FINAL

PROJECT PLAN

FOR THE SURFACE WATER AMBIENT MONITORING PROGRAM IN THE

COLORADO RIVER BASIN REGION

Prepared by

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California Regional Water Quality Control Board
Colorado River Basin Region

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1. INTRODUCTION

1.1 BACKGROUND

The Surface Water Ambient Monitoring Program (SWAMP) is implemented by the State Water Resources Control Board (SWRCB) to develop a statewide and regionwide picture of the status and trends of the quality of California's surface water resources. Monitoring is needed to define the larger scale condition of beneficial uses of surface waters in the state. State and regional monitoring can determine if known local impacts can be observed over large distances. Monitoring also allows the assessment of regionwide or statewide water resource conditions. The result of regional monitoring will help the SWRCB and Regional Water Quality Control Boards (RWQCBs or Regional Boards) determine clearly the effectiveness of the State's water quality control program. The ambient monitoring program will provide physical, chemical, and biological information on water bodies that the State presently has little information. Data will establish the effects of diffuse pollution sources and determine baseline conditions of potentially clean areas.

The California Legislature also is very interested in establishing a closer link between budgeted water quality program activities and the impact those activities have on protecting and improving water quality. The Supplemental Report Language to the 1999 Budget Act directed the SWRCB to "… develop performance measures for its core regulatory programs …. that relate directly to water quality outcomes …." Since 1995, the SWRCB has used several performance objectives and measures for its programs. The measures generally are output-related and designed to measure program efficiency and timeliness. These measures include: (a) percent of total inspections completed versus the number of permitted sites, (b) number of Cleanup and Abatement Orders (CAOs), and (c) median time required to issue new National Pollutant Discharge Elimination System (NPDES) permits and Waste Discharge Requirements (WDRs). Historically, however, the ability to relate directly the performance of their programs to water quality outcomes has been hampered by limited data management capabilities and fragmented and incomplete water quality monitoring data collection, evaluation, and management.

Regional monitoring will provide the SWRCB and RWQCBs with a better picture of the water quality outcome of their programs. The information will assess program performance and support CWA Section 305(b) reporting. The information will focus on the State's surface water area that fully or partially supports associated beneficial uses.

SWAMP is implemented in each hydrologic area of the state over a five-year rotational period. The State Board allowed flexibility in monitoring design when delegating implementation to Regional Boards. Regional Boards may conduct special studies in areas that merit collection of ambient data.

FY 2002-03 goals and objectives for the Regional Water Quality Control Board for the Colorado River Basin Region (Region 7) are to build upon FY 2001-02 progress, refine the program, and ensure that quality information is collected to satisfy state and regional needs. Region 7 has developed a work plan that coordinates existing monitoring efforts to ensure funding accountability and to complete task orders. The work plan is a

document detailing regional and site-specific SWAMP plans and procedures for FY 2002-03. The work plan is based on projected funding and estimated costs from previous years, and may not reflect actual costs.

Our previous task orders include analysis of 44 stations for specific water column and sediment parameters, and the development of a Bioassessment protocol for the Region. For FY 2002-03, Regional Board staff selected 13 strategic sampling locations from the original 44, to evaluate at all SWAMP monitoring events. The strategic sites are situated along the Lower Colorado River, New River, Alamo River, Whitewater River, and Salton Sea, which are the five surface water bodies of major interest in the Region. These water bodies are the focus of numerous Total Maximum Daily Loads (TMDLs) for sediments, nutrients, selenium, pesticides, and pathogens. Physical, chemical, and biological parameters (water quality indicators) will be collected at these selected sites throughout the five-year period.

Efforts will concentrate on the Alamo River, given that the Alamo River Sedimentation/Siltation TMDL is the first TMDL implemented in the Region. Best Management Techniques (BMTs) to control silt runoff will be used within the next five years. Ambient monitoring information collected now and during implementation will be used to measure BMT effectiveness in reducing silt and other constituents of concern that are transported with silt.

SWAMP information will be used to support Basin Planning activities and objectives, and will complement other past and present studies conducted in the Region. SWAMP will provide a comprehensive view of changes that occur with BMT implementation, and will help refine the Bioassessment program specific to our Region. Collected information also will support listing and de-listing of impaired surface waters.

2. BASIN REGION DESCRIPTION

2.1 GENERAL DESCRIPTION

The Colorado River Basin Region covers approximately 13 million acres (20,000 square miles) in the southeastern corner of California. It includes all of Imperial County and portions of San Bernardino, Riverside, and San Diego Counties. The Region is bound to the northeast by Nevada; to the east by the Colorado River; to the south by Mexico; to the west by the Laguna, San Jacinto, and San Bernardino Mountains; and to the north by the New York, Providence, Granite, Old Dad, Bristol, Rodman, and Ord Mountain Ranges. The Region has 28 recognized major watersheds or "hydrologic units," and contains water bodies of statewide, national, and international significance (e.g., Salton Sea and Colorado River) (Figure 1). The climate is arid, with zero to five inches of annual precipitation. Seasonal temperatures fluctuate from 120 ºF in summer, to near freezing temperatures in winter.

