

A Water Quality Portal for the Sacramento River Watershed

Supporting Community-Based Watershed Management

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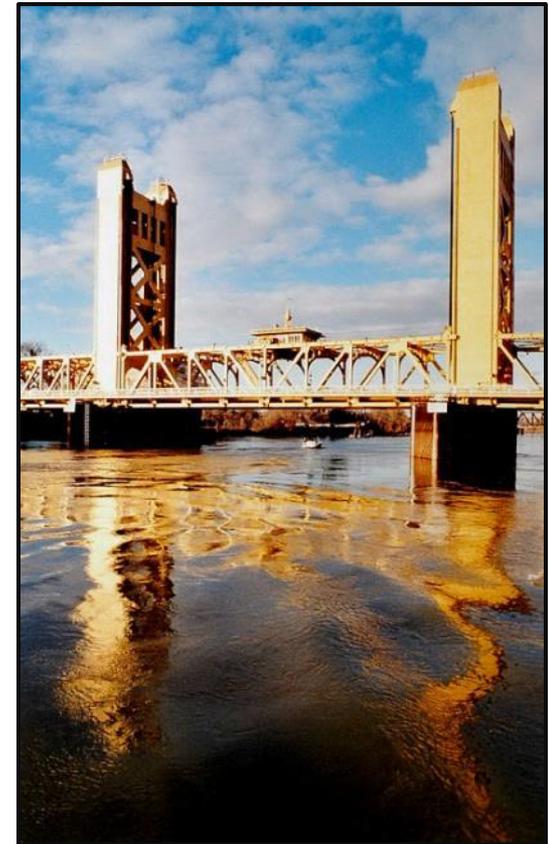
Stephen McCord, Ph.D., P.E.



- SRWP background & recent activities
- Future data and tool development
- Project process
- CWQMC overlap

Core SRWP Functions

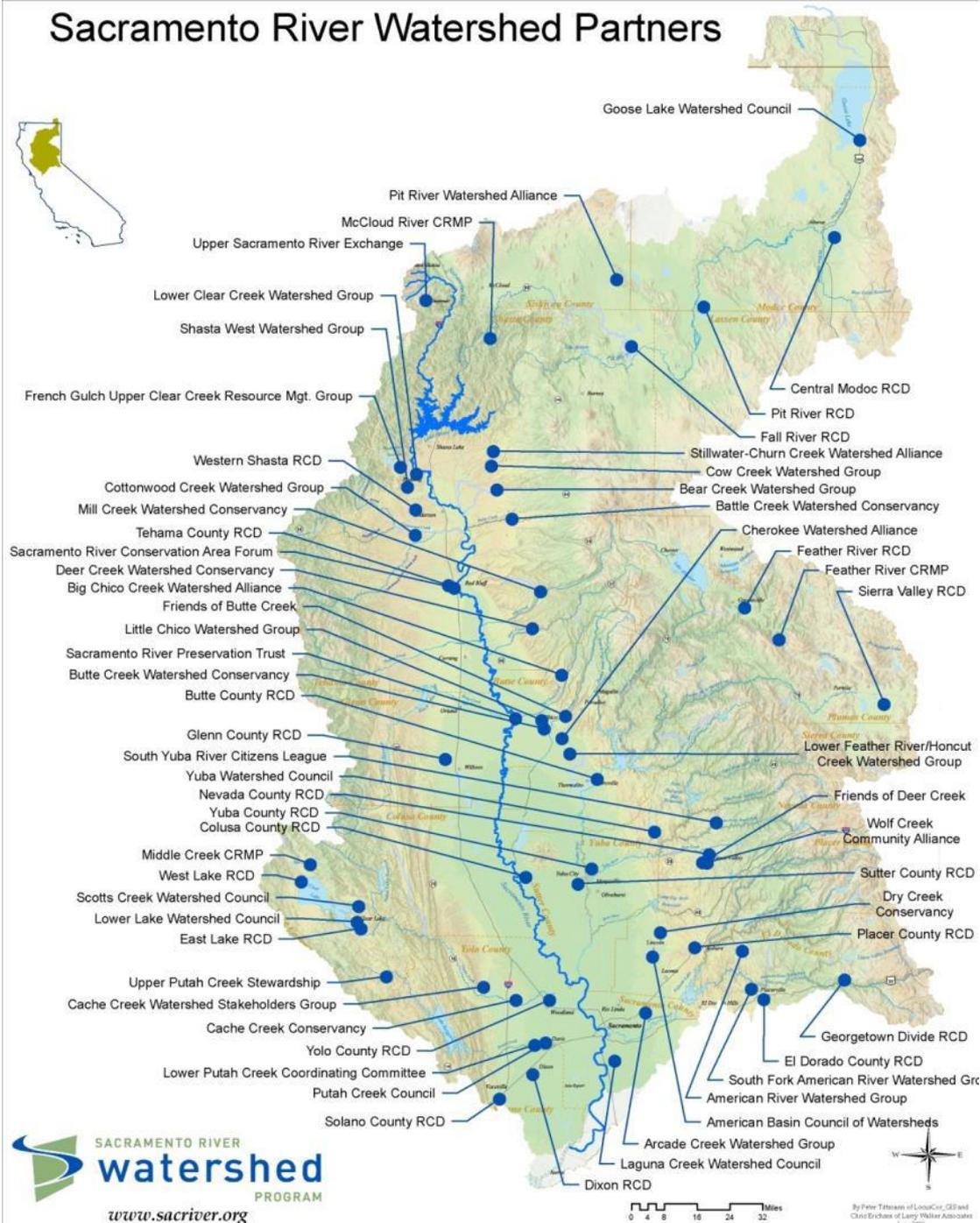
- Public Outreach and Education
- Local Watershed Support
- **Watershed Monitoring and Assessment**



