

Findings to date have included weighted evidence indicating sediment toxicity associated with pyrethroids in a number of agricultural drains, sporadic acute and chronic water column toxicity associated with organics and nutrients in the lower watershed areas, and sporadic exceedances of the single sample E. coli bacteria goal for recreational swimming (235 MPN) both in upper watershed area streams and the San Joaquin River itself.

In-House Bacteria Analyses Allow Broader Assessment of Potential Recreational Use Impacts

Early in Central Valley Region SWAMP development, staff noted that very limited water quality information was available for pathogen indicators. They therefore purchased an IDEXX Colilert system to allow timely in-house water sample analyses of total coliform and E. coli bacteria. Analytical accuracy of the in-house process was verified through studies with both commercial and UCD laboratories. Currently, over 1,400 ambient water samples are processed in house annually at a net savings of \$55,000 per year, providing quality information indicating relatively low bacteria concentrations overall with limited areas of potential concern requiring further evaluation.

Collaborative Efforts

Coordination of monitoring efforts between SJR SWAMP, state and federal agencies, agricultural coalitions and other local stakeholders has allowed the continuation of a multi-agency Grassland Bypass Program which reduces loads of selenium, salt and boron into wetland channels and the main stem of the SJR. The coordination also has allowed SWAMP to develop more complete annual monitoring efforts in the watershed's sub-basins. In the case of the Westside sub-basin, timing of sampling was offset at sites monitored by multiple agencies to allow information gathering twice a month rather than once. Resources saved allowed expanded monitoring in the upper watershed, funding for toxicity identification evaluations on sediment samples collected by the agricultural coalition and coordinated special bioassessment and sediment studies with the Department of Pesticide Regulation. All information will be accessible on the SWAMP master database.

Many of SWAMP's resources have been devoted to developing a comprehensive monitoring program that works with local stakeholders, grant projects and university and governmental programs in site selection, sample coordination, data sharing

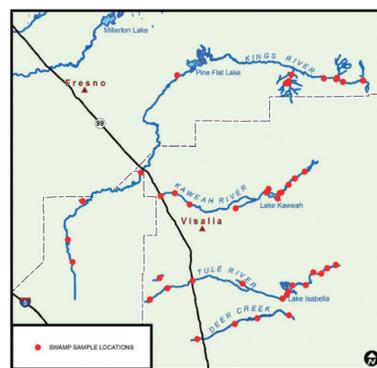
and project evaluation. Some of the agencies with which SJR SWAMP collaborates include Department of Pesticide Regulation on the Surface Water Protection Program; CALFED on the Drinking Water Quality Program/ Interagency Ecological Program; U.S. Fish and Wildlife Service and the University of California on a nutrient survey; and U.S. Geological Survey on the Cycle II National Ambient Water Quality Monitoring Program.

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Tulare Lake Basin

The Tulare Lake Basin (Basin) comprises the drainage area of the San Joaquin Valley south of the San Joaquin River and encompasses approximately 10.5 million acres including the historic lakebed. Essentially, it is a closed basin since surface water drains north to the San Joaquin River only in years with rainfall well above average. Approximately 3.5 million acres of the upper Basin are federally owned and consist in part of Kings Canyon and Sequoia national parks and substantial portions of Sierra, Sequoia, Inyo and Los Padres national forests. The dominant land use in the Basin's valley floor is agriculture, with approximately 4.5 million acres under irrigation.



Fact Sheet Region 5

The Basin is divided into six watershed management areas: Kern County, Tulare Lake, Tule Management Area, Kaweah, Kings Management Area and Westside Management Area.

Program Activity

Historically, the emphasis on water quality studies has been on groundwater, with SWAMP being one of the first major efforts to evaluate surface water. To date, SWAMP's intent has been to collect baseline data from the Kern, Tule, Kaweah, South Fork Kings and Lower Kings rivers and associated reservoirs and tributaries draining the western slope of the Sierra Nevada. The lands surrounding these waterbodies support similar uses, such as residential and commercial development, recreational activities, industrial processes, agriculture and livestock grazing.