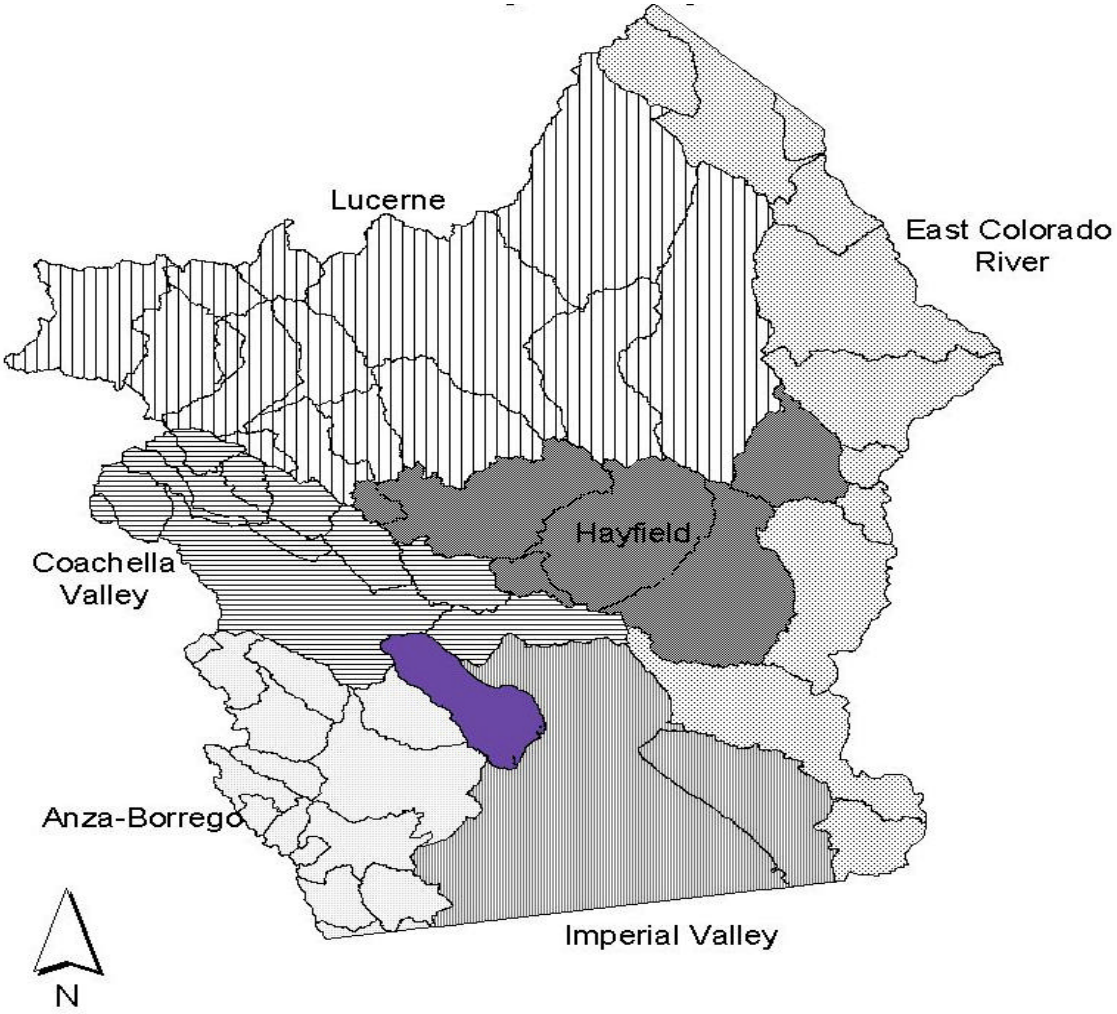

Figure 1. Colorado River Basin Region and the Basin Planning Areas

The majority of the Region's surface waters are located in the Imperial Valley and East Colorado River planning areas, with a few situated in the Coachella Valley, Lucerne, Anza-Borrego, and Hayfield planning areas (Figure 1). Since the majority of surface waters are in the Imperial Valley and East Colorado River planning areas, the ambient surface water-monitoring program will be focused there.

The East Colorado River planning area is bound to the north by Nevada, to the east by the Colorado River (which forms the Arizona-California state line), to the south by Mexico, and to the west by the drainage division of California streams and washes directly tributary to the Colorado River. The area is 200 miles long with a maximum east-west width of 40 miles. The Palo Verde and Bard Valleys are included in this planning area. All drainage flows to the Colorado River except for a minor amount, which flows into the Colorado River aqueduct via Gene Wash and Copper Basin Reservoirs.

The Imperial Valley planning area comprises 2,500 square miles in the southern portion of the Region, almost all of it in the Imperial Valley. Its northerly boundary is along Salton Sea and the Coachella Valley planning area and its south boundary follows the International Boundary with Mexico. Surface waters mostly drain toward the Salton Sea. The Alamo and New Rivers convey agricultural irrigation drainage water from farmlands in the Imperial Valley, surface runoff, and amounts of treated municipal and industrial wastewater from the Imperial Valley. The flow in the New River also contains agricultural drainage, treated and untreated wastewater discharges from Mexicali, Baja California, Mexico. The main source of this water is the Lower Colorado River, imported via the All American Canal. The imported water is used for irrigation, industrial purposes, and domestic drinking.

The Coachella Valley planning area contains the Whitewater Hydrologic Unit and the East Salton Sea Hydrologic Unit. It lies almost entirely in Riverside County and covers 1,920 square miles in the west-central portion of the Region. The Whitewater River is the major drainage course in the planning area. There is perennial flow of the Whitewater River in the mountains, but due to diversions and percolation into the basin, the river becomes dry further downstream. The constructed downstream extension of the river channel known as the Coachella Valley Storm Water Channel serves as a drainage way for irrigation return flows, treated community wastewater, and storm runoff. This outfall ultimately flows into the Salton Sea.

The Anza-Borrego planning area includes the Clark, West Salton Sea, and Anza-Borrego Hydrologic Units. It comprises 1,000 square miles in the southwest corner of the Region, mostly in San Diego and Imperial Counties, with a small segment in Riverside County. The drainage flows to the Salton Sea except for two small areas of internal drainage in Clark and Borrego Valleys in the northwest corner of the planning area.

2.2 WATERSHED DELINEATION

The Region can be divided into three watersheds: The Lower Colorado River, Salton Sea Transboundary, and Desert Aquifers. Major surface water bodies geographically define the Lower Colorado River Watershed and Salton Sea Transboundary Watershed. The Desert Aquifers Watershed has little surface water and hundreds of aquifers. The

Lower Colorado River Watershed is the East Colorado River planning area discussed above that contains the Colorado River, and associated waterbodies.