Partners Everywhere

>300 contacts in Watershed Monitoring stakeholders

Sacramento River Watershed Partners



Regional Monitoring Efforts

2008-2009

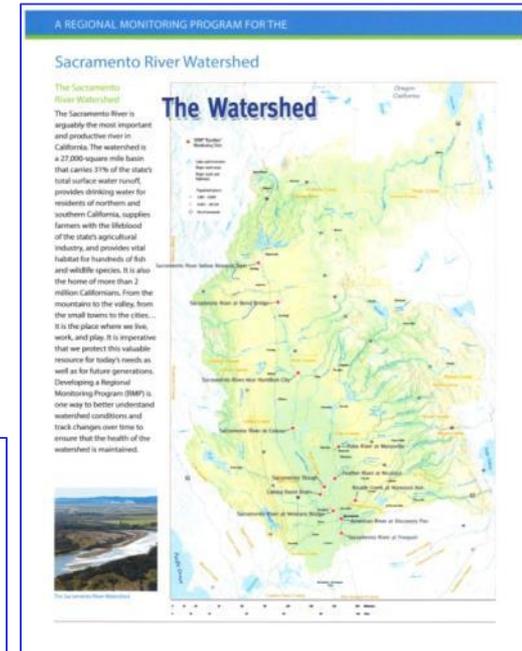
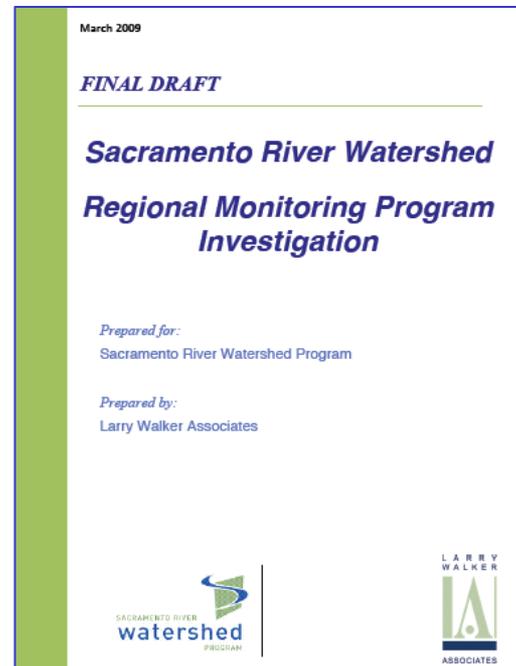
- Feasibility Study

