



WEB SERVICES • GIS • VISUALIZATION



Open and Collaborative  
Natural Resource Management

# SAN JOAQUIN RIVER WATER QUALITY



The screenshot shows the website interface for San Joaquin River Water Quality. At the top, there is a navigation bar with 'Home', 'Explore Data', 'Library', 'Explore the SIR', and 'Login'. Below this is a main content area with a featured article titled 'What is the level of aquatic toxicity in the San Joaquin River?' and a 'Learn More' button. Underneath are four smaller article cards, each with a thumbnail image and a 'View more' button:

- Water Quality Conditions in the San Joaquin River Basin**
- Is it Safe to Swim in the San Joaquin River and its Tributaries?**
- Does Water Temperature in the San Joaquin River and its Tributaries Support Chinook?**
- Is Salt Affecting Beneficial Uses in the San Joaquin River Basin?**
- Are excess nutrients a problem in the San Joaquin River?**

[WWW.SANJOAQUINRIVERWATERQUALITY.COM](http://WWW.SANJOAQUINRIVERWATERQUALITY.COM)

[WWW.SJRWQ.COM](http://WWW.SJRWQ.COM)

# A COLLABORATIVE EFFORT (Building on an "Open

BAYDELTA.LIVE.COM (Primary Underwriters)



CAESTUARIES.OPENNRM.ORG



MY WATER QUALITY PORTALS

CURES/EPA SAN JOAQUIN WATER QUALITY



USBR SAN JOAQUIN REAL TIME MANAGEMENT

DWR 1641 INTERACTIVE



...and others

"OPENNRM A FEDERATED SYSTEM THAT CAN SHARE  
EVERYTHING"

---



**OpenNRM**  
ENTERPRISE

OpenNRM unites each module for a powerful management and collaboration tool:



Map Maker and Map Manager



Document Library



Project Collaborator



RSS Engine



Real Time Monitoring



Geo-Spatial and Science Application



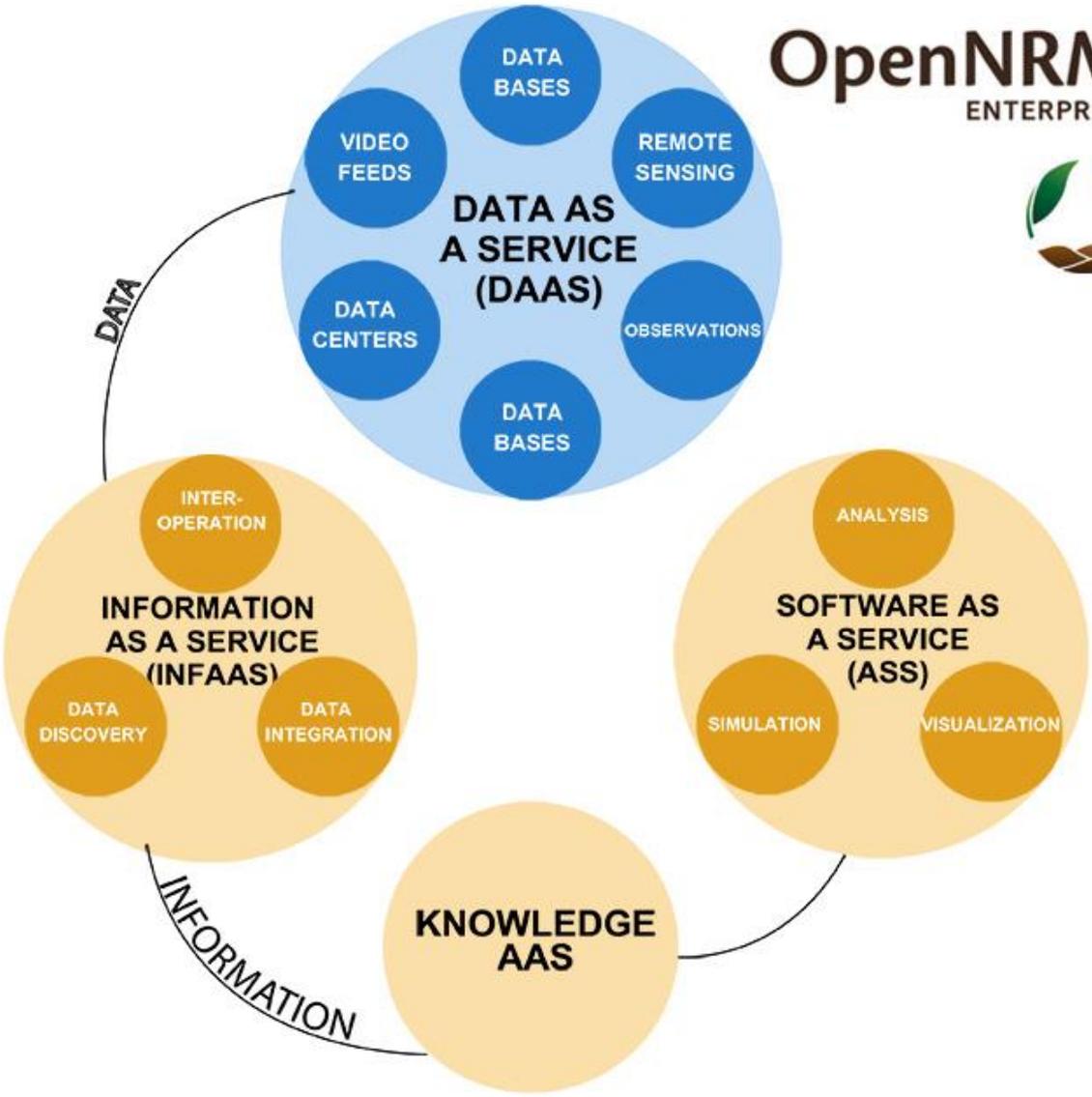
Simulation Engine

...or combine as many modules as you want for a custom application.

Collaborative  
resource  
management  
workspace and  
project management  
application for data  
collection, analysis,  
reporting and  
visualization

# OpenNRM

ENTERPRISE



INTEROPERABILITY

Collaborative  
Science Projects

Regional  
Monitoring

Ecosystem  
Restoration

Estuary  
Management



Data  
Visualization

Publication  
Management

Species  
Observation

Operations  
Management

**Using the OpenNRM Workspace to build stories** using Spatial Data, Observations Data, and Site Content to build stories at various scales.  
(Site Level, Regional Level and System Wide)

### Support for SB 1070 and the Monitoring Councils' requirements:

*“SB 1070 and the MOU require that the Monitoring Council develop specific recommendations to improve the coordination and cost-effectiveness of water quality and related ecosystem monitoring and assessment, **enhance the integration of monitoring data across departments and agencies, and increase public accessibility to monitoring data and assessment information.** While the Monitoring Council may recommend new monitoring or management initiatives, it will build on existing efforts to the greatest extent possible.”*

---

### *“Enhancing the Vision for Managing California’s Environmental Information” - Data Summit White Paper*

OPENNRM embraces the Data Summit white paper recommendations:

1. Integrates sensor technologies and analytics for increased monitoring requirements.
2. Integrates multiple sources of data using web services (if available). Allows users to share and download data.
3. Provides stakeholders with data visualizations tools



## What is the level of aquatic toxicity in the San Joaquin River?

The California Healthy Streams Portal measures how well a water body supports aquatic life. Water samples from a given water body are taken to the laboratory and test organisms are exposed to that water to see if they exhibit any adverse effects. Toxicity tests are especially useful in water...

[Learn More...](#)



## Water Quality Conditions in the San Joaquin River Basin

Is it Safe to Swim in the San Joaquin River and its Tributaries



The San Joaquin River boasts 330 miles of beauty, wildlife habitat, and superb recreational opportunities. The incredibly scenic San Joaquin River Gorge near the town of Auberry boasts excellent hiking, mountain biking and horseback riding trails as well as guided nature walks, camping, swimming, and more. Keeping our water safe for recreational uses is a national priority ...

[View more](#)

Does Water Temperature in the San Joaquin River and its Tributaries Support Chinook ...



Monitoring temperature in the San Joaquin River and its tributaries will help us better understand if conditions support migration and other life stages of the Chinook Salmon. Two San Joaquin River runs (spring and fall) of the Chinook salmon are currently struggling for survival. There are varying reasons for their decline and temperature is one factor.

[View more](#)

Is Salt Affecting Beneficial Uses in the San Joaquin River Basin?



