado (5 stations)	Dominguez Channel Estuary (9 stations)	Upper Dominguez Channel (1 station)	Total Units	Total Cost (Total Units x cost/unit)	Calculate 5% Field Duplicate QA/QC Samples	Round up to nearest whole number	Cost of 5% Field Duplicates QA/QC Samples		
Analysis or Service to be Performed	**Description**	**Unit Cost (per sample)**												
Sediment and/or Water Sample Collection ***(all costs shown are estimated costs; actual costs will be negotiated with Regional Board staff for Task Order)***	Collect sed and/or water samples; conduct centroid velocity measurement; conduct multiparameter probe reading; includes all sample shipping. For close access, drive-up sites only. Estimated cost.	$750		3	5	9	1	18	$13,500	0.9	1	$750		
	Sediment sample collect ONLY--no probe measures and no centroid velocity measures; includes all sample shipping. For close access, drive-up sites only. Estimated cost.	$500						0	$0	0	0	$0		
	For sites that have more difficult access (requiring hiking & packing in of gear/out of samples...of more than 15-20 minute duration to hike...and where proximal vehicle access is not possible), or boat access, or other types of sample collection not described herein.	to be negotiated with Region	refigure					1	refigure	0.05	1	$0		
Fish/Bivalve Sample Collection (includes dissection/homogenization)	Bagged bivalve bioaccum (SMW style)	$1,234						0	$0	0	0	$0		

	Fish collected w/ non-marine (TSM style)	$1,828			TSM			0	$0	0	0	$0			
	Fish collected within marine/estuarine (CFC style)	$1,409						0	$0	0	0	$0			
Trace Organic Chemistry	Full Scan (pesticides and pcb congeners; no PAH's) - sediment	$830						0	$0	0	0	$0			
	Full Scan (pesticides and pcb congeners; no PAH's) - tissue	$830						0	$0	0	0	$0			
	Full Scan (pesticides and pcb congeners; no PAH's) - water	$483						0	$0	0	0	$0			
	Full Scan (pesticides and pcb congeners) + PAH's - sediment	$1,423		3	5			8	$11,384	0.4	1	$1,423			
	Full Scan (pesticides and pcb congeners) + PAH's - tissue	$1,423			TSM			0	$0	0	0	$0			
	Full Scan (pesticides and pcb congeners) + PAH's - water	$798	60			9	1	70	$55,860	3.5	4	$3,192			
	PAH's only (NIST List) - sediment	$698						0	$0	0	0	$0			
	PAH's only (NIST List) - tissue	$698						0	$0	0	0	$0			
	PAH's only (NIST List) - water	$368						0	$0	0	0	$0			
	PAH's expanded (NIST list + substituted PAH's) - sed	$815						0	$0	0	0	$0			
	PAH's expanded (NIST list + substituted PAH's) - tiss	$815						0	$0	0	0	$0			
	PAH's expanded (NIST list + substituted PAH's) - water	$578						0	$0	0	0	$0			
	PH (petroleum hydrocarbons) - sed	$641						0	$0	0	0	$0			
	PH (petroleum hydrocarbons) - tiss	$641						0	$0	0	0	$0			
	PH (petroleum hydrocarbons) - water	$499						0	$0	0	0	$0			
	TPH (total petroleum hydrocarbons) - sed	$384						0	$0	0	0	$0			
	TPH (total petroleum hydrocarbons) - tiss	$384						0	$0	0	0	$0			
	TPH (total petroleum hydrocarbons) - water	$210						0	$0	0	0	$0			
	MtBE + BTEX - water	$150						0	$0	0	0	$0			
	BTEX only - water	$125	60					60	$7,500	3	3	$375			
	Organophosphate Scan (incl	$639						0	$0	0	0	$0			

