SWAMP
Surface Water Ambient Monitoring Program

| Monitoring Plan | 2006-07 |
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# PROJECT PLAN
# FOR THE SURFACE WATER AMBIENT MONITORING PROGRAM IN THE COLORADO RIVER BASIN REGION
# FY 06-07

August 2007

Water Boards

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# FY 06-07

**Prepared by**

**TMDL Section**

**California Regional Water Quality Control Board**
**Colorado River Basin Region**

**Updated August 2007**

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# 1. INTRODUCTION

## 1.1 Background

The Surface Water Ambient Monitoring Program (SWAMP) is a water quality monitoring program implemented by the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs) for the purpose of developing a statewide and regional picture of the status and trends in the quality of California's surface waters. SWAMP is intended to meet four goals:

1. Create an ambient monitoring program that addresses all hydrologic units of the State using consistent and objective monitoring, sampling and analytical methods; consistent data quality assurance protocols; and centralized data management.
2. Document ambient water quality conditions in potentially clean and polluted Areas at site-specific to statewide scales.
3. Identify specific water quality problems preventing the SWRCB, RWQCBs, and the public from realizing the full beneficial uses of water in targeted watersheds.
4. Provide data to evaluate the overall effectiveness of water quality regulatory programs in protecting beneficial uses of waters of the State (SWRCB, 2000).

The SWRCB has used and continues to use 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) issued, 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. SWAMP provides a comprehensive tool to evaluate water quality and changes to it; for establishing a closer link between budgeted water quality program activities and the impact those activities have on protecting and improving water quality.

This work plan details regional SWAMP plans and procedures for FY 06-07. SWAMP monitoring in Region 7 for FY 06-07 continues the monitoring strategy developed in previous years. Water samples will continue to be collected from strategic monitoring locations and subjected to analysis of parameters that are indicators of water quality. Water samples from these same stations have been collected and analyzed since 2002. Work continues on completing overdue annual data assessment reports for SWAMP data collected in 2002, 2003, and 2004. These assessment reports are SWAMP performance targets, and are important tools for evaluating the effectiveness of the program. The budget is based the most current cost estimates from San Jose State

University Foundation who provides the majority of sampling and analytical services for Region 7. The estimates will be updated as this workplan is finalized.

Region 7 SWAMP staff recognize that the Comprehensive Monitoring and Assessment Strategy and Scientific Planning and Review Committee (SPARC) review mean that significant changes have to occur at all levels of SWAMP, so that the program can continue and be successful. SPARC made it clear that the alignment of regional efforts to SWAMP near-term statewide goals is essential for program survival (SCCWRP, 2006). This workplan highlights areas where Region 7 is aligning with statewide assessment strategy goals as recommended by SPARC.

Region 7 Monitoring Objectives
The objectives of Region 7 SWAMP monitoring translate the State's CWA Section 106 workplan objectives into regional objectives. The objectives of monitoring in Region 7 are to answer the following questions:

- What is the overall quality of water in the Lower Colorado River, New River, Alamo River, Whitewater River, and Salton Sea, the region's main surface waters?
- Is water quality in the Lower Colorado River, New River, Alamo River, Whitewater River, and Salton Sea changing over time?
- Are there areas in the Lower Colorado River, New River, Alamo River, Whitewater River, and Salton Sea with known or potential problems that need additional protection? What level of protection is needed?
- How effective are Management Practices currently being implemented in Imperial Valley agricultural fields at reducing silt levels in the New River, Alamo River, and Imperial Valley Drains?
- How effective is the new WWTP in Mexicali, Mexico at reducing bacterial concentrations in the New River?

## 1.2 **PROBLEM STATEMENT**

The overall goal of SWAMP is to develop a statewide and regional picture of the status and trends of the quality of California's surface waters (SWRCB, 2000). Regional Board staff selected 12 strategic monitoring stations. These stations are located along the Lower Colorado River, New River, Alamo River, Whitewater River, and Salton Sea; five surface water bodies of major interest in the Region. These water bodies are the focus of many Total Maximum Daily Load (TMDL) programs for sediments, nutrients, selenium, pesticides, and pathogens. Measures of physical, chemical, and biological parameters (water quality indicators) will be collected.

In addition, ambient monitoring will be used to assess the effectiveness of implemented MPs. Management Practices (MPs) to control silt runoff are currently being applied in Imperial Valley as required by three Silt TMDLs (RWQCB CRBR 2001a, 2002, and 2005). A wastewater treatment plant was recently constructed in Mexicali, B.C. Mexico

to treat water before it is discharged into the New River to comply with a Bacteria Indicators TMDL (RWQCB CRBR, 2001b). Ambient monitoring will be used to measure MP effectiveness in reducing silt and evaluate the effectiveness of the newly constructed WWTP.

