



Sacramento River Aerial

# *Water Quality Monitoring*

## IN THE SACRAMENTO RIVER BASIN



Fish population survey in Feather River tributary

### Background

Sacramento River Basin waterways historically were used as places to dispose of contaminants. The practice dates back at least to the gold rush era of the 1850s when miners dumped sediment and mercury into tributaries in their search for gold. The sediment clogged natural channels, sometimes making them too shallow for fish passage or navigation, and introduced contaminants such as metals, with mercury being particularly problematic.

After the gold rush, the Sacramento River Basin's rivers and creeks became dumping grounds for human and animal waste, often untreated. Cities and industries that dispose of wastes into the basin (known as point sources) follow much stricter standards since enactment of the federal Clean Water Act in 1971, and California's Porter-Cologne Act in 1969. Both laws set pollutant-specific standards for discharges of contaminants into federal and state waters.

In recent decades, treatment for municipal wastewater and industrial wastewater, and management of urban stormwater runoff, have increased and improved

greatly. Industries and municipalities now provide at least secondary treatment of wastewater; large and medium-size cities are implementing urban stormwater programs to reduce the impacts of urban runoff to adjacent waterways. In the past several years, agricultural runoff has come under regulation. Agricultural groups have formed coalitions to work together to meet the new requirements.



Monitoring on the Lower American



Wintertime monitoring on the Pit River



Meadow stream survey work in Upper Feather Watershed



Water quality monitoring on Lassen Creek

## Water Quality Monitoring Programs

Today, there are dozens of citizen monitoring efforts and watershed-specific monitoring programs being implemented throughout the Sacramento River Basin. Summaries of three of the primary water quality monitoring programs in the Sacramento River Basin—Sacramento Coordinated Monitoring Program, Irrigated Lands Regulatory Program Monitoring, and Sacramento Watershed Coordinated Monitoring Program—follow.

### SACRAMENTO COORDINATED MONITORING PROGRAM

The confluence of the American and Sacramento Rivers is located near downtown Sacramento. To protect and enhance the health of these rivers, the CMP, a joint effort of the Sacramento Regional County Sanitation District and the Sacramento Stormwater Management Program, was implemented in 1991. CMP partnering agencies collect river water samples and test for a variety of water quality constituents and contaminants. The fundamental purpose of the CMP is to develop high-quality data to aid in the development and implementation of water quality policy and regulations in the Sacramento area.

As regulatory requirements for treating stormwater discharges and wastewater have changed over the years, the partnering agencies now are required to conduct more of the monitoring under their individual discharge permits that once was performed voluntarily. The partnerships have continued despite these changes because the cooperative effort saves money and achieves the goal of developing high-quality data in the most cost-effective manner.

By collecting samples throughout the year and under varying weather conditions, the CMP partnering agencies identify water quality conditions, trends, and influences that are invaluable for defining the health of the river system. CMP partnering agencies support many area programs committed to safeguarding water

quality in the Sacramento and American Rivers. Data from the program are shared with a wide group of stakeholders that includes regulatory and other public agencies, nonprofit organizations, the general public, and private companies to enhance other environmental efforts in the region.

The CMP has five sampling sites: Veterans Bridge, Freeport Bridge, River Mile 44, Nimbus Dam, and Discovery Park. Water samples are tested for approximately 70 parameters at each site, with an additional 250 parameters analyzed during expanded events that occur three times a year. Monitoring currently takes place on a bimonthly basis (six times per year).

The CMP water quality parameters include:

- » pesticides and herbicides such as diazinon, chlorpyrifos, and Roundup®;
- » bacteria (E. coli, fecal and total coliform);
- » mercury;
- » metals such as copper, arsenic, lead, and aluminum; and
- » pH, temperature, turbidity, and dissolved oxygen.



Macrinvertebrate monitoring in Big Chico Creek

## IRRIGATED LANDS REGULATORY PROGRAM MONITORING

In 2003, the CVRWQCB adopted the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands. These regulations provide for a watershed approach that includes a basin-wide monitoring program to assess impacts of irrigation water discharge. Since that time, the Sacramento Valley Water Quality Coalition (organized under NCWA) together with ten individual subcoalition groups, has been conducting ambient monitoring throughout the basin at sites dominated largely by agricultural effluent. Coalition groups are required to monitor water quality at selected locations monthly during the irrigation season and twice during the winter storm season. Constituents monitored are pesticides, metals, nutrients, toxicity, pathogens, general chemistry, and physical parameters. Shown in the figure are the locations of sites monitored under the ILRP from 2003 to 2009.