Water quality in the San Joaquin River has degraded significantly since the late 1940s. During this period, salt concentrations in the River, near Vernalis, have doubled. Concentrations of boron, selenium, molybdenum and other trace elements have also increased. These increases are primarily due to reservoir development on the east side tributaries and upper basin for agri ...

[View more](#)

Are excess nutrients a problem in the San Joaquin River?



Nutrients in rivers serve the same basic function as nutrients in a garden. They are essential for growth. In a garden growth and productivity are considered beneficial, but this is not necessarily so in a river. The additional algae and other plant growth allowed by the nutrients may be beneficial up to a point, but may easily become a nuisance.

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### Tweets

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3 Dec

Does water temperature support Chinook salmon migration in the San Joaquin River? [sanjoaquinriverwaterquality.com/question/687](http://sanjoaquinriverwaterquality.com/question/687)



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@SJRWQ

3 Dec

Are excess nutrients a problem in the San Joaquin River? [View the latest monitoring data](#)

Tweet to @SJRWQ

## Management Activities

[view all](#)



### News

Access the latest news and information for the San Joaquin River Basin.

[view more](#)



### About the San Joaquin River Basin

The San Joaquin River basin surrounds the San Joaquin River from Friant Dam to Vernalis. The main tributaries to the San Joaquin River basin include the Stanislaus River, Tuolumne River, and Merced River. The San Joaquin River is the second largest river in California and includes

wetlands and marshes.

[view more](#)



### Management Activities

The San Joaquin River Restoration Program is a comprehensive long-term effort to restore flows to approximately 92 miles of the San Joaquin River in California's Central Valley from Friant Dam to the confluence of the Merced River. Its goal is to restore and

maintain fish populations in "good condition", including naturally reproducing and self-sustaining populations of s ...

[view more](#)



### Regional Assessment: What we measure?

There are many tools used for regional assessment in the San Joaquin River Basin. Each tool provides the user with specific information about their questions. Below is a list of regional tools for the public to explore.

[view more](#)

## San Joaquin River Tributaries

### Stanislaus River



The Stanislaus River is one of the largest tributaries of the San Joaquin River. The river is 95.9 miles long. The north and south forks meet several miles upstream from New Melones Lake. The river is extensively dammed and diverted. Donnell's Dam on the middle fork forms Donnell Lake. McKays' Point Diversion Dam, Lyons Dam, and Strawberry Dam all provide hydroelectric power ...

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### Mokelumne River



Originating in the Sierra Nevada Mountain Range, the Mokelumne River flows into the Camanche Reservoir in the Sierra Foothills. The lower portion of the Mokelumne River crosses California's Central Valley and meets its conflux with the San Joaquin River in the Sacramento-San Joaquin River Delta (see map in Related Docs/Results). Chinook salmon returns in the Mokelumne River ...

[Learn more](#)

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The headwaters of the Tuolumne River begin at 13,000 feet in Yosemite National Park in the Sierra Nevada Mountains. The strength of the river carves out canyons that provide 27 miles of whitewater, ideal for recreational rafters and kayakers. Approximately 150 miles downstream of the river's mouth, thousands of Chinook Salmon return each fall to spawn in the lower river. T ...

[Learn more](#)

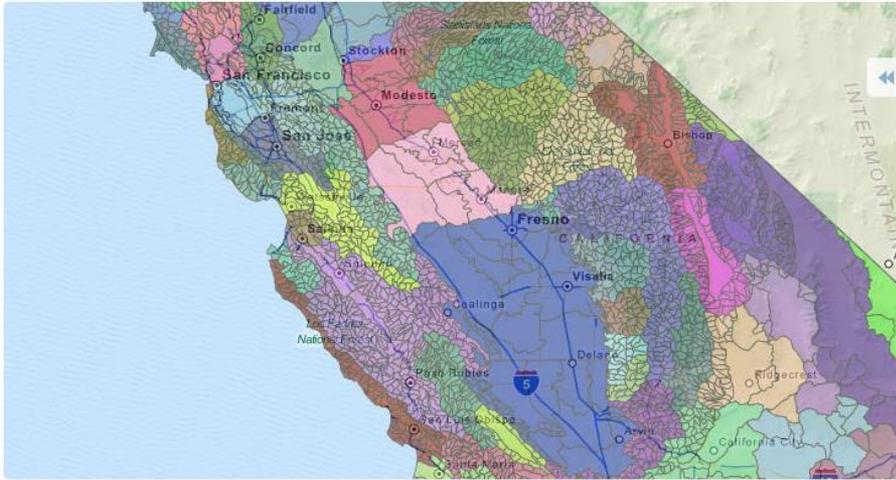
### Merced River



Originating in Yosemite National Park, the Merced River drains a 1,276 square mile watershed in California's Central Valley. The river has been affected by anthropogenic activities, including water storage and diversion, land use changes, introduction of exotic plant and animal species, and gold and aggregate mining. In the 1950s and 1960s Chinook escapement averaged less ...

[Learn more](#)

## From the Map Gallery



## Cal Watersheds San Joaquin River Area

This data set is an extract of the California Watershed (calwater) dataset. It has been generalized to hydrologic sub-areas for those watersheds that are considered part of the coastal steelhead trout range.

[view more](#)

## About Us

This website is the culmination of a multi organization, multi discipline effort to make information about the San Joaquin River watershed more readily available and usable for a multitude of audiences. Its genesis is a project funded by the United States Environmental Protection Agency (EPA) to develop a Regional Monitoring Program for the San Joaquin River. Funds from EPA were later matched by other supporters including the State and Federal Contractors Water Agency, to develop this informational website. Its development was managed by the Coalition for Urban Rural Environmental Stewardship (CURES). The website technology and site content was developed by 34 North.

The main goal of this website is give users access to the extensive water monitoring data, studies, reports and articles on the San Joaquin River watershed. The watershed has been extensively studied and monitored since the early 1980s and continues to be studied today. These monitoring programs collect samples for a wide range of constituents and cover a wide range of research as well as state and federal regulatory requirements.

In addition to sharing information with the public, this website is intended to facilitate development of partnerships and coordinate efforts between the major ongoing monitoring programs collecting water quality data in the San Joaquin River watershed.

## Who's Involved



## SJR Photo Gallery



[read more](#)

# USING DATA TO ANSWER QUESTIONS

## A Federated System to EXPLORE AND ANALYZE DATA. Combining...

Hundreds of spatial data layers, real time and discrete data parameters from disparate data sources

GIS Data, CEDEC, CEDEN, USGS NWIS, CIMIS

## MONITOR AND REPORT

Visualizing Water Quality Criteria with relevant data

Monitoring in real-time

Answer Questions for the Public

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**SAN JOAQUIN RIVER**  
Regional Water Quality Monitoring

Does water temperature support Chinook salmon migration in the San Joaquin River?

Does Water Temperature in the San Joaquin River and its Tributaries Support Chinook ...



Monitoring temperature in the San Joaquin River and its tributaries will help us better understand if conditions support migration and other life stages of the Chinook Salmon. Two San Joaquin River runs (spring and fall) of the Chinook salmon are currently struggling for survival. There are varying reasons for their decline and temperature is one factor.

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## Does water temperature support Chinook salmon migration in the San Joaquin River?

Next Question

[Chinook Salmon and the SJR Basin](#)

[Current Conditions for Salmon](#)

[Fun Facts](#)

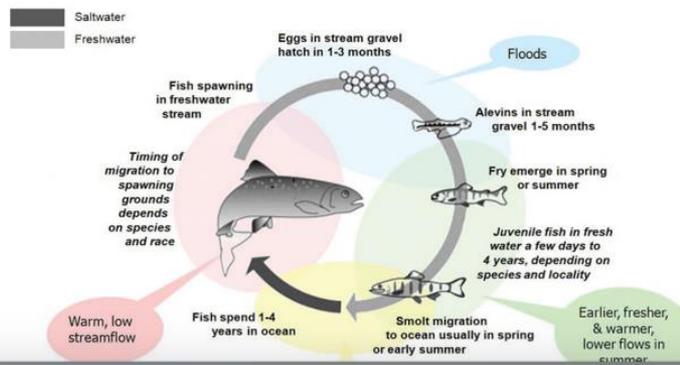
[Water Quality Objectives and Beneficial Uses](#)

Monitoring temperature in the San Joaquin River and its tributaries will help us better understand if conditions support migration and other life stages of Chinook salmon (*Oncorhynchus tshawytscha*). Two San Joaquin River runs (spring and fall) of Chinook salmon are currently struggling for survival. There are varying reasons for their decline and temperature is one important factor.