The Salton Sea Transboundary Watershed encompasses the Coachella and Imperial Valleys. It is the priority watershed for Region 7, containing five of six 303(d)-listed impaired surface water bodies. Water from the Colorado River has created an irrigated agricultural ecosystem throughout this watershed. Wildlife and aquatic species are dependent on habitat created and maintained through the discharge of agricultural return flows. Major water bodies in the watershed include the Salton Sea, Alamo River, New River, Imperial Valley Agricultural Drains, and Coachella Valley Storm Water Channel. San Felipe Creek and Salt Creek also occur in this watershed and provide critical habitat for the endangered desert pupfish. Aquatic and wildlife habitats are designated beneficial uses, among others, in the Region's Water Quality Control Plan.

Agricultural drain waters from Imperial Valley comprise over 70% of the freshwater flows to the Salton Sea. Because the Sea is enclosed, salts and nutrients accumulate, and cause eutrophic conditions and other ecological problems. The high salinity cannot be addressed strictly from a regulatory stance; rather, a coordinated approach aimed at stabilizing and/or restoring salinity to levels that maintain beneficial uses and water quality objectives must be implemented.

3. MONITORING LOCATIONS, OBJECTIVES, AND ANALYSIS

3.1 MONITORING LOCATIONS

Some monitoring locations were selected based on known or suspected water quality problems that merited in-depth study. Other monitoring locations were selected to provide baseline conditions to which surface waters could be compared.

Regional Board staff prepared sampling location reconnaissance forms, with information such as longitude and latitude, access, directions to sites, photographs, and health and safety precautions. Reconnaissance forms are not to be used in lieu of health and safety planning, and will be provided to field personnel who will collect water and sediment samples.

Table 1 identifies FY 2002-03 SWAMP monitoring stations, with their known or potential water quality problems.

Table 1. Monitoring Stations and Water Quality Problems

Stations	Known Problems	Potential Problems	Strategic Station?
Colorado River @ Nevada State Line	M, S		yes
Colorado River @ Imperial Dam	B	O, P, M	yes
Palo Verde Lagoon	B	P, N, M	yes
Palo Verde Outfall Drain	B	P, N, M	yes
Alamo River Outlet	B, O, P, M, N, S	P	yes
Alamo River @ Drop 3	B, P, N, S		no
Alamo River @ Drop 6	B, P, N, S		no
Alamo River @ Drop 6A	B, P, N, S		no
Alamo River @ Drop 8	B, P, N, S		no
Alamo River @ Drop 10	B, P, N, S		no
Alamo River @ International Boundary		B, O, P, N	yes
New River Outlet	B, O, P, M, N, S		yes
New River @ Boundary	B, O, P, M, N, S		yes
Salton Sea USGS 2	B, P, M, N	O	yes
Salton Sea USGS 7	B, P, M, N	O	yes
Salton Sea USGS 9	B, P, M, N	O	yes
Salton Sea Drain NW1 (Torres Martinez 1)	B, P, M, N	O	yes
Coachella Valley Drain Outlets	B	P, N	yes

B = Bacteria, P = Pesticides, O = Organics, M = Metals, N = Nutrients, S = Silt

3.2 MONITORING OBJECTIVES

Monitoring objectives address the ability of specific water bodies to support their designated beneficial uses. In developing SWAMP monitoring objectives for regionwide and site-specific monitoring, the SWRCB used a modified version of the model proposed by Bernstein et al. (1993) for developing clear monitoring objectives. The model makes explicit the assumptions and/or expectations that often are embedded in less detailed statements of objectives, such as those presented in the SWRCB Report to the Legislature on comprehensive monitoring submitted in February 2000 (SWRCB, 2000). This section is organized by each major question posed in the January 2000 report.

Is it safe to swim?

Beneficial Use: Water Contact Recreation (REC I)

1. Throughout water bodies that are used for swimming, estimate the concentration of pathogenic contaminants above and below screening values, health standards, or adopted water quality objectives.

2. Throughout water bodies that are used for swimming, estimate the percent of beach area that poses potential health risks of exposure to pathogens in streams, rivers, lakes, nearshore waters, enclosed bays, and estuaries using several critical threshold values of potential human impact (e.g., pathogen indicators).

3. Throughout water bodies that are used for swimming, estimate the concentration of bacterial contaminants from month-to-month above and below screening values, health standards, or adopted water quality objectives.

Is it safe to drink the water?

Beneficial Use: Municipal and Domestic Water Supply (MUN)

4. Throughout water bodies that are used as a source of drinking water, estimate the area of lakes, rivers, and streams where the concentration of microbial or chemical contaminants are above and below screening values, drinking water standards, or adopted water quality objectives used to protect drinking water quality.

5. Throughout water bodies that are used as a source of drinking water, estimate the concentration of microbial or chemical contaminants from month-to-month above and below screening values, drinking water standards, or adopted water quality objectives used to protect drinking water quality.

Is it safe to eat fish and other aquatic resources?

Beneficial Use: Commercial and Sport Fishing (COMM), Shellfish Harvesting (SHELL)

6. Throughout water bodies that are used for fishing or shellfish harvesting, estimate the area of streams, rivers, lakes, nearshore waters, enclosed bays, and estuaries

where the concentration of chemical contaminants in edible fish or shellfish tissue exceeds several critical threshold values of potential human impact (e.g., screening values or action levels).

7. Throughout water bodies that are used for fishing or shellfish harvesting, assess the geographic extent of chemical contaminants in selected size classes of commonly consumed target species that exceed several critical threshold values of potential human impact (e.g., screening values or action levels) (Adapted from USEPA, 1995).

8. Throughout water bodies that are used for fishing or shellfish harvesting, 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).

9. Throughout water bodies that are used for shellfish harvesting, estimate the concentration of bacterial contaminants from month to month above and below health standards or adopted water quality objectives.

10. Throughout water bodies that are used for shellfish harvesting, estimate the concentration of bacterial contaminants above and below health standards or adopted water quality objectives.

Are aquatic populations, communities, and habitats protected?