2009

- Stakeholder Meeting
- RMP Fact Sheet
- Investigation Report

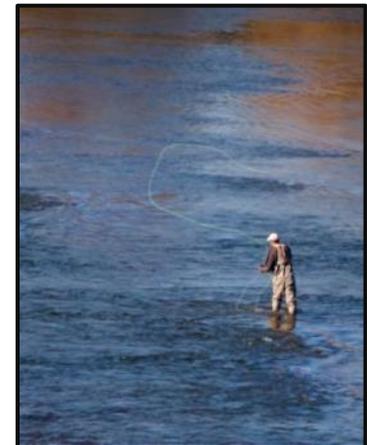
2013

- Stakeholder Interviews
- Summary of Responses and Recommendations



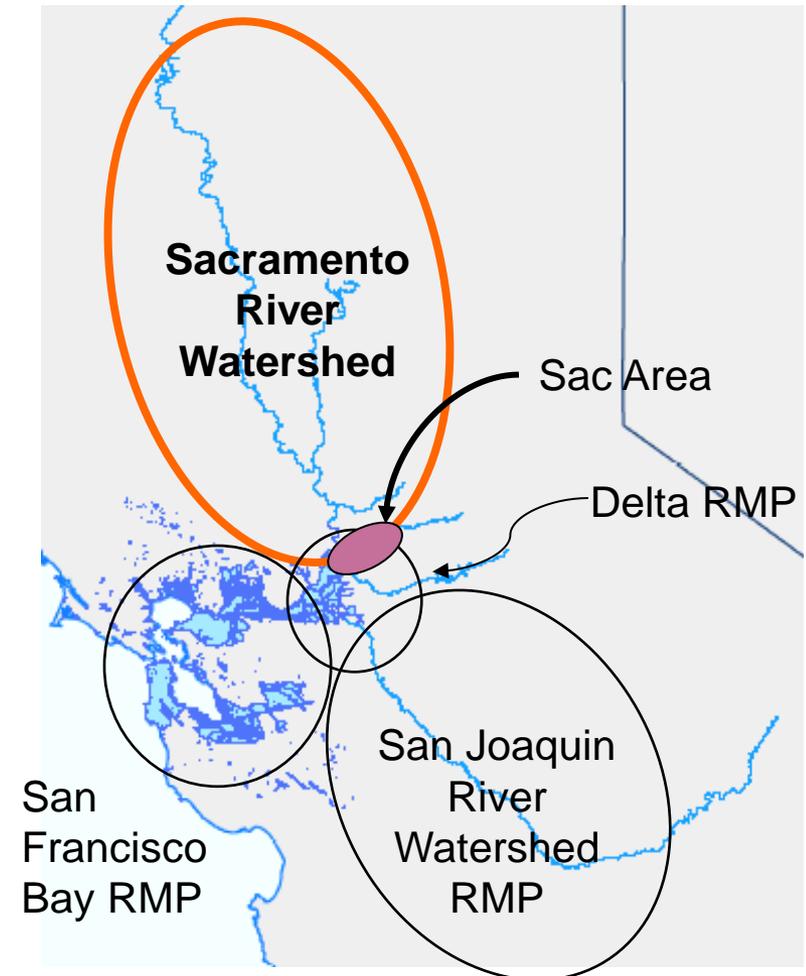
Stakeholders

- NPDES permittees – POTWs, MS4s
 - Irrigated Lands Regulatory Program
 - FERC-licensed reservoir operators
 - California Urban Water Agencies
 - State Water Contractors
 - IEP agencies
 - Reclamation Districts
 - Dept. Water Resources
 - USEPA, State & Regional Boards
 - Dept. Public Health
 - Non-Government Organizations
 - General public
- } Regulated Dischargers
- } Water Purveyors
- } Agencies
- } Regulators
- } Others



Building a Comprehensive RMP

- Currently least RMP effort in the State's largest watershed
- No stakeholder input
- No data synthesis
- No broad reporting

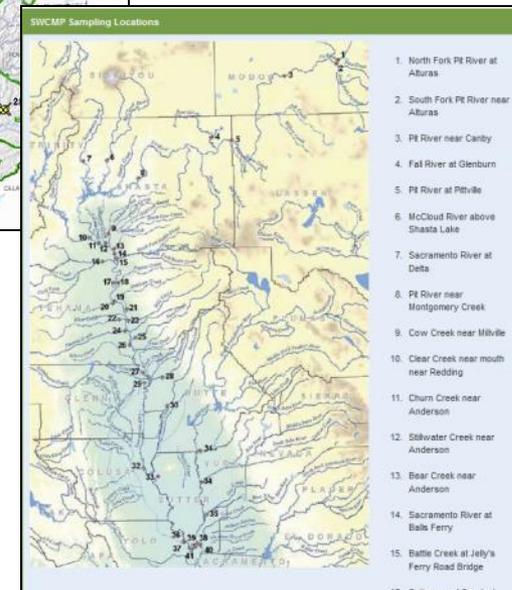
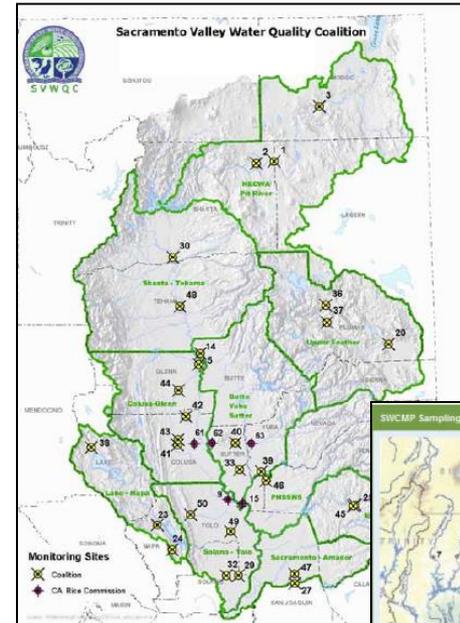


So Cal programs



Current Monitoring Activities

- Sac. Area CMP
- Irrigated Lands Coalitions (Rice & Other)
- Regional SWAMP by DWR



- SRWP background & recent activities
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CA Estuaries Portal

- Workspace for My Water Quality portal content (>85 Q&A!)
- Source project for critical estuary data
- Estuary wiki
- Custom GIS files

The screenshot displays the California Estuary Portal website. At the top, there is a navigation menu with links for Home, Sensors & Data, Visualizations, Maps & GIS, Document Library, Projects, Wiki, and Users. A search bar and a location indicator for Sacramento 47° are also present. The main banner features a large image of an estuary with the text "California Estuaries" and a brief description: "What are estuaries? Estuaries are partly enclosed bodies of water where fresh water coming down the rivers mixes with salt water from the sea. A range of coastal landforms fits this description, including bays, lagoons, harbors, inlets, and some wetlands. There are many types of estuaries in..." Below the banner, there are several featured articles and documents, each with a thumbnail image and a "View more" button. The articles include "Why Are Living Resources A Key Attribute?", "How And Where Are Fish Surveyed In The SF Estuary? (APPROVED)", "How And Where Are Zooplankton Monitored In The SF Estuary? (APPROVED)", and "What Is Being Done To Protect California's Estuaries?". At the bottom, there is a "Workspace Documents" section with a "View all" button and a "CAESTUARIES Twitter" section with a "Follow" button.

MY WATER QUALITY PORTALS

ENVIRONMENTAL PROTECTION AGENCY
NATURAL RESOURCES AGENCY
CALIFORNIA WATER QUALITY MONITORING COUNCIL

Home Safe to Drink Safe to Swim Safe to Eat Fish Ecosystem Health Stressors & Processes Contact Us

Office of Governor
Edmund G. Brown Jr.
Visit his Website

→ Cal/EPA
→ Natural Resources Agency
→ About the California Water Quality Monitoring Council

California Estuaries



Click on image above for more information

5/15

WETLANDS

→ Stressors
→ Laws, Regulations & Standards
→ Regulatory Activities
→ Enforcement Actions
→ Research
→ Monitoring Programs, Data Sources & Reports

QUESTIONS ANSWERED

What are Estuaries?