## 1.3 Target Audience and Management Decisions

The SPARC members recommended that SWAMP identify key target audiences that reflect the updated program goals. The target audience should include those with regional and statewide responsibilities for the protection of water resources, and expand from existing relationships. The key target audiences for SWAMP data are individuals involved in Basin Planning issues, 303(d)/305(b) Integrated Reporting, TMDL development and implementation activities, NPDES activities, other regulatory or planning programs that focus on preventing pollution in surface waters, and interested members of the public who have concerns about water quality. SWAMP provides data for establishing a closer link between budgeted water quality program activities and the impact those activities have on protecting and improving water quality.

# 2. REGIONAL DESCRIPTION

## 2.1 WATERSHED DESCRIPTIONS

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 bordered 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 regional 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.

Even though most of the land area in the region is desert, this region contains water bodies of statewide, national, and international importance (e.g., Salton Sea and Colorado River) (Figure 1, Appendix B). 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, our ambient surface water-monitoring program is focused there.

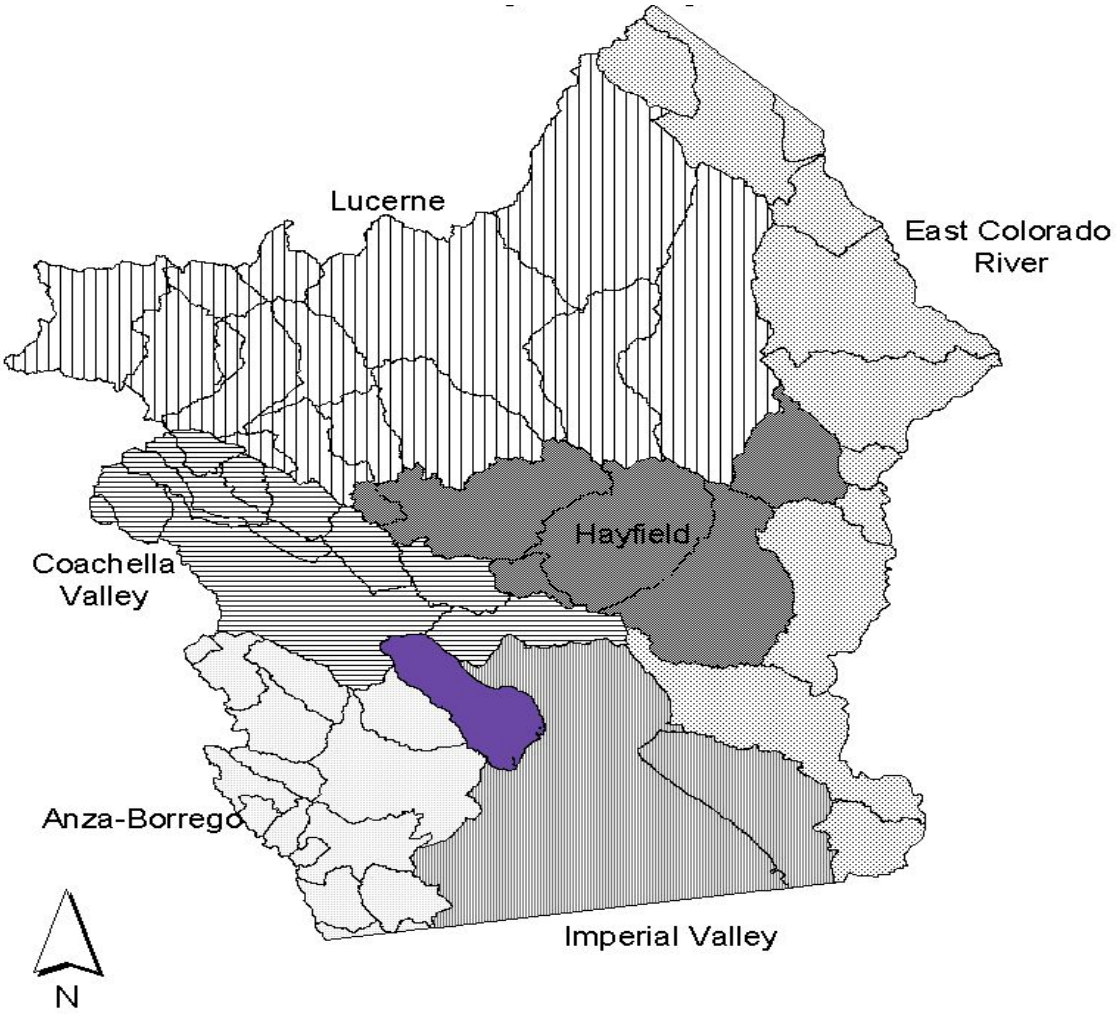


Figure 1. Colorado River Basin Region and the Basin Planning Areas

The Region's watersheds are organized into three larger watershed management areas: The Lower Colorado River, Salton Sea Transboundary, and Desert Aquifers (CRWQCB CRBR, 2004).

