Collaborative Natural Resource Management in the Sacramento River Watershed Using OpenNRM Software for Data Aggregation Analytics, and Visualization

Reclaiming the Sierra 2017
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data.sacriver.org
What is the SRWP Data Portal?

- Access to current monitoring conditions from hundreds of sensors throughout the watershed.
- Explore historical data and review data stories.
- Access catalogs of current research and reports. Upload and share data.
- View, synthesize and download more than 200 map layers.
- In-depth analysis of important topics including forest health, river water temperature, reservoir operations and fisheries management.
- Explore data information hubs: region and topic specific.
- Add, track and share projects.
Sacramento River Watershed Data Portal
Contributing Stakeholders

- CA Department of Conservation
- CA Department of Water Resources (regional and CWP for Water Management)
- Central Valley Regional Water Quality Control Board (regional and Surface Water Ambient Monitoring Program)
- Northern CA Water Association/Sacramento Valley Water Quality Coalition (Irrigated Lands Regulatory Program)
- Sac Valley Region of Resource Conservation Districts
- Sac Valley Regional Water Management Groups (Integrated Regional Water Management)
- Sierra Nevada Conservancy - WIP/Watershed Assessments
- State Water Resources Control Board
- The Nature Conservancy (regional and Fire Learning Network for Forest Health)
- UC Davis
- US Forest Service - Watershed Improvement Program (WIP)
SRWP Data Management and In-Depth Topics

- Current Monitoring and WQ Conditions (Lower Sac Valley)
- Region View: Projects, Documents
- Reservoirs
- Forest Health and Fire
- Mercury Mines and Water Quality
- Water Temperature and Compliance
- Fish Monitoring
- Region Focus: Battle Creek, Lower Sac
- Safe to Swim
- Nutrients
Key Data and Available Monitoring Programs

- Sacramento Watershed Coordinated Monitoring Program (WDL/SWAMP)
- California Data Exchange Center (CDEC)
- Sacramento Coordinated Monitoring Program (CEDEN)
- Irrigated Lands Regulatory Program Monitoring (CEDEN)
- Sacramento River Watershed Program Monitoring (CEDEN)
- DWR/IEP Environmental Monitoring Program (BDL Web Services)
- Fisheries Data (BDL Web Services)
- National Water Information System (USGS)
- California Irrigation Management Information System
- NOAA Weather Service, River Forecasts, and Tide Predictions
Butte Forest Thin Doe-Mill Ridge Watershed Project

Quick Links

- Restoration Project Boundaries
- Restoration Project Tracking

Project Tracking

Caption: Sample Project tracking Graph

Acres of Land Improved or Restored

The purpose of this Performance Measure (PM) is to track efforts to improve natural resource conditions, such as site productivity and wildlife habitat, through site improvement or restoration activities and reduce the risk of natural disasters.
Beneficial Uses Addressed by the Butte Forest Thin Doe Mill Ridge Watershed Restoration Project

What is a Beneficial Use?

The term “Beneficial Use” determines how the state of California monitors and regulates aquatic ecosystems and underground aquifers water quality. The goal is to provide the highest water quality consistent with maximum benefit to the people of the state. Aquatic ecosystems and underground aquifers provide many different benefits. A beneficial use is defined by assigning water quality requirements to agriculture supply, cold freshwater habitat, fishing, estuarine habitat, water supply recreation and much more. Reservoirs are one tool used by water managers to meet these requirements.

**What: Spawning, Reproduction, and/or Early Development (SPWN): Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.**

**How: “Butte Creek Supports Spring-run Chinook salmon and steelhead”**

**Description:** California streams support the southern-most Chinook salmon runs on the west coast. The Sacramento River and its tributaries support 4 distinct runs of Chinook salmon. The distinct runs of Chinook are named based on season of the year when the majority of the adults enter freshwater to spawn. Overall, chinook salmon generally spawn at 2-7 years of age depending on the population. Chinook salmon eggs.
Irrigation, stockwatering, or support of vegetation for range grazing.