- Why are Estuaries important?
- What is the San Francisco Estuary and Bay-Delta?

Where are California's Estuaries?

- How many estuaries are in California?
- Which are the larger estuaries?

How healthy are our estuaries?

- How do we measure estuary health?
- What studies have documented estuary health?

How are we restoring our estuaries?

- What restoration projects are underway?
- What regulations protect our estuaries?

What is an Estuary?

An estuary is a partly enclosed body of water where fresh water coming down the rivers mixes with salt water from the sea. A range of coastal landforms fit this description, including bays, lagoons, harbors, inlets, sounds, fjords and swamps.

Flush with nutrients and inhabited by resilient organisms, estuaries are among the most productive ecosystems on earth. They provide rich feeding grounds for coastal fish and migratory birds, and spawning areas for fish and shellfish. They are also important in maintaining the quality of coastal waters.

California's Estuaries

There are many estuaries distributed along 2600 km expanse of the California coast. The bays and estuaries as broadly defined above are diverse in size and type in California and Baja California and present an array of different environmental conditions for coastal fishes. Large embayments, such as San Francisco Bay and San Diego Bay, generally represent the broadest range of habitats including deep to shallow channels, mudflats, eelgrass beds, and salt marshes.

The deep portions of these large systems are perinular extensions of the shallow continental shelf and therefore offer habitat to many species of nearshore fishes. The smallest bays and estuaries predictably contain some reduced combination of shallow channels, mudflats, eelgrass beds, and salt marshes and are inhabited by a smaller number of typical bay-estuarine fish species.

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What are the San Francisco Estuary and Bay Delta?



WETLANDS

→ Stressors
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QUESTIONS ANSWERED

What are the characteristics of the SF Bay Delta?

- How big is the SF Estuary and Delta?
- What makes up the area?

What are the characteristics of estuarine health?

- Estuarine Fish?
- Estuarine Physical and
- Chemical Processes?
- Estuarine Vegetation?

How are we monitoring SF Bay and Delta estuary health?

- Regulatory?
- Monitoring Projects?

The San Francisco Estuary & Delta

The San Francisco Estuary and delta represents a highly altered ecosystem. The region has been heavily re-engineered to accommodate the needs of water delivery, shipping, agriculture, and most recently, suburban development. These needs have wrought direct changes in the movement of water and the nature of the landscape, and indirect changes have arisen from the introduction of non-native species. New species have altered the architecture of the food web as surely as levees have altered the landscape of islands and channels that form the complex system known as the Delta [1].

This article deals particularly with the ecology of the low salinity zone (LSZ) of the estuary. Reconstructing a historic foodweb for the LSZ is difficult for a number of reasons. First, there is no clear record of the species that historically have occupied the Estuary. Second, the San Francisco Estuary and Delta have been in geologic and hydrologic transition for most of their 10,000 year history, and so describing the "natural" condition of the Estuary is much like "hitting a moving target" [1]. Climate change, hydrologic engineering, shifting water needs, and newly introduced species will continue to alter the food web configuration of the Estuary. This model provides a snapshot of the current state, with notes about recent changes or species introductions that have altered the configuration of the food web. Understanding the dynamics of the current food web may prove useful for restoration efforts to improve the functioning and species diversity of the estuary.

Baydeltalive.com

- Data central for the Delta
- Extensive libraries for Delta data, photos, reports
- Real time reporting dashboards: salinity, WQ
- Weekly survey results, fish tracking
- Relevant news
- Collaborator workspace
- Ecosystem projects
- Post model results