	chlorpyrifos and diazinon) - sed														
	Organophosphate Scan (incl chlorpyrifos and diazinon) - tiss	$639						0	$0	0	0	$0			
	Organophosphate Scan (incl chlorpyrifos and diazinon) - water	$452						0	$0	0	0	$0			
	PCB only (congeners) - sed	$397						0	$0	0	0	$0			
	PCB only (congeners) - tiss	$397						0	$0	0	0	$0			
	PCB only (congeners) - water	$315						0	$0	0	0	$0			
	Toxaphene only - sed	$397						0	$0	0	0	$0			
	Toxaphene only - tiss	$397						0	$0	0	0	$0			
	Toxaphene only - water	$315						0	$0	0	0	$0			
	Total DDT w/ individual DDT compounds - sed	$397						0	$0	0	0	$0			
	Total DDT w/ individual DDT compounds - tiss	$397						0	$0	0	0	$0			
	Total DDT w/ individual DDT compounds - water	$368						0	$0	0	0	$0			
	Chlordane Compounds Only - sed	$397						0	$0	0	0	$0			
	Chlordane Compounds Only - tiss	$397						0	$0	0	0	$0			
	Chlordane Compounds Only - water	$368						0	$0	0	0	$0			
	a, b, g, d - HCH - sed	$397						0	$0	0	0	$0			
	a, b, g, d - HCH - tiss	$397						0	$0	0	0	$0			
	a, b, g, d - HCH - water	$368						0	$0	0	0	$0			
	Hexachlorobenzene - sed	$321						0	$0	0	0	$0			
	Hexachlorobenzene - tiss	$321						0	$0	0	0	$0			
	Hexachlorobenzene - water	$315						0	$0	0	0	$0			
	Chlorpyrifos & Diazinon only- sed	$397						0	$0	0	0	$0			
	Chlorpyrifos & Diazinon only - tiss	$397						0	$0	0	0	$0			
	Chlorpyrifos & Diazinon only - water	$368						0	$0	0	0	$0			
	Endosulfan (I, II, Sulfate) only - sed	$397						0	$0	0	0	$0			
	Endosulfan (I, II, Sulfate) only - tiss	$397						0	$0	0	0	$0			
	Endosulfan (I, II, Sulfate) only - water	$368						0	$0	0	0	$0			
	TCP/PCP - sed	$885						0	$0	0	0	$0			
	TCP/PCP - tiss	$885						0	$0	0	0	$0			
	TCP/PCP - water	$630						0	$0	0	0	$0			
	TBT only - sed	$524						0	$0	0	0	$0			
	TBT only - tiss	$524						0	$0	0	0	$0			
	TBT only - water	$420						0	$0	0	0	$0			
	Indexing & quantitating unknowns	$110						0	$0	0	0	$0			
Trac	**Sediment ICPMS metals suite** (Includes Al, Cr, Mn, Ni, Cu, Zn, Ag, Cd, Pb, As--all costs)	$234		3	5			8	$1,872	0.4	1	$234			

e Metal Chemistry															
	Tissue ICPMS metals suite (Includes Al, Cr, Mn, Ni, Cu, Zn, Ag, Cd, Pb, As, Se--all costs)	$324			TSM			0	$0	0	0	$0			
	Water ICPMS metals suite--unfiltered "total" (Includes Al, Cr, Mn, Ni, Cu, Zn, Ag, Cd, Pb, As, Se--all costs)	$199						0	$0	0	0	$0			
	Water ICPMS metals suite--filtered "dissolved" (Includes Al, Cr, Mn, Ni, Cu, Zn, Ag, Cd, Pb, As, Se--al costs)	$219	60				1	61	$13,359	3.05	4	$876			
	Mercury in sediment	$91						0	$0	0	0	$0			
	Mercury in tissue	$91						0	$0	0	0	$0			
	Mercury in water	$91						0	$0	0	0	$0			
	Methylmercury in sediment	$254						0	$0	0	0	$0			
	Methylmercury in tissue	$219						0	$0	0	0	$0			
	Methylmercury in water	$219						0	$0	0	0	$0			
	Selenium in sediment (not a part of the ICPMS analysis)	$91						0	$0	0	0	$0			
Conventional Water Chemistr	Major anions nutrient scan: ortho-phosphate, nitrate, nitrite, chloride, sulfate	$135	60	3	5	9	1	78	$10,530	3.9	4	$540			