Beneficial Use: Cold Freshwater Habitat (COLD); Estuarine Habitat (EST); Inland Saline Water Habitats (SAL); Marine Habitat (MAR); Preservation of Biological Habitats (BIOL); Rare, Threatened or Endangered Species (RARE); Warm Freshwater Habitat (WARM); Wildlife Habitat (WILD)

11. Throughout water bodies that are used by aquatic resources, estimate the percent of degraded water area in rivers, lakes, nearshore waters, enclosed bays, and estuaries using several critical threshold values of toxicity, water or benthic community analysis, habitat condition, and chemical concentration**.**

12. Throughout water bodies that are used by aquatic resources, estimate the percent of degraded sediment area in rivers, lakes, nearshore waters, enclosed bays, and estuaries using several critical threshold values of toxicity, water column or benthic community analysis, habitat condition, and chemical concentration.

13. Throughout water bodies that are used by aquatic resources, identify the area extent of degraded sediment locations in rivers, lakes, nearshore waters, enclosed bays, and estuaries using several critical threshold values of toxicity, water column or benthic community analysis, habitat condition, and chemical concentration.

14. Throughout water bodies that are used by aquatic resources, estimate the percent of degraded sediment area from year-to-year in rivers, lakes, nearshore waters, enclosed bays, and estuaries using several critical threshold values of toxicity, water column or, benthic community analysis, habitat condition, and chemical concentration.

15. Throughout water bodies that are used by aquatic resources, estimate the percent of degraded water area from year-to-year in rivers, lakes, nearshore waters, enclosed bays, and estuaries using several critical threshold values of toxicity, water column or benthic community analysis, habitat condition, and chemical concentration.

Beneficial Use: Spawning, Reproduction and/or Early Development (SPWN)

16. Throughout water bodies that are used by fisheries, estimate the area of degraded spawning locations and water or sediment toxicity associated with toxic pollutants in rivers, lakes, nearshore waters, enclosed bays, and estuaries using critical threshold values of early life-stage toxicity, chemical concentration, and physical characteristics.

17. Throughout water bodies that are used by fisheries, estimate the area degraded spawning locations and water or sediment toxicity associated with toxic pollutants from year-to-year in rivers, lakes, nearshore waters, enclosed bays, and estuaries using critical threshold values of early life-stage toxicity, chemical concentration, and physical characteristics.

Is water flow sufficient to protect fisheries?

Beneficial Use:Migration of Aquatic Organisms (MIGR); Rare, Threatened or Endangered Species (RARE); Wildlife Habitat (WILD)

18. Throughout water bodies that are used by fisheries, estimate the area with the conditions necessary for the migration of aquatic organisms, such as anadromous fish, using measures of habitat condition including water flow, watercourse geomorphology, sedimentation, temperature, and biological communities.

19. Throughout water bodies that are used by fisheries, estimate the area with the conditions from month to month necessary for the migration of aquatic organisms, such as anadromous fish, using measures of habitat condition including water flow, watercourse geomorphology, sedimentation, temperature, and biological communities.

Is water safe for agricultural use?

Beneficial Use: Agricultural Supply (AGR)

20. Throughout water bodies that are used for agricultural purposes, estimate the area of lakes, rivers, and streams that are used for agricultural purposes where the concentration of chemical pollutants are above or below screening values or adopted water quality objectives used to protect agricultural uses.

21. Throughout water bodies that are used for agricultural purposes, estimate the concentration of chemical pollutants from year-to-year above or below screening values or adopted water quality objectives used to protect agricultural uses.

Is water safe for industrial use?

Beneficial Use: Industrial Process Supply (PRO); Industrial Service Supply (IND)

22. Throughout water bodies that are used for industrial purposes, estimate the area of coastal waters, enclosed bays, estuaries, lakes, rivers, and streams where the concentration of chemical pollutants are above or below screening values or adopted water quality objectives used to protect industrial uses.

23. Throughout water bodies that are used for industrial purposes, estimate the concentration of chemical pollutants from year-to-year above or below screening values or adopted water quality objectives used to protect industrial uses.

Are aesthetic conditions of the water protected?

Beneficial Use: Non-Contact Water Recreation (REC II)

24. Throughout water bodies that are used for non-contact recreation, estimate the area of coastal waters, enclosed bays, estuaries, lakes, rivers, and streams where the aesthetic conditions are above or below screening values or adopted water quality objectives used to protect non-contact water recreation.

25. Throughout water bodies that are used for non-contact recreation, estimate the aesthetic condition from year-to-year above or below screening values or adopted water quality objectives used to protect non-contact water recreation.

These objectives may not be relevant to all Regions. Each Region prioritizes their monitoring objectives, and Regions with similar objectives will be monitored in a similar manner. Adherence to these monitoring objectives is dependent on finalized sampling costs and funding.

3.3 WATER QUALITY INDICATORS (WQI)

Water quality indicators are used to assess the ability of specific water bodies to support their designated beneficial uses. Water quality indicators may be physical, chemical, or biological parameters. Monitoring programs sponsored by the SWRCB and the RWQCBs have used a variety of environmental indicators. Indicators that have been used in ambient monitoring efforts and meet the requirements of the general criteria are presented in Table 2. Use of these indicators is dependent upon funding, sampling cost, and characteristics of the water body.

Table 2. List of Indicators for Site-Specific and Regional Monitoring

Beneficial Use	Monitoring Objectives[1]	Category	Indicator
REC I	1, 2, and 3	Contaminant exposure	Total coliform bacteria
			Fecal coliform bacteria
			Enterococcus bacteria
			Enteric viruses
MUN	4 and 5	Contaminant exposure	Inorganic water Chemistry
			Nutrients
			Organic water Chemistry
			Total coliform bacteria
			Cryptosporidium
			Giardia

Beneficial Use	Monitoring Objectives[1]	Category	Indicator
COMM, SHELL	6, 7, 8, 9, and 10	Contaminant exposure	Fish tissue chemistry
			Shellfish tissue Chemistry
			Coliform bacteria in shellfish
			Fecal coliform bacteria in water
COLD, EST, SAL, MAR, BIOL, RARE, WARM, WILD, SPWN	11, 12, 13, 14, 15, 16, and 17	Biological response[2]	Phytoplankton
			Chlorophyll-a
			Benthic fauna (animals that live in sediment)
			Fish assemblage
			Fish pathology
			Recruitment of sensitive life stages
			Interstitial water toxicity
			Macroinvertebrate assemblage
			Periphyton
			Sediment toxicity
			Water toxicity