### **i** About the Chinook salmon life-cycle

Chinook salmon are anadromous, which means they spawn in freshwater, but migrate to the ocean where they remain for their adult lives. After years of living in the open ocean, they return to their natal freshwater streams to reproduce. Females dig nests in gravel-bedded streams called redds where they deposit their eggs. After the male fertilizes the eggs, the female covers the redd with gravel. The embryos hatch into larval fish called alevin that remain in the gravel redd nourished by the yolk sac of the egg from which they were born. The alevin absorbs the yolk sac and grows, emerging from the gravel as fry (see life stage illustration below). The fry begin their migration downstream toward the ocean. As they grow, they develop scales and dark vertical bars on their sides called parr markings. At this stage they are called parr. Smoltification is a physiological change that enables the fish to adapt from living in freshwater to living in saltwater. At the completion of this process they are called smolt. Smolt typically remain in brackish water estuaries as juveniles before they move into the open ocean. Adults migrate throughout the North-east Pacific until returning to the freshwater streams to reproduce.





Does water temperature support Chinook salmon migration in the San Joaquin River?

Next Question

[Chinook Salmon and the SJR Basin](#)

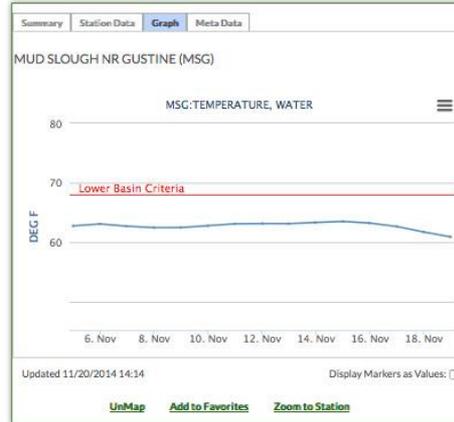
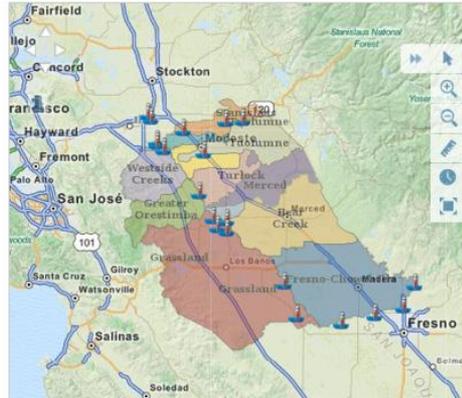
[Current Conditions for Salmon](#)

[Fun Facts](#)

[Water Quality Objectives and Beneficial Uses](#)

Currently, temperature is measured in many locations in the San Joaquin River watershed. Most stations are located on the main stem of the San Joaquin River (see interactive map with conditions below).

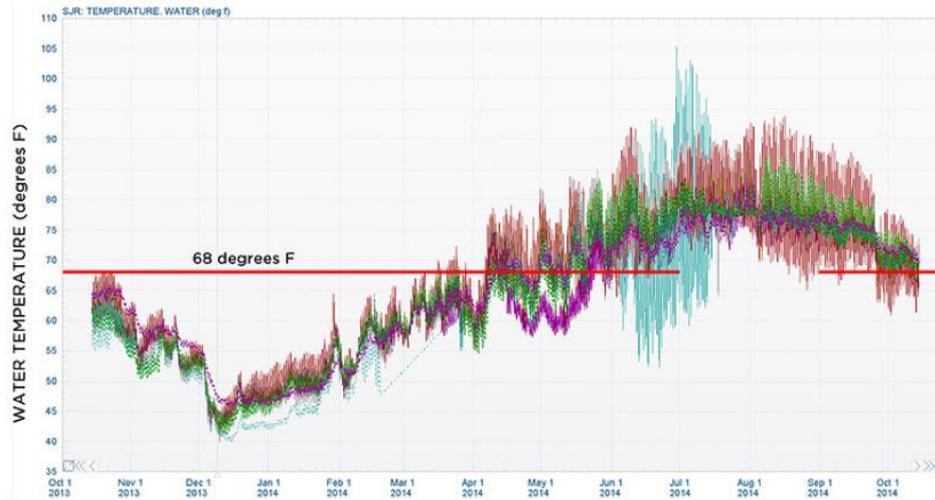
### Current Temperature Conditions in the San Joaquin River and its Tributaries



Graph Mode (Toggles between graph and current value)

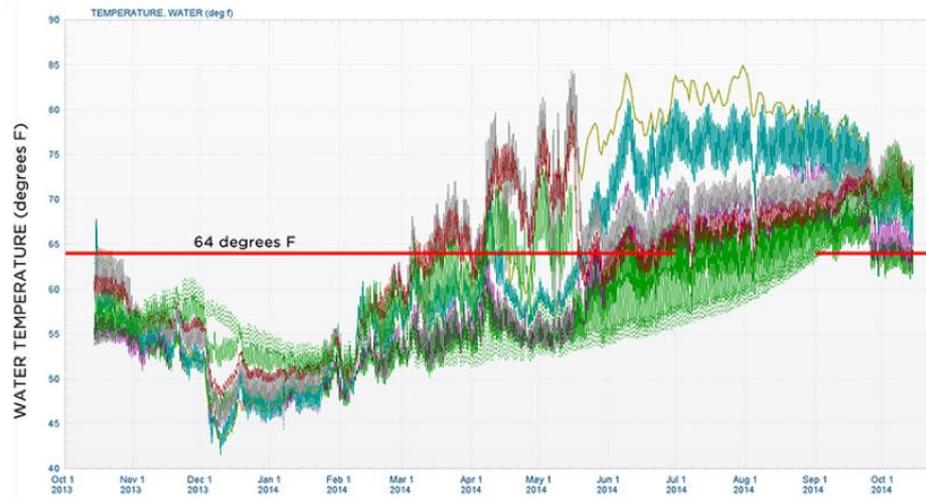
Click on the stations above to see real time temperature conditions. The graphs illustrate the temperature conditions over the last two weeks. The peak temperature experienced in any given day is averaged across 7 days to produce the 7-day average daily maximum value which is being displayed. For the Lower Basin stations the red line shows the 68 F (7-day average daily maximum) threshold to support migration. In the Upper Basin, the red line shows the 64 F (7-day average daily maximum) threshold to support migration. To allow for migration of both Spring and Fall-run Chinook the thresholds must be met September thru June.

### San Joaquin River lower basin temperatures over the last year



October 2013 to October 2014

## San Joaquin River upper basin temperatures over the last year



October 2013 to October 2014

### San Joaquin River Basin Tributaries Stations Water Temperature (degrees F) CDEC Stations:

- STANISLAUS R AT ORANGE BLOSSOM BRI (OBB)
- STANISLAUS RIVER AT OAKDALE (SOK)
- RIPON (RPN)
- TUOLUMNE RIVER AT MODESTO (MOD)
- SAN JOAQUIN RIVER AT GRAVELLY FORD (GRF)
- SAN JOAQUIN R AT DONNY BRIDGE (DNB)
- SAN JOAQUIN R AT HWY 41 (H41)
- ..... SAN JOAQUIN RIVER BELOW FRIANT (SJF)

— 64 degrees F Water Temperature  
Migration Criteria

**Caption:** The above graphs illustrate the temperature trends for the upper and lower basins of the San Joaquin River over the last year. The temperatures displayed are actual temperatures, however, the red line shows the 7-day average daily maximum threshold to support migration. For the Lower Basin stations this is 68 F and for the Upper Basin this is 64 F. To allow for migration of both Spring and Fall-run Chinook the thresholds must be met September thru June.

## Why is water temperature important?

Water temperature is the single most important factor that affects the distribution and survival of Chinook salmon. Chinook are cold water species and respond to small water temperature variations during different life stages. Unlike most mammals whose body temperature stays nearly constant, Chinook are poikilotherms, which mean their body temperature varies with the temperature of their environment; i.e. water temperature.

Water temperature affects every life-cycle stage of the Chinook salmon. The timing for spawning and egg hatching are temperature-dependent. Growth, development and metabolic rate are directly influenced by water temperature. The following water temperatures are a compilation of guidelines set by the U.S. Environmental Protection Agency and additional information used as criteria for these limits.