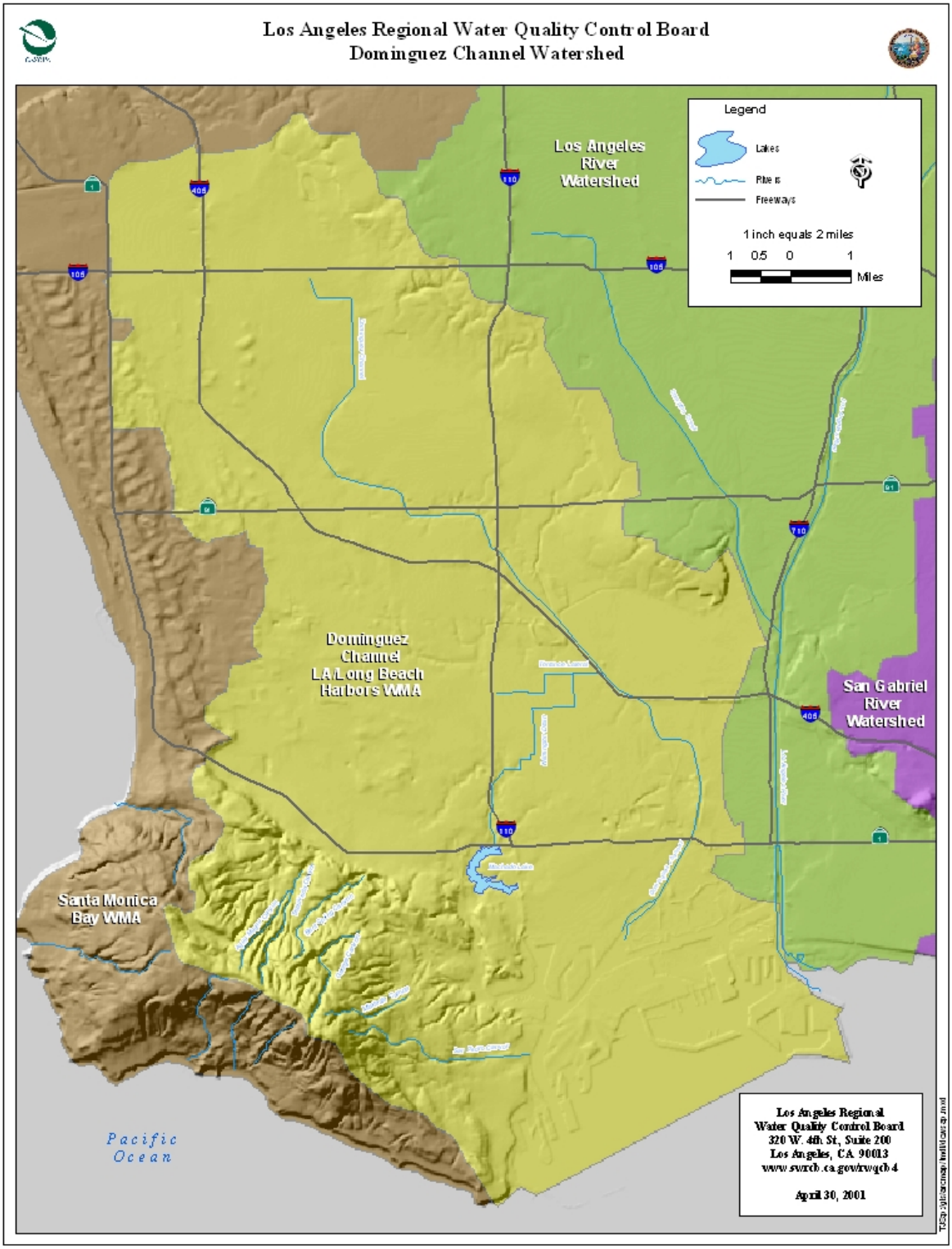
y															
	Total Phosphate	$38						0	$0	0	0	$0			
	Boron	$35						0	$0	0	0	$0			
	TKN	$45						0	$0	0	0	$0			
	TDS	$30						0	$0	0	0	$0			
	TSS (highly recommend SSC instead…see below)	$25	60	3	5	9	1	78	$1,950	3.9	4	$100			
	Ammonia	$25	60	3	5	9	1	78	$1,950	3.9	4	$100			
	Chlorophyll-a	$50	60	3	5	9	1	78	$3,900	3.9	4	$200			
	Alkalinity	$25	60	3	5	9	1	78	$1,950	3.9	4	$100			
	Hardness	$25	60	3	5	9	1	78	$1,950	3.9	4	$100			
	Oil & Grease	$45	60					60	$2,700	3	3	$135			
	BOD	$60				9		9	$540	0.45	1	$60			
	COD	$40				9		9	$360	0.45	1	$40			
	TOC	$65	60	3	5	9	1	78	$5,070	3.9	4	$260			
	DOC	$65						0	$0	0	0	$0			
Sediment Physical Characteristics	Sediment Total Organic Carbon (TOC)	$65		3	5			8	$520	0.4	1	$65			
	Suspended Sediment Concentration (SSC)	$65						0	$0	0	0	$0			
	Sediment grain size (%silt/clay = fines only)	$55						0	$0	0	0	$0			
	Sediment grain size - full analysis (phi scale)	$125		3	5			8	$1,000	0.4	1	$125			
Bacteriology and Pathology	To be negotiated, based on actual analyses requested							0	$0	0	0	$0			
		$150	30		5	9	1	45	$6,750	2.25	3	$450			
								0	$0	0	0	$0			
								0	$0	0	0	$0			
Biological Assessment	Site collection, sorting, taxonomy, QA, report (3 replicates at $407 each)	$1,221		3		9		12	$14,652	0.6	1	$1,221			
	Sample sorting, taxonomy, QA, report (no sample collection; sample must be provided by RWQCB per ABL protocols)	$353						0	$0	0	0	$0			
Toxicity Testing - Salt Water Origin	**Water**														
	Larval Development (sea urchin, abalone, bivalve)	$630						0	$0	0	0	$0			
	Larval Development at Sediment Water Interface	$656						0	$0	0	0	$0			
	Sea Urchin Fertilization	$630						0	$0	0	0	$0			
	Mysid Juvenile 96-h Survival	$525						0	$0	0	0	$0			
	Additional Sample Dilutions	$420						0	$0	0	0	$0			
	Sediment														
	Amphipod 10-d Survival (*Rhepoxynius* or *Euhaustorius*)	$814						0	$0	0	0	$0			