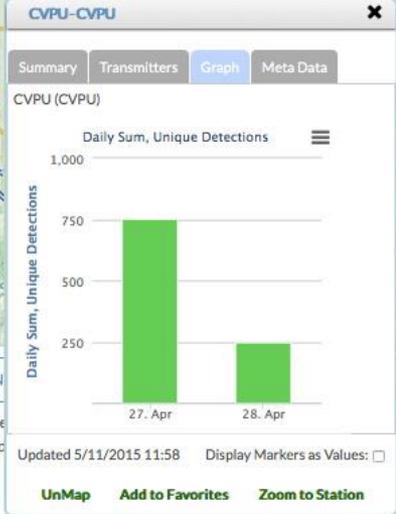
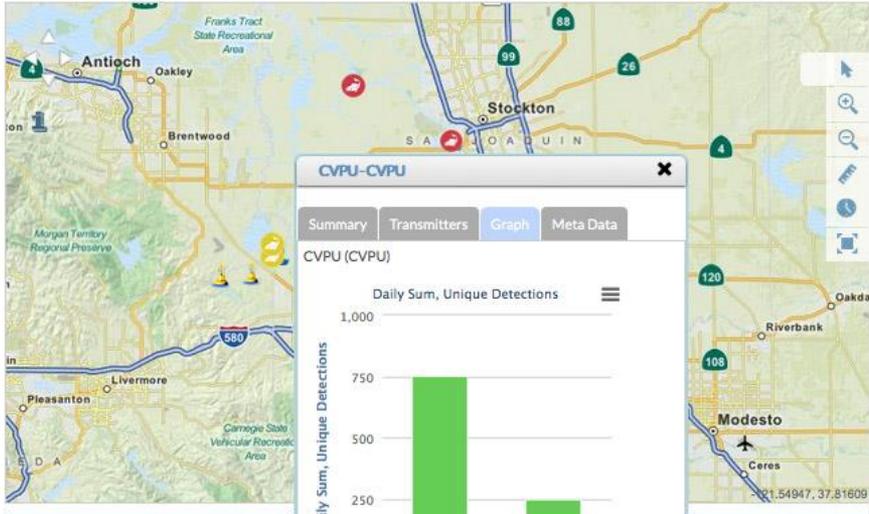
The screenshot shows the Bay-Delta Live website homepage. At the top, there is a navigation bar with the Bay-Delta Live logo, a search bar, and buttons for LOGIN, JOIN COMMUNITY, and ADD A PROJECT. The main content area features a large map of the Sacramento-San Joaquin Bay-Delta system with a blue overlay indicating turbidity. To the right of the map is a blue box titled "Real Time Turbidity Conditions" with a "LEARN MORE..." link. Below the map and box is a grid of 14 circular icons representing different data categories: Live Conditions, Daily Operations, Reservoir Storage, Snowpack / Runoff, Water Quality, Fish, Data Visualizations, Data Workspace, Ecosystem Projects, Scientific Studies, GIS/Map Layers, Delta Atlas, Photos / Videos / Docs, Salinity Conditions, 1641 Interactive, and News. The "HIGHLIGHTS" section contains four featured articles: "OPERATIONS: Salinity Conditions Dashboard", "RESEARCH: Real-Time Acoustic Telemetry Data", "PROJECTS: Creating new, self sustaining wetlands", and "SPOTLIGHT: NASA Update". The "WATER NEWS" section at the bottom lists several recent news items with small thumbnail images.

San Joaquin River RMP and RT Portals

- 50+ datasets for multi-stakeholder use & evaluation
- Real-time. Public assessments for Temp., Salinity, Nutrients, etc.
- Current phase: SJR Real-time WQ management
- Funded by USEPA, CURES, SFCWA and 34 North

The screenshot shows the homepage of the San Joaquin River Real-time Water Quality Portal. The header includes the logo for 'SAN JOAQUIN RIVER Regional Water Quality Monitoring', the location 'STOCKTON 73°', a search bar, and a 'Log In' button. The main navigation menu consists of 'Home', 'Explore Data', 'Library', 'Explore the SJR', and 'Log In'. The featured article is titled 'Does Water Temperature in the San Joaquin River and its Tributaries Support...'. Below this, there are four smaller article thumbnails: 'Is Salt Affecting Beneficial Uses in the San Joaquin River Basin?', 'Does Water Temperature in the San Joaquin River and its Tributaries Support Chinook ...', 'Is it Safe to Swim in the San Joaquin River and its Tributaries', and 'Are excess nutrients a problem in the San Joaquin River?'. The bottom section is divided into 'SJRWQ Twitter' (showing three tweets about water quality and salmon migration), 'Management Activities' (with a map and text about the restoration program), and 'Regional Assessment: What we measure?' (with a map and text about regional assessment tools).

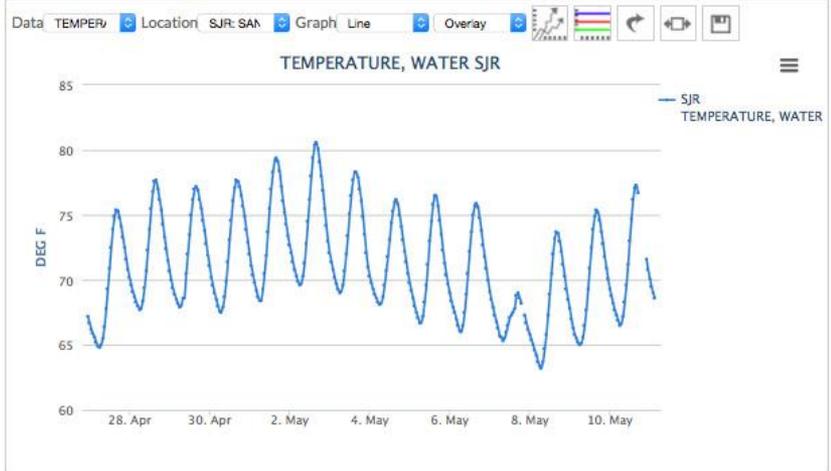
- All Stations
- Release Site
- Head of Old River
- Garwood Bridge
- Turner Cut
- Facilities
- Current Extent