Lower Colorado River

The East Colorado River planning area makes up the Lower Colorado River watershed management area (Figure 1). 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 border), to the south by Mexico, and to the west by the drainage division of California streams and washes that are 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. The main source of water in the East Colorado River Valley is the Lower Colorado River. 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.

Salton Sea Transboundary
The Imperial Valley, Coachella Valley, and Anza-Borrego planning areas make up the Salton Sea Transboundary watershed management area (Figure 1). 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 the Salton Sea and the Coachella Valley planning area and its south boundary follows the International Boundary with Mexico. Surface waters in this area mostly drain toward the Salton Sea. The main source of water in the Imperial Valley is the Lower Colorado River, imported via the All American Canal. The imported water is used for irrigation, industrial purposes, and domestic drinking. The Alamo and New Rivers convey agricultural irrigation drainage water from farmlands, surface runoff, and treated municipal and industrial wastewater from the Imperial Valley into the Salton Sea. The flow in the New River also conveys agricultural drainage, treated and untreated wastewater discharges from Mexicali in Baja California, Mexico.

The Coachella Valley planning area lies almost entirely in Riverside County and covers 1,920 square miles in the west-central portion of the Region (Figure 1). The main source of water in the Coachella Valley is the Lower Colorado River, imported via the Coachella Branch of the All American Canal. The imported water is used for some irrigation, industrial, and domestic purposes. 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. The channel ultimately flows into the Salton Sea.

The Anza-Borrego planning area 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 (Figure 1). The main source of surface water in the Anza-Borrego area is from rainfall and snowmelt. 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.

Desert Aquifers
The Lucerne and Hayfield planning areas make up the Desert Aquifers watershed management area (Figure 1). The Desert Aquifers Watershed has little surface water but hundreds of groundwater aquifers. Water quality in this area would probably be better evaluated with a groundwater ambient monitoring program.

## 2.2 Ecological Attributes of Concern

The Salton Sea Transboundary Watershed Management Area is the priority watershed for Region 7 (CRWQCB CRBR, 2004). Water from the Colorado River has created an

irrigated agricultural ecosystem throughout this watershed management area. Humans, wildlife and aquatic species are dependent on and make use of the habitat created and maintained through the discharge of agricultural return flows. These waters provide critical habitat for the endangered desert pupfish and migratory birds.

The Salton Sea located in the Salton Sea Transboundary Watershed Management Area supports a National Wildlife Refuge and is a critical stop on the Pacific Flyway for migratory birds, including some listed endangered and threatened species. Agricultural drain waters from Imperial Valley comprise over 70% of the freshwater flows to the Salton Sea. Because the Sea is enclosed the only way that water is lost is through evaporation. As the water evaporates, salts and nutrients left behind accumulate causing 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.

The designated uses for these waters associated with aquatic life beneficial uses are aquaculture (AQUA), warm freshwater habitat (WARM), cold freshwater habitat (FRSH), wildlife habitat (WILD), preservation of rare, threatened or endangered species and wildlife habitats (RARE) and Water Contact Recreation (REC1), as cited in the Region's Water Quality Control Plan.

# 3. MONITORING DESIGN

## 3.1 Monitoring Goals

The goal of this program is to ensure the public of the physical, chemical and biological integrity of the waters of the state through information generated by the interpretation of water quality data indicative of state and federal standards for the protection of designated beneficial uses. In layman's terms, we will assess the ability of water bodies to support their designated beneficial uses by collecting water samples and analyzing them.

The overall SWAMP plan is to develop assessments that support the decision needs for evaluating all types of water and beneficial uses. The current focus is on developing statewide assessments of the status and trends of aquatic life uses in perennial streams and bioaccumulation to primarily assess human health issues associated with fish tissue contamination in lakes and reservoirs as described in the State's CWA Section 106 workplan. SWAMP will continue to develop objectives that support the decision needs relevant to all types of State waters.

Region 7 is cooperating with the State Board as they move forward with these projects. In accordance with that shift, priority will be given in our region's 06-07 sampling work to the collection of water samples and the analysis of water quality indicators that support the assessments of the status and trends of aquatic life uses. To the extent possible we we will collect water samples and analyze them for water quality indicators that support the assessment of bioaccumulation and the human health impacts associated with fish consumption. We will continue to collect and analyze for water quality indicators that also assess the ability of specific water bodies to support other designated beneficial uses

For aquatic life uses, what we are trying to determine is if aquatic populations, communities, and habitats are protected. The questions we would like to be able to answer are:

- What are the extent and locations of water bodies, which do not meet beneficial uses for aquatic life protection?
- What are the extent and locations of at-risk water bodies?
- What are the extent and locations of high-quality waters and watersheds with high physical, chemical, and biological integrity?
- What is the proportion of water bodies in the State and each region for which evidence exists that they do or do not meet beneficial uses for aquatic life protection?
- Are conditions in water bodies or hydrologic units improving over time?
- What metrics are needed to evaluate trends in biological integrity, physical habitat, and water chemistry?
- What are appropriate time frames for evaluating trends?