	Amphipod 10-d Survival (*Ampelisca*)	$919						0	$0	0	0	$0			
	Polychaete 20-d Growth & Survival (*Neanthes*)	$998						0	$0	0	0	$0			
Toxicity Testing - Fresh Water Origin	**Water**														
	Mysid Juvenile 96-hr Survival	$525						0	$0	0	0	$0			
	Ceriodaphnia 96-hr Survival in situ	$578						0	$0	0	0	$0			
	Ceriodaphnia 7-day Survival & Reproduction	$683	60	3	5		1	69	$47,127	3.45	4	$2,732			
	Pimephales (fathead minnow) 7 -day	$683		3	5		1	9	$6,147	0.45	1	$683			
	Selenastrum (algae) test	$683						0	$0	0	0	$0			
	Additional Sample Dilutions for *Ceriodaphnia* 7-day test	$500						0	$0	0	0	$0			
	Sediment														
	Amphipod 10-d Survival (*Hyalella*)--acute	$840						0	$0	0	0	$0			
	Amphipod 28-d Survival (*Hyalella*)--chonic (recommended)	$1,050		3	5	1		9	$9,450	0.45	1	$1,050			
	Additional species 10-d acute (estimate)	$840						0	$0	0	0	$0			
	Sediment / Water Interface (consult as to species)	$656						0	$0	0	0	$0			
Other Toxicity Testing Services	Phase I TIE Fresh or Salt	$3,885	2					2	$7,770	0.1	1	$3,885			
	Phase II and Phase III - negotiable	$3,885						0	$0	0	0	$0			
	Additional fresh- and saltwater origin sample toxicity tests available	ask for cost													
	ELISA for Diazinon	$32						0	$0	0	0	$0			
	ELISA for Chlorpyrifos	$32						0	$0	0	0	$0			
5% Field Duplicate QA/QC Sample Cost	Calculated based on columns at far right on spreadsheet	$18,696						**$18,696**		**$18,696**					
DFG Miscellaneous	Regional proportional share of statewide cost of DFG pass-thru subcontract ovrhd, coordination/logistics/management cost	$11,809						1	$11,809						
	Sampling/Cruise Reports - $525 per sampling seasonal event	$525						2	$1,050						
	Interpretive Report / Publication	Negotiate						0	$0						
TOTAL COST FOR ALL SERVICES/ANALYSES DESCRIBED ABOVE:								**$240,650**							
Total available for R4 in DFG Contract for FY 01-02 swamp funded work:									**$336,526**						
Total cost for all services/analyses									**$240,**						

Section VII.

described above:								**650**						
Amount not yet allocated for R4 FY01-02 work:								**$95,876**						
QAQC:								$18,696						
Amount not yet allocated for R4 FY01-02 work (Allocate to follow up studies):								$77,180						

Section VIII.