Beneficial Use	Monitoring Objectives[1]	Category	Indicator
		Pollutant exposure	Acid
			Volatile sulfides/simultaneously extracted metals
			Debris
			Interstitial water
			Metal chemistry
			Reporter Gene System (RGS 450)
			Organic and inorganic sediment chemistry
			Total organic carbon
			Shellfish or fish tissue chemistry
			Nutrients
			Turbidity
			Inorganic and organic water chemistry

Beneficial Use	Monitoring Objectives[1]	Category	Indicator
		Habitat	Dissolved oxygen
			Sediment grain size and gradations
			Sediment organic carbon
			Water flow
			Water temperature
			Channel morphology
			Residual pool volume
			Instream structure
			Substrate composition
			Wetland vegetation
			Riparian vegetation
			Electrical conductivity
			Salinity
			Hydrogen sulfide
			Ammonia
MIGR, RARE, WILD	18 and 19	Habitat	Water flow
			Suspended solids
			Channel morphology
			Water temperature
		Biological response	Fish assemblage and populations
			Macroinvertebrate assemblage and populations
			Periphyton
			Wetland habitat
			Riparian habitat
AGR	20 and 21	Pollutant exposure	Organic and inorganic chemistry

Beneficial Use	Monitoring Objectives[1]	Category	Indicator
PRO, IND	22 and 23	Pollutant exposure	Organic and inorganic chemistry
			Total organic carbon
			Temperature
			Electrical conductivity
REC II	24 and 25	Pollutant exposure	Taste and odor
			Debris and trash

Adapted from: SWRCB, 1993; SPARC, 1997; SCCWRP, 1998; Stephenson et al., 1994; CalEPA, 1998; CABW, 1998; CDFG, 1998; Noble et al., 1999; AB 982 Scientific Advisory Group, personal communication, August, 2000

[1] The number refers to the monitoring objective discussed previously.
[2] While the assessment of invasive species is not a focus of SWAMP, these organisms will very likely be identified when biological community measurements are made.

3.4 OVERVIEW OF AVAILABLE INFORMATION

Water quality information collected by the Regional Board, Universities, Federal agencies, and others, was evaluated to identify types of water quality data gathered, data gaps, and sites with historical water quality concerns.

Regional Board staff collected trend monitoring data from 1983 to 1993 at various locations along the Alamo River, New River, Lower Colorado River, Salton Sea, Imperial Valley Drains, and Salt Creek.

Several public agencies have collected water quality data from the Salton Sea and its tributaries. The Imperial Irrigation District (IID) has physical and chemical data for the Alamo and New Rivers at the International Boundary, and at the outlets to the Salton Sea. The United States Geologic Survey (USGS) has water quality data from the Lower Colorado River, and the Alamo and New Rivers under their National Water-Quality Assessment (NAWQA) and National Irrigation Water Quality Programs (NIWQP). The monitoring period for these two programs varies for each station. The SWRCB Toxic Substances Monitoring Program (TSMP) evaluates fish tissue for the presence of contaminants and is a significant assessment monitoring activity in Region 7. Fish tissue samples have been collected from 1978 to the present on an annual basis from strategic locations throughout the Region. This program detects contaminants that bioaccumulate in fish, and pose threats to aquatic species, fish-eating birds, and humans.

The University of Redlands compiled a list of agencies that collected data on the Salton Sea in a report titled "Salton Sea Watershed Water Quality Monitoring Program Inventory and Assessment." The report identifies the type and period the data was collected. One significant finding was that much data was collected without a quality control plan. Furthermore, data collection and/or analysis methods frequently differed, rendering the data incompatible. It is difficult to compare water quality data from various

sites if different analytical methods and reporting conventions for chemical constituents are utilized.

4. GENERAL STUDY DESIGN

4.1 VERVIEW

The overall goal of SWAMP is to develop a statewide and regionwide picture of the status and trends of the quality of California's surface water resources. It is intended that this portion of SWAMP will be implemented in each hydrologic unit (including coastal waters) of the State at least one time every five years. This portion of SWAMP is focused on collecting information on water bodies for which the State presently has little information and to determine the effects of diffuse sources of pollution and the baseline conditions of potentially clean areas.

4.2 REGIONWIDE DESIGN

The objective of SWAMP in FY 2001-02 was twofold: to obtain representative baseline measurements for surface waters in Region 7, and to develop future program strategies based on data collected to date. Comprehensive sampling events were scheduled during two hydrological cycles in 2002 (spring and fall), to account for seasonal variations in flow. May was selected because of the increased use of agricultural chemicals at this time (e.g., pesticides, fertilizers), and high rates of flow due to melting snow and irrigation. October was selected because of increased use of agricultural chemicals, and low flow rates.

For FY 2002-03, Regional Board staff designated a network of 13 strategic sampling locations from the originals situated on the Lower Colorado River, New River, Alamo River, Whitewater River, and Salton Sea (Table 1). These five water bodies are the major surface waters of interest in this Region, and the focus of TMDLs because of water quality impairments.

Site selection was based on location, historical information, current information, and future plans for utilization of Best Management Techniques (BMTs). Locations that exhibited high concentrations of contaminants (e.g., selenium, pesticides, VOCs, bacteria) were selected to monitor the progression of these pollutants. Sites in critical areas with regional significance (e.g., International Boundary, diversion points, State borders, source waters for an entire region) also were included. Finally sites were selected for which little data has been collected, to establish baseline conditions.

More sampling events will enable us to capture seasonal fluctuation trends, baseline data, and effectiveness of water quality control measures. Sampling frequency and timing will be performed during two hydrologic cycles.