- How precise do trend measurements need to be?
- Have water bodies that previously supported aquatic life uses become impaired?
- Have previously impaired water bodies been restored?
- How is the proportion of water bodies meeting aquatic life uses changing over time?

For fishable uses (fish consumption), the questions we want to be able to answer are:

- What are the extent and locations of water bodies with fishing as a beneficial use?
- What are the extent and locations of water bodies with some indications that the fishing beneficial use may not be supported (screening-level evidence of fish contamination)?
- What are the extent and locations of water bodies supporting the fishing beneficial use?
- What is the proportion of water bodies in the State and each region where consumption advice is unnecessary; limited consumption is advised; or no consumption is advised (advisory-level evidence)?
- Are water bodies improving or deteriorating with respect to the fishing beneficial use?
- Have water bodies fully supporting the fishing beneficial use become impaired?
- Has full support of the fishing beneficial use been restored for previously impaired water bodies?
- How is the proportion of water bodies where the fishing beneficial use is unimpaired changing over time (this skirts the detailed question about “fully, partially, or not supporting” the fishing BU and includes screening info)?

Similar assessment questions can be applied to assess the status and trends of waterbodies to support other designated beneficial uses. Adherence to these monitoring goals is dependent on finalized sampling costs and funding.

## 3.2 Monitoring Design

The monitoring design for FY 06-07 continues the same basic design from previous years, and compliments other studies carried out in the region. In the FY 01-02 and 02-03, regional monitoring was designed for two purposes: to obtain representative baseline measurements for surface waters in Region 7, and to develop future program strategies based on data collected. Comprehensive sampling events by Department of Fish and Game (DF&G) field crews were scheduled at eighteen monitoring stations during two hydrological cycles in 2002 and 2003 (spring and fall), to account for seasonal variations in flow. May was selected because of increased use of agricultural chemicals at this time (e.g., pesticides, fertilizers), and high rates of flow due to melting snow and irrigation runoff. October was selected because of relatively lower flow rates due to less irrigation.

In April of 2003, the United States Geological Survey completed a pesticide study that investigated the concentration of twelve current use pesticides, and one legacy

organochlorine compound (*p,p'*-DDE) in the water column and sediments of the New River, Alamo River and Salton Sea Watersheds(LeBlanc, Orlando, and Kuivila, 2004). Pesticides assessment were made at four of SWAMP's strategic monitoring stations.

Bioassessments were completed in the region in May of 2003 by the DF&G's Aquatic Bioassessment Laboratory. These were initial bioassessments of benthic macroinvertebrate communities at newly established monitoring sites on five tributaries to the Salton Sea: Alamo River, New River, Salt Creek, San Felipe Creek, and Whitewater River (Sibbald, 2003). Three different bioassessment protocols were employed, dependant on site conditions (Sibbald, 2003). Bioassessments were completed at three of SWAMP's strategic monitoring stations. This bioassessment work was funded with Regional TMDL contract money. Although not collected through SWAMP, the results of the study could help SWAMP in answering monitoring goal questions.

For the FY 03-04 and 04-05 the monitoring design was modified due to reduced funding. Regional Board staff designated a network of thirteen strategic monitoring stations from the original stations. These monitoring stations were located on the Lower Colorado River, New River, Alamo River, Whitewater River, and Salton Sea (Table 1). Sampling occurred during two hydrologic cycles in 2004 and 2005, and during the spring cycle in May of 2006.

For FY 05-06 we continued to gather as much information from twelve strategic monitoring stations as funding allowed. One of the thirteen strategic monitoring stations was eliminated. Salton Sea Drain Northwest 2 was eliminated because it was thought that we collected similar information at the three remaining Salton Sea monitoring stations. Given FY 05-06 funding level, we sampled once in May 2007. Region 7 SWAMP staff also planned to complete Annual Assessment Reports for FY 00-01, 01-02, and 02-03 SWAMP data. As annual assessments of historical SWAMP data are completed staff will modify the project plan to better meet SWAMP objectives.

We plan to sample in October 2007, May 2008, and October 2008 using FY 06-07 funds. This monitoring scheme continues the monitoring design of collecting water samples at the strategic monitoring station twice per year.