Early sampling efforts were for basic water quality parameters including temperature, dissolved oxygen, pH, electrical conductivity, nutrients, bacteria and toxicity. The objective at that time was to establish baseline water quality conditions and to detect potential variations on a temporal and spatial scale. Those sampling efforts focused on the mainstem rivers and reservoirs draining the western slope of the Sierra Nevada and occurred quarterly, based on seasonal conditions. Since fiscal year 2004-2005, sampling has focused on the Tule and Kaweah Basin Watershed Management Areas and has been conducted monthly during the irrigation season (June through August) and runoff season (January through March) and once each during the October low water period and the April high water period. Results of fiscal year 2001-2002 sampling are available in the report SWAMP Annual Report FY 2001-2002, available online. Results for fiscal years 2002-2004 are presented in SWAMP Annual Report for FY 2002-2003 and FY 2003-2004, being submitted for peer review in December 2006, and anticipated online early in 2007.



Fact Sheet Region 5

Central Valley Regional Water Quality Control Board

Overview

The Central Valley Regional Water Quality Control Board stretches from the Oregon border to the northern tip of Los Angeles County and includes all or part of 38 of California's 58 counties. Three major watersheds delineate the region: the Sacramento River (divided into upper and lower river basins) and the San Joaquin River and Tulare Lake Basins. The three watersheds comprise some 40 percent of the total area of the state, provide over 50 percent of the state's managed water supply and contain approximately 77 percent of the irrigated agriculture.

Vision and Goals for Monitoring

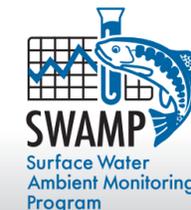
The overall vision of Central Valley SWAMP is to provide ambient water quality assessments through a combination of long-term trend monitoring, rotational sub-region monitoring and regional priority issue water quality investigations. The priorities of the regional effort include:

- Coordination of internal and external monitoring efforts to leverage limited resources.
- Evaluation of beneficial use protection and potential sources of impairment.
- Evaluation of the effectiveness of Water Board water quality improvement policies.
- Availability of monitoring results to the public in a timely manner.

Program Activity

The Central Valley SWAMP structure is coordinated with and built around existing programs, both internal and external to the agency. This structure provides the flexibility to address differing water quality issues throughout the region and to allow creative leveraging of limited resources. Each basin's unique characteristics, variety of existing monitoring frameworks and diverse water quality issues have spawned separate approaches toward meeting the overall SWAMP vision and can be generalized as follows:

- The upper Sacramento River Basin augments monitoring efforts by locally directed watershed management partnerships.
- The lower Sacramento River Basin coordinates broad monitoring efforts with the Sacramento River Watershed Program and focuses on regional priority issues.



Water Facts

43,991 acres of estuaries

504,350 acres of lakes, reservoirs and ponds

400,000 acres of wetlands

29 miles of coast and bay shoreline

83,624 miles of rivers and streams

1,512 miles of waterways dominated by agricultural discharge

19, 812 miles of constructed agricultural drains



Central Valley Region

- The San Joaquin River Basin expands the existing framework used in the multi-agency Grassland Bypass Project.
- The Tulare Lake Basin focuses primarily on watersheds with known water quality impairments with efforts to broaden the scope throughout the basin.

Contact

General program information, annual monitoring plans, water quality results and summary reports are available on the region's Website at [http://www.swrcb.ca.gov/rwqcb5/programs/agunit/swamp/].

Upper Sacramento River Basin

The upper Sacramento River Basin includes all or portions of eight counties. Major rivers include the Upper Sacramento, McCloud, Pit and Upper Feather. The area is divided into five sub-basins:

- Northeastern California (Pit, McCloud and upper Sacramento Rivers).
- Upper Feather River (North, Middle and South Fork Feather River downstream to Lake Oroville).
- North Sacramento Valley (Clear, Churn, Stillwater, Cow and Bear Creeks).
- East Sacramento Valley (Battle, Mill, Deer, Big Chico and Butte Creeks).
- West Sacramento Valley (Cottonwood, Redbank, Elder, Thomes and Stony Creeks).

Water quality issues typically involve temperature, erosion and sediment discharge, nutrient loading and bacteria concentrations. Water quality and beneficial use protection are closely linked to channel and habitat conditions. Flow depletion is also a significant factor. The area is generally rural. Much of the watershed is public land held by the U.S. Forest Service and Bureau of Land Management. Past and current mining, timber harvest, irrigated/non-irrigated agriculture, livestock grazing and road construction practices play an important role in determining water quality and watershed condition.