4.3 SITE-SPECIFIC STUDY DESIGN

The overall goal of SWAMP is to develop site-specific information on sites that are known or suspected to: (1) have water quality problems, and (2) be clean. It is intended that this portion of SWAMP will be targeted at specific locations in each Region. 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 CWA Section 303(d). The RWQCBs are given significant flexibility to select specific locations to be monitored. The

RWQCBs at their discretion may perform monitoring at clean sites to determine baseline conditions (for assessments related to antidegradation requirements) or to place problem sites into perspective with cleaner sites.

Efforts will concentrate on the 7 Alamo River sites (Table 1), given that the Alamo River Sedimentation/Siltation TMDL will be the first TMDL implemented in the Region. BMT's to control silt runoff will be used within the next five years. Ambient monitoring information collected now and during implementation will be used to measure the effectiveness of BMTs in reducing silt and other constituents of concern that are transported with silt (e.g., pesticides). Sampling will be performed quarterly at these sites.

The Alamo River is sustained and dominated by agricultural return flows. These flows are either discharged directly into the Alamo River or into the Imperial Valley Agricultural Drains operated and maintained by the Imperial Irrigation District (IID). The Alamo River originates about 0.6 river miles south of the International Boundary, and flows northward roughly 60 miles through the Imperial Valley, eventually emptying into the southeast corner of the Salton Sea. The Alamo River is the Salton Sea's largest tributary, contributing about 52% of the Sea's annual inflows.

If funding permits, Regional Board staff will evaluate the main drains tributary to the Alamo River (i.e., Alamo sites from Table 3) for silt and other constituents/contaminants, to ascertain their effect on water quality in the Alamo. This will be accomplished by evaluating samples a few meters downstream and upstream of the drain, and at the junction of the drain with the river.

4.4 BIOLOGICAL ASSESSMENT

California Bioassessment Procedures will be implemented for biomonitoring and bioassessment. Utilizing these protocols standardizes data collection and assessment efforts, and satisfies quality control/quality assurance concerns. Region 7 has no historical bioassesment data, due partly to the distribution of water via engineered canals from the Lower Colorado River.

California protocols for stream bioassessment utilize benthic macroinvertebrate assemblages. Bioassessment of the New and Alamo Rivers will evaluate the biological health of the rivers, and the effects of the major agricultural drains on biota.

Habitat assessment will utilize California Stream Bioassessment Procedures (CSBP) and protocols. Selected physicochemical parameters will be evaluated at least quarterly. A YSI 6600 Multiprobe will be used to measure water temperature, pH, dissolved oxygen (DO) concentration, DO % saturation, turbidity, and specific conductance/salinity. Measurements will be collected at each sampling site at one-meter intervals from the surface to the bottom of the river. Water transparency will be measured using a Secchi disk. Water samples will be collected and analyzed for ammonia-N, nitrate-N, total dissolved solids (TDS), total suspended solids (TSS), phosphates, biochemical oxygen demand (BOD), and other constituents deemed necessary by Regional Board staff.

Benthic macroinvertebrates will be assessed two times per year for the New and Alamo Rivers: late winter/early spring, and late summer when the ecosystem is exposed to the greatest stress. Grab samples will be collected at one randomly-chosen transect from

each sampling location. At each transect, three evenly-spaced grab samples will be collected from the margin to midstream.

Implementation of a biomonitoring and bioassessment program for the Salton Sea Transboundary Watershed will supplement physicochemical data, and provide a comprehensive tool to evaluate the health of the watershed. Biological data from the Salton Sea, New River, and Alamo River then can be used to evaluate TMDLs for these water bodies, and to monitor restoration measures implemented in the future.

4.5 DATA USES

The information collected through SWAMP will support Basin Planning activities and water quality studies conducted in the Region. Unlike TMDLs, which focus on specific contaminants or water quality impairments, SWAMP provides a comprehensive tool to evaluate water quality changes that can be used to support listing and de-listing of impaired surface waters.

5. ACTIVITIES PLANNED FOR FISCAL YEAR 2002-03

5.1 SAMPLING SCHEDULE FY 2002-03

Table 3 shows a list of water bodies and locations to be sampled, their beneficial uses, associated monitoring objectives, and water quality indicators. The list is contingent on funding and sampling costs. Sampling events are scheduled quarterly (Table 3 & 4).

Table 3. Sampling Locations (FY 2002-03)

Stations	Frequency	Beneficial Uses	Monitoring Objectives	Category	Water Quality Indicators
Colorado River @ Nevada State Line	2	MUN, AGR, AQUA, IND, GWR, REC I, REC II, WARM, COLD, WILD, POW, RARE	1, 2, 4, 5, 6, 7, 8, 11, 12, 13, 14, 15, 18, 20, 21, 24	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic/Organic Water & Sediment Chemistry, Nutrients, Bacterial Analysis, Trace Metal Chemistry, Water & Sediment Toxicity
Colorado River @ Imperial Dam	2				
Palo Verde Lagoon	2	REC I, REC II, WARM, WILD, RARE	1, 2, 6, 7, 8, 11, 12, 13, 14, 15, 18, 24	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic/Organic Water & Sediment Chemistry, Bacterial Analysis, Trace Metal Chemistry, Water & Sediment Toxicity
Palo Verde Outfall Drain	2				
Alamo River Outlet	4	REC I, REC II, WARM, WILD POW*, FRSH, RARE	1, 2, 6, 7, 8, 11, 12, 13, 14, 15, 18, 24	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic/Organic Water & Sediment Chemistry, Bacterial Analysis, Trace Metal Chemistry, Water & Sediment Toxicity
Alamo River @ Drop 3	4				
Alamo River @ Drop 6	4				
Alamo R @ Drop 6A	4				
Alamo R @ Drop 8	4				
Alamo R @ Drop 10	4				
Alamo River @ International Boundary	4				
New River Outlet	2	IND*, REC I, REC II, WARM, WILD, FRSH, RARE	1, 2, 6, 7, 8, 11, 12, 13, 14, 15, 18, 22, 23, 24	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic/Organic Water & Sediment Chemistry, Bacterial Analysis, Trace Metal Chemistry, Water & Sediment Toxicity

