



## CALIFORNIA WATER QUALITY MONITORING COUNCIL

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## Are Our Aquatic Ecosystems Healthy?

California has many types of aquatic habitats. Follow the links below to learn more...



### WETLANDS

Wetlands form along the shallow margins of deepwater ecosystems such as lakes, estuaries, and rivers. They also form in upland settings where groundwater or runoff makes the ground too wet for upland vegetation. [More >>](#)



### ESTUARIES

Estuaries are unique habitats found where rivers and the ocean mix. They feature a diverse array of plants and animals adapted to life along this mixing zone. [More >>](#)



### STREAMS, RIVERS & LAKES

California's streams and rivers flow through diverse habitats, from mountain canyons, valleys, deserts, estuaries and urban areas. Riparian woodlands develop along stream banks and floodplains, linking forest, chaparral, scrubland, grassland, and wetlands. California lakes, supporting deep water, wetlands, riparian woodlands, offer a quiet refuge for plants, animals and humans alike. [More >>](#)



### OCEAN

California has 1,100 miles of shoreline and 220,000 square miles of state and federal oceanic habitat, featuring one of the world's most diverse marine ecosystems. [More >>](#)

**Healthy Streams Mockup Review  
Monitoring Council— June 15, 2011**

**Cristina Grosso, Meredith Williams Aquatic Science Center**

# Healthy Streams Portal Development

- Healthy Streams Partnership (HSP) drafted initial content
- ASC technical support – web design, data exchange through CEDEN, web mapping
- Priority is on healthy streams (rather than strict focus on impairments)

# Portal Contents and Data Sources

- Extent
  - NHD streams and river data
- Condition
  - Toxicity - SWAMP toxicity summary report
  - Stream Health – Perennial Streams Assessment (PSA) data
- Regulatory
- Management

Initial review completed by Healthy Streams Workgroup  
and SWAMP Roundtable

**INTRO**



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### Are Our Stream & River Ecosystems Healthy?

What is a healthy stream? Stream health is determined by biological and physical properties. Biological assessments can determine whether stream/river flora and fauna communities are thriving. Contaminant surveys can tell us if biota are being exposed to toxic levels of contaminants. This portal is designed to help answer questions about stream and river health. [More >>](#)

Click on a question below to view maps and summary information based on available monitoring results.

### Questions Answered

- [What is the extent of stream and river resources?](#)
- [What is the condition of our streams and rivers?](#)
- [What is being done to protect and restore our streams and rivers?](#)
- [What are the trends in the condition of our streams and rivers?](#)
- [What are the stressors affecting the condition of our streams and rivers?](#)

**EXTENT**



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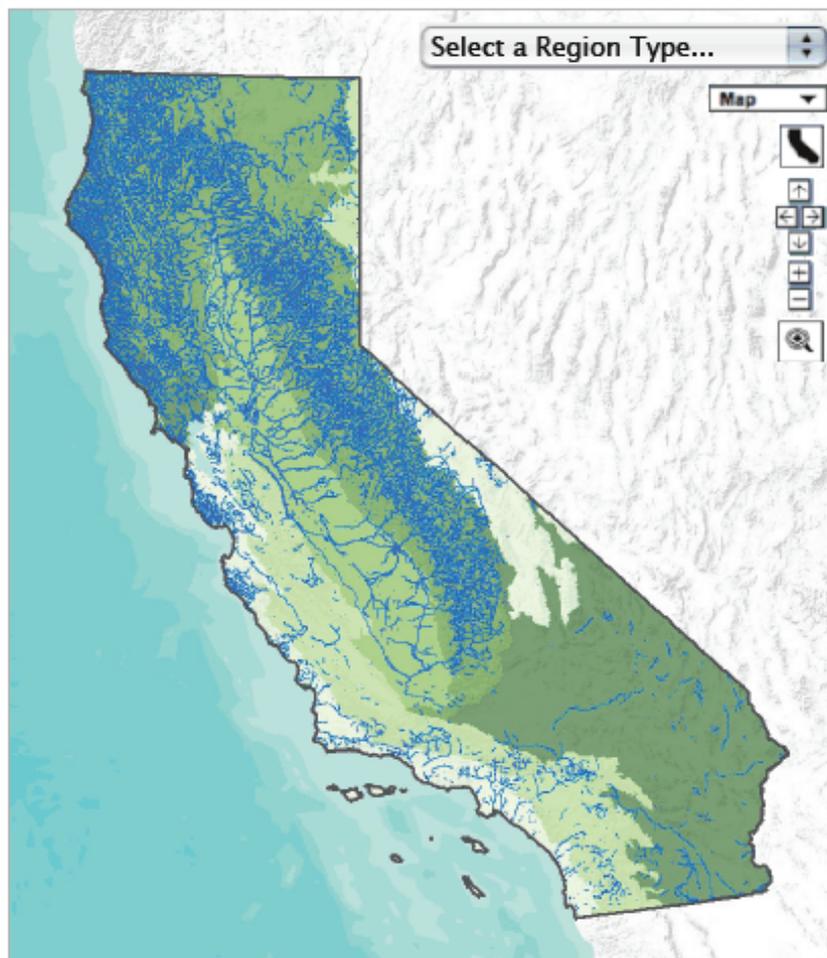


### What is the Extent of Our Stream and River Resources?

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California has perennial, intermittent, and ephemeral streams and rivers from the temperate rain forest in the north to the desert in the south. [More >>](#)

#### Statewide Stream and River Summaries

- > **Perennial** streams provide year round habitat and refuge for fish.
  - > 71,695 km (44,549 miles)
- > **Non-perennial** streams provide seasonal habitat and refuge for fish.
  - > 238,617 km (148,270 miles)

Summaries based on the [National Hydrography Dataset](#).

