SAN JOAQUIN RIVER WATER QUALITY

WWW.SANJOAQUINRIVERWATERQUALITY.COM
WWW.SJRWQ.COM
A COLLABORATIVE EFFORT (Building on an “Open

BAYDELTALIVE.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”
Collaborative resource management workspace and project management application for data collection, analysis, reporting and visualization.
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.
4. Operates on a “Sustainable Business Model” through collaborative and incremental investments.
5. Working toward an Open Source / Open Core code model.
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...

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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 agric ...

View more

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Management Activities

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

**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.

**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...

**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.
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.

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 to 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.
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
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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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-filled streams called redds where they deposit their eggs. After the male fertilizes the eggs, the female covers the redds 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 later 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.
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The life cycle of a salmon takes it from rivers to the ocean and back again. At every step, they face challenges of a changing world, shown in the shaded bubbles. Source: Washington State Recreation and Conservation Office

Chinook Salmon and the San Joaquin River?

There are two distinct runs of Chinook salmon in the San Joaquin River. Runs are designated by the timing that adults enter into freshwater from the ocean toward their natal spawning streams. Many factors, however, influence the precise timing of the runs such as water temperature, flow characteristics and maturation of the fish.

Fall-run Chinook salmon migrate upstream between September and December. They are sexually mature when they enter freshwater streams and spawn between October and December.

Spring-run Chinook salmon typically migrate upstream between February and May. They remain in cold freshwater habitats while they sexually mature and spawn between August and October.

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<th>Life Stage</th>
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Spring-Run

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

Current Temperature Conditions in the San Joaquin River and its Tributaries

The graph illustrates the temperature conditions over the last two weeks. The water temperature experienced at any given day is averaged across 7 days to produce the daily average. This measure allows for a better understanding of the water temperature over time.

San Joaquin River lower basin temperatures over the last year

The graph shows the water temperature over the past year, with a threshold of 68 degrees F for Chinook salmon migration.
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 BRIDGE (DBB)
- STANISLAUS R AT OAKDALE (SDO)
- RIPON (RPN)
- TUDORINE RIVER AT MODESTO (HGO)
- SAN JOAQUIN RIVER AT GRAVELLY FORD (DRF)
- SAN JOAQUIN R AT BORNY BRIDGE (DBB)
- SAN JOAQUIN R AT BORNY AT UF (DBB)
- SAN JOAQUIN R BELOW FRANT (SFJ)

64 degrees F Water Temperature Migration Criteria

Continue: The above graph illustrates the temperature trends for the upper and lower tributaries of the San Joaquin River over the last year. The temperatures fluctuations in actual temperatures were monitored through the chart. The 64 degrees F represents the critical temperature values necessary for optimal migration, as recommended by the US Fish and Wildlife Service. For the upper basin, this is 64F, while for the lower basin, it is 60F.

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 rates 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 fields.
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 riparian vegetation along stream banks, which provide shade that helps 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.

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 1998. 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 Dam’s 195-km long-term water contractors.

This project includes improvements to the channel and structures that convey flow and improve fish habitat, 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.
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.
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 (PO4) 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 Walter, Department of Water Resources)

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. (CRWQCB 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.

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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**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?

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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 ...
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.

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<th>Recommendation 1</th>
<th>Recommendation 2</th>
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<tr>
<td>(estimated illness rate 36/1,000)</td>
<td>(estimated illness rate 32/1,000)</td>
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<tr>
<td>GM</td>
<td>STV</td>
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<td>126</td>
<td>410</td>
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**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:

Click on the stations above to view monitoring result for each. Horizontal lines on the charts represent EPA’s 2012-recommended recreational water quality criteria. One is the Statistical 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

Management Activities

News
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About the San Joaquin River Basin
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The San Joaquin River Restoration Program is a comprehensive long-term effort to restore the river to a more natural state. It includes efforts to restore and maintain fish populations in “good condition”, including naturally reproducing and self-sustaining populations of fish.

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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 return in the Mokelumne River...

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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 its 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 2008, 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.
REGIONAL ASSESSMENTS AND DATA SOURCES

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.

1 REGIONAL ASSESSMENT TOOLS AND CALIFORNIA DATA RESOURCES

CALIFORNIA MY WATER QUALITY PORTALS

These web portals, supported by a wide variety of public and private organizations, presents California water quality monitoring data and assessment information that may be viewed across space and time.

USGS Water Data for the Nation: National Water Information System [NWIS]

USGS National Water Information System (NWIS) provides access to water-resources data collected at approximately 1.5 million sites in all 50 States, the District of Columbia, Puerto Rico, the Virgin Islands, Guam, American Samoa and the Commonwealth of the Northern Mariana Islands. The USGS investigates the occurrence, quantity, quality, distribution, and movement of surface and underground waters and disseminates the data to the public, State and local governments, public and private utilities, and other Federal agencies involved with managing our water resources.

USGS Current Water Data for the Nation

Select a state from the map to access real-time data

Current data typically are recorded at 1- to 50-minute intervals, stored online, and then transmitted to USGS offices every 1 to 4 hours, depending on the data transmission method used. Recording and transmission rates may vary depending on critical events. Data from current sites are online by USGS offices via websites, telephones, fax machines and telegrams, and are available for viewing within minutes of arrival.

California Data Exchange Center (CDEC)

The California Data Exchange Center (CDEC) installs, maintains, and operates an extensive hydrologic data collection network including automatic snow reporting gages for the Cooperative Snow Surveys Program and precipitation and river stage sensors for flood forecasting. CDEC provides a centralized location to store and process real-time hydrologic information gathered by various cooperators throughout the State. CDEC then disseminates this information to the cooperators, public and private agencies and, news media.
Collaborative development efforts for the San Joaquin provides stakeholders 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 requirements.
The 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 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 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 Stanislaus, 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)
INTEROPERABILITY: SHARE EVERYTHING

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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