Program Activity

Since SWAMP-funded monitoring in the upper Sacramento watershed began in 2000, focus has been on two sub-basin areas, the upper Feather River and the Pit River watersheds and resulted in two monitoring reports: Feather River Coordinated Resource Management Watershed Monitoring Report, 2000-2003 and Pit River Water Quality Study, 2001–2002.¹ A third report, to include results of 2004-2005 monitoring in the Pit River Watershed, will be completed in 2006. For additional information, see www.feather-river-crm.org and www.pitrivalliance.net.

Collaborative Efforts

Staff has generally used SWAMP resources to assist in the data collection needs of locally directed watershed management programs. This data supports the development of watershed assessments, watershed management plans and community education and provides a means to track overall success of the management program. Each sub-basin area has a monitoring technical advisory committee that includes local, state and federal resource agencies; university personnel; industry representatives and private landowners. Monitoring information collected by SWAMP and other individuals or organizations is shared and becomes part of the overall water quality/watershed monitoring program database for that sub-basin area.

Conduct of watershed monitoring is a collaborative effort. For example, the Department of Water Resources has provided funding for a Pit River watershed monitoring coordinator, and SWAMP funded data collection/analysis. In recent years, these local watershed management programs have received public grants that include funding for ambient water quality monitoring. The intent is to combine these grant projects with SWAMP resources to establish and implement an overall watershed monitoring program.

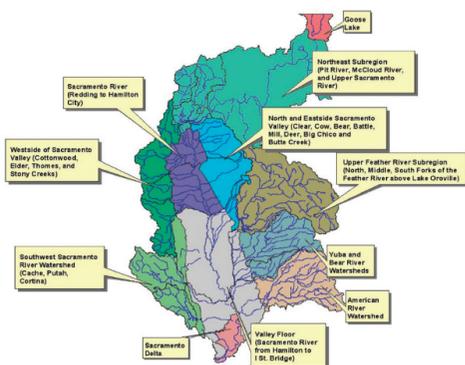
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Lower Sacramento River Basin

The lower Sacramento River Basin includes:

- Westside of Sacramento Valley (Cache and Putah Creek watersheds).
- Yuba and Bear River watersheds.
- American River Watershed.
- Lower Sacramento Valley Floor (Sacramento River from Hamilton City to I Street Bridge).
- Sacramento River Delta.



Program Activity

Accomplishments of the lower Sacramento River SWAMP include rotational basin monitoring, priority issue monitoring and long-term trend monitoring, as well as regulatory waterboard program support, grant program coordination and final interpretive water quality assessment reports.

- Bioassessment and biosurvey monitoring in the Lower Sacramento River Watershed included aquatic habitat, zooplankton and benthic macroinvertebrate (BMI) assessments of agriculture- and effluent-dominated waterways. The monitoring identified compromised BMI community integrity and poor aquatic habitat conditions and discovered habitat variables, including decreased riparian zone, increased channel alteration,

increased sedimentation and loss of quality benthic habitat as probable determinants of BMI community integrity. Final interpretive reports are available.²

- Screening Central Valley surface waters for estrogenic endocrine disrupting chemicals with a juvenile rainbow trout assay resulted from heightened concern over the last 15 years regarding possible occurrence of chemicals that disrupt endocrine system functions in aquatic species. Estrogenic endocrine disrupting chemicals (EEDCs), compounds that mimic or interfere with the reproductive function of estrogen, can have variable effects on fish, ranging from behavioral changes to feminization of males. The objective of this investigation was to screen ambient surface water samples for estrogenic activity. In coordination with the North Coast Regional Water Quality Control Board, University of California, Davis and U.S. Environmental Protection Agency (U.S. EPA), sample sites were chosen and water samples assessed from agriculture-, effluent- and urban-dominated waterways throughout the Central Valley and North Coast Regions. A final interpretive report is available.³

- Identifying organochlorine (OC) pesticides and PCBs in fish tissue samples from the Central Valley is particularly important as many of the OC pesticides have been banned for some 25 years, and fish tissue concentrations should be decreasing. About 10 percent of all the organochlorine pesticides used in the nation were applied in the Central Valley Region. As a result, many waterbodies are 303(d) listed, while insufficient data exists to determine whether others should be listed. The Office of Environmental Health Hazard Assessment is developing new fish consumption advisories for the Central Valley based on elevated mercury levels. This project will address a priority data gap for OCs and PCBs in fish tissue and provide more accurate assessment of fish tissue contaminants in Central Valley fish populations. A final report is expected in Fall 2007.