New River @ Boundary	2				
Salton Sea USGS 2	2	AQUA, IND*, REC I, REC II, WARM, WILD, RARE	1, 2, 6, 7, 8, 11, 12, 13, 14, 15, 18, 22, 23, 24	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic/Organic Water & Sediment Chemistry, Bacterial Analysis, Trace Metal Chemistry, Water & Sediment Toxicity
Salton Sea USGS 7	2				
Salton Sea USGS 9	2				
Salton Sea Drain NW1 (Torres Martinez 1)	2				
Coachella Valley Drain Outlets	2	REC I, REC II, WARM, WILD, FRSH, RARE	1, 2, 6, 7, 8, 11, 12, 13, 14, 15, 18, 24	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic/Organic Water & Sediment Chemistry, Bacterial Analysis, Trace Metal Chemistry, Water & Sediment Toxicity

* Indicates Potential Beneficial Use

5.2 SAMPLE COLLECTION

Field crews will collect sediment and water samples at previously identified sites. Regional Board staff will supply reconnaissance forms to sampling crews. Questions concerning site location shall be resolved in consultation with the Regional Board staff member present in the field or via phone contact.

Sufficient volume of sediment, tissue, or water shall be collected to perform analyses, as well as to archive for future analysis, according to the Sampling and Analyses Schedule for 2002-03 (Table A.1) located in the appendix. Sample collection, processing, and testing will be performed according to the most recent SWAMP QAPP (pending Regional Board review) and Region-specific QAPPs and standard operating procedures (SOPs).

Scarce data dictates that spatial characteristics within sub-watersheds be addressed during each sampling event. For example, sampling locations for a small stream may vary for each sampling event due to flow conditions. Variation in flow conditions will be addressed by measuring or obtaining the flow and concentration within the water body (where applicable), and calculating a mass loading. Real-time flow data is available for the outlets of the New and Alamo Rivers, and points along the Lower Colorado River.

Sampling analyses, and frequency are listed in Table A.1 of the appendix. Costs pertaining to fiscal year 2002-03 are pending contract development and encumbrance.

5.3 LABORATORY ANALYSIS

Chemical, physical, and biological parameters will be measured in the field and from water and sediment samples. Various inorganic (e.g., nitrates, selenium) and organic chemicals (e.g., VOCs, pesticides, solvents) will be evaluated. A YSI probe will be used to measure physical parameters (e.g., flow, depth, DO, turbidity, electrical conductivity). Biological information will be collected by CDFG, and evaluated at their Aquatic Bioassessment Laboratory.

Specific laboratory analyses performed are listed in Table A.1 in the appendix. A local laboratory will perform bacterial analyses due to holding time constraints (six hours). All other laboratory work will be performed through CDFG, USGS or other contracted agency. Analytical detection limits, Quality Assurance/ Quality Control criteria, and related information are included in the QAPP.

5.4 DATA QUALITY EVALUATION AND DATA REPORTING

Quality Assurance (QA) includes activities to ensure that the quality of data collected is sufficient to satisfy monitoring objectives. Quality Control (QC) activities include sample collection and protocol standardization. QA/QC evaluation reports and verification that data met QA criteria set forth in the QAPP will be provided to the Regional Board in hardcopy and electronic format. QA/QC should be included in each data report and the final report, with information describing how the data complied with QA/QC parameters. QA/QC procedures are provided in the State Board Master QAPP developed by CDFG.

Chemical data includes the analytical result, method detection limit, reporting limit, and quality assurance information on surrogate recovery, duplicate relative percent difference (RPD), matrix spike percent recovery and RPD, and blank spike percent recovery and RPD. Deviations from QA goals established in the QAPP will be noted.

5.5 DELIVERABLE PRODUCTS

The following is a list of deliverable products:

- Data reports for each sampling event.
- Field Reports by the contractor to RWQCB
- Task orders as needed.
- Final data report by FY.

All quarterly and FY reports will be provided to the SWRCB, as well as any additional reports produced from results collected by the SWAMP program.

5.6 MILESTONES

Scheduled milestones are listed in Table 4, and based on estimated costs.

Table 4. Scheduled Milestones

Milestone	Scheduled Completion Date
Colorado River & Lakes Sampling Event	9/30/2002
Alamo River Sampling Event	10/07/2002
Colorado River & Lakes Data Report	10/15/2002
New River Sampling Event	10/15/2002
Salton Sea Sampling Event	10/15/2002
Alamo River Data Report	10/30/2002
New River Data Report	11/11/2002
Salton Sea Data Report	11/11/2002
Report for the Fall Season Event	12/15/2002
Alamo River & Sampling Event	01/06/2003
Alamo River & Data Report	01/21/2003
Colorado River & Lakes Sampling Event	03/17/2003
Alamo River Sampling Event	03/24/2003
Colorado River & Lakes Data Report	04/01/2003
New River Sampling Event	04/01/2003
Salton Sea Sampling Event	04/01/2003
Alamo River Data Report	04/14/2003
New River Data Report	04/21/2003
Salton Sea Data Report	04/21/2003
Report for the Spring Season Event	05/15/2003
Alamo River Sampling Event	07/06/2003
Alamo River & Data Report	07/21/2003
Final Report	09/12/2003

5.7 SAMPLE SCHEDULE

Sample analysis from time of receipt of sample to time of submission of analytical data, should be two weeks (14 days).

5.8 BUDGET

The authorized ceiling of expenses is $272,565 for this workplan. Site costs will vary with different contracts.

6. WORKING RELATIONSHIPS

The Regional Board has developed task orders and workplans to contract with the CDFG and USGS. Regional Board staff, are also preparing a request for Proposal and seeking to develop independent contracts. The following tables identify the responsibilities of each organization (Table 5) and the task for developing independent contracts (Table 6). The Regional Board requires any contracted agency to provide a QAPP to ensure that samples are collected and analyzed according to Regional Board and SWRCB standards.