## 3.3 MONITORING STATION SELECTION

Regional SWAMP staff used best professional judgment when selecting the strategic monitoring stations to address management needs. The rationale for selecting the strategic monitoring stations was that they were located on the Region's major surface waters, and many of our cleanup programs are focused there. Table 1 identifies the twelve FY 06-07 SWAMP monitoring stations, their designated beneficial uses, and known or potential water quality problems. The map in Appendix B generally depicts where the strategic monitoring stations are located. Region 7 SWAMP staff are amenable to relocating monitoring stations to support a statewide monitoring design to include a probability-based network for making statistically valid inferences about the condition of all State water types over time.

Table 1. Strategic Monitoring Stations

| Monitoring Station | Beneficial Uses[1] | Known Problems | Potential Problems |
|---|---|---|---|
| Colorado River @ Nevada State Line | MUN, AGR, IND, GWR, REC1, REC2, WARM, COLD, WILD, POW, RARE | Se | Perch |
| Colorado River @ Imperial Dam | Same as Colorado River @ Nevada State Line | Se | O, P, M Perch |
| Palo Verde Lagoon | REC1, REC2, WARM, WILD, RARE | B, P | P, N, M |
| Palo Verde Outfall Drain | Same as Palo Verde Lagoon | B, P | P, N, M |
| Alamo River Outlet | FRSH, REC1, REC2, WARM, WILD, POW, RARE | O, P, N, S | B, M |
| Alamo River @ International Boundary | Same as Alamo River Outlet | O, P, N, S | B, M |
| New River Outlet | FRSH, IND, REC1, REC2, WARM, WILD, RARE | B, O, P, M, N, S, V | |
| New River @ International Boundary | Same as New River Outlet | B, O, P, M, N, S, V | |
| Salton Sea USGS 2 | AQUA, IND, REC1, REC2, WARM, WILD, RARE | N, Se | B, M, O, P |
| Salton Sea USGS 7 | Same as Salton Sea USGS 2 | N, Se | B, M, O, P |
| Salton Sea USGS 9 | Same as Salton Sea USGS 2 | N, Se | B, M, O, P |
| Coachella Valley Storm Water Channel Outlet | FRSH, REC1, REC2, WARM, WILD, RARE | B, P | N |

B = Bacteria, P = Pesticides, O = Organics, M = Metals, N = Nutrients, S = Silt; Se = Selenium, Perch = Perchlorate; T = Trash, V = Voloatile Organic Compounds.[1]Beneficial Use definitions can be found in CRWQCB CRBR, 2003.

## 3.4 MONITORING STATION BACKGROUND

Lower Colorado River Watershed

Four stations were selected in the Lower Colorado River watershed management area. The Colorado River at the Nevada State Line is the first station. It is important to collect samples here because it allows us to know the quality of water in the Colorado River as it enter the State and before its waters get distributed throughout Southern California. The Colorado River at the Imperial Dam station is located in the Imperial Dam area, near the International Boundary with Mexico. The Imperial Dam serves as a diversion structure for water deliveries throughout southeastern California, Arizona and Mexico. This site is important because this is where water is diverted to Imperial, Coachella, and Mexicali valleys for agricultural and municipal use.

Two stations were selected near the city of Palo Verde (Palo Verde Lagoon and Palo Verde Outfall Drain). Palo Verde is a community located about one hundred miles south of the Nevada State line station, six miles west of the Colorado River. Water is diverted from the Colorado River into the Palo Verde area to irrigate agricultural crops. The runoff is then discharged into canals that ultimately discharge back into the Colorado River. The Palo Verde lagoon area is listed on the State's 303(d) list as impaired by pathogens. Palo Verde is about forty miles upstream from Imperial Dam.

Salton Sea Transboundary Watershed

Eight stations were selected in the Salton Sea Transboundary watershed management area. The most significant water quality problems in the Salton Sea Transboundary watershed management area occur in the Salton Sea and its tributaries. Because this area is a closed basin, the only way that water in the Salton Sea is lost is through evaporation. When the water evaporates, salts are left behind, leading to an accumulation of salts. The Salton Sea is around 30% saltier than the Pacific Ocean, with salinity predicted to increase approximately 1% per year. The Sea is also classified as a hyper-eutrophic lake because of high concentrations of nutrients from agricultural runoff. Nonetheless, it supports a National Wildlife Refuge and is a critical stop on the Pacific Flyway for migratory birds, including some listed endangered and threatened species. Three stations were selected inside the Salton Sea itself (Salton Sea USGS 2, Salton Sea USGS 7, Salton Sea and USGS 9).

The Coachella Valley Storm Water Channel Outlet station is located on the Coachella Valley Storm Water Channel, which extends approximately 17 miles from Indio to the Salton Sea. The Channel is a constructed extension of the Whitewater River and serves as a depository and drainage way for irrigation return water, treated wastewater and storm water runoff that ultimately flows into the Salton Sea. The Channel is one of the major tributary waters to the Salton Sea.