Appendix A

Applicable Sections of the 1996 & 1998 Water Quality Assessments

1996 Water Quality Assessment

Santa Clara

This section is not currently available electronically. Please contact Tracy Vergets at (213) 576-6661 or tvergets@rb4.swrcb.ca.gov to obtain a copy of this section. We apologize for the inconvenience.

Calleguas Creek

This section is not currently available electronically. Please contact Tracy Vergets at (213) 576-6661 or tvergets@rb4.swrcb.ca.gov to obtain a copy of this section. We apologize for the inconvenience.

LA County Coastal Watersheds

(Dominguez Channel & LA/LB Harbor Complex)
(Santa Monica Bay Watershed Management Area)

This section is not currently available electronically. Please contact Tracy Vergets at (213) 576-6661 or tvergets@rb4.swrcb.ca.gov to obtain a copy of this section. We apologize for the inconvenience.

Explanatory Notes for Interpreting the Tables

This section is not currently available electronically. Please contact Tracy Vergets at (213) 576-6661 or tvergets@rb4.swrcb.ca.gov to obtain a copy of this section. We apologize for the inconvenience.

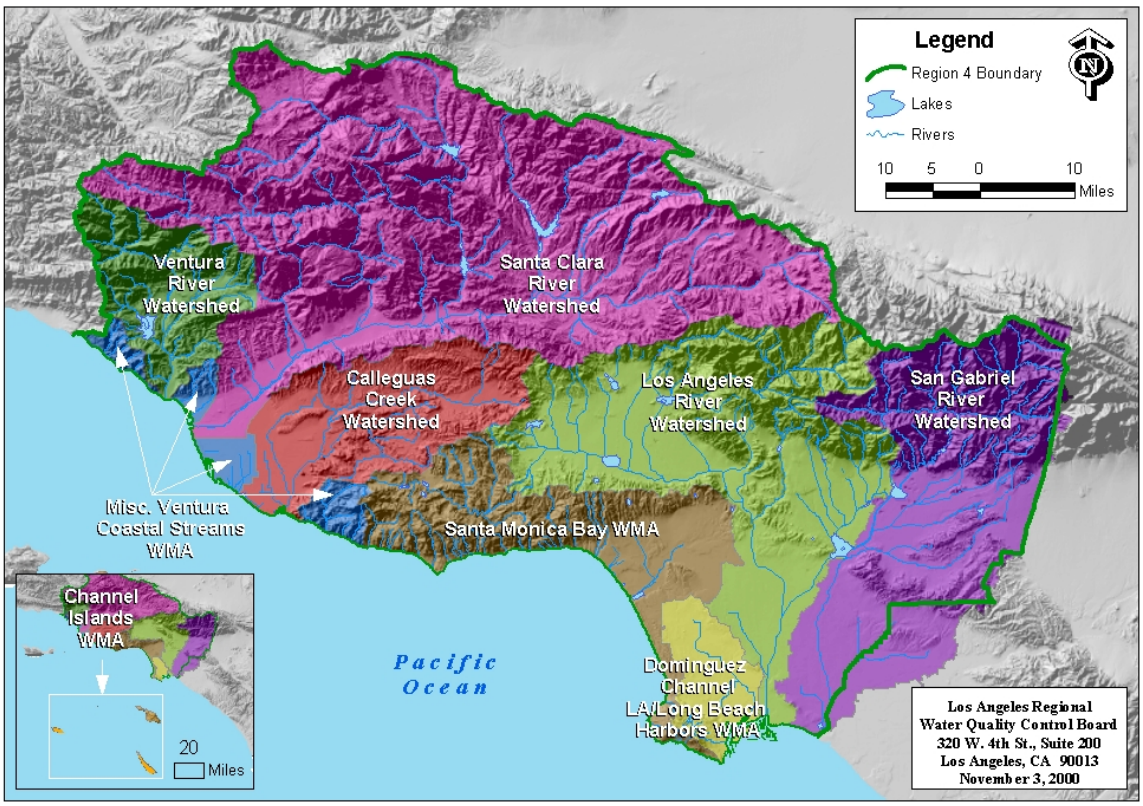
1998 Water Quality Assessment

This section is not currently available electronically. Please contact Tracy Vergets at (213) 576-6661 or tvergets@rb4.swrcb.ca.gov to obtain a copy of this section. We apologize for the inconvenience.