Table 5. Working Relationships

Task	Responsible Organization			
	SWRCB	**RWQCB**	**USGS**	**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 problems, monitoring objective, or clean		•		

Task	Responsible Organization			
	SWRCB	**RWQCB**	**USGS**	**CDFG**
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, make assessments on data quality, adapt study as needed	• (Review Role)	•	•	•
Report data through SWRCB web site	•	• (Coordination Role)	•	•
Prepare written report of data	•	•	•	•

Table 6. The Work Approval Process Between Regional Board and Private Contractors under SWAMP

Task	Responsible Organization			
	SWRCB	**RWQCB**	**Private**	**DAS**
Develop contract(s) with the scope of work and budget	•	•	•	
Review and verification of funding by Program	•			

Task	Responsible Organization			
	SWRCB	**RWQCB**	**Private**	**DAS**
Analyst				
Review of task order(s) by Division of Water Quality (DWQ) SWAMP Staff to ensure that the Contract Scope conforms to the Region's workplan	•			
Sign off by DWQ Manager and Division Manager	•			
Contract Office assigns the contract number; reviews and prepares formal exhibits; and verifies funding, budget & PCA				•
Contractor, reviews, signs, and returns contract documents to Contract Office			•	•
Contract Office sends signed documents to accounting				•
Accounting forwards contract documents to Department of Administrative Services (DAS) Chief for signature				•
DAS forwards documents to Department of General Services (DGS) for review and returns approved contract to Contract Office				•
DAS distributes executed contract documents to Contractor, Regional				•

Task	Responsible Organization			
	SWRCB	**RWQCB**	**Private**	**DAS**
Board, and SWRCB				
Work can be implemented. Agreement with all parties	•	•	•	•

7. APPENDIX -

See attached file

		Col			Alamo R Watershed									Ne		Sal					CV
Analysis Worksheet for RWQCB 7 FY02-03 SWAMP		Colorado River at Nevada State Line	Colorado River at Imperial Dam	Palo Verde Lagoon (LG1)	Palo Verde Outfall Drain (PVOD2)	Alamo River Outlet	Alamo River @ Drop 3	Alamo River @ Drop 6	Alamo R @ Drop 6A	Alamo R @ Drop 8	Alamo R @ Drop 10	Alamo River at International Boundary	New River Outlet	New R @ Boundary	Salton Sea USGS2	Salton Sea USGS7	Salton Sea USGS9	Salton Sea Drain NW1 (Torrez Martinez	Coachella Valley Stormwater Channel Outlet	
ANALYSIS OR SERVICE PERFORMED																					
FIELDWORK																					
ANALYTICAL LABORATORY SERVICES																					
Conventional constituents--water																					
Major anions: nitrate, nitrite, chloride,		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
ortho-phosphate, sulfate																					
TKN		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
Ammonia		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
Total Phosphorous		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
Chlorophyll-a		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
Alkalinity		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
TSS		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
TOC		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
DOC		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
Hardness		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
Other special analyses--water																					
Bacterial analysis		2	2	2	2	2						2	2	2	2	2	2	2	2	2	
Includes *E. Coli*, Total Coliform, Enterococcus, Fecal Coliform																					
Perchlorate		2	2	2	2	2						2	2	2	2	2	2	2	2	2	
Sediment physical characterization																					
Sediment TOC		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
Sediment grain size – full analysis (phl)		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
Organic chemistry																					
Sediment organic chemistry																					
Full scan + PAH (NIST list)		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
Includes pesticides (organochlorides, and most organophosphates--including																					
diazinon and chlorpyrifos), PCB's (arochlors and congeners), & NIST-list PAH's																					
Total petroleum hydrocarbons (TPH)		2	2	2	2	2						2	2	2	2	2	2	2	2	2	
Water organic chemistry																					
Full scan + PAH (NIST list)--see above analytes		2	2	2	2	2						2	2	2	2	2	2	2	2	2	
Total petroleum hydrocarbons (TPH)		2	2	2	2	2						2	2	2	2	2	2	2	2	2	
MTBE + BTEX in water		2	2	2	2	2						2	2	2	2	2	2	2	2	2	
VOC's		2	2	2	2	2						2	2	2	2	2	2	2	2	2	

		Col			Alamo R Watershed									Ne		Sal					CV
Analysis Worksheet for RWQCB 7 FY02-03 SWAMP		Colorado River at Nevada State Line	Colorado River at Imperial Dam	Palo Verde Lagoon (LG1)	Palo Verde Outfall Drain (PVOD2)	Alamo River Outlet	Alamo River @ Drop 3	Alamo River @ Drop 6	Alamo R @ Drop 6A	Alamo R @ Drop 8	Alamo R @ Drop 10	Alamo River at International Boundary	New River Outlet	New R @ Boundary	Salton Sea USGS2	Salton Sea USGS7	Salton Sea USGS9	Salton Sea Drain NW1 (Torrez Martinez	Coachella Valley Stormwater Channel Outlet	
Trace metal chemistry																					
Sediment trace metal chemistry																					
ICPMS suite: metals in sediment		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
Elements included in ICPMS sed metals suite: Al, Cr, Mn, Ni, Cu, Zn, Ag, Cd, Pb, As--10 total																					
Mercury in sediment (not part of ICPMS)		2	2	2	2	2						2	2	2	2	2	2	2	2	2	
Selenium in sediment (not part of ICPMS)		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
Water trace metal chemistry																					
ICPMS suite: dissolved metals in water		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
Elements included in ICPMS water metals suite: Al, Cr, Mn, Ni, Cu, Zn, Ag, Cd, Pb, As, Se--11 total																					
Mercury (dissolved) in water		2	2	2	2	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	
(not part of ICPMS)																					
BIOLOGICAL ASSESSMENT SERVICES																					
Second Phase		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
TOXICITY TESTING SERVICES																					
Water (Freshwater) toxicity testing																					
Ceriodaphnia 7-d surv/repro in freshwater		2	2	2	2	2						2	2	2	2	2	2	2	2	2	
Sediment (freshwater) toxicity testing																					
Hyalella 10-d survival in freshwater sediments		2	2	2	2	2						2	2	2	2	2	2	2	2	2	