The stations, New River at the International Boundary and New River Outlet, were selected because the New River originates in Mexicali Valley, Mexico and drains into the Salton Sea. The New River is one of the major tributary waters to the Salton Sea. As the New River flows, it receives urban and agricultural runoff, untreated and partially treated municipal and industrial waste from Mexicali Valley, Mexico. In the United States, the river receives urban runoff, agricultural runoff, treated industrial waste and treated, disinfected domestic waste from Imperial Valley. It's flow at the International

Boundary fluctuates between166 and 359 cubic feet per second (cfs), and at the outfall to the Salton Sea between 459 and 940 cfs as reported by the United States Geological Survey's National Water Information System.

Two stations were selected along the Alamo River (Alamo River Outlet and Alamo River at the International Boundary). The Alamo River is the main tributary of the Salton Sea. As the River flows from the International Boundary to its outlet at the Salton Sea, it receives treated wastewater and agricultural return flows. The Alamo's flow volume is dominated by agricultural return flows from Imperial Valley. Its flow at the outfall to the Salton Sea ranges from 408 to 994 cfs, as reported by the United States Geological Survey's National Water Information System.

## 3.5 Indicators and Measurement Parameters

Water quality indicators are measured to assess the ability of specific water bodies to support their designated beneficial uses. Water quality indicators can be physical, chemical, or biological parameters. Indicators that can be used in ambient monitoring efforts and meet the requirements of the general criteria are presented in Table 2. These indicators are essentially the same ones suggested by USEPA. Use of these indicators is dependent upon funding, sampling cost, and characteristics of the water body.

Table 2. List of Water Quality Indicators for Assessing Beneficial Uses.

| Beneficial Uses | Category | WQ Indicator |
|---|---|---|
| COLD, RARE, WARM, WILD | Biological response | 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 |
| COLD, RARE, WARM, WILD | 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 |
| COLD, RARE, WARM, WILD | 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 |
| RARE, WILD | Habitat | Water flow, Suspended solids, Channel |

| Beneficial Uses | Category | WQ Indicator |
|---|---|---|
| | | morphology, Water temperature |
| RARE, WILD | Biological response | Fish assemblage and populations, Macroinvertebrate assemblage and populations, Periphyton, Wetland habitat, Riparian habitat |
| REC I | Contaminant exposure | E. coli bacteria, Fecal coliform bacteria, Enterococcus bacteria, Fecal Streptoccocus bacteria |
| REC II | Pollutant exposure | Taste and odor, Debris and trash |
| MUN | Contaminant exposure | Inorganic water Chemistry, Nutrients Organic water Chemistry, E. coli bacteria Cryptosporidium Giardia |
| AGR | Pollutant exposure | Organic and inorganic chemistry |
| IND | Pollutant exposure | Organic and inorganic chemistry, Total organic carbon, Temperature, Electrical conductivity |

Adapted from: Bernstein, 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

## 3.6 Spatial and Temporal Scale

The monitoring program is designed to collect water and sediment quality data to satisfy near term regional needs and long term statewide needs. Data will serve to identify impaired waters, evaluate changes in the water quality over time, and to assess the effectiveness of implemented management practices that can be applied regionally and statewide.

# 4. FY 06-07 SWAMP ACTIVITIES

## 4.1 Sample Collection

DF&G field crews will collect sediment and water samples at the previously identified stations. DF&G field crews adhere to recommended SWAMP sample collection protocols, or approved and documented alternative protocols in order to ensure the collection of representative samples that are free of contamination. Deviations from the standard protocols are documented. Regional Board staff supplied reconnaissance forms of the strategic monitoring station to DF&G staff previously. Questions concerning station location will be resolved by consultation with the Regional Board staff member present in the field or via phone contact.

Table 3 shows the list of requested analysis. Emphasis will be placed on collecting as many water quality indicators as possible that are associated with Aquatic Life uses to align with the State's CWA Section 106 workplan. We will give priority to analysis of indicators that integrate conditions, such as water and sediment toxicity.

Table 3. Requested Water Quality sample for each monitoring station

| Monitoring Station | Indicator Category | Requested Water Quality Analysis |
|---|---|---|
| Colorado River @ Nevada State Line | 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 | | |
| Palo Verde Lagoon | Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat | Inorganic/Organic Water & Sediment Chemistry, Bacterial Analysis, Trace Metal Chemistry, Water & Sediment Toxicity |
| Palo Verde Outfall Drain | | |
| Alamo River Outlet | Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat | Inorganic/Organic Water & Sediment Chemistry, Bacterial Analysis, Trace Metal Chemistry, Water & Sediment Toxicity |
| Alamo River @ International Boundary | | |
| New River Outlet | Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat | Inorganic/Organic Water & Sediment Chemistry, Bacterial Analysis, Trace Metal Chemistry, Water & Sediment Toxicity |
| New River @ International Boundary | | |

| | | |
|---|---|---|
| Salton Sea USGS 2 | Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat | Inorganic/Organic Water & Sediment Chemistry, Bacterial Analysis, Trace Metal Chemistry, Water & Sediment Toxicity |
| Salton Sea USGS 7 | | |
| Salton Sea USGS 9 | | |
| Coachella Valley Storm Water Channel Outlet | Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat | Inorganic/Organic Water & Sediment Chemistry, Bacterial Analysis, Trace Metal Chemistry, Water & Sediment Toxicity |