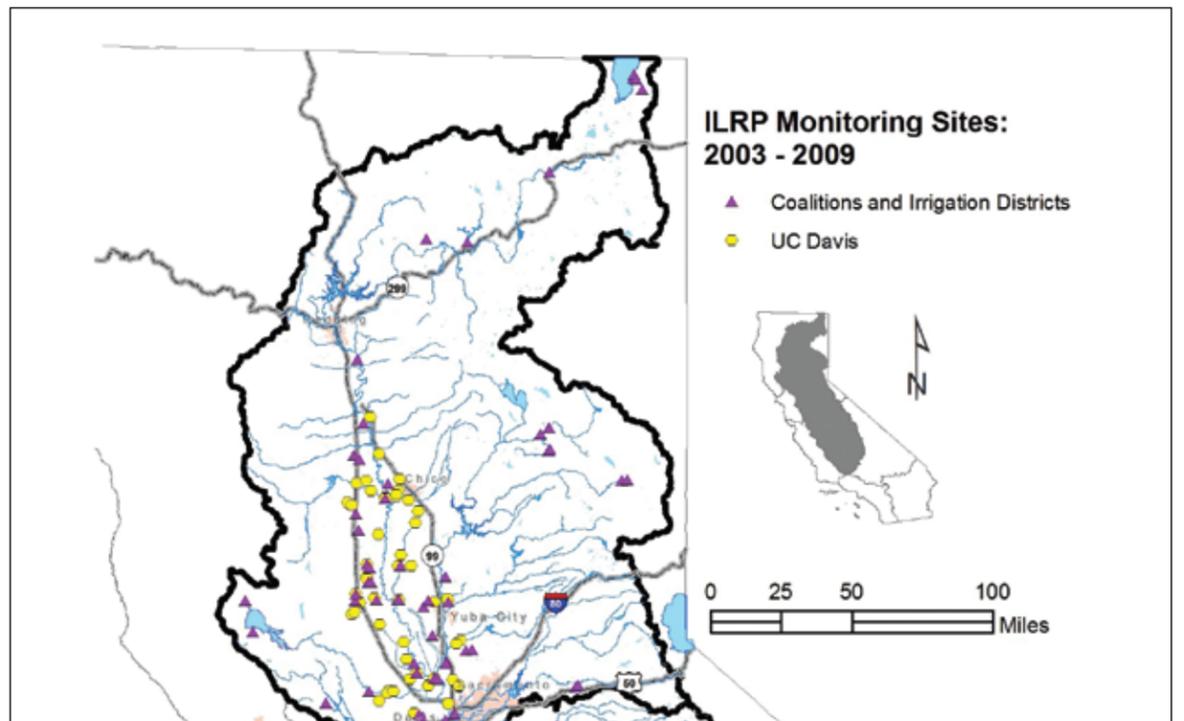
The objectives of the ILRP Monitoring and Reporting Program are:

- » assess the impacts of waste discharges from irrigated lands to surface waters,
- » determine the level of implementation and the effectiveness of management practices intended to reduce water quality impacts, and
- » evaluate compliance with numeric and narrative water quality objectives adopted to protect beneficial water uses.

Coalitions are required to submit to the Central Valley RWQCB an annual report summarizing the monitoring program findings. Where there are repeated exceedances of water quality objectives, coalitions are required to prepare a management plan that addresses the source and corrective action needed for those exceedances. The Central Valley RWQCB is in the process of developing the Long-Term Irrigated Lands Regulatory Program, with Board adoption scheduled for spring 2011. Future ILRP monitoring requirements will be defined in that long-term program.



Water quality monitoring on Butte Creek



### ILRP Monitoring Sites

Anderson Creek at Ash Creek Rd	Lower Snake River at Nuestro Rd
Butte Slough at Pass Rd	Lurline Creek at 99W
Cache Creek at Capay/Diversion Dam	McGaugh Slough at Finley Rd
Capell Creek u/s of Lake Berryessa	Middle Fork Feather River at A-23
Colusa Basin Drain abv Knights Landing–SacValley	North Canyon Creek at Hassler Rd
Colusa Drain nr Maxwell Rd	Pine Creek at Nord Gianella Rd
Coon Creek at Brewer Rd	Pit River at Canby Rd
Coon Creek at Striplin Rd_SacValley	Pit River at Pittville Bridge
Coon Hollow Creek	Rough and Ready Pumping Plant at Rd 108
Cosumnes River at Twin Cities Rd	Spanish Creek above Greenhorn Creek
Coyote Creek at Tyler Rd	Stone Corral Creek at Maxwell Rd
Dry Creek at Alta Mesa	Stony Creek on Hwy 45 nr Rd 24
Fall River at FRR Bridge	Ulati Creek at Brown Rd
Freshwater Creek at Gibson Rd	Wadsworth Canal at S Butte Rd
Gilsizer Slough at George Washington Rd	Walker Creek at Co Rd 48
Grand Isle at Leary Rd	Willow Slough Bypass at Pole Line Rd
Indian Creek at Arlington Bridge	Z Drain
Laguna Creek at Alta Mesa	