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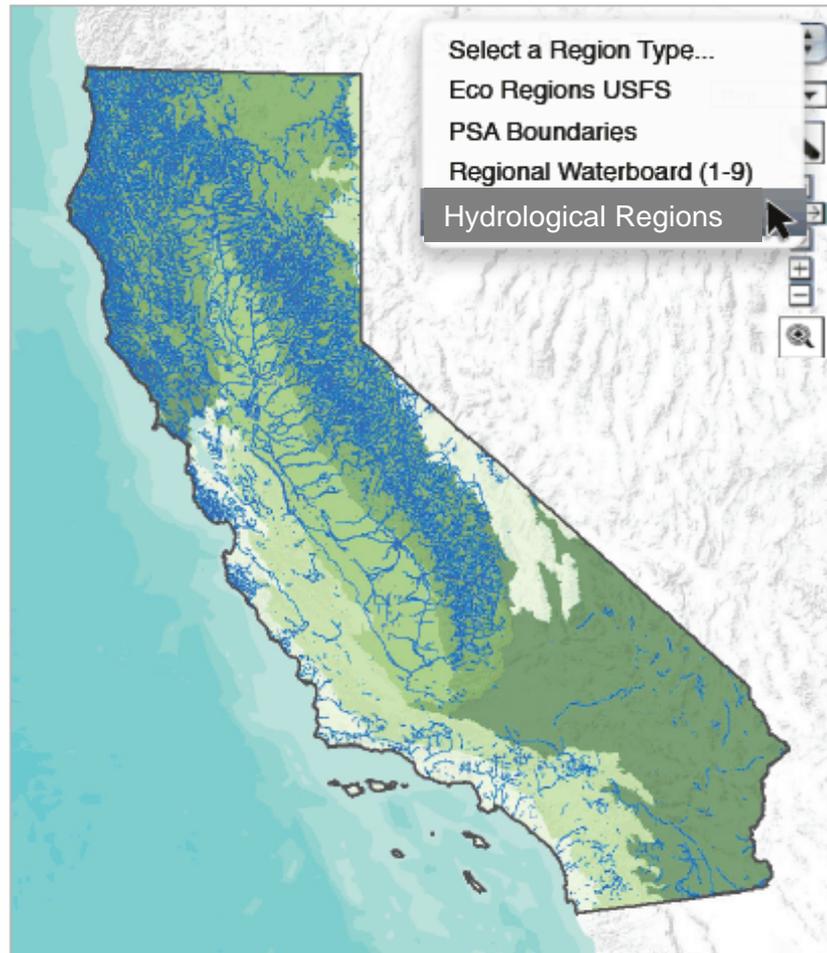
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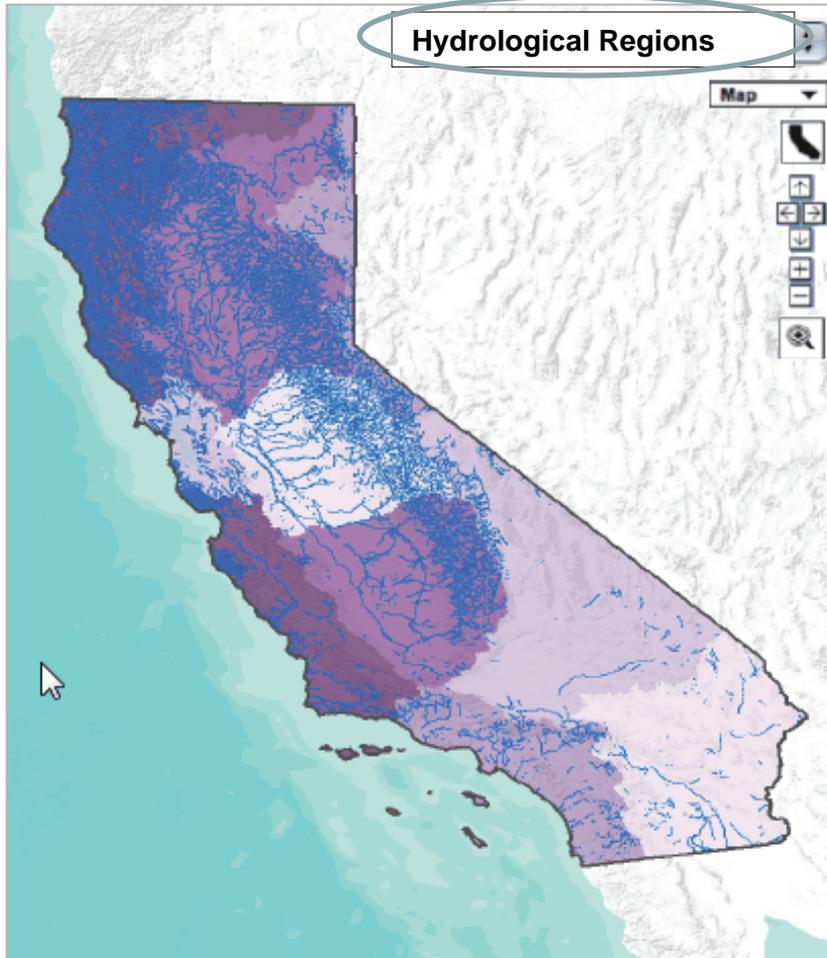


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[Click a subregion for stats](#)

\*Hydrological Region boundaries are WPU DWR



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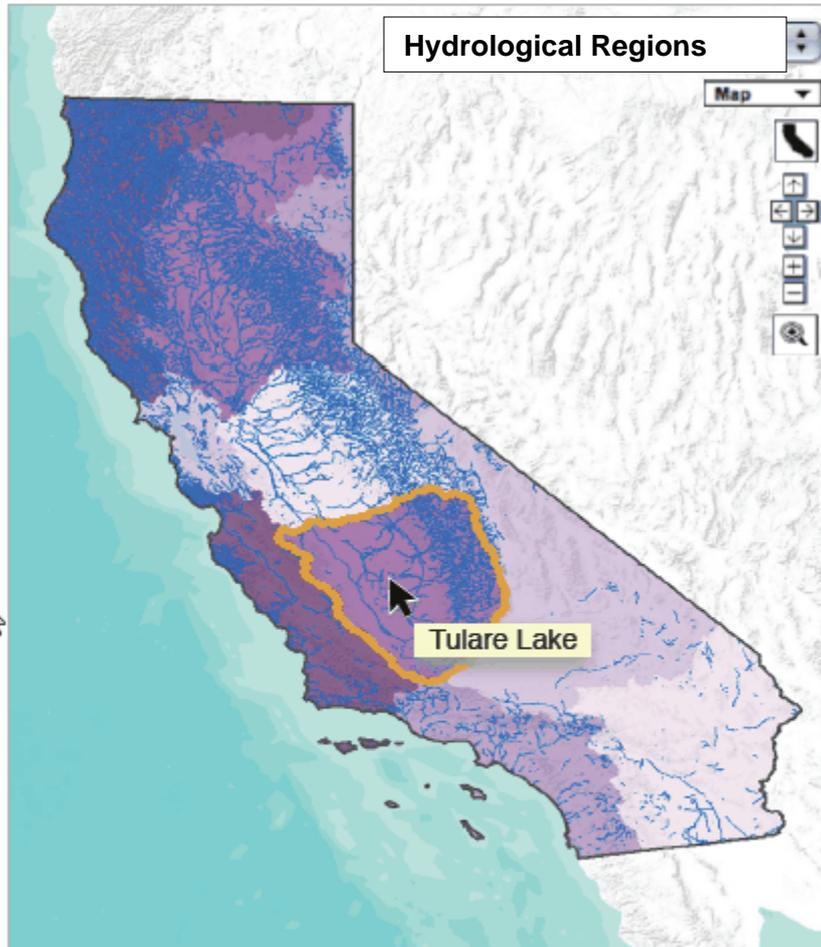


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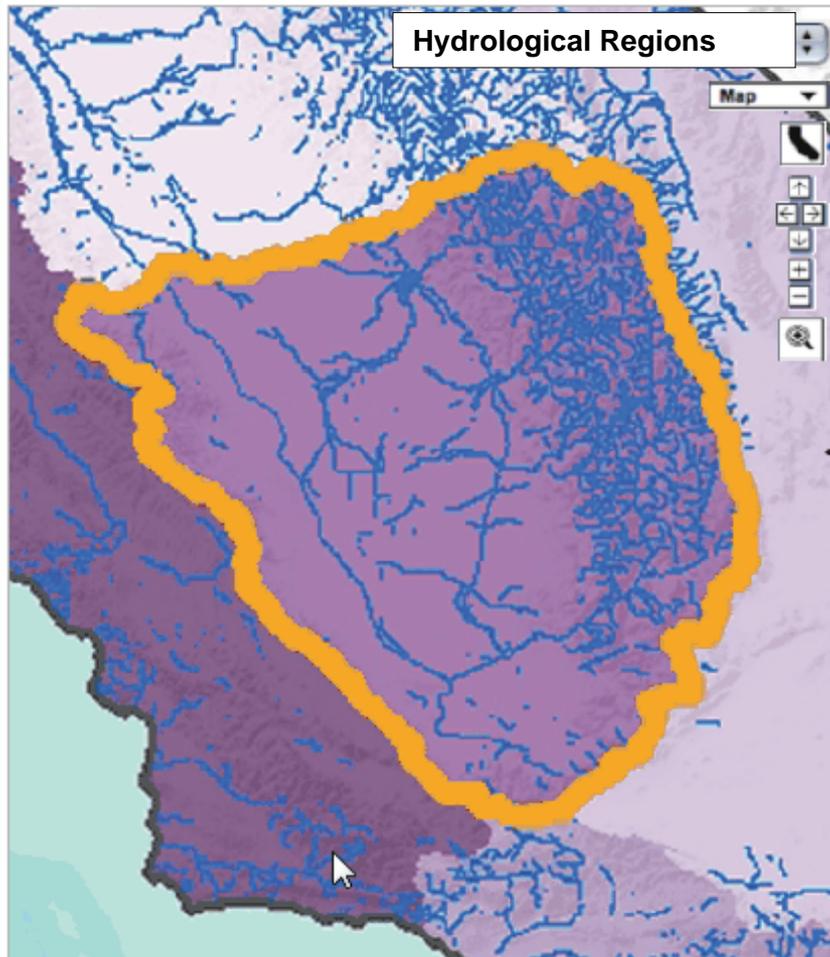