Sufficient volumes of sediment or water will be collected to perform the requested analyses, and if necessary to archive for future analysis, according to the Sampling and Analyses Schedule for FY 06-07 located in the Appendix (Table A.1). Each sampling protocol specifies the types of containers suitable for the type of sample and specific analytes being collected. Sample collection, processing, and testing will be performed according to the most recent SWAMP Quality Assurance Management Plan (QAMP).

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 possible), 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 from the United State Geologic Survey (USGS).

## 4.2 Laboratory Analysis

Chemical, physical, and biological parameters will be measured in the field and from lab analysis of water and sediment samples. Various inorganic (e.g., nitrates, selenium) and organic chemicals (e.g., VOCs, pesticides) will be evaluated. A YSI probe will be used to measure physical parameters in the field (e.g., DO, turbidity, electrical conductivity and pH).

Specific requested laboratory analyses are listed in Table A.1 in the appendix. Our Regional Board Laboratory will perform bacterial analyses due to the short holding times for bacteria analysis (six hours). All other laboratory work will be performed through DF&G. Analytical detection limits, Quality Assurance/Quality Control criteria, and related information are included in the QAMP.

## 4.3 Quality Assurance

Quality Assurance (QA) defines activities that ensure that the quality of data collected is sufficient to satisfy monitoring objectives. Quality Control (QC) activities include sample collection and protocol standardization. Quality Assurance activities are a top priority of the SWAMP Program. Considerable progress has been made since the formation of the SWAMP QA Team. The SWAMP QA Officer solicits input from the Water Boards and USEPA Region 9.

QA/QC evaluation reports and verification that data met QA criteria set forth in the QAMP 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, and will be consistent with the State Board QAMP developed by DF&G.

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 QAMP will be noted.

## 4.4 Data Management

Because the region's sampling and the majority of analysis are handled through a master contract with DF&G, the data generated from the analysis of water samples will be entered into the SWAMP database by DF&G staff. The DF&G staff will follow data management procedures outlined in the SWAMP QAMP. Once data have entered the SWAMP Database and have undergone the SWAMP procedures for verification and transfer to the permanent side of the database, the data will be displayed on the BDAT/CEDEN enterprise database for the public to access.

Currently, SWAMP has a computerized database that includes appropriate metadata and State/Federal geo-locational standards. SWAMP plans to make the system an accessible electronic data system for submitting and collecting water quality, fish tissue, toxicity, sediment chemistry, habitat, biological data, with timely data entry following appropriate metadata and State/Federal geo-locational standards. This system will be available for the public to access and exchange information.

## 4.5 Data Analysis and Assessment

An assessment will be made as to whether chemical concentrations in the water samples meet or exceed regional, state, and federal limits set to protect designated beneficial uses. Chemical concentrations in water are to be compared with objectives established in the Basin Plan (CRWQCB CRBR 2003), with USEPA criteria, and if applicable, California DF&G 1-hour averages and instantaneous maxima for toxicity to aquatic life criteria. If none of these types of thresholds have been established, data will be compared with other criteria such as California primary and secondary maximum contaminant levels (MCLs), Department of Health Services (DHS) action levels, and California Toxics Rule (CTR)/National Toxics Rule (NTR) criteria. Data will also be compared with USEPA criteria recommendations (USEPA 1986, 2000).

Chemical concentrations in sediment will be compared with consensus-based sediment quality guidelines (SQG) presented in MacDonald et al. (2000). Adverse effects on sediment-dwelling organisms are not expected to occur below a threshold effects concentration (TEC), and adverse effects are expected to occur frequently above a probable effects concentration (PEC) (MacDonald et al. 2000). At concentrations

between a TEC and PEC, it is difficult to predict whether or not the sediments will be toxic to organisms.

# 5. COORDINATION

## 5.1 COORDINATION AND REVIEW STRATEGY

The Regional Board coordinates with the State Board and the Department of Fish and Game to develop SWAMP task orders and workplans. At present, the Regional Board does not have private contracts to accomplish SWAMP goals. The following table describes the tasks associated with implementing SWAMP in the Region, and each organizations responsibilities (Table 4). The Regional Board requires any contracted agency to provide a QAPP to ensure that samples are collected and analyzed according to SWAMP standards.

Table 4. Working Relationships (SWRCB, 2000).

| **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 problems, monitoring objective, or clean conditions | | • | |
| Make decision on adequacy of available information | | • | |
| Prepare site-specific | • | • | • |

| Task | Responsible Organization | | |
|---|---|---|---|
| | SWRCB | RWQCB | CDFG |
| 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) | | • (Bacteria Analysis) | • |
| 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 reports of data | • | • | • |

# 6. REPORTS

## 6.1 Reporting Products

The following is a list of deliverable products:

- Data reports for each sampling event to the DMT for loading onto the SWAMP Database.
- Field or cruise reports by the contractor to RWQCB
- Work orders as needed.
- Annual data assessment reports

## 6.2 Project Schedule

Scheduled milestones are listed in Table 5, and based on estimated costs.

Table 5. Scheduled Milestones

| Milestone | Scheduled Completion Date |
|---|---|
| **Fall Sampling 2007** | |
| Colorado River Sampling Event | 10/22/07 |
| Alamo River Sampling Event | 10/23/07 |
| New River Sampling Event | 10/24/07 |
| Salton Sea Sampling Event | 10/25/07 |
| **Field Reports** | |
| Draft Field Report for the Fall Season Event | 12/15/2007 |
| Final Field Report for the Fall Season Event | 01/30/2008 |
| **Data Reports** | |
| Colorado River Data Report | 07/16/2008 |
| Alamo River Data Report | 07/16/2008 |
| New River Data Report | 07/16/2008 |
| Salton Sea Data Report | 01/16/2008 |
| | |
| **Spring Sampling 2008** | |
| Colorado River Sampling Event | 04/30/2008 |
| Alamo River Sampling Event | 05/01/2008 |
| New River Sampling Event | 05/02/2008 |
| Salton Sea Sampling Event | 05/03/2008 |
| **Field Reports** | |
| Draft Field Report for the Spring Season Event | 05/15/2008 |
| Final Field Report for the Spring Season Event | 06/30/2008 |

| | |
|---|---|
| **Data Reports** | |
| Colorado River Data Report | 03/2009 |
| Alamo River Data Report | 03/2008 |
| New River Data Report | 03/2008 |
| Salton Sea Data Report | 03/2008 |
| | |
| **Fall Sampling 2008** | |
| Colorado River Sampling Event | 10/08 |
| Alamo River Sampling Event | 10/08 |
| New River Sampling Event | 10/08 |
| Salton Sea Sampling Event | 10/08 |
| **Field Reports** | |
| Draft Field Report for the Fall Season Event | 02/2009 |
| Final Field Report for the Fall Season Event | 03/2009 |
| **Data Reports** | |
| Colorado River Data Report | 06/2009 |
| Alamo River Data Report | 06/2009 |
| New River Data Report | 06/2009 |
| Salton Sea Data Report | 06/2009 |
| | |
| | |
| **FY 06-07 Data Assessment Report** | |
| Draft Data Assessment Report | 8/2010 |
| Final Data Assessment Report | 1/2011 |
| | |
| **FY 00-04 Data Assessment Reports** | |
| Select Independent Contractor | completed 2/20/07 |
| Draft Data Assessment Report for FY 00-01 | 10/15/2007 |
| Draft Data Assessment Report for FY 01-02 | 10/15/2007 |
| Draft Data Assessment Report for FY 02-03 | 10/15/2007 |
| Draft Data Assessment Report for FY 03-04 | 10/15/2007 |
| | |
| Peer review | 11/31/2007 |
| | |
| Final Data Assessment Report for FY 00-01 | 1/30/2008 |
| Final Data Assessment Report for FY 01-02 | 1/30/2008 |
| Final Data Assessment Report for FY 02-03 | 1/30/2008 |
| Final Data Assessment Report for FY 03-04 | 1/30/2008 |

## 6.3 ANNUAL ASSESSMENT REPORTS

Staff plan to have an assessment report of Historic SWAMP datasets from FY 00-01, FY 01-02, FY 02-03, and FY 03-04 prepared by the end of this fiscal year. This reports will link budgeted water quality program activities to the impact those activities have on protecting and improving water quality. Region 7 SWAMP staff have selected a suitable

independent contractor, who will evaluate the collected data and produce a high quality Annual Assessment Report that begin to answer these questions.

The State has committed to producing timely and complete water quality reports and lists called for under Sections 305(b) and 303(d) (Integrated Report) of the Clean Water Act and Section 406 of the Beaches Act. Beginning in 2008 the State will submit an Integrated Report. Data collected through SWAMP and annual assessment reports prepared with SWAMP data will assist with the preparation of the States Integrated Report.

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# 8. APPENDICES

Appendix A

**(See Attached Excel Spreadsheet)**

**Appendix B**
**Map of SWAMP Strategic Monitoring Stations (not to scale)**