## What Affects Temperature

Water is heated by solar and atmospheric radiation, but there are many ways in which humans influence water temperature. These include:

- Removing canopy vegetation along stream banks, which provide shade that help shield the water from solar radiation.
- Reducing the flow of water through the use of dams, reservoirs and irrigation diversions. Reduced flows decrease the rate at which water moves down the river, allowing more time for heat absorption from the atmosphere and soil. It also reduces the depth of the water column, which exposes more of the water to solar radiation.
- Water stored in lakes and reservoirs has had more time for solar radiation to heat the body of water.
- Urban runoff has been heated by hot surfaces such as roads and parking lots before being discharged into the river.
- Discharge of warm water from industrial cooling plants.
- Anthropogenic climate change is warming atmospheric conditions, which increases water temperatures.
- Discharge of deeper, cooler water from reservoirs can quickly cool and shock the river system.



(Photo Credit: USFWS)

## Working Toward a Solution?

The [San Joaquin River Restoration Program \(SJRRP\)](#) was established as part of a settlement agreement based on a lawsuit filed by the National Resources Defense Council in 1988. The Settlement is focused on two goals. The first is to restore flows in the main stem of the San Joaquin River below Friant Dam in order to maintain naturally reproducing and self-sustaining populations of salmon and other fish. The second is to reduce or avoid impacts to Friant Division long-term water contractors.

This project includes improvements to the channel and structures that convey flow and improve fish habitats, increasing flows from Friant Dam for fish, and re-introducing spring-run Chinook.

-October 1, 2009. The first interim flows of water were released from the Friant Dam to benefit fisheries. This improves temperature by increasing water flow during critical periods of fish life stages.

-April 17-18, 2014. The Bureau of Reclamation and the U.S. Fish and Wildlife Service released 54,000 hatchery produced juvenile spring-run Chinook salmon. It is anticipated that these juveniles will return to spawn as adults in 2017; however, drought conditions may impact their numbers.

[Back to top](#)



Are excess nutrients a problem in the San Joaquin River?

Next Question

Are excess nutrients a problem in the San Joaquin River?



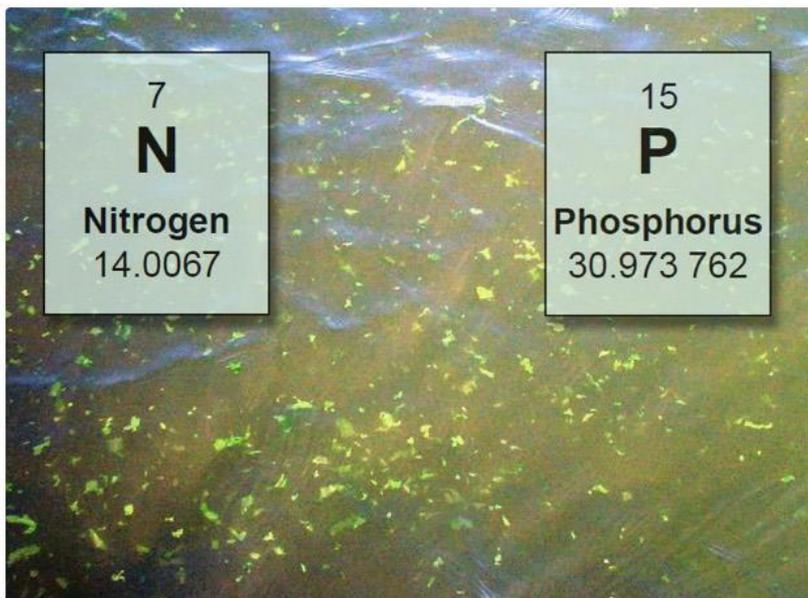
Nutrients in rivers serve the same basic function as nutrients in a garden. They are essential for growth. In a garden growth and productivity are considered beneficial, but this is not necessarily so in a river. The additional algae and other plant growth allowed by the nutrients may be beneficial up to a point, but may easily become a nuisance.

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## Nutrients and the San Joaquin River Basin

Nutrients in rivers serve the same basic function as nutrients in a garden. They are essential for growth. In a garden growth and productivity are considered beneficial, but this is not necessarily so in a river. The additional algae and other plant growth allowed by the nutrients may be beneficial up to a point, but may also reduce dissolved oxygen needed by aquatic life and/or contribute to the creation of harmful algal blooms.

The main nutrients of concern are phosphorus and nitrogen. Both elements are measured in several forms. Phosphorus can be measured as total phosphorus (TP), or soluble reactive phosphate (SRP) (also sometimes called phosphate (PO<sub>4</sub>) or orthophosphate (ortho-P). The last, three represent different terms used to describe the fraction of TP that is soluble or available to organisms for growth.



Microcystis in the San Joaquin River (Photo courtesy of Scott Waller, Department of Water Resources)



Rock Slough Algae Bloom

### THE PROBLEM

The San Joaquin River Basin is predominately used for agriculture. Fertilizers are used on agricultural lands because nitrogen and phosphorus are often depleted from the soil. Excess or unused amounts are carried by surface runoff or as tail water into river systems. Nutrients from agriculture can also infiltrate with water into ground water aquifers. Many wells in the basin area have been closed due to high nitrate levels. (CRWQB 1998)

Livestock operations, such as dairy farms, are another source of pollution. Water that drains from the facilities transports waste nutrients, along with sediments and bacteria directly into the river system via surface water runoff.

Urban population has expanded throughout the basin area over the last century. This has placed increasing demands on waste water treatment facilities, which contribute excess nutrients into the river system.

### REASONS FOR NATURAL VARIATION

The concentration of nutrients and the form they are found in changes continually. How and why they change is a very complex field of study. During the summer, nutrient input may increase due to fertilization of cropland or lawns and gardens. During the winter, high rainfall causes increased wash-off of organic matter such as leaves, twigs, grass, and other debris. Because decomposition of this organic matter releases nutrients, it constitutes an important source of nutrient loading.

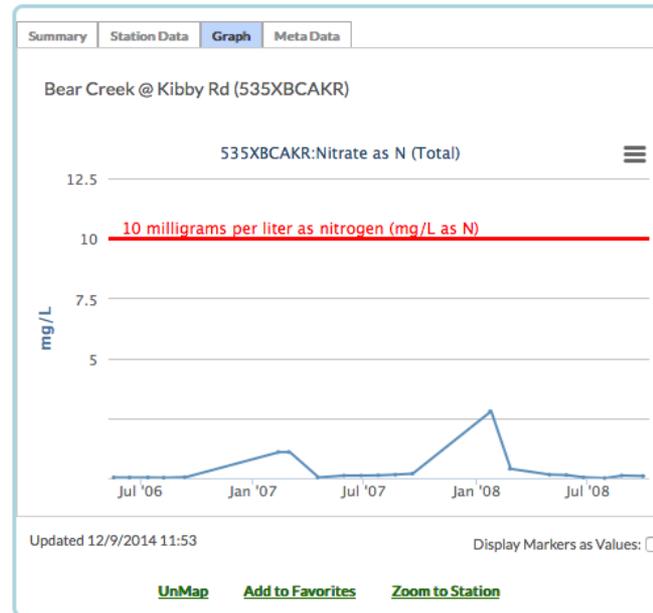
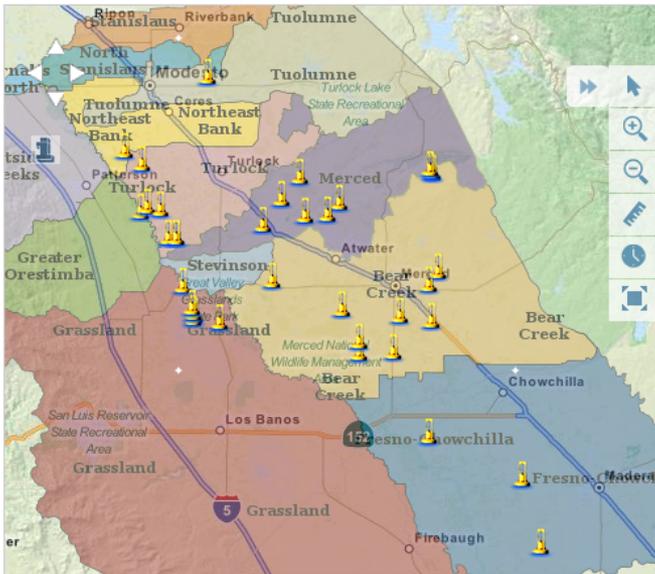
## THE PROBLEM

Nitrogen and phosphorus are essential nutrients for aquatic plants. However in high concentrations, they can cause excessive plant growth (eutrophication). High ammonia levels are toxic to aquatic life. High nitrate levels in drinking water can cause "blue baby syndrome" or methemoglobinemia. The EPA has set criteria for the nitrate and ammonia forms of nitrogen, but not for phosphorus. The maximum contaminant level (MCL) for nitrate in drinking water is 10 milligrams per liter as nitrogen (mg/L as N) (U.S. Environmental Protection Agency, 1986)

The USEPA also has established criteria for maximum ammonia concentrations in surface water on the basis of chronic and acute exposure of aquatic organisms to un-ionized ammonia (U.S. EPA, 1986). These criteria vary inversely with pH and temperature. The chronic criteria range from about 0.2 to 2 mg/L as N for the range of pH (7.5-8.5) and temperatures (5-25 Degree Celsius) generally found in surface water in the San Joaquin Valley.