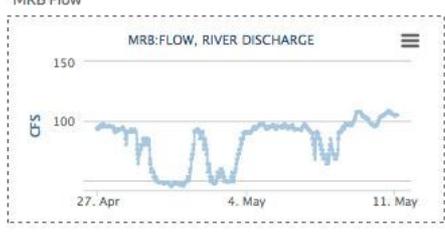
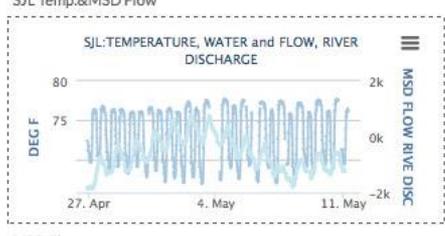
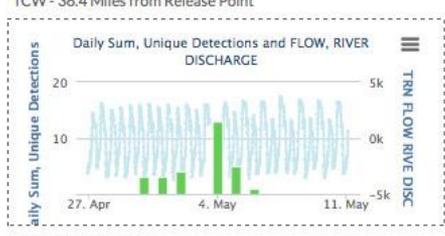
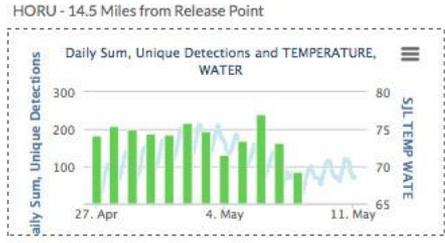
FISH RECEIVER DATA: DAILY SUM, 30 MIN

Roll over each icon on the map to see time se
build your own graphs with the aggregated d

MORE



Tag Detection Data/Current Conditions



Model Forecasts

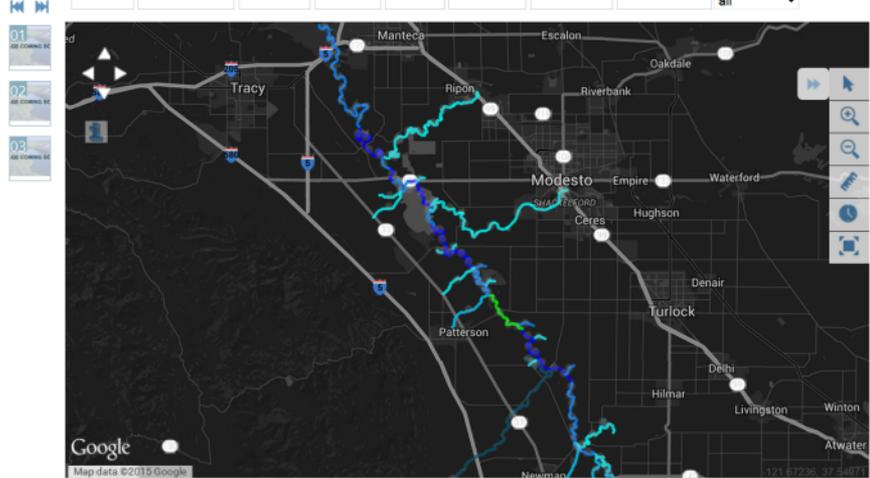
WARMF Visualization Overview: Visualize WARMF

A quick model load for visualizing the WARMF forecast on your desktop. The interactive map defaults the first visualization to the WARMF forecast* for Salt Load. Using the image carousel on the left side of the map, you can choose additional visualizations including Electrical Conductivity and Flow. Data graphs displayed on the right are filtered by region using the graph quick view buttons below. For a complete list of stations graph available, see the Station Finder.

*The time interval for the forecast is currently set at 14-day duration, the last 7 day archive forecast with current 7 day forecast.

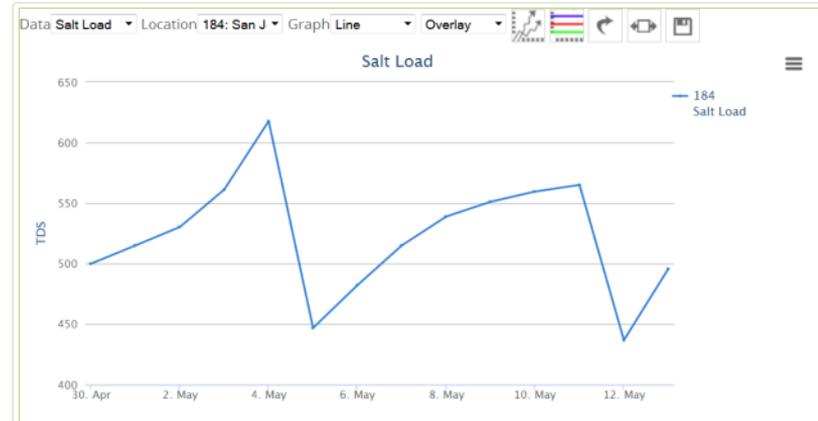
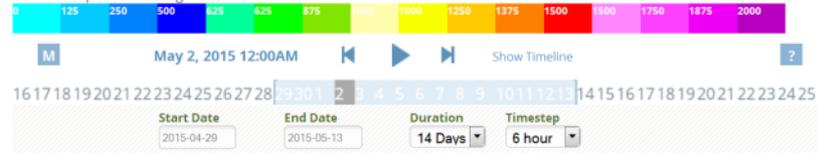
Quick Region Links

Vernalis | Crows Landing | Lower SJR | Modesto | Turlock | Salt Slough | Mud Slough | Current Extent | Station Finder



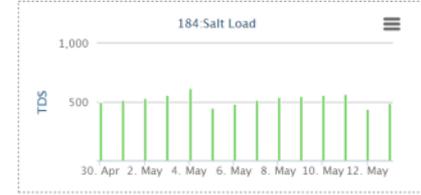
WARMF FORECAST (Reduced): Salt Load (TDS)- 14 Day Duration

Salt Load Forecast Visualization using a custom GIS grid with reference to the WARMF model station output. This model has been optimized using a reduce station count.