How: Downstream surface water supply for Agricultural users

Description: In the upper Sacramento River Watershed, much of the land area is managed by the U.S. Forest Service for multiple uses such as timber production, grazing, and recreation. Alluvial valleys in the upper watershed are mostly privately owned and used for irrigated agriculture and cattle ranching. Most of the Sacramento Valley is intensively cultivated, with some 2 million acres of irrigated farmland growing crops that include rice, wheat, orchard fruits and olives, corn, alfalfa, tomatoes, and vegetables.

What: Municipal and Domestic Supply (MUN): Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply

How: Downstream surface water supplies for Municipal Users

Description: Headwaters, such as the upper Butte Creek supply water for cities and towns inside and outside of the Sacramento River Watershed. Maintaining high water quality standards of water in headwaters decreases costs and increases water availability.

What: Cold Freshwater Habitat (COLD): Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, shellfish, or wildlife, including invertebrates.

How: Feeds into Little Chico Creek and Butte Creek contributing baseline flow and cooler Temperatures for Aquatic Species.

Description: Cold freshwater habitats generally support trout and may support anadromous salmon and steelhead fisheries as well. Cold water habitats are commonly well-oxygenated.
Butte Forest Thin Doe-Mill Ridge Watershed Project

View Results:

Fuel Moisture Near Doe Mill Ridge

Fuel Moisture Near Doe Mill Ridge

Fuel Moisture Near Doe Mill Ridge
Tree Mortality Screenshots here

What Is Being Done About The Tree Mortality Crisis? Real-Time Data The Effects Of Tree Mortality Fire Return Intervals Precipitation And Air Temperature, 2010 To Current

Tree Mortality in California What Is The Tree Mortality Crisis?

Tahoe National Forest Current Fire Return Intervals

Tahoe National Forest Current Fire Return Intervals
Shasta Trinity National Forest Mean Reference Fire Return Intervals
El Dorado National Forest Mean Reference Fire Return Interval

Tahoe National Forest Mean Reference Fire Return Intervals
Klamath National Forest Mean Reference Fire Return Interval
Plumas National Forest Mean Reference Fire Return Intervals
Lassen National Forest Mean Reference Fire Return Intervals
Mendocino National Forest Mean Reference Fire Return Interval
Modoc National Forest Mean Reference Fire Return Interval
Modoc National Forest Current Fire Return Intervals
Lassen National Forest Current Fire Return Interval
Klamath National Forest Current Fire Return Intervals
El Dorado National Forest Current Fire Return Intervals
Mendocino National Forest Current Fire Return Interval
Plumas National Forest Current Fire Return Intervals
Shasta Trinity National Forest Current Fire Return Intervals

Tahoe National Forest Current Fire Return Intervals
The Effects of Tree Mortality

The tree mortality crisis and resulting unprecedented tree die-off is resulting in numerous adverse impacts throughout the state of California.

Fire Threat

With millions of dead trees there is an increase in both short-term and long-term fire danger. This is due to the fact that once ignited, stands of dead trees may burn more severely and unpredictably. These high severity fires then create a secondary waterfall of impacts including impacts to water quality, public health and a net release of carbon adding to climate change. Studies suggest severe “stand-replacing” forest fires are increasing in frequency and extent, and climate change will likely exacerbate the situation, leading to increases in wildfire size and severity.

The map to the right shows the annual probability of fire in the years 2028 - 2060.

High Hazard Zones: Public Health

The map to the right depicts Tier One high hazard zones (FRAP). These zones represent areas of tree mortality in direct proximity to assets determined to be important to life and property (including communications, transportation, recreation, communities, and utilities). They represent a direct threat to public safety from falling trees.
California Tree Mortality in 2016

The map to the right shows areas of tree mortality at the end of 2016.