Water quality monitoring on Bear Creek

SACRAMENTO WATERSHED COORDINATED MONITORING PROGRAM

SWCMP is a coordinated monitoring effort between the DWR and the Central Valley RWQCB. This program monitors ambient water quality at locations in the Sacramento River starting upstream of Lake Shasta and going south to Verona, and at the lower end of all large streams tributary to the Sacramento River. It is funded jointly by the DWR Northern District Water Quality Section and the Central Valley RWQCB SWAMP.

The overall program objectives are to:

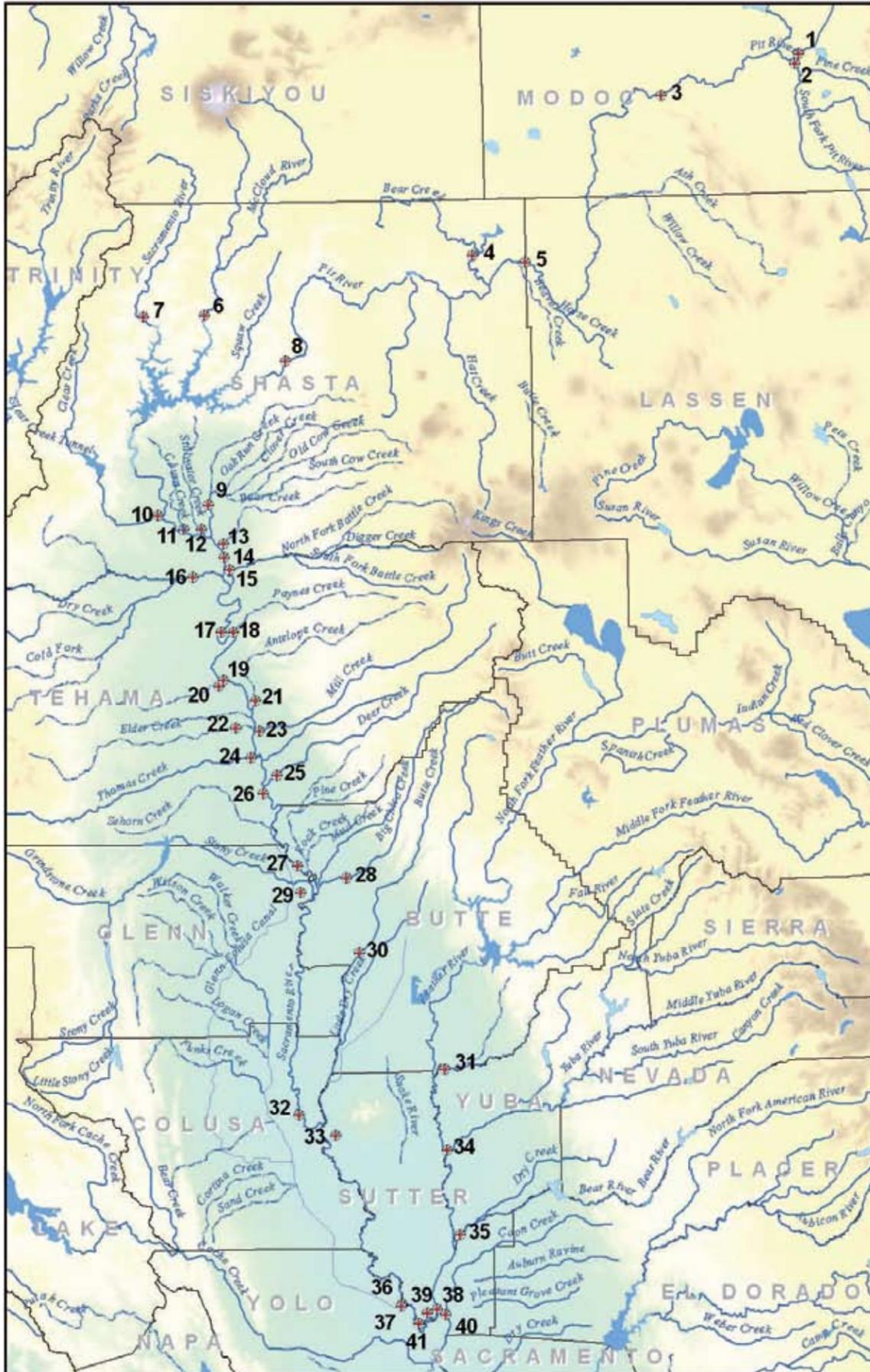
- » create an ambient monitoring network within the Sacramento River Basin using consistent monitoring and quality assurance protocols,