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Tulare Lake Regional Summary

- > **Perennial** streams provide year round habitat and refuge for fish.  
 > 9,266 km (5,758 miles)
- > **Non-perennial** streams provide seasonal habitat and refuge for fish.  
 > 51,431 km (31,958 miles)

[More About This Region](#)

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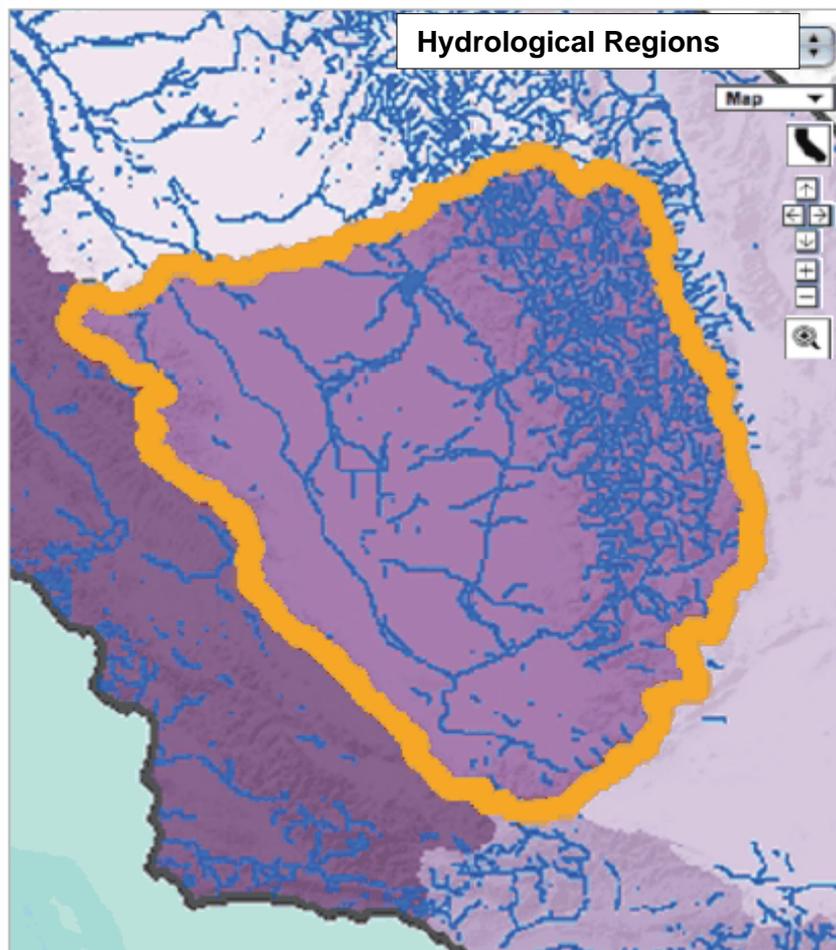
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## What is the Extent of Our Stream and River Resources?



## Tulare Lake

Major Rivers			
River	Length (mi.)	Watershed Area (sq. mi.)	Peak Discharge (cfs)
Eel	200	3,120	752,000
Gualala	35	290	55,000
Klamath	210	12,100	557,000
Mad	90	490	81,000

### CLIMATE

Region dominated by strong orographic influence of Sierra Nevada and southern Cascade Mountains. High yearly precipitation totals, with approximately 50% occurring as snow. Highest precipitation occurs in Mount Shasta and northern Sierra Nevada...

### TECTONIC SETTING

### GEOLOGY

### SEDIMENT SUPPLY

### RUNOFF CHARACTERISTICS



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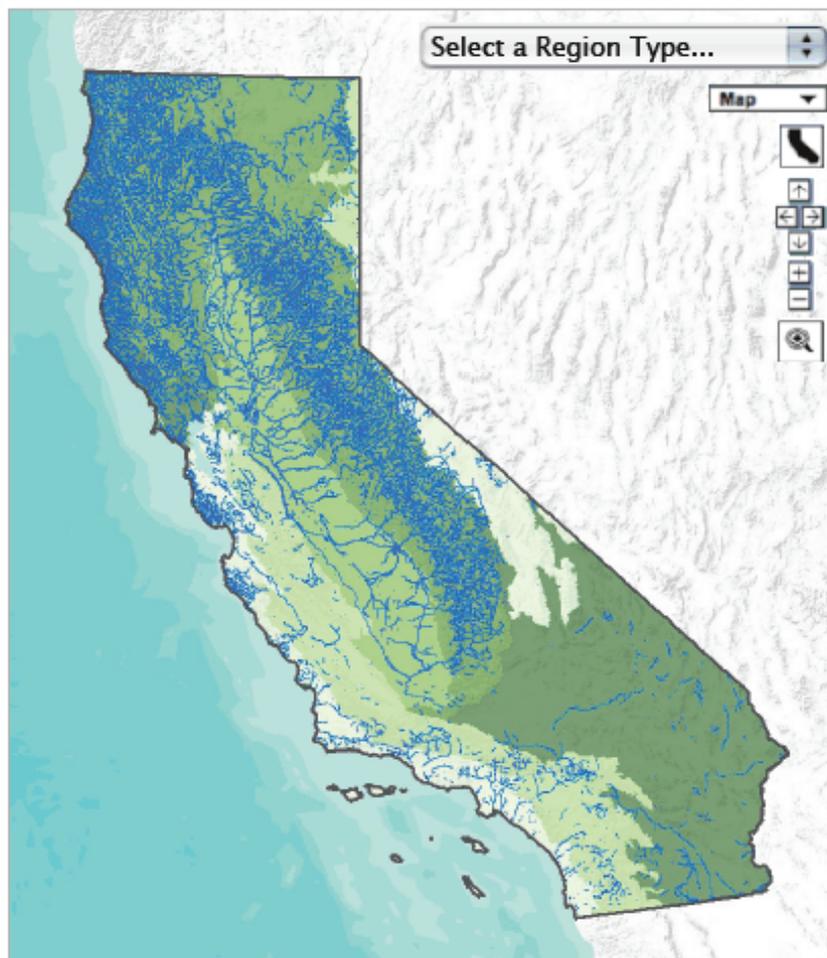


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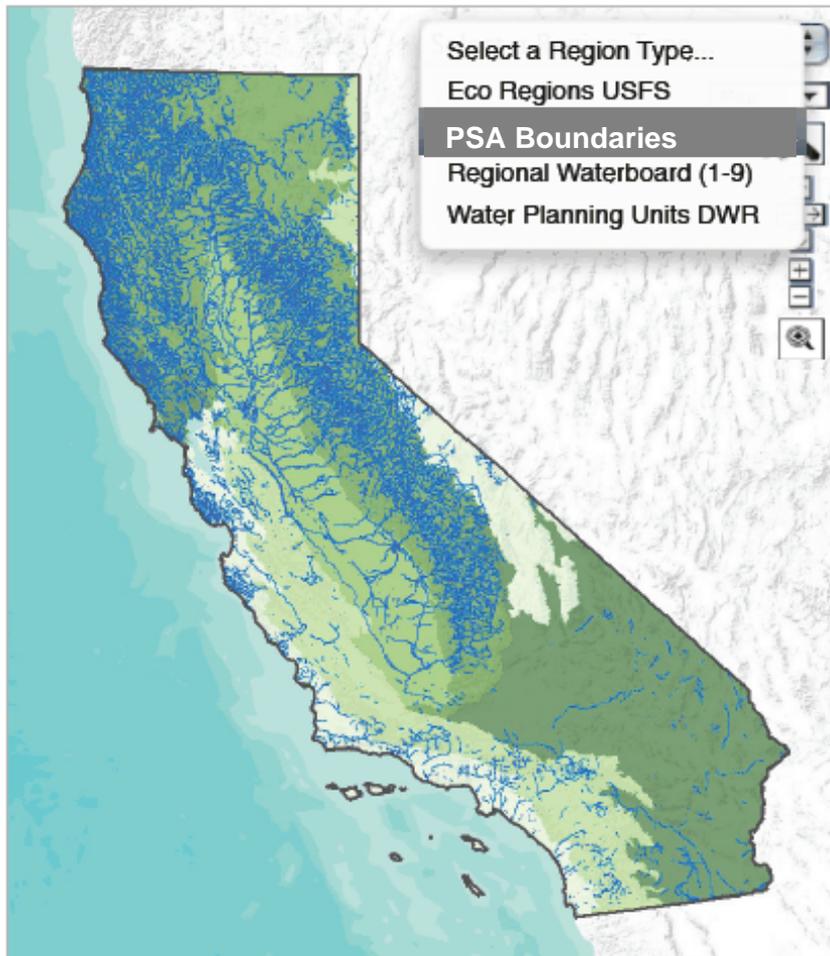
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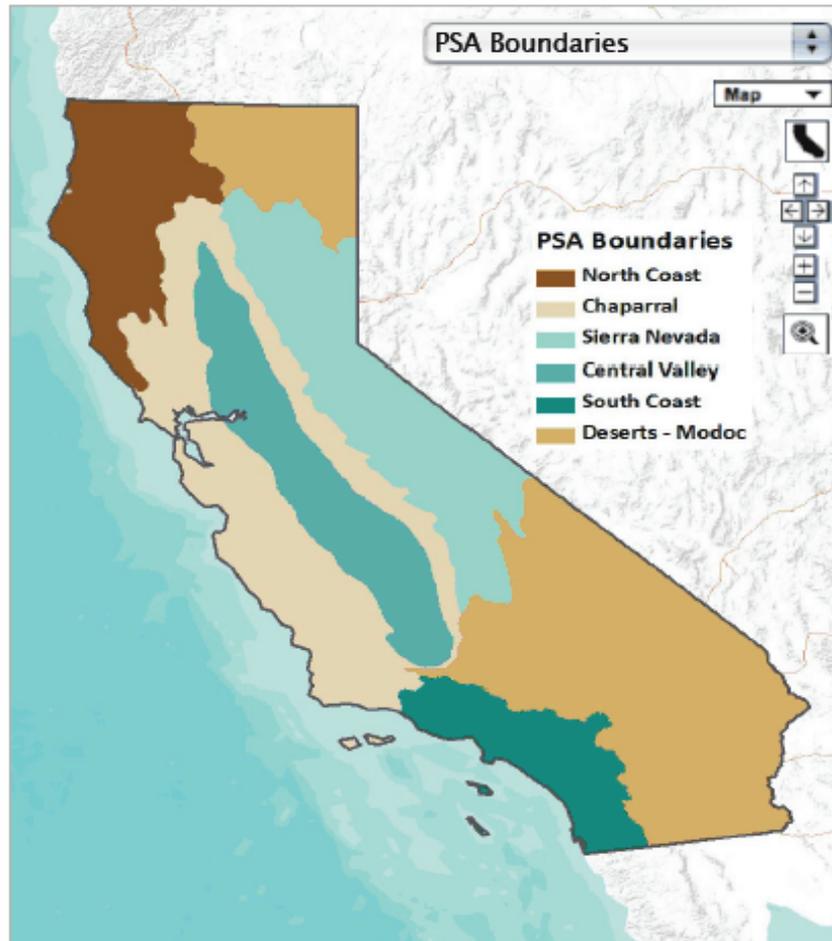


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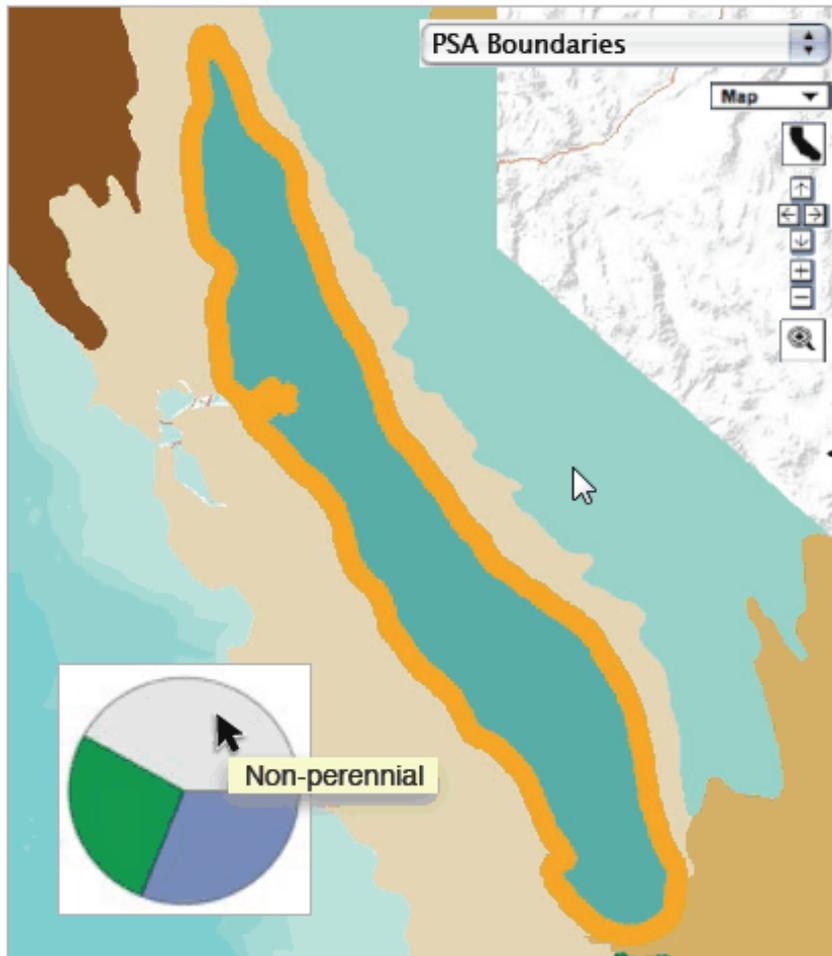
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## What is the Extent of Our Stream and River Resources?



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Statewide Stream and River Summaries

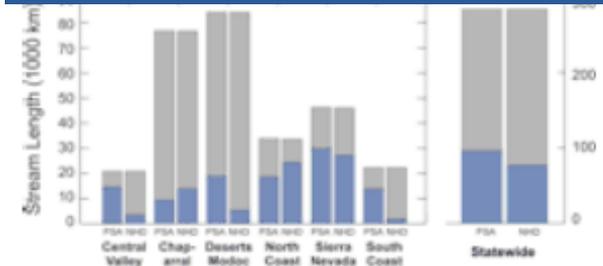
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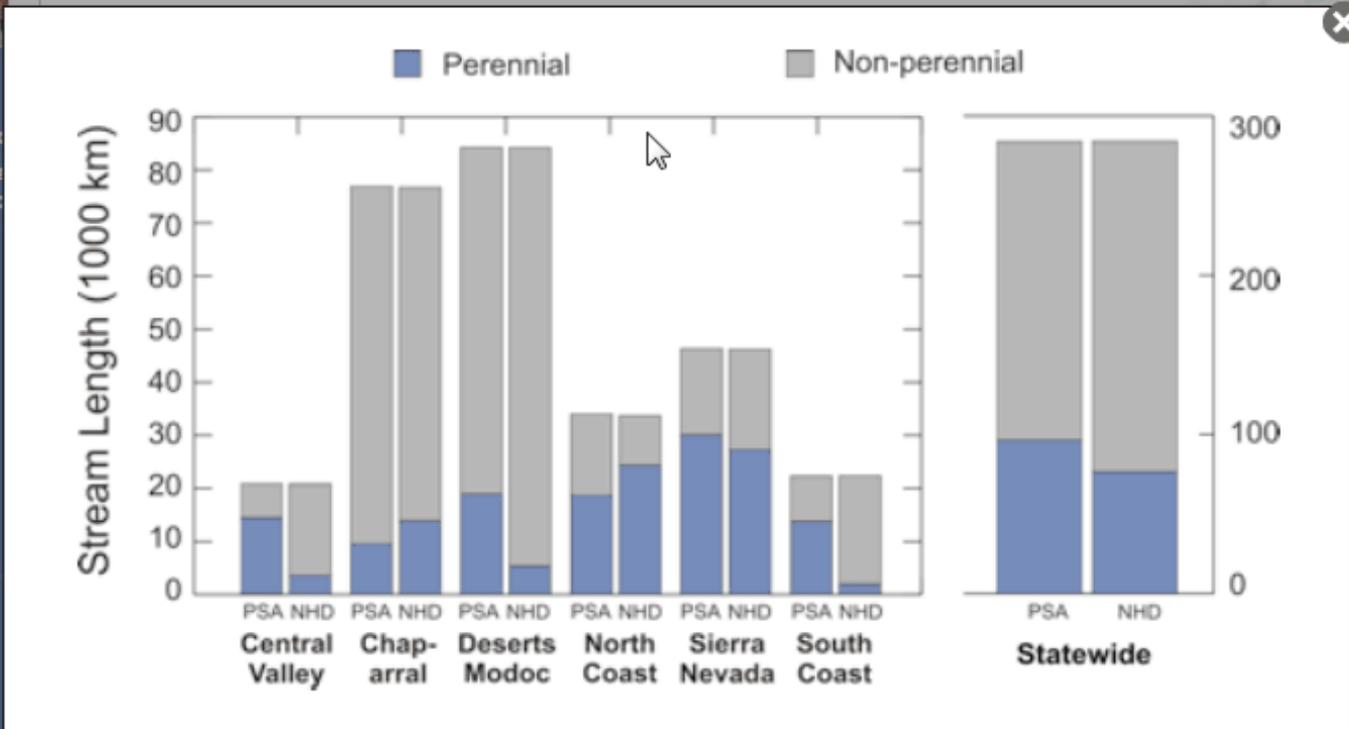
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Summaries

stats

**CONDITION: BIOLOGICAL/PHYSICAL (PSA)**

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## What is the Condition of our Streams and Rivers?

Counties  Regions



A combination of biological and physical assessments can determine whether stream/river flora and fauna communities are thriving. The Perennial Stream Assessment measures water quality, biological, and physical habitat conditions to obtain stream health condition at locations throughout the state.

[More >>](#)

**Questions Answered**

- [What is the condition of our streams and rivers?](#)

- Assessment types
- [Biological Condition \(IBI\)](#)
  - [Biological Condition \(BMI\)](#)
  - [Habitat Condition \(CRAM\)](#)

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**Alameda Creek**  
Site Code: 401ALA032

Alameda

BMI scores:  
O/E = 0.34  
IBI=46

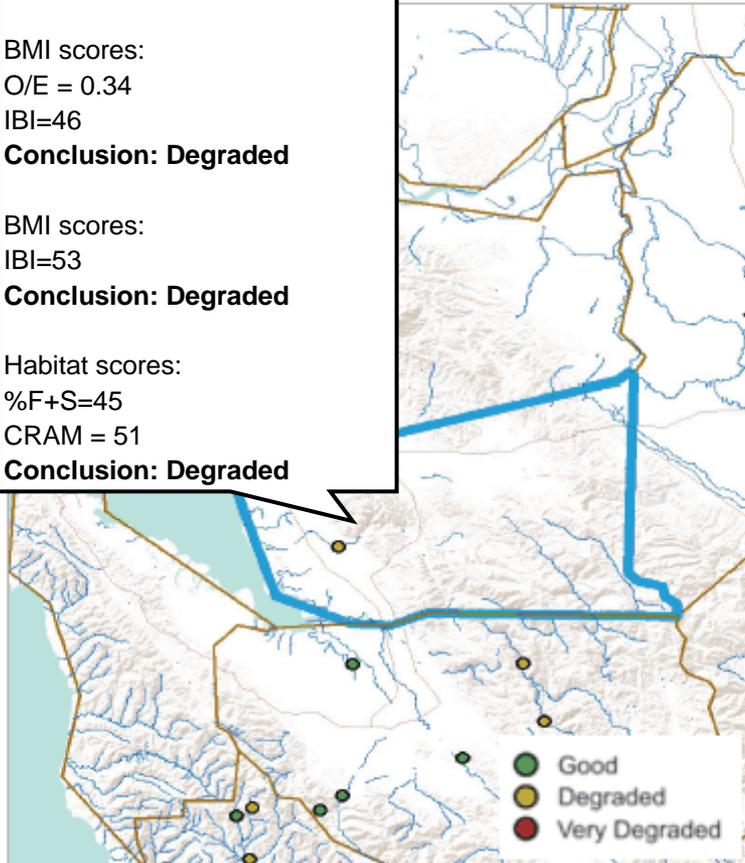
**Conclusion: Degraded**

BMI scores:  
IBI=53

**Conclusion: Degraded**

Habitat scores:  
%F+S=45  
CRAM = 51

**Conclusion: Degraded**



Condition can be assessed using both biological and physical indicators.

### QUESTIONS ANSWERED

→ [What is the condition of California's streams and rivers?](#)

[In Alameda County](#)

[Tools to Assess Condition](#)  
[Statewide Condition Assessment](#)  
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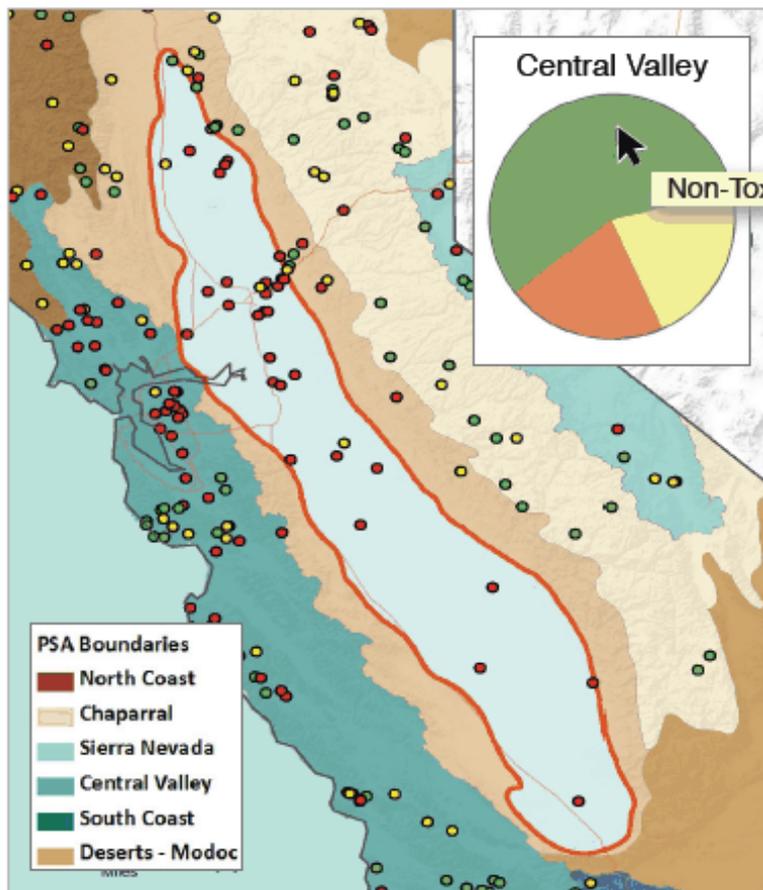


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## What Is the Condition of Our Streams and Rivers?

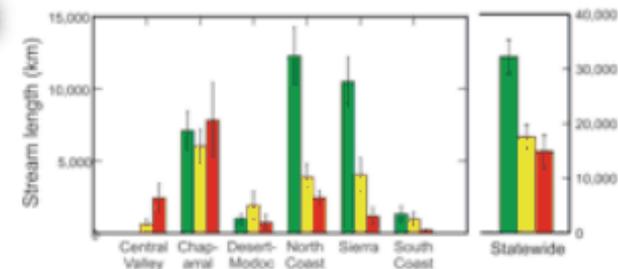
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- PSA Boundaries



## IBI INFORMATION

The Perennial Streams Assessment (PSA) study collected IBI information. [More >>](#)

[Download Study](#)



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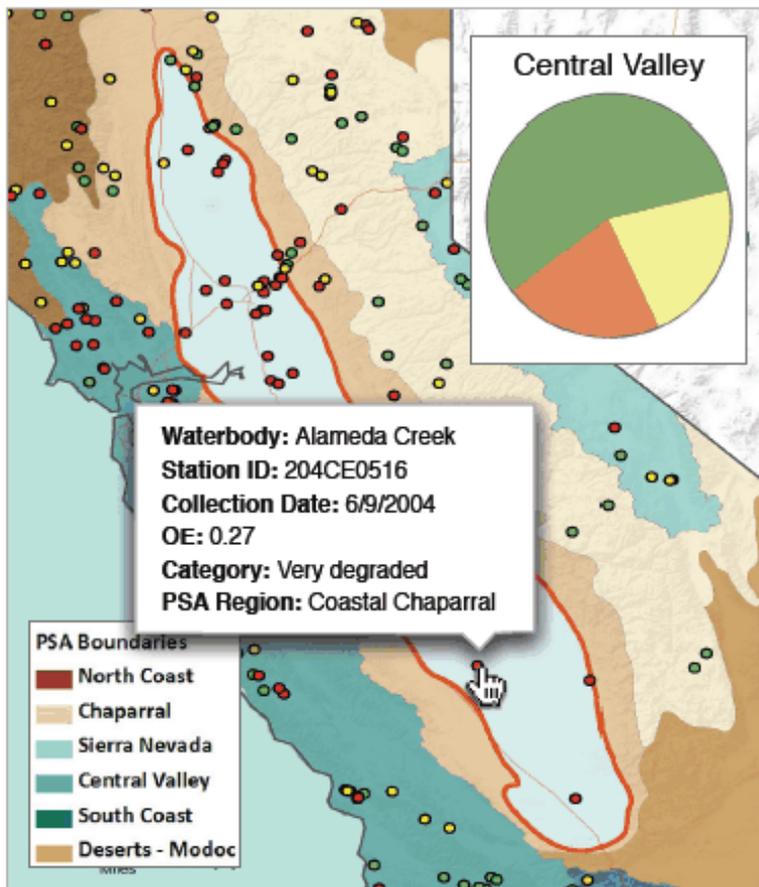


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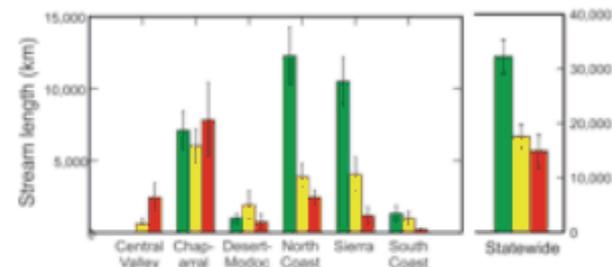
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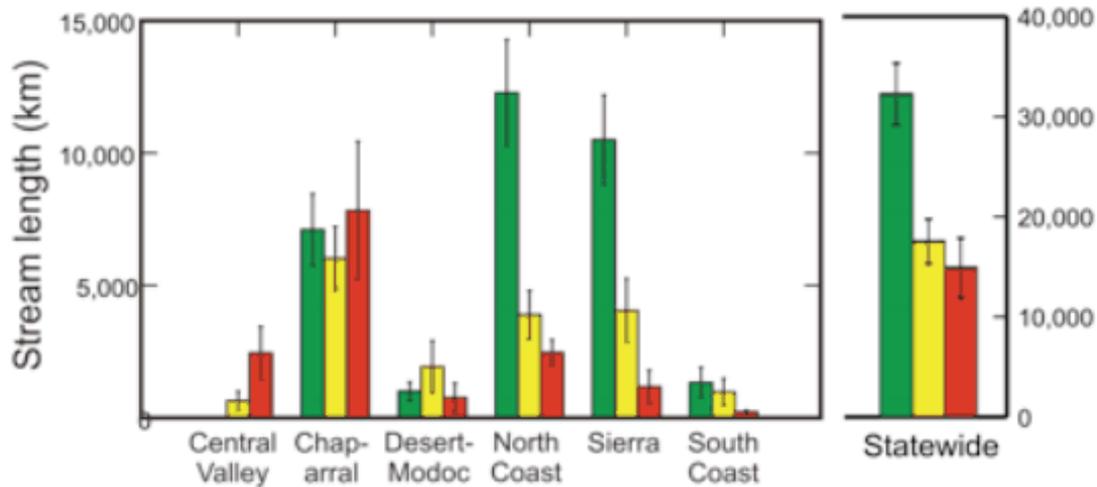
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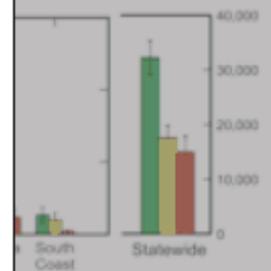
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ment (PSA)  
[More >>](#)



**CONDITION: TOXICITY**

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## What is the Condition of our Streams and Rivers?

- Counties
- Regions

Select a County...  
 Alameda  
 County 2  
 County 3  
 ...  
 County n



Biological assessments have been performed throughout the state to determine whether stream food sources are thriving.

Toxicity surveys can tell us if fish or other biota are being exposed to toxic levels of contaminants. [More >>](#)

## QUESTIONS ANSWERED

- [Where has toxicity been observed in California waters?](#)
- [What is the magnitude of observed toxicity?](#)
- [How do the results of toxicity measurements compare among different land cover types?](#)

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- [Statewide Condition Assessment](#)
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## Where Has Toxicity Been Observed in California Waters and What is the Magnitude of Observed Toxicity?

Counties 
  Test Species



This interactive map shows locations of sites sampled by the SWAMP and partner programs. All sites are color coded using the categorization process described [here](#), which considers the available toxicity test endpoints in both water and sediment. [More >>](#)

[Summary of Toxicity in California Waters: 2001-2009](#)

### FILTER MAP DATA



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Where Has Toxicity Been Observed in California Waters and What is the Magnitude of Observed Toxicity?

Counties  Test Species

- Alameda
- County 2
- County 3
- ...
- County n



This interactive map shows locations of sites sampled by the SWAMP and partner programs. All sites are color coded using the categorization process described [here](#), which considers the available toxicity test endpoints in both water and sediment. [More >>](#)

[Summary of Toxicity in California Waters: 2001-2009](#)

**FILTER MAP DATA**

Select Test Matrix

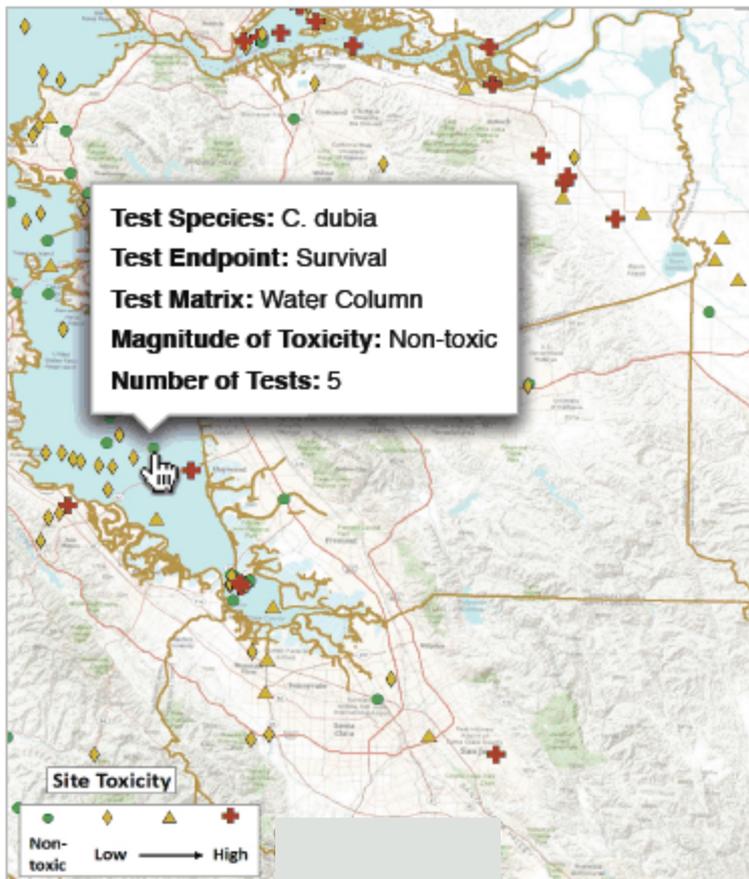
Select Magnitude of Toxicity



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### Where Has Toxicity Been Observed in California Waters and What is the Magnitude of Observed Toxicity?

Counties  Test Species



This interactive map shows locations of sites sampled by the SWAMP and partner programs. All sites are color coded using the categorization process described [here](#), which considers the available toxicity test endpoints in both water and sediment. [More >>](#)

#### FILTER MAP DATA

Select Test Matrix

Select Magnitude of Toxicity

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Select a Data Set

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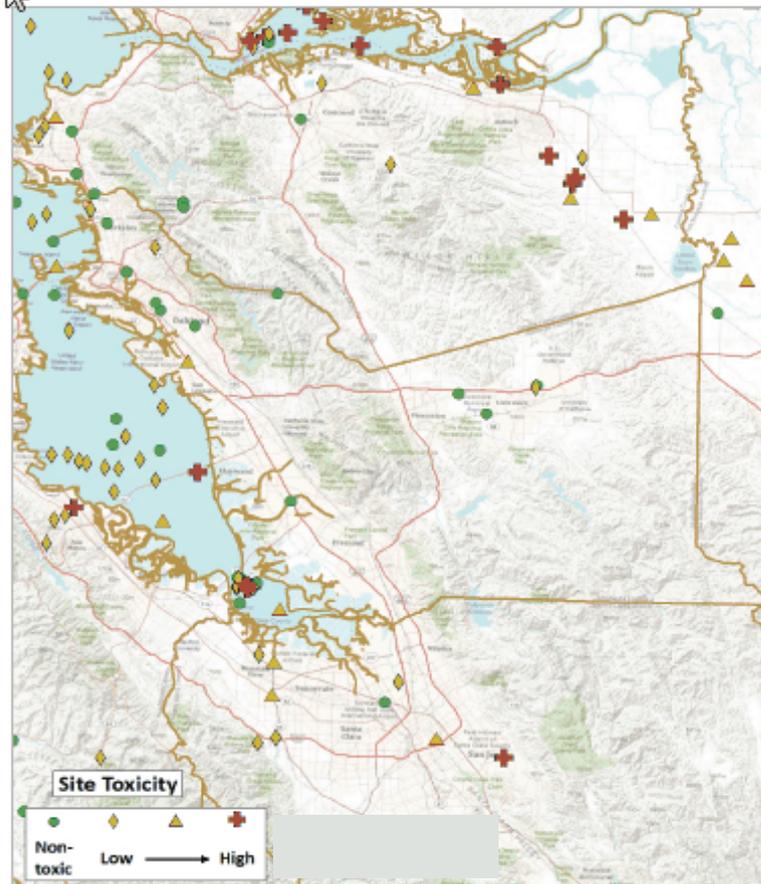
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## Where Has Toxicity Been Observed in California Waters and What is the Magnitude of Observed Toxicity?



Counties  Test Species



This interactive map shows locations of sites sampled by the SWAMP and partner programs. All sites are color coded using the categorization process described [here](#), which considers the available toxicity test endpoints in both water and sediment. [More >>](#)

### FILTER MAP DATA

Select Test Matrix...

### DOWNLOAD DATA

Select a Data Set

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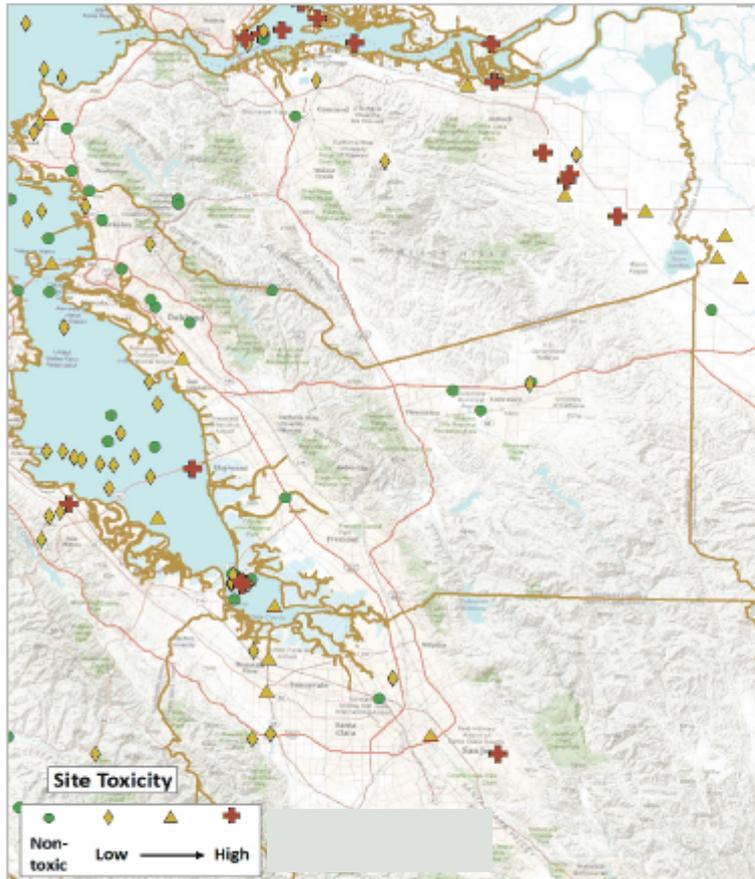
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## Where Has Toxicity Been Observed in California Waters and What is the Magnitude of Observed Toxicity?

Counties  Test Species



This interactive map shows locations of sites sampled by the SWAMP and partner programs. All sites are color coded using the categorization process described [here](#), which considers the available toxicity test endpoints in both water and sediment. [More >>](#)

### FILTER MAP DATA

Select Test Matrix

Select Magnitude of Toxicity

### DOWNLOAD DATA

- Select a Data Set
- End Date
- Matrix
- Start Date
- Test Species
- Toxicity Observed (N)
- Toxicity Observed (Y)

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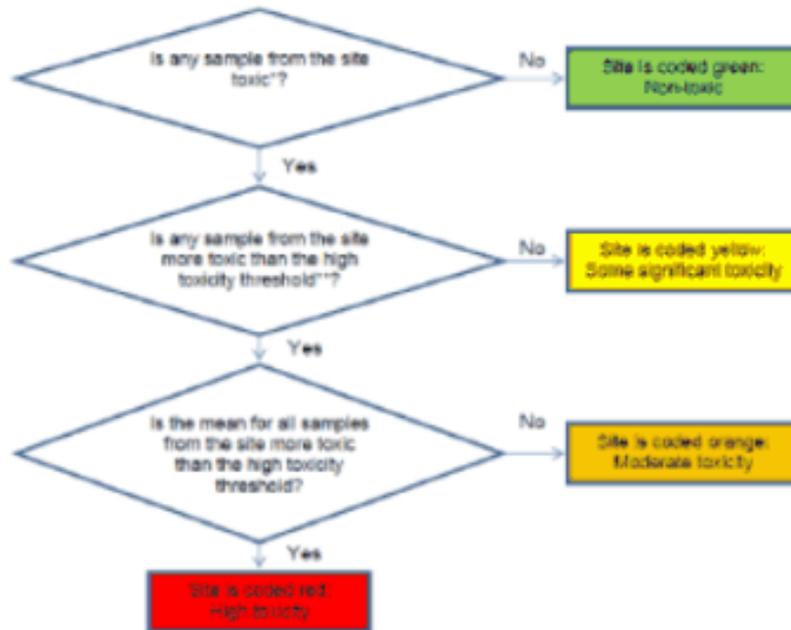
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## Where Has Toxicity Been Observed in California Waters and What is the Magnitude of Observed Toxicity?



The process used to characterize the magnitude of toxicity at each site was designed to take into consideration the widely varying number of samples and test endpoints (such as fish or crustacean survival) among sites. If any toxic samples were measured for a site, the site was categorized based on the most sensitive endpoint. This process considers both individual sample results and the mean results for sites with multiple samples. Relative to the impaired waterbody listing process, a site coded "green" would not be listed for toxicity. Sites coded "yellow" to "red" would be listed if the number of toxic samples met the criteria outlined in the State Water Board's Listing and De-listing Policy.



### NOTE:

"Toxic" means sample result (e.g., survival) is significantly lower than the control result using the EPA Test of Significant Toxicity.

The high toxicity threshold was derived for each endpoint as the mean between the most toxic 25th percentile of all toxic samples and the point of 99% confidence that the samples was toxic.

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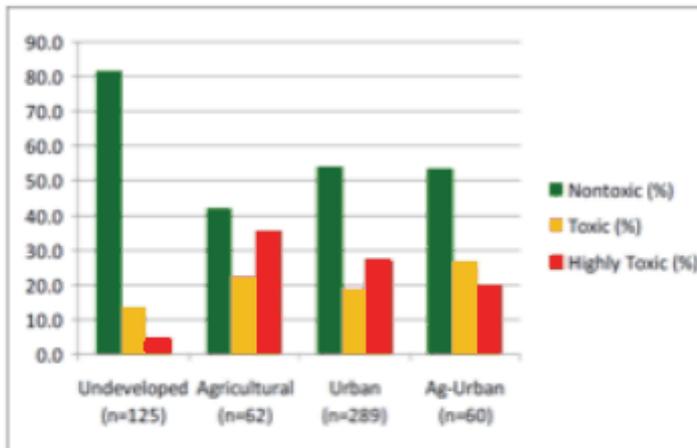
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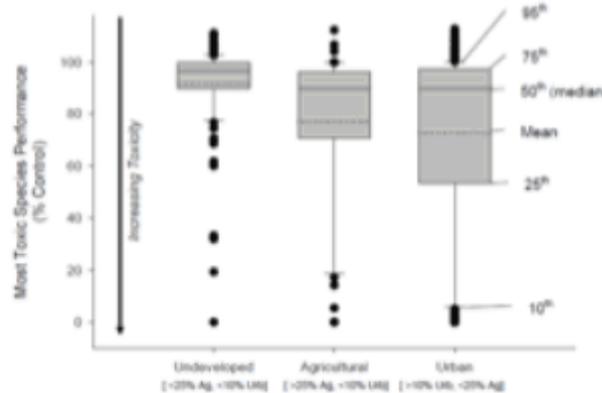
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## How do the Results of Toxicity Measurements Compare Among Different Land Cover Types?



Samples from sites in agricultural and urban areas had significantly higher toxicity than sites in less developed areas (Figure 9), and had a greater magnitude of toxicity (Figure 10). The differences in toxicity between undeveloped and urban areas was highly statistically significant ( $p < 0.0005$ ); and the same is true for the difference between undeveloped and agricultural areas.

A subset of the sites assessed (536 out of 992) were mapped and categorized for land cover using geographic information system (GIS) analysis. For each site, an area 1 km upstream (including tributaries) and 500 m on either side of the stream was mapped. If land cover within those areas was greater than 10% "developed" (National Land Cover Dataset classification), they were designated as urban. This is based on the widely supported impervious surface area model that shows decreased ecological condition in streams draining lands with greater than 10% impervious surface area. Sites with greater than 25% agricultural land cover were classified as agricultural sites. Sites were classified as "undeveloped" if they had both less than 10% urban and less than 25% agricultural land cover. Sites were classified as "ag-urban" if they had both greater than 10% urban and 25% agricultural land cover.



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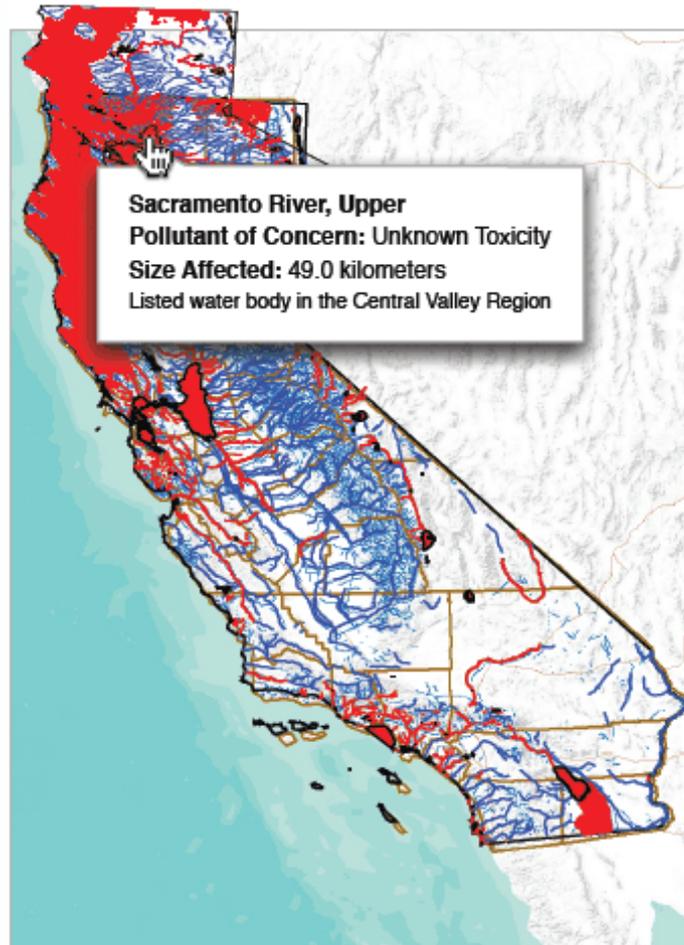


## Which Streams or Rivers are Listed by the State as Impaired?

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- Natural Resources Agency
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