Collaborative Efforts

Ambient monitoring by Central Valley Water Board SWAMP identified a high incidence of sediment toxicity associated with pyrethroid pesticides in several urban creeks. This incidence is the result of steadily increasing use of the pesticide following severe restriction in uses of diazinon and chlorpyrifos that previously plagued major Central Valley water bodies for decades. Central Valley

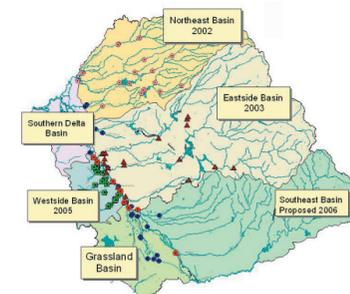
SWAMP was able to examine the magnitude of the threat posed by pyrethroid pesticides in the greater Sacramento area by leveraging limited resources: coordinating with a grant to the Sacramento River Watershed Program and collaborating with the University of California, Berkeley and the California Department of Fish and Game. Current coordination and collaboration efforts with local storm water municipalities, the Department of Pesticide Regulation, local watershed groups and Water Board regulatory programs are helping to work toward improved control over pesticide product use in urban areas. Follow-up studies are underway through multiple collaborative efforts, including an examination of sources of pyrethroid pesticides to urban creeks and a statewide assessment of sediment toxicity and pyrethroid pesticides in urban streams across California. Final interpretive reports are available.⁴

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San Joaquin River Basin

The San Joaquin River (SJR) Basin covers roughly 16,000 square miles and has had highly managed hydrology since implementation of the Central Valley Project (CVP) in 1951. Most of the SJR flow is diverted into the Friant-Kern Canal, leaving the river channel upstream of the Mendota Pool dry except during periods of wet weather flow and major snowmelt. Flows resume downstream of the Mendota Pool with eastside discharges dominated by snowmelt from the Sierra Nevada and westside discharges dominated by agricultural drainage. Agriculture is the major land use



4. Ibid.

along the valley floor. Urban growth along the Interstate 5 corridor is rapidly converting historically agricultural land to urban use.

The SJR watershed has six sub-areas: the Northeast, Eastside, Southeast, Grassland, Westside and Southern Delta basins. The SJR SWAMP has been developed to allow expanded monitoring annually in each basin on a rotating basis. Information gathered during the rotations is added to long-term, trend monitoring stations that have been established along the river and to representative discharges from each sub-basin.

Program Activity

SWAMP for the SJR builds upon a site-specific monitoring framework developed as part of the agricultural subsurface drainage management program that has evolved since 1985. Parameters were selected to measure the most limiting beneficial use impacts: salt, bacteria, total organic carbon (drinking water); temperature, toxicity, bioassessments (aquatic life); salt, boron, minerals (irrigation water supply); bacteria (recreation); and selenium (waterfowl). Bacteria analyses are completed in house and have been verified through round-robin testing with University of California, Davis (UCD) and Sierra Foothills Laboratory.

To identify potential sources of impairment, staff developed a layered monitoring framework. The first layer has sites selected along the main stem of the river downstream of major inflows. The second layer is a series of sites representing inflows from specific sub-watersheds into the main stem of the river. The final layer is a more detailed survey of water quality within each of the sub-basins, once every five years.

To evaluate implementation efforts, the sites along the main stem of the San Joaquin River and those representing drainage inflows from five sub-basins have been designated as permanent monitoring locations. These sites will also allow evaluation of water quality over time and over water year types that can range from flood to critically dry years. Bioassessment has been conducted in the SJR Basin through a separate effort and coordinated with the water column and sediment monitoring.

1. Available at the Central Valley Regional Water Quality Control Board Web site at [http://www.waterboards.ca.gov/centralvalley/available_documents/index.html#wqstudies].

2. Ibid.

3. Ibid.