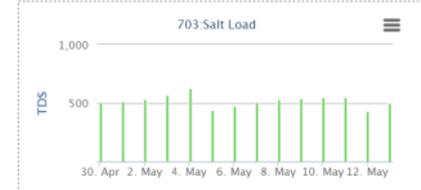


Salt Load

San Joaquin River at Vernalis (184)



San Joaquin River at Maze Road (703)



MID Main Canal Spill (209)



Stanislaus River at Caswell S.P. (161)



DATA STORIES

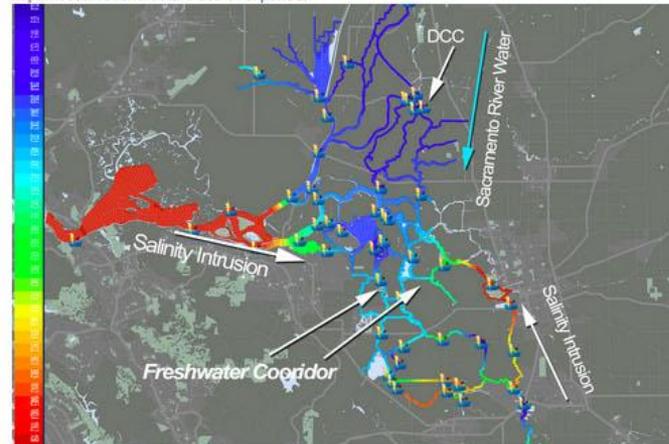
Managing Salinity in the Sacramento-San Joaquin River Delta- During Drought Conditions

An Overview

Flows and water quality in the Sacramento-San Joaquin Delta (Delta) are strongly influenced by freshwater inflow from the rivers, by the tides in San Francisco Bay and by salinity from Bay waters. Prior to human influence, the historical distribution of salinity in the Delta was controlled primarily by the seasonal and inter-annual distribution of precipitation, the geomorphology of the Bay and Delta, daily tides, the spring-neap tidal cycle, and the mean sea level at Golden Gate. Extended wet and dry periods are both evident in the historical record. Since about 1860, a number of morphological changes to the Delta landscape and operational changes of reservoirs and water diversions have affected flows and the distribution of salinity within the Delta.

Drought Conditions

Salinity controls exports during droughts. As river flows entering the delta decrease, the water in the south delta will become so salty it will be unusable and exports from the delta will stop. This document outlines a number of alternatives for "controlling" the salt field in the central delta. These alternatives principally rely on strategically placed "temporary" barriers. In the absence of these barriers, a great deal of water will be used to repel salinity intrusion in the delta, rather than being kept in reservoirs for future use or exported.

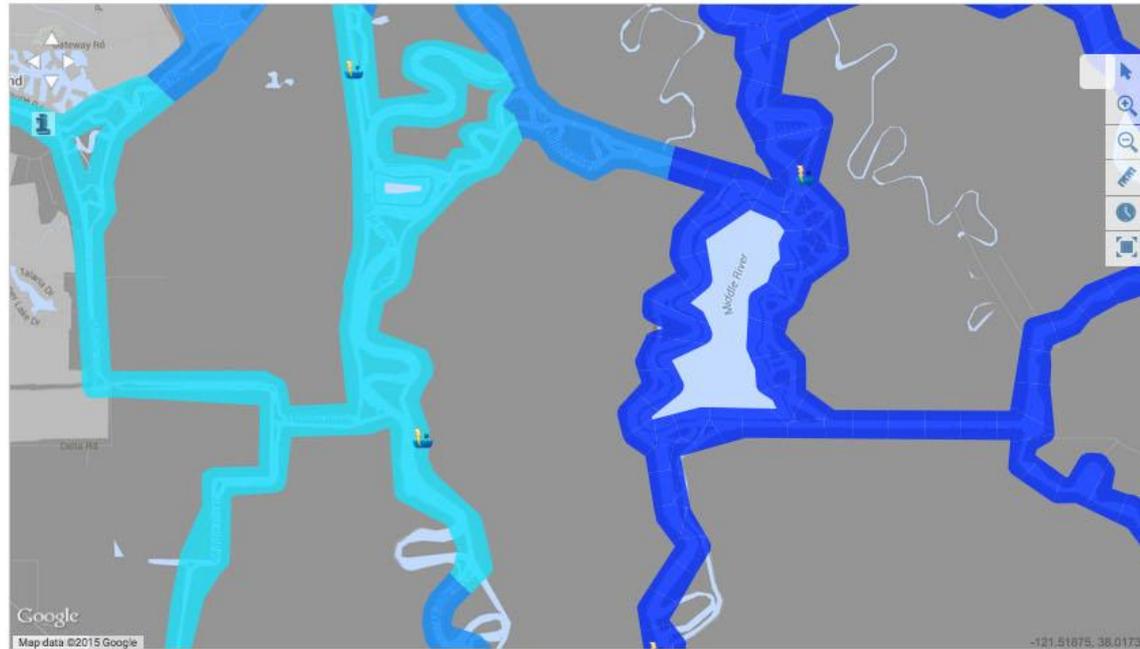


Caption: Salinity Intrusion and the Fresh Water Corridor Illustrated

There number of drought mitigation strategies that will allow the water projects to reduce reservoir releases, minimize the impacts of the ecosystem of very low river flows and continue to deliver water to the greatest extent possible as water supplies dwindle. A variety of numerical models are being used to evaluate the response of the salt field to a sequence of mitigation measures, which involve export curtailments, reservoir releases, gate operations and temporary barriers. All of these strategies could help us minimize the amount of water needed to keep the "fresh water

Quick Links

Current Extent Get Quick Link All



Electrical Conductivity (micro s) Data Visualization - Last 7 days

Salinity Conditions Visualization, Data always displays last 7-Days.