Tree Mortality in 2012 by Park

<table>
<thead>
<tr>
<th>Unit</th>
<th>Bark Beetle</th>
<th></th>
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<th></th>
<th>Other Agents</th>
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<tbody>
<tr>
<td></td>
<td>Pine</td>
<td>Fir</td>
<td>Mix</td>
<td>Total</td>
<td>Pine</td>
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<td>1</td>
<td>0</td>
<td>32</td>
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<td>118</td>
<td>3</td>
<td>4,019</td>
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<td>Inyo</td>
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<td>160</td>
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<td>Klamath</td>
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<td>15,846</td>
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<td>Los Padres</td>
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<td>Mendocino</td>
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</tbody>
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Data Stories and Dashboards

Data stories templates currently discuss the following topics:

- Temperature Compliance and Monitoring
- Safe to Swim
- Forest Health and Fire
- Reservoirs
- Lower Sacramento Valley Current Conditions
- Mercury and Mining
- Flow
- Nutrients
How the Portal is Organized?

Data Dashboards:
Compilations for easy display and discovery of data:

- Sacramento River Watershed Coordinated Monitoring Program
- Fisheries
- Triggers and Indices
- Regional Hubs
Explore Data:

Explore monitoring programs and key datasets from the region:

- Run filters (Avg, 7DADM etc)
- Save Data Maps and Graphs to your Catalog
- Share and Download
- Monitoring Data
- Combine with Spatial Layers
- Use Analytics for Visualization
Data is aggregated from stakeholders throughout the region:

- **Hydrologic**
- **Water Quality**
- **Terrestrial**
- **Satellite**
- **Meteorological**
- **Volunteer Sampling**
What Can You Do on the SRWP Data Portal?

- Using data dashboards, view current monitoring conditions from hundreds of data sensors throughout the watershed.
- Explore SRWP historical data.

Current Conditions
Temperature Compliance Stations

Forest Health and Fire in the Sacramento River Watershed

Management Objectives: To assess the health of our forests, identify areas of tree mortality,
Interactive Map Tools:
Tools to explore the SRW region spatially. Layers can be combined and saved to be used with projects, data stories, maps stories, dashboards and more.

- 200 + Map Layers
- Query Data
- Create and Save Map Stories
- Combine Layer with Data
Spatial Catalog and Maps
Available GIS as Data Layers and Maps

Specific to SRWP, over 200+ California Wide

- 60 Hydrology
- 14 Restoration Projects
- 6 Water Projects
- 60 Fisheries Data
- 28 Geology
- 12 Critical Habitat
- 18 Fire
- 24 Biogeography
- 5 Land use
- 3 Mercury
- 8 Vegetation
- 2 Recreation
- 30 Administrative (Boundaries, Regions, Partners etc)
While officially a type of catalog, projects are organized to showcase project details according to the amount of project information a user has. We currently have 3 project templates:

- General
- Data Story
- Projects with Dashboards
Catalogs (Geo-Located Everything):

Store and help organize content throughout the site. Catalogs are organized into the following categories but can be expanded or condensed:

- Document Library
- Projects
- Data Catalog
- GIS
- Resources Wiki
Share and collaborate with colleagues:

- Catalog entries, saved maps, graphs etc can be made public or kept private.
- All assets (including projects) allow users to share or invite members.
- Comment Feeds
- Library Feeds
A Collaborative Effort
Regional and Statewide Programs

SAN JOAQUIN REAL TIME MANAGEMENT

SWRCB MY WATER QUALITY PORTALS

CALIFORNIA ESTUARY PORTAL

SAN JOAQUIN RIVER

DWR 1641 WATER QUALITY

SACRAMENTO RIVER WATERSHED

SACRAMENTO SAN JOAQUIN BAY-DELTA

CALIFORNIA WATER QUALITY

SACRAMENTO RIVER

CALIFORNIA ESTUARY WORKGROUP TOOLS
Building on Each Other’s Program

Each region’s needs are different

Various Stakeholder Requirements
Regional Data
Region Specific Data Analysis
Local Mapping and GIS
Regional Document Libraries
Share data and products with other portal’s for system wide view

Stakeholder Specific Data Dashboards
Tool for Local Ecosystem Projects
Special Studies
Regulatory Reporting
Web Service Development