## CONSTITUENTS OF CONCERN

The graphs below display nitrate levels in the San Joaquin River and its tributaries.



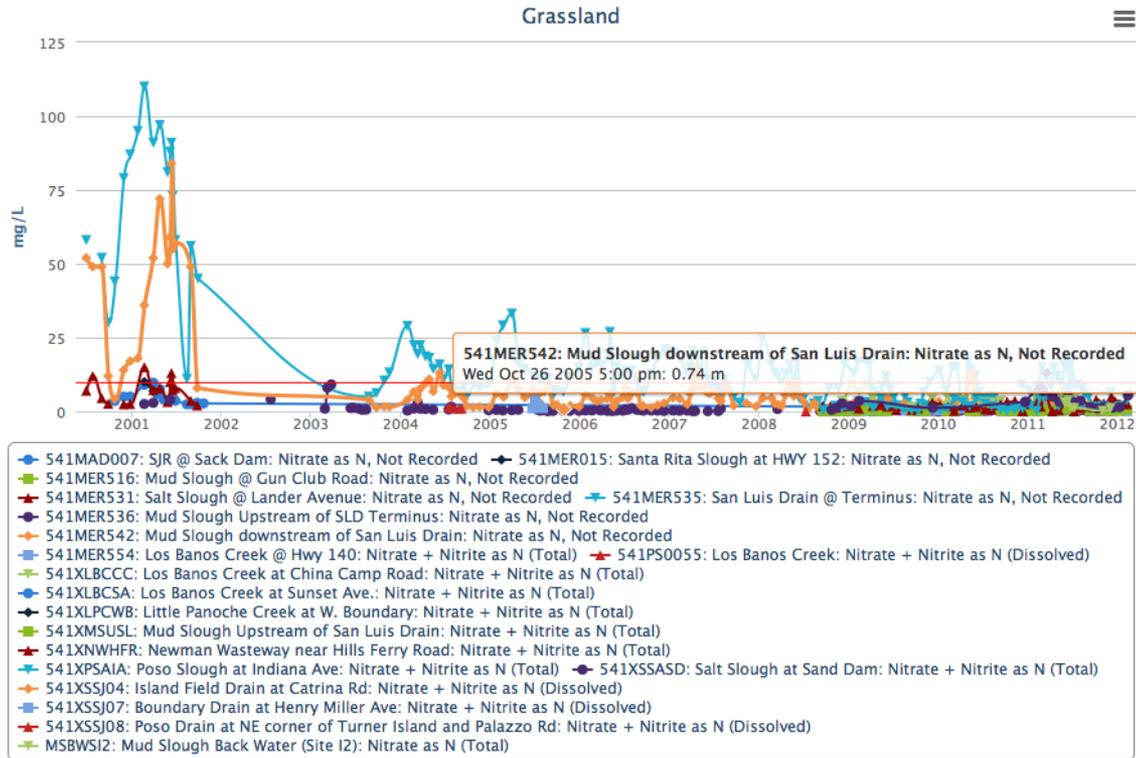
Graph Mode (Toggles between graph and current value)

Click on the stations above to see the most recent available nitrate data. The red line shows the Maximum Contaminant Level for nitrate in drinking water. Note that levels of nutrients much lower than these have been shown to have impacts on aquatic ecosystem health.

Using the menu below choose a region to Graph Nitrate. Data is not real time and varies on region. The red line represents maximum contaminant level (MCL) for nitrate in drinking water is 10 milligrams per liter as nitrogen (mg/L as N):

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Grassland



Regional Nitrate Trends: The chart above displays all the data available from stations within the subwatershed selected. The red line shows the Maximum Contaminant Level for nitrate in drinking water. Note that levels well below this level are known to cause problems for aquatic life.



**DATA SOURCES:**

The California Environmental Data Exchange Network is a statewide system that enables data sharing of water quality and aquatic resources related monitoring data.



Is it safe to swim in the San Joaquin River?

Next Question 

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## HOW BACTERIA ARE MEASURED

The vast majority of the time, California beaches and streams are available for the recreation their visitors go to enjoy. Unfortunately, there are times when it is not advisable to go in the waters due to bacterial contamination. There are various programs focused on measuring and evaluating bacteria in California's waters. Below are the current assessment methods:

### USEPA's 2012 Recreational Water Quality Criteria

The geometric mean (GM) should not be exceeded in any 30-day interval

The statistical threshold value (STV) should not be exceeded by more than 10 percent of the samples taken in any 30-day interval

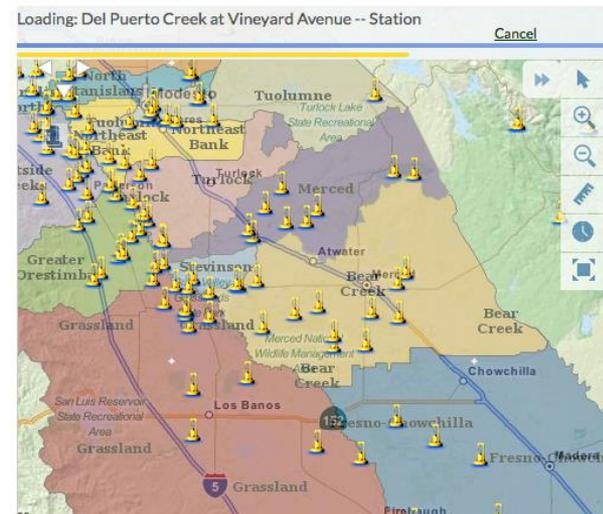
	Recommendation 1 (estimated illness rate 36/1,000)		Recommendation 2 (estimated illness rate 32/1,000)	
	GM	STV	GM	STV
E. coli (cfu/100 mL)	126	410	100	320

### Water Quality Control Plan for the Sacramento and San Joaquin River Basins

Fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 mL, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 400/100 mL.

[Read the Basin Plan for more information](#)

Choose a region using the map to see E. coli results from that area:



Graph Mode (Toggles between graph and current value)

Click on the stations above to recent monitoring result for e.coli. Horizontal lines on the charts represent EPA's 2012 recommended recreational water quality criteria. One is the Stastical Threshold Value (STV) that should not be exceeded by more than 10 percent of the samples taken in any 30-day interval. The other is the 30-day Geometric Mean (GM) which the five most recent samples from each site should not exceed. Note: Individual sample results above this line do not necessarily represent violations.

# SUPPORTING DATA STORIES

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[view all](#)



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[view more](#)



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[Learn more](#)

### Merced River



Originating in Yosemite National Park, the Merced River drains a 1,276 square mile watershed in California's Central Valley. The river has been affected by anthropogenic activities,

including water storage and diversion, land use changes, introduction of exotic plant and animal species, and gold and aggregate mining. In the 1950s and 1960s Chinook escapement averaged less ...

[Learn more](#)

## ABOUT THE SAN JOAQUIN RIVER BASIN

### 📌 Profile information on the San Joaquin River Basin

- » 32,000 square miles in extent
- » Second largest drainage area in California
- » It contributes on average 15% of the inflow to the Delta (~ 2.8 million acre feet)
- » Urban population over 2 million
- » 40% of surface water comes from Sierra Nevada streams
- » 60% groundwater and imports from the Delta account for the remainder that contribute to the source of surface water
- » Groundwater accounts for a third of the Basin water supply, including drinking water
- » Agricultural growers on Valley floor receive ~2 million acre feet pumped from the Delta, which contains more salt, selenium, and contaminants (pesticides) leading to contamination of San Joaquin River water in runoff
- » 1.3 million acre feet annually of the flow of the San Joaquin River is diverted near Fresno into the Tulare Basin for agricultural use
- » Hydrologic modifications and surface water diversions have resulted in significant losses in habitat (wetlands) and species (salmon)

Wildlife in the basin includes migrating birds, over 40 species of freshwater fish including Chinook salmon, foxes, Mule deer, and riparian brush rabbits.