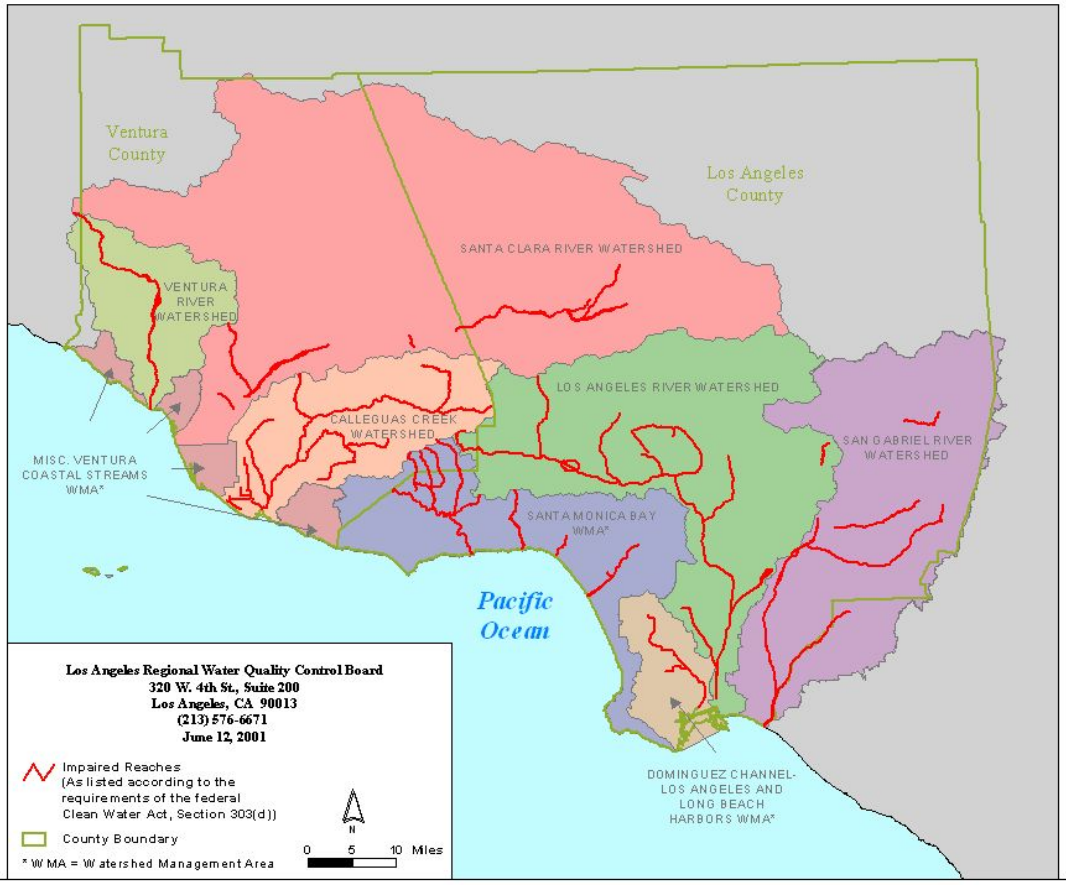
Appendix B

Maps

Los Angeles Regional Water Quality Control Board
Watersheds, Lakes, and Rivers



Locations of Impaired River Reaches in Los Angeles County and Ventura County California With Watersheds and County Boundaries



Appendix C

Beneficial Use Table from Region 4's Water Quality Control Plan (Basin Plan)

This section is available on line at
http:/www.swrcb.ca.gov/rwqcb4/html/meetings/tmdl/Basin_plan/el_doc/BP2%20Beneficial%20uses_tables.pdf