- » document ambient water quality in both clean and potentially polluted areas,
- » provide data to identify specific problems and evaluate the effectiveness of water quality regulatory programs, and
- » establish a database to track long-term trends in ambient water quality.

The program was initiated in November 2008, and sites have been sampled quarterly since that time. Constituents analyzed include all standard chemical, physical, and biological parameters (e.g., temperature, bacteria, nutrients, metals, dissolved

oxygen, numerous other chemical parameters). Flow is recorded at sites with existing DWR/USGS gaging stations. Macroinvertebrate sampling has been done at selected sites with plans to make this a regular program component for all sites. In addition, it is hoped that the program can be expanded to include sites in some upper watershed areas of major tributaries. The locations below are also being monitored annually for water column and sediment toxicity.

A public report summarizing the results of the first 2 years of monitoring is being prepared by the CVRWQCB, and the intent is to produce a summary report annually thereafter. The goal is to provide Sacramento River Basin stakeholders with easily accessible, current, and defensible water quality data in DWR's Water Data Library. The Water Data Library is managed by DWR and has a streamlined process of organizing and distributing water quality data ([www.wdl.water.ca.gov](http://www.wdl.water.ca.gov).)



SWCMP Sampling Locations

Map# Station Name

- 1 North Fork Pit River at Alturas
- 2 South Fork Pit River near Alturas
- 3 Pit River near Canby
- 4 Fall River at Glenburn
- 5 Pit River at Pittville
- 6 McCloud River above Shasta Lake
- 7 Sacramento River at Delta
- 8 Pit River near Montgomery Creek
- 9 Cow Creek near Millville
- 10 Clear Creek near mouth near Redding
- 11 Churn Creek near Anderson
- 12 Stillwater Creek near Anderson
- 13 Bear Creek near Anderson
- 14 Sacramento River at Balls Ferry
- 15 Battle Creek at Jelly's Ferry Road Bridge
- 16 Cottonwood Creek at Cottonwood
- 17 Paynes Creek near Red Bluff
- 18 Sacramento River at Bend Bridge
- 19 Sacramento River below Red Bluff
- 20 Red Bank Creek at Highway 99W near Red Bluff
- 21 Antelope Creek near mouth near Red Bluff
- 22 Elder Creek at Gerber
- 23 Mill Creek near mouth near Los Molinos
- 24 Thomes Creek at Hall Road
- 25 Deer Creek at Hwy 99E near Vina
- 26 Sacramento River at Vina bridge
- 27 Sacramento River at Hamilton City
- 28 Big Chico Creek at Chico
- 29 Butte Creek below Western Canal Siphon
- 30 Stony Creek at The Nature Conservancy
- 31 Honcut Creek at Highway 70
- 32 Sacramento River at Colusa
- 33 Butte Slough near Meridian
- 34 Yuba River at Marysville
- 35 Bear River near mouth
- 36 Sacramento River above CBD near Knights Landing
- 37 Colusa Basin Drain near Knights Landing
- 38 Feather River near Verona
- 39 Sutter Bypass at RD-1500 Powerplant
- 40 Sacramento River at Verona
- 41 Sacramento River below Knights Landing

Working toward a Regional Monitoring Program

SRWP conducted water quality monitoring on the Sacramento River mainstem and its major tributaries between 1998 and 2008. SRWP's monitoring program was one of the first ongoing monitoring programs for the Sacramento River Basin. Annual reports were developed for each monitoring year, and a Monitoring Program Summary was developed in December 2006. This information helped establish a baseline for Sacramento River Basin water quality conditions. With the CMP, ILWMP, and SWCMP, SRWP is now working toward the development of a sustainable water quality monitoring program for the Sacramento River Basin.