May 13, 2015 7:30AM



13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 :

Start Date

End Date

Duration

Timestep

2015-5-5

2015-05-13

7 Days

1 hour

- SRWP background & recent activities
- Future data and tool development
- Project process
- CWQMC overlap

Project Process

- Stakeholder commitments
- ID practices, questions, underlying issues
- ID & characterize available info. (data, maps, reports, programs, photos)
- Script analyses & visualizations
- Build & host site
- Outline future activities

ID Current Practices

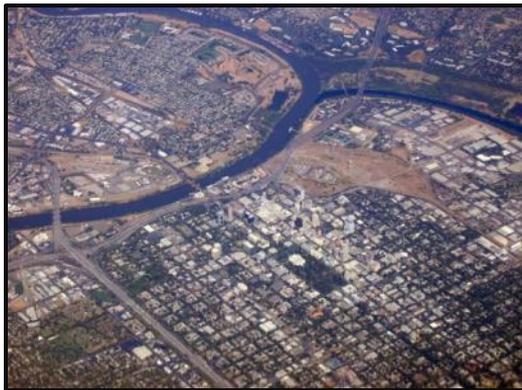
- What data are you accessing now?
- How are you evaluating those data to make decisions?
- How and where are your data stored, assessed and reported?
- How do you communicate for effective coordination of monitoring ?
- Where are your reports stored for access?

Clarify Value Proposition

- How could a portal support your needs & interests?
 - What questions do you have about water quality in the watershed?
 - What data do you want but can't find?
- How could a portal save you time & money?

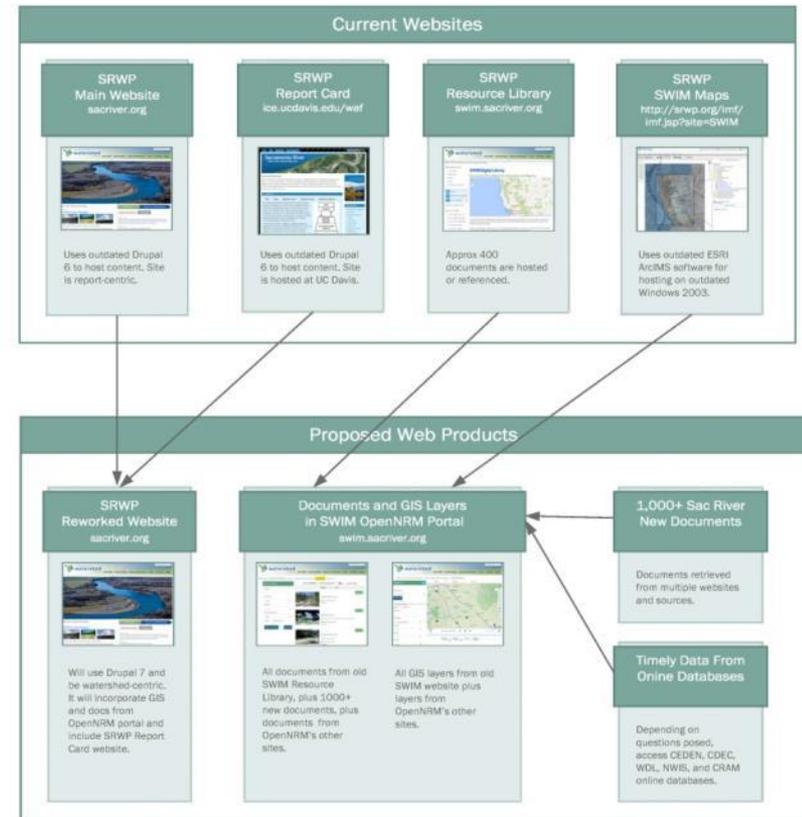
Potential Questions

- Are the fish safe to eat?
- Is the water safe for recreation?
- Is the aquatic ecosystem healthy?
- Are salmon runs healthy?
- Is riparian habitat increasing? Are habitats benefiting wildlife?
- Who is monitoring water quality? Where and how?
- Who is doing what to protect water quality?



Design and Content

- Create, customize, integrate OpenNRM templates
- Use collaboration (pages, teams, docs, links, wiki)
- Import 1,400+ documents using metadata standards
- Import ~120 GIS layers
- Access data with open data standards
- Entirely web-based (no desktop app)



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CWQMC Overlap

- CA Estuaries Monitoring Workgroup
- CA Wetland Monitoring Workgroup
- Healthy Watersheds Partnership
- Data Management Workgroup
- BOG Workgroup for “Is it safe to eat fish?”

Anticipated Challenges

- Initial outreach and engagement
- Relevant, accurate interpretations
- Sustainable hosting & maintenance

Near-term Activities

- Host 1st stakeholder meeting (June 11)
- Communicate with SWAMP, IRWMPs, ILRP...
- Gather letters of commitment



CWQMC Questions

- What questions would be most useful/practical regionally?
- Who should we target for use cases?
- What will be our keys to success (i.e. sustainability)?
- ??

For more information

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