[Learn more about the area and it's species by visiting the San Joaquin River National Wildlife Refuge Website](#)

[Learn more about the San Joaquin River Tributaries](#)



### 📌 About the San Joaquin Region

- » The San Joaquin Region has over two million acres of irrigated cropland
- » Agricultural output is valued at more than \$7.25 billion
- » One of the most productive agricultural areas in the country
- » Agriculture water use is over 7 million acre feet (MAF) annually
- » Innovative water quality improvement programs: Grasslands Project (selenium), a basin-wide TMDL (Total Maximum Daily Load) for salinity and boron, and the Irrigate Lands Program
- » Urban population use averages 600,000 acre feet (AF) annually (mostly groundwater)

The San Joaquin River is the largest river of Central California in the United States. The 366-mile (589 km) long river starts in the high Sierra Nevada, and flows through a rich agricultural region known as the San Joaquin Valley before reaching Suisun Bay, San Francisco Bay, and the Pacific Ocean. An important source of irrigation water as well as a wildlife corridor, the San Joaquin is among the most heavily dammed and diverted of California's rivers.

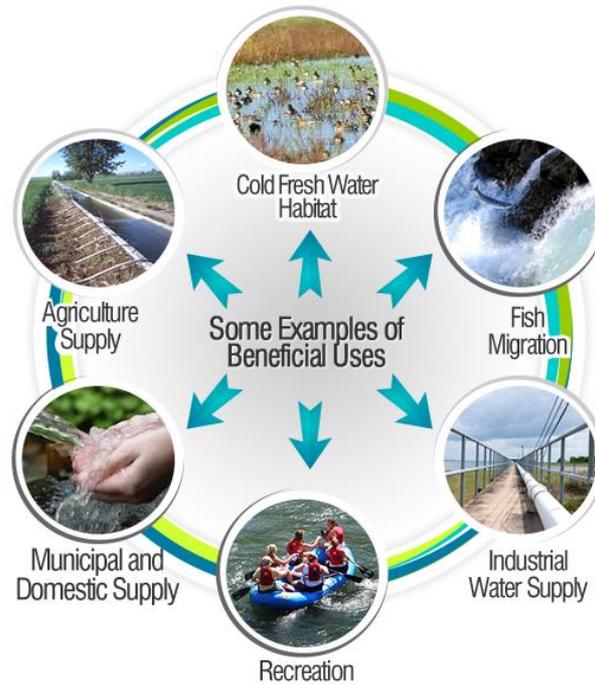
People have inhabited the San Joaquin Valley for more than 8,000 years, and it was long one of the major population centers of pre-Columbian California. Starting in the late 18th century, successive waves of explorers then settlers, mainly Spanish and American, emigrated to the San Joaquin basin, first exploiting then driving out the indigenous tribes. The newcomers quickly appropriated the rich natural and hydrologic resources of the watershed for use in farms and cities, but found themselves plagued by flood and drought. Because of the uniform topography of the San Joaquin Valley, floods once transformed much of the lower river into a huge inland sea.

In the 20th century, many levees and dams were built on the San Joaquin and all of its major tributaries. These engineering works changed the fluctuating nature of the river forever, and cut off the Tulare Basin from the rest of the San Joaquin watershed. Once habitat for thousands of spawning salmon and millions of migratory birds, today the river is subject to tremendous water-supply, navigation and regulation works by various federal agencies, which have dramatically reduced the flow of the river since the 20th century.

The San Joaquin River has been altered to allow for diversion of water to aqueducts used for hydroelectric power, drinking water and irrigation. In 1931 the State Water Plan was developed which entailed the construction of dams and canals to transport water from the Sacramento River to the San Joaquin River. The result is a series of canals and reservoirs built to supply water for agriculture and support human population growth across the basin.

## BENEFICIAL USES

California State policy for water quality control is directed toward achieving the highest water quality consistent with maximum benefit to the people of the state. Aquatic ecosystems and underground aquifers provide many different benefits to the people of the state. The beneficial uses define the resources, services, and qualities of these aquatic systems that are the ultimate goals of protecting and achieving high water quality. The California State Water Board is charged with protecting all these uses from pollution and nuisance that may occur as a result of waste discharges in the region. Beneficial uses of surface waters, groundwaters, marshes, and wetlands [as presented by the California State Water Resources Control Board](#) serve as a basis for establishing water quality objectives and discharge prohibitions to attain these goals.



## MANAGEMENT ACTIVITIES



### [San Joaquin River Restoration Program](#)

The San Joaquin River Restoration Program is a comprehensive long-term effort to restore flows to approximately 92 miles of the San Joaquin River in California's Central Valley from Friant Dam to the confluence of the Merced River. Its goal is to restore and maintain fish populations in "good condition", including naturally reproducing and self-sustaining populations of salmon and other fish, while reducing or avoiding adverse water supply impacts to irrigators. This effort will include a combination of channel and structural modifications along the River, and reintroduction of Chinook Salmon.

### [CV-SALTS – Developing new approaches to protect Central Valley soils and water](#)

Elevated salinity and nitrates in surface water and groundwater are increasing problems affecting much of California, other western states, and arid regions throughout the world. In California, as surface and groundwater supplies become scarcer, and as wastewater streams become more concentrated, salinity and nitrate impairments are occurring with greater frequency and magnitude.

In 2006, the Central Valley Water Board, the State Water Board, and stakeholders began a joint effort to address salinity and nitrate problems in California's Central Valley and adopt long-term solutions that will lead to enhanced water quality and economic sustainability. Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) is a collaborative basin planning effort aimed at developing and implementing a comprehensive salinity and nitrate management program. The goal of CV-SALTS is to maintain a healthy environment and a good quality of life for all Californians by protecting our most essential and vulnerable resource: WATER.

In July 2008, the Central Valley Salinity Coalition (CVSC) was formed. CVSC represents stakeholder groups working with the Board in the CV-SALTS effort. Its purpose is to organize, facilitate and fund efforts needed to fulfill the goals of CV-SALTS. CVSC coordinates the meetings of the CV-SALTS committees, maintains an independent web site, and manages the projects originating from this effort. Information and materials regarding the stakeholder committees and other activity, including the meeting schedule, are posted on their website.

### [Irrigated Lands Regulatory Program](#)

California agriculture is extremely diverse and spans a wide array of growing conditions from northern to southern California. California's agriculture includes more than 400 commodities. The state produces nearly half of US-grown fruits, nuts and vegetables. Across the nation, US consumers regularly purchase crops produced in California. Many of the products are exported to markets worldwide.

Water discharges from agricultural operations in California include irrigation runoff, flows from tile drains, and storm water runoff. These discharges can affect water quality by transporting pollutants, including pesticides, sediment, nutrients, salts (including selenium and boron), pathogens, and heavy metals, from cultivated fields into surface waters. Many surface water bodies are impaired because of pollutants from agricultural sources. Groundwater bodies have suffered pesticide, nitrate, and salt contamination.

To prevent agricultural discharges from impairing the waters that receive these discharges, the Irrigated Lands Regulatory Program (ILRP) regulates discharges from irrigated agricultural lands. This is done by issuing waste discharge requirements (WDRs) or conditional waivers of WDRs (Orders) to growers. These Orders contain conditions requiring water quality monitoring of receiving waters and corrective actions when impairments are found. The number of acres of agricultural land enrolled in the ILRP is about six million acres. The number of growers enrolled is approximately 40,000.



# A CONTINUED EFFORT IN THE SAN JOAQUIN

COLLABORATIVE DEVELOPMENT EFFORTS FOR  
THE SAN JOAQUIN PROVIDES STAKEHOLDER  
WITH TOOLS TO:

- Explore and analyze regional data (CDEC, CEDEN, CIMIS, NWIS, etc). Each investment benefits the community.
- Answer questions about regional water quality.
- Supports multi-stakeholder collaboration to better understand water quality objectives.
- Provides tools for stakeholders to ~~operate and comply with regulatory~~

# ADDITIONAL TOOLS AND RESOURCES



STOCKTON 53.4°

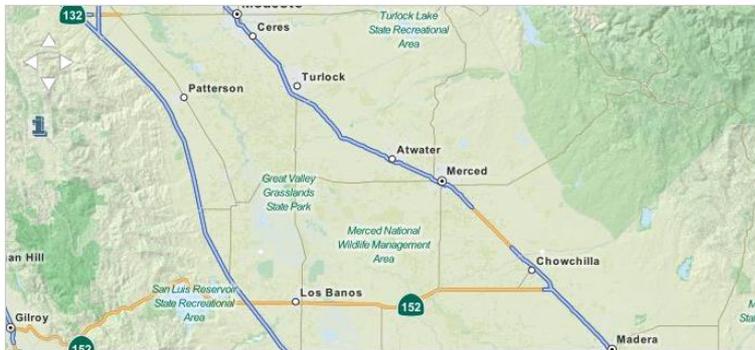
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## Library

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- [P] Mokelumne River
- [P] Tuolumne River
- [P] Merced River
- [P] Calaveras River
- [P] Cosumnes River



### Mokelumne River

Originating in the Sierra Nevada Mountain Range, the Mokelumne River flows into the Camanche Reservoir in the Sierra... [Learn More](#)

### Tuolumne River

The headwaters of the Tuolumne River begin at 13,000 feet in Yosemite National Park in the Sierra Nevada Mountains... [Learn More](#)



### Merced River

Originating in Yosemite National Park, the Merced River drains a 1,276 square mile watershed in California's Central... [Learn More](#)



### Stanislaus River

The Stanislaus River is one of the largest tributaries of the San Joaquin River. The river is 95.9 miles long. The north and south forks meet several miles upstream from New Melones Lake. The river... [More](#)

# Mokelumne River

TOOLS

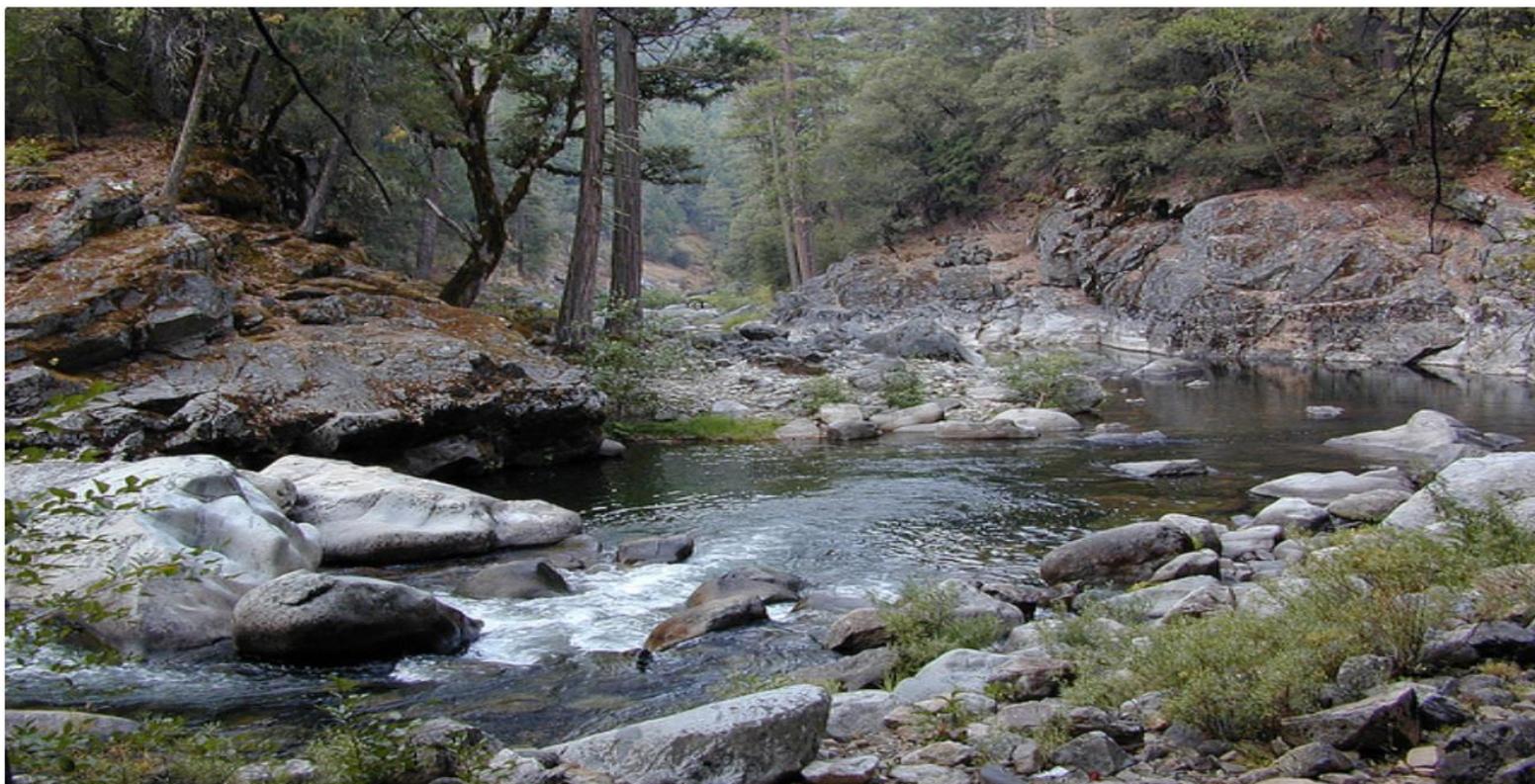
ARTICLE

SUMMARY/REPORT

## The Mokelumne River

[Next Tributary](#)

▶ Originating in the Sierra Nevada Mountain Range, the Mokelumne River flows into the Camanche Reservoir in the Sierra Foothills. The lower portion of the Mokelumne River crosses California's Central Valley and meets its confluence with the San Joaquin River in the Sacramento-San Joaquin River Delta (see map in Related Docs/Results). Chinook salmon returns in the Mokelumne River are indicators of ecological health in the river ecosystem. Salmon returns declined in the drought years of 1977 and from 1987-1992. Since then, flow and non-flow ecosystem restoration efforts began by the California Department of Fish and Game, the U.S. Fish and Wildlife Service, Woodbridge Irrigation District, and other stakeholders have improved the fishery habitat.



## The Calaveras River

[Next Tributary](#)

**▶** The Calaveras River is a river in the California Central Valley. It flows roughly southwest for 51.9 miles (83.5 km) from the confluence of its north and south forks in Calaveras County to its confluence with the San Joaquin River just west of the city of Stockton. The Spanish word calaveras means "skulls." The river was said to have been named by Spanish explorer Gabriel Moraga when he found many skulls of Native Americans along its banks. He believed they had either died of famine or been killed in tribal conflicts over hunting and fishing grounds. In fact, the human remains were of the native Miwuk people killed by Spanish soldiers after they banded together to rise against Spanish missionaries. The Stanislaus River is named for Estanislau, a coastal Miwuk who escaped from Mission San Jose in the late 1830s. He is reported to have raised a small group of men with crude weapons, hiding in the foothills when the Spanish attacked. The Miwuk were quickly decimated by Spanish gunfire. Moraga must not have known this part of history. New Hogan Lake is the only lake on the river. It is formed by New Hogan Dam, which was completed in 1963. The dam was built by the United States Army Corps of Engineers, primarily for flood control. The dam also provides drinking water, water for irrigation, hydroelectricity and recreation, including fishing, camping, swimming and water skiing. (Wikipedia)



# Upper Stanislaus

TOOLS

IMAGES/VIDEO

## Upper Stanislaus



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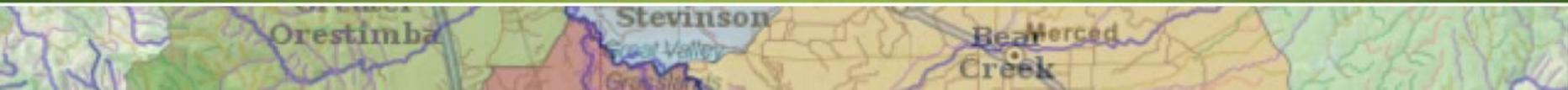
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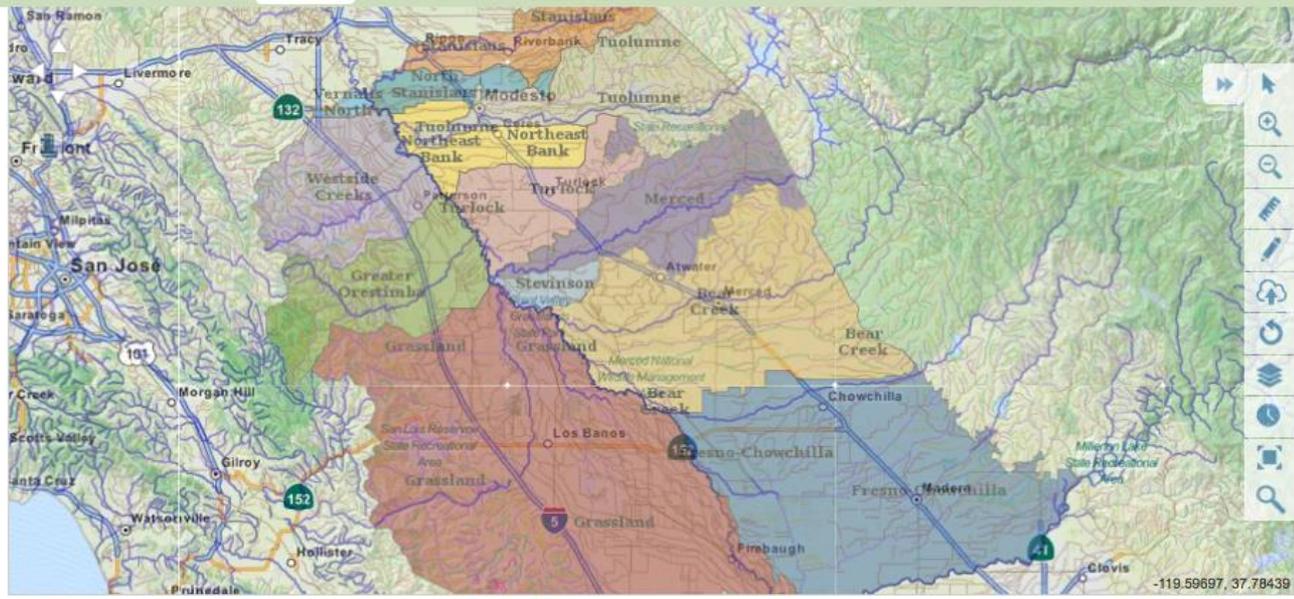
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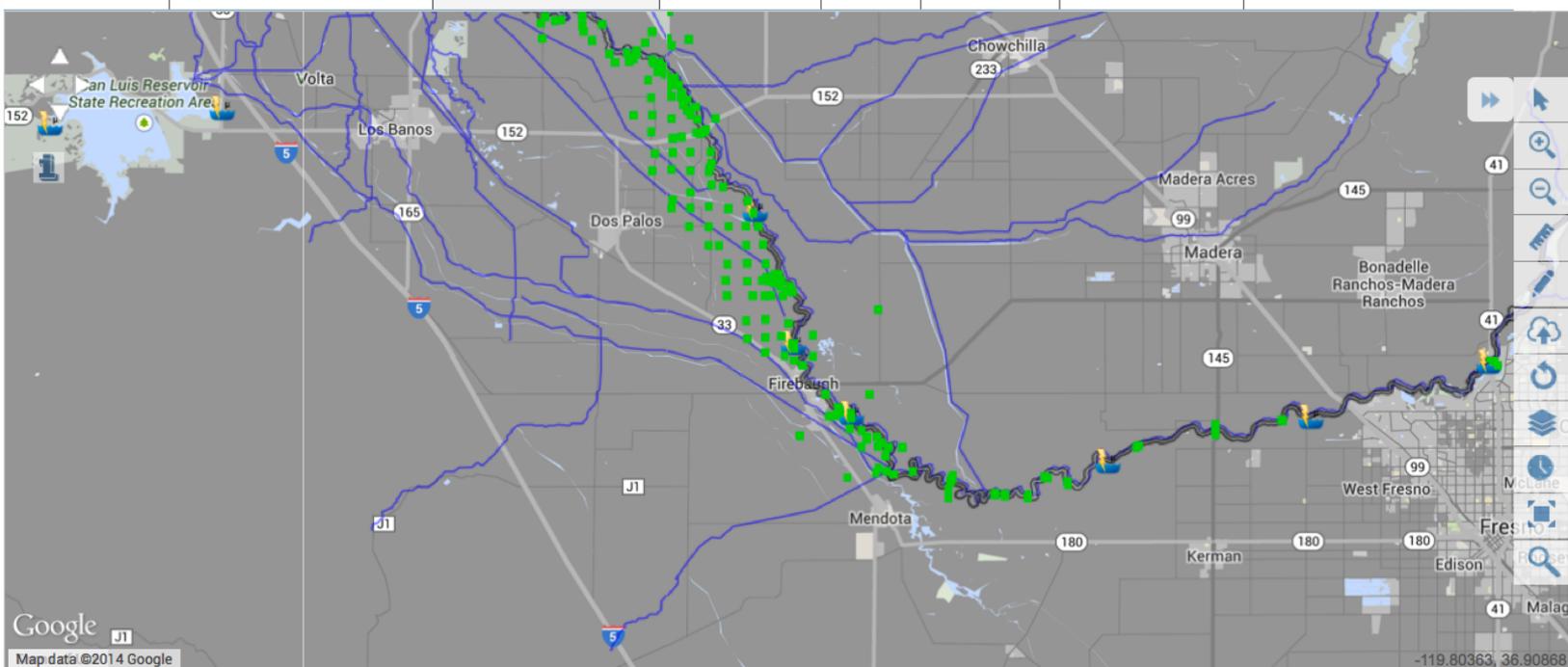


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Maps ⏪ ▶



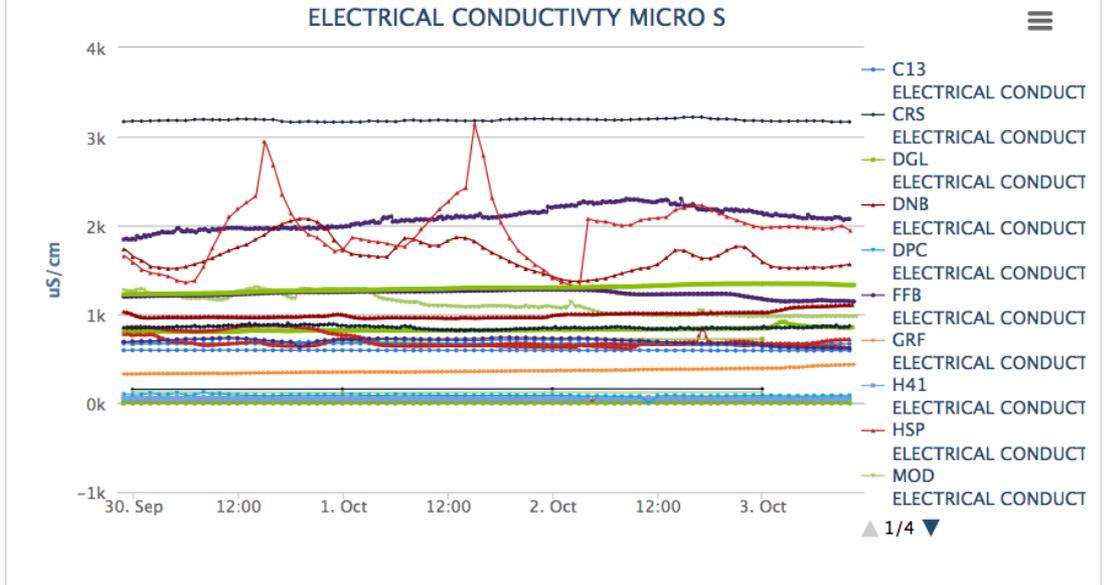
Data Sets Layers Tools

Map Layers (Refresh Legend)

- All Layers Active
- + SJR\_Groundwater\_Monitoring\_Sites
- + CDEC Stations
- + SJR\_NHD\_WM\_Poly1
- + SJ\_WARMF\_Rivers\_012513\_Web
- + San Joaquin River
- + SJR Canals
- + Mist Styled

Maps Graphing Results

Data ELECTRICA Location all Graph Line Overlay



# INTEROPERABILITY: SHARE EVERYTHING

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# WHAT'S NEXT?

## CONTINUED COLLABORATION AND DEVELOPMENT:

- Future projects underway that will benefit the SJR project:
  - Access to more data and information
  - Better analytics
  - More integration of assessment criteria
  - More users
  - More scale
- SJR Real Time Management WARMF Online
- Multistakeholder collaboration: USBR, DWR and East/West Coalitions for efforts

**THANK YOU!!**

**[WWW.SANJOAQUINRIVERWATERQUALITY.COM](http://WWW.SANJOAQUINRIVERWATERQUALITY.COM)**

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