



# Appendix E

## Regional Fact Sheets



## North Coast Regional Water Board

During the first five years of the Surface Water Ambient Monitoring Program (SWAMP), the North Coast Regional Water Board focused on funding monitoring in each of our 6 watershed management areas. We established 80 rotating stations and 29 long-term trend monitoring stations on 49 rivers and streams throughout the North Coast Region. Due to funding constraints, we have spent most of our funding allocation on monitoring wadeable streams and large rivers, relying upon water column chemistry to assess whether the aquatic life beneficial use is supported. An [interpretive report](#) on this data is available through the State Water Board website.

Our Regional SWAMP efforts were initially coordinated to provide information to the North Coast Watershed Assessment Program and the Total Maximum Daily Load program as well as to provide information to managers and decision makers where limited or no data was previously available. These efforts provide almost all of the Regional ambient monitoring data that we use to assess the general health and condition of our waters. SWAMP data have proven to be especially valuable for assessing the many unpopulated areas of the Region where other entities are not actively monitoring. We also are using these data to prepare the 303(d) and 305(b) Integrated Water Quality Assessment Report. Over 60% of the “Lines of Evidence” used to evaluate the North Coast waterbodies for the Integrated Water Quality Assessment Report were based on Regional SWAMP data.

In addition, the North Coast Regional Water Board utilized SWAMP funding to investigate MTBE concentrations in two North Coast lakes and to conduct a screening study of estrogenic endocrine disrupting



chemicals in two major rivers in the North Coast in conjunction with the Central Valley Water Regional Board.

Currently we are involved with the development of the Klamath River Water Quality Monitoring Group, a regional monitoring program comprised of members from Federal, State, County, Tribal agencies, and local non-governmental organizations. We also provide training, staff time, and equipment to local and Tribal entities throughout the Region to increase their involvement in data collection, analysis, and assessment.

The North Coast Regional Water Board is re-evaluating the direction of our Regional SWAMP efforts for fiscal year 2010-2011. We are evaluating all of the data collected to date by SWAMP and other entities to determine where additional information is needed and where additional investigations are warranted.



## San Francisco Bay Regional Water Board

During the first five years of SWAMP, the San Francisco Bay Regional Water Board's program focused on monitoring watersheds throughout the region on a rotating basis and conducting studies to measure the concentrations of contaminants in fish caught and consumed by fishers in places other than San Francisco Bay. Since the San Francisco Estuary Regional Monitoring Program (RMP) conducts monitoring in San Francisco Bay, we decided to concentrate our limited resources primarily on evaluating whether the beneficial use of aquatic life was protected in wadeable streams and whether it was safe to consume fish from water bodies other than San Francisco Bay. A description of the San Francisco Bay Region, as well as our regional SWAMP activity, monitoring goals and vision, and collaborative efforts are available in our [regional fact sheet](#).

To assess whether aquatic life was protected in wadeable streams, we used a suite of indicators including bioassessments, physical habitat assessments, continuous basic water quality monitoring, water column chemistry and toxicity, and sediment chemistry and toxicity. In five years of monitoring we assessed whether aquatic life was protected in 34 wadeable streams. Three [interpretive reports](#) on the water quality condition of these streams can be found on the Regional Water Board SWAMP website. We also developed a trash assessment method, used this method to assess trash at 26 sites, in 14 water bodies, and documented this information in a [technical report](#).

To assess whether it is safe to eat the fish, we conducted studies measuring contaminants in fish in Tomales Bay, along the San Mateo coast and in 10 lakes in the Region. A [report](#) interpreting the data

is available online. To better inform the public of potential risks associated with eating fish from these reservoirs, we formed a committee consisting of the Office of Environmental Health Hazard Assessment (OEHHA), the California Department of Public Health, county environmental health departments, East Bay Regional Parks and other responsible parties to develop advisories for consuming fish, translating advisories in to several languages, and developing signs and other materials for education and outreach. In subsequent years, we collected additional data so that OEHHA could refine fish advisories for the lakes we sampled. All of the creek and fish data collected over this 5-year period was used in the 2006 and 2008 water quality assessment process and resulted in a total of 30 water bodies being listed as impaired.

In 2008 we modified our SWAMP creek strategy based on needs identified during previous monitoring. Our current strategy is to monitor water quality conditions and biotic assemblages, and the spatial and temporal variability of those conditions, at minimally disturbed reference sites and at urban sites that represent “best attainable” conditions. Our [peer reviewed design](#) is available online. The purpose of this monitoring is to: 1) provide context for creek monitoring that will be conducted by the Regional Monitoring Coalition, made up of storm water programs and the regional SWAMP; 2) collect data that can be used for developing bioassessment protocols, indices of biological integrity, biological objectives and nutrient criteria; and 3) identify long-term trends associated with climate change.

In 2010 we started a study to measure nutrients, chlorophyll a and the phytoplankton community in Suisun Bay in the spring/summer. Results of previous research has indicated that elevated levels of ammonium may be inhibiting diatom production and preventing the development of phytoplankton blooms that feed the food chain in the San Francisco Estuary. Results from our 2010 study showed relationships that were consistent with this hypothesis. In 2011-2012 we plan to conduct a more intensive study to measure these parameters, as well as primary production and nutrient uptake, at 4 different depths in Suisun Bay.

In addition to the studies conducted by the regional program, the San Francisco Bay Regional Water Board SWAMP spends significant staff resources coordinating monitoring in the region.



This provides an opportunity to leverage SWAMP funding and to form coalitions that can provide consistent water quality information targeted at answering specific water quality management questions, while maximizing efficient use of resources. SWAMP staff has been working with a coalition of programs that collect bioassessment data, the Bay Area Macroinvertebrate Bioassessment Information Network (BAMBI.net), to further develop information on water quality in wadable streams. BAMBI.net meets to: 1) discuss and standardize bioassessment data, 2) input all regional bioassessment data in to one database, and 3) analyze regional data for the purpose of developing a Bay area Index of Biotic Integrity (IBI). Regional SWAMP staff is also working with storm water programs, as an outgrowth of the regional MS4 permit, to develop a watershed monitoring coalition (Regional Monitoring Coalition) so that watershed monitoring will be coordinated throughout the region and with SWAMP statewide.

To develop information on water quality in the San Francisco Estuary, SWAMP staff has been integral to the establishment and development of the San Francisco Estuary [Regional Monitoring Program](#) (RMP). The RMP is a world-class water quality monitoring program targeted at the highest priority questions faced by the San Francisco Bay Water Board and the regulated community. Currently, the RMP is working collaboratively with SWAMP to monitor contaminants in fish in bays and estuaries of the state. Regional SWAMP staff also plays an advisory role in TMDL monitoring, NPDES mandated monitoring and volunteer monitoring in order to provide consistency, enhance coordination and foster a comprehensive approach to water quality monitoring in the region.





## Central Coast Regional Water Board

### Watershed Monitoring

The Central Coast Ambient Monitoring Program (CCAMP) has been monitoring the Central Coast Region's five watershed areas on a rotational basis for over ten years, beginning in 1998. The CCAMP program design is focused on supporting regulatory decision-making with water-body scaled status assessments, and detecting change at both a watershed and sub-watershed scale. Our study design emphasizes relatively high data density with repeated visits to a network of fixed monitoring locations. Sites are typically placed at the lower ends of major tributaries and along the main stem, so that we can readily identify which tributaries are of greatest concern for regulatory attention.

Each of five Central Coast watershed areas are sampled on a five-year rotation. Conventional chemistry and flow are monitored monthly at approximately 30 watershed sites during each rotation year. In addition, 33 coastal stream confluences are monitored monthly on a continuous basis for the detection of trends. A subset of sites are sampled and on a less frequent basis for water and sediment toxicity, invertebrate bioassessment, and occasionally, bioaccumulation.

### Special Studies

In addition to the CCAMP's basic watershed sampling mandate, the CCAMP participates in a variety of other Regional monitoring projects. The CCAMP conducted an assessment study of Central Coast harbors in collaboration with a U.S. EPA assessment of the Morro Bay National Estuary. In this study, harbors were evaluated

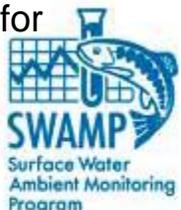
using a probabilistic approach for sediment chemistry, sediment toxicity, benthic invertebrate assemblages, water column chemistry and fish and mussel tissue chemistry. A report of this study is available at: <http://www.ccamp.org/ccamp/Reports.html>. The Central Coast Regional Board is planning follow-up studies with the Office of Environmental Health Hazard Assessment (OEHHA), of several lakes that were identified by the State-wide SWAMP Bioaccumulation Program, as having elevated levels of chemicals in fish tissue. The Central Coast Regional Board also participated in research

## Data Use

Data from the basic monitoring program is used for many purposes, including development of assessment reports, comprehensive 303(d) listing and 305(b) assessment, enforcement actions, NPDES permit requirements, watershed planning, grants prioritization, evaluation of Basin Plan objectives, and other Water Board staff activities. It is also heavily used by the public, consultants, and other agencies through our web site ([www.ccamp.org](http://www.ccamp.org)). CCAMP Hydrologic Unit assessment reports and other related publications are available on the website at: <http://www.ccamp.org/ccamp/Reports.html>. Planned assessment reports include an overview of agricultural impacts in our region, and a general regional status report.

## Data Management and Tool Development

CCAMP has invested significant staff time in development of data management and assessment tools. The website ([www.ccamp.org](http://www.ccamp.org)) makes data available online through Google maps, and in chart and tabular form. We process all of our data electronically using a data checking and uploading tool that prepares it for delivery to SWAMP. This tool is also used by the Central Coast Cooperative Monitoring Program for Agriculture and by regional grants programs to deliver data to us in a format that we can move to our website and to SWAMP. This upload tool has been deployed for use by volunteer data gatherers and is now being adapted for CalFED and other grant data delivery through a grant with DFA. Other CCAMP software scans data for water quality exceedances and creates “Lines of Evidence” for submittal into the State’s Water Quality Assessment Database to support the “Integrated Report” for 305(b) assessment and 303(d) listing/delisting. This software is also being adapted for use at a statewide level for the 2012 listing process.



## Leveraging

CCAMP leverages our program through coordinated monitoring design. For example, an additional network of 50 long-term trend sites are monitored through the Cooperative Monitoring Program for Agriculture, the agricultural industry's monitoring program to comply with regulatory discharge requirements. This adds to our ability to detect change and to understand agricultural impacts in our Region. Our single Phase 1 storm water permit has a similarly structured monitoring program. Major Monterey Bay area dischargers have coordinated with CCAMP in implementing the Central Coast Long-Term Environmental Assessment Network (CCLEAN). We also coordinate with the Monterey Bay National Marine Sanctuary program to bring data from other monitoring sources, including volunteer groups, local agencies, and universities, into a comparable format that can then be moved into the California Environmental Data Exchange Network, into the Integrated Report scanning tool, and eventually onto our website.

# SWAMP Monitoring Strategy



## Los Angeles Regional Water Board

During the first five years of the Surface Water Ambient Monitoring Program (SWAMP), the Los Angeles Regional Water Board focused on funding monitoring in each of our 10 watersheds on a rotating basis. Due to funding constraints, we spent most of our resources on monitoring wadeable streams, relying on a triad of indicators to assess whether the aquatic life beneficial use is being supported (benthic macroinvertebrate community, water column toxicity, water column chemistry). We assessed 6 of the 10 watersheds: Calleguas Creek, Santa Clara River, Santa Monica Bay, Los Angeles River, San Gabriel River, Dominguez Channel. We also monitored a few estuaries (Calleguas Creek, Santa Clara River, Los Angeles River, San Gabriel River), harbors (Los Angeles/Long Beach Harbor, Port Hueneme), and marinas (Ventura Marina, Channel Islands Harbor) and lagoons to assess protection of aquatic life. We were only able to monitor one lake to assess protection of aquatic life (Lake Machado).

Following SWAMP's scientific review, we shifted our strategy to augment statewide SWAMP programs. In 2007, we sampled 32 lakes and reservoirs in the Los Angeles Region in conjunction with the statewide study of contamination in fish from lakes to assess whether it is safe to consume sportfish from these waterbodies. In 2008, we sampled 6 watersheds with the triad of indicators mentioned above in conjunction with the SWAMP Perennial Stream Assessment (PSA) initiated in 2008 and to begin early implementation of the PSA-based design adopted by the Southern California Stormwater Monitoring Coalition (due to begin in 2009). In 2008, we also contributed to the Bight'08 regional monitoring

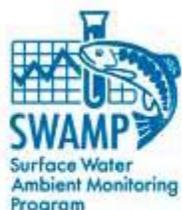


program to survey coastal waters in the Southern California Bight. In 2009, we are sampling in two watersheds (Santa Monica Bay, Santa Clara River) to help implement the Southern California Stormwater Monitoring Coalition watershed monitoring program and we expect to continue this support in 2010 and subsequent years.

In 2009, we contributed funding to augment the SWAMP's study of contamination in sportfish in coastal waters, bays and estuaries to assess whether it is safe to consume sportfish from these waterbodies. We also set aside funds to conduct follow-up work on lakes with high fish tissue contamination levels to provide sufficient data for the Office of Environmental Health Hazard Assessment (OEHHA) to evaluate the need for fish consumption advisories. This monitoring probably will begin in 2010.

In addition to routine SWAMP matters, staff time has been spent on planning activities associated with the periodic regional Bight surveys of coastal waters, bays and estuaries (1998, 2003, 2008) and coordinating development and implementation of watershed-wide monitoring programs (Calleguas Creek, San Gabriel River, Los Angeles River) that integrate NPDES-mandated monitoring, TMDL monitoring, SWAMP monitoring, volunteer monitoring and other efforts into more useful comprehensive monitoring programs with defined objectives.

The Los Angeles Regional Water Board produced reports on SWAMP monitoring for the Santa Clara and Calleguas Creek Watersheds, the Santa Monica Bay Watershed Management Area, the Dominguez Channel/Los Angeles-Long Beach Harbor Watersheds, and the San Gabriel River Watershed. These [reports](#) are available online. A [fact sheet](#) providing an overview of the Los Angeles Region also is available online.



## Central Valley Regional Water Board

The Central Valley Regional Water Quality Control Board has four overarching goals for its SWAMP efforts:

- Evaluate ambient water quality, beneficial use protection and potential sources of impairment.
- Evaluate effectiveness of the Water Board water quality improvement policies.
- Coordinate internal and external monitoring efforts to leverage limited resources.
- Ensure timely availability of monitoring results.

During the first five years of SWAMP, the Central Valley Regional Water Board coordinated with and built off of existing frameworks within each individual basin (San Joaquin River, Upper and Lower Sacramento River, and Tulare Lake) in order to leverage limited resources. Separate approaches were developed based on each basin's unique characteristics, existing monitoring programs, and water quality issues. SWAMP resources were also used to purchase equipment and developed standard operating procedures to perform in-house water sample analyses for total coliform and *E. coli* bacteria.

Following the statewide SWAMP scientific review in 2005, Central Valley Water Board staff re-evaluated the program. The revised focus aims to better coordinate internal monitoring efforts and data assessments (including supporting the region's 303d/305b Integrated Report development), ensure regional efforts are aligned with the statewide strategy and assessment framework, and facilitate a region-wide program.

To meet these objectives staff initiated [region-wide trend monitoring](#) that builds off of 30 Central Valley integrator sites identified by the statewide Stream Pollution Trends monitoring. The region-wide effort will allow seasonal evaluation at key sites, more detailed evaluation of the Sacramento, San Joaquin and Tulare Lake Basins on a rotating basis, and a consistent framework for coordination efforts. Key findings from earlier monitoring have been used to inform the current monitoring designs.

Coordination is still a primary goal of the Central Valley Water Board's SWAMP and includes but is not limited to:

- Staff support to coordinate the development of the [Sacramento-San Joaquin Delta Regional Monitoring Program](#), as well as funding for Delta monitoring and tool development studies.
- Continued monitoring and data management support for the multi-agency [Grassland Bypass Project](#).
- [Coordinated trend monitoring](#) with the Department of Water Resources in the upper Sacramento River Basin—focused on measuring ambient water quality at lower watershed integrator sites and coordinated with the statewide SWAMP Stream Pollution Trends.
- [Safe to swim](#) studies that monitor and assess bacteria concentrations at popular swimming holes throughout the Central Valley in coordination with local watershed groups—follow-up studies attempt to identify sources and specific pathogens at sites with elevated bacteria levels.
- Data management support for the [Irrigated Lands Regulatory Program](#) to streamline data transfers to CEDEN and improve data quality.
- Development of the web-based [Central Valley Monitoring Directory](#) to improve internal and external coordination.

The Central Valley SWAMP has created a five year plan that identifies and prioritizes projects for funding for fiscal years 10/11 through 14/15. This plan simplifies budgeting and aids transparency of how resources are allocated. The five year plan and detailed information on the Central Valley Water Board SWAMP, including links to over 40 water quality assessment reports, water quality data for the San Joaquin River Basin, and historic and current program information, is available on the [Central Valley Water Board SWAMP website](#).



## Lahontan Regional Water Board

The [Lahontan Region](#) is unique in that its Water Quality Control Plan (“Basin Plan”) contains numerous site-specific numeric water quality objectives, most of which were adopted in the early 1970s but (prior to SWAMP) never monitored. The Region also is unique in that it has many interstate waters (which flow into the State of Nevada). The primary objectives of SWAMP monitoring at the Lahontan Region are to:

1. Determine whether ambient water quality at selected sites is in compliance with the chemical and physical water quality objectives contained in the Water Quality Control Plan for the Lahontan Region ([Basin Plan](#)) and the “[California Toxics Rule](#)”.
2. Determine (to the extent to which funding is available) whether water flowing from the Lahontan Region into the State of Nevada meets [Nevada’s water quality objectives](#).
3. Develop and implement tools to assess the biological integrity of the Region’s streams and rivers based on instream macroinvertebrate and algae assemblages (i.e., “[bioassessment](#)”).

The available funding has allowed for chemical monitoring at about 30 sites throughout the Region on a quarterly basis. All [data](#) and a [summary report](#) on the first five years of work (i.e., years 2000-05) are available at the Region’s [SWAMP webpage](#).

In addition to ongoing, routine monitoring at the selected sites, the Region’s SWAMP staff spends considerable time on other related tasks, such as: (1) designing and maintaining a [user-friendly website](#)

to make monitoring data and assessment reports accessible to the public; (2) coordinating water and fish monitoring projects with other public agencies and NGOs; (3) testing for contaminants in fish tissue where screening studies indicate potential exceedances of human health thresholds; (4) coordinating bioassessment methods and approaches throughout the State; and (5) other [special projects](#), such as monitoring the success of restoration efforts, developing biological objectives for use in assessing stream health, and assisting Water Board staff and others in using bioassessment techniques.

Due to funding limitations, the quality of many surface waters in the Lahontan Region remains unassessed. As funding allows, the Region would like to conduct additional targeted and probabilistic assessments of the regions 700+ lakes, 3,000+ miles of streams, and numerous wetlands.



## Colorado River Basin Regional Water Board

### Colorado River Basin – 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 Colorado River Basin Region is located in the most arid area of California. 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. Hence, the ambient surface water-monitoring program focuses on the water bodies in the Imperial Valley and the Lower Colorado River planning areas.

The Salton Sea Trans-boundary Watershed contains 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 species. The designated beneficial uses of the waters in the watershed include agricultural supply, aquaculture, cold freshwater habitat, groundwater recharge, hydroelectric power generation, industrial, municipal and domestic, rare and endangered species, warm freshwater habitat, water contact recreation, and non-contact recreation, and wildlife habitat.

The water quality objectives for the region are specified in the Water Quality Control Plan.

## **Goals and Objectives**

**Goal.** The goal of Region 7's SWAMP program is to monitor the surface water bodies within the Region's watersheds in order to evaluate if beneficial uses are being protected and to establish a baseline for water quality trend monitoring.

### **Objectives:**

1. to identify impaired water bodies as required by Section 303 (d) of the Federal Clean Water Act
2. to collect additional information at sites that are known to or suspected of having water quality problems.
3. to evaluate the effectiveness of specific management practices (MP) employed to improve water quality of impaired water bodies
4. to coordinate and share information with other monitoring efforts at the region.

## **Methods of Achieving Objectives**

The Regional Board selected 13 strategic sampling locations to assess water quality. The strategic sites are 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 on priority TMDLs for sediments, nutrients, selenium, pesticides, and pathogens. Physical, chemical, and biological parameters are used as water quality indicators. Monitoring data collected include conventional water quality parameters, organic chemistry, trace metals, bacteria indicators and aquatic toxicity at the water column. The monitoring data collected for sediments include organic chemistry, trace metals and sediment toxicity. The monitoring events are, most of the time, conducted biannually. Information gathered through the SWAMP Program is used to support Basin Planning activities and objectives, and will complement other past and present studies conducted at the Region. SWAMP will provide a comprehensive view of changes that occur with MP implementation and will help with TMDL development.



## Santa Ana Regional Water Board

Since the inception of the Surface Water Ambient Monitoring Program (SWAMP) in 2000, the Santa Ana Regional Water Board focused resources to obtain data in waterbodies that lacked the necessary data to determine compliance with water quality objectives. These waterbodies included Anaheim Bay, Huntington Harbor, Lake Elsinore, and Canyon Lake. In each of these waterbodies, we learned about their seasonal differences in biology, and toxicity and used the data to refine their status on the Clean Water Act's Section 303(d) list of impaired waterbodies.

Our current strategy is to evaluate streams in the region against the Southern California Index of Biological Integrity. For those streams that score "poor", prioritized actions such as additional monitoring may be done. To this end, we conduct bioassessment monitoring of our rivers and streams in the region using a probabilistic design. This monitoring is scheduled to be completed in 2011. We plan to use the findings from this study to identify the areas of concern in our region, which will aid in developing waste discharge requirements, specifying conditions for water quality certifications, updating the Integrated Report and in commenting on environmental documents.

We also plan to continually reach out to citizen groups, and non government entities that monitor waterbodies in our region to educate them about quality assurance, sampling and data management protocols, and where possible to establish partnerships that will allow our monitoring funding to extend to its fullest potential. For example, we are coordinating with and contributing funds to the multi-regional

bioassessment monitoring being headed by the Southern California Coastal Water Research Project for the stormwater management agency coalition in Southern California. The coalition is a partnership of the Southern California stormwater agencies that, together with the Southern California Regional Boards, have embarked on a multi-regional monitoring study that aims to answer watershed related questions in Southern California's 15 watersheds. We plan on using this data to determine the water quality condition of streams in our four major watersheds, the major stressors to aquatic life, and pollutant trends. Further, we are in the nascent stages of developing and coordinating the regional monitoring program for the Upper and Middle Santa Ana River Watershed with our point source dischargers. The data generated will answer status and trends questions and will be assessed during the update of our Integrated Water Quality Assessment Report and, if applicable, to update the Clean Water Act Section 303(d) List of our region's impaired waters. The goal is to have improved monitoring coordination ensuring that management and protection of the Upper and Middle Santa Ana River watersheds is conducted appropriately.





## San Diego Regional Water Board

The San Diego Region's SWAMP is designed to support and expand water quality assessments in the regions' waterbodies. The first several years of SWAMP monitoring in the San Diego region focused on perennial streams on a rotational basis. In 2007 and 2008, the program focused its efforts on bioassessment on high-quality and impaired sites in perennial streams. Since 2009, the San Diego Region's SWAMP supports several programs: (1) Probability-based surveys, (2) Improved monitoring coordination of watersheds and waterbodies, (3) An information management system, and (4) Special studies. It also will continue and increase leveraging with other San Diego Water Board programs, several dischargers, universities, and non-profit organizations in the San Diego region. In addition, the San Diego Region's SWAMP will focus some efforts to develop assessments in the form of watershed report cards.

Rotational Watershed Monitoring: From 2000-2005, the San Diego Regional Board has been monitoring the Region's 11 hydrologic units on a rotational basis. Water chemistry, water and sediment toxicity, benthic macroinvertebrate community, physical habitat, and on occasion tissue contamination, were assessed in perennial streams at multiple targeted sites twice during dry and wet season. Data from the rotational watershed monitoring were analyzed and watershed reports were produced for each hydrologic unit by the Southern California Coastal Water Research Project. In addition, a synthesis report was produced for an assessment of all 11 hydrologic units and for an evaluation of the current SWAMP program of the San Diego region. The synthesis report gives four main recommendations: (1) Use appropriate indicators;

(2) Design a probability based study to address the ecological health of wadeable streams; (3) Improve integrative and coordinated regional monitoring to increase cost-efficiency, and (4) Build an information management system. All four recommendations are addressed in the SWAMP monitoring design since 2007.

Appropriate Indicators: In 2007 and 2008, the San Diego regions' SWAMP program focused its efforts on bioassessment (both with benthic macroinvertebrates and algae) in perennial streams. The study included sampling on Reference sites to protect high quality sites, and produce information on the development of bio-objectives. Sampling for Reference sites will continue in 2011. In 2008, targeted impaired sites within all 11 hydrologic units were sampled to compare past data with current conditions, and to include algae as additional indicators. The report on those data is currently under development.

Probability Survey for Perennial Streams: Since 2009, the SWAMP program of the San Diego region participates in the SMC study (a probability-based study in Southern California through the Stormwater Monitoring Coalition (SMC) by devoting regional SWAMP allocations towards the study to support eleven monitoring sites in perennial streams. For five years, SWAMP regional allocations will support the SMC study.

Improved Coordination in Watershed and Waterbodies: In 2010 and 2011, the San Diego Region's SWAMP funding supports the coordination of monitoring in the San Diego River watershed to develop a cost-effective and coordinated monitoring and assessment program. In 2011 and 2012, SWAMP allocations in the San Diego region will be used to develop a cost-effective and coordinated monitoring program for coastal wetlands.

Information Management System: Data from San Diego Region's SWAMP are disseminated to the public by a Regional Data Portal. The data portal was developed by funds from the Cleanup and Abatement Account. Monitoring data from dischargers, non-profit organizations, and other

agencies in the San Diego region are included into the data portal. The San Diego Region's SWAMP website will link to the Regional Data Portal.



Special Studies: Currently, the San Diego Region's SWAMP is focusing on Contaminants of Emerging Concern (CECs) for its special studies. In 2010, the San Diego Region's SWAMP started a study on the occurrence and extent of pharmaceuticals and personal care products (PPCPs) in areas with discharge of treated wastewater, with septic tanks, with untreated human waste water, and at Reference sites. In 2012, the occurrence of cyanobacteria and microcystin will be studied in different waterbodies in the San Diego region.

Monitoring of Freshwater Wetlands, and Non-Perennial Streams: From 2011-2013, the San Diego Region's SWAMP is funding a freshwater wetlands monitoring program. This probability-based monitoring program will focus on depressional wetlands in the San Diego region. Starting 2013, the San Diego Region's SWAMP will focus future funding on non-perennial streams in the region.

Collaborations: The Region 9 SWAMP program has leveraged the program considerably with collaboration efforts. The San Diego Region's SWAMP collaborated in a post-fire study in the San Diego region with the CA Department of Fish and Game and Chico State University, and in a coastal wetlands eutrophication study with the Bight '08 program and the Southern California Coastal Water Research Project. Additionally, the San Diego Region's SWAMP collaborates with several dischargers in the San Diego Region (municipal stormwater and agricultural dischargers), San Diego State University, and two non-profit organizations (San Diego Stream Team, and the San Diego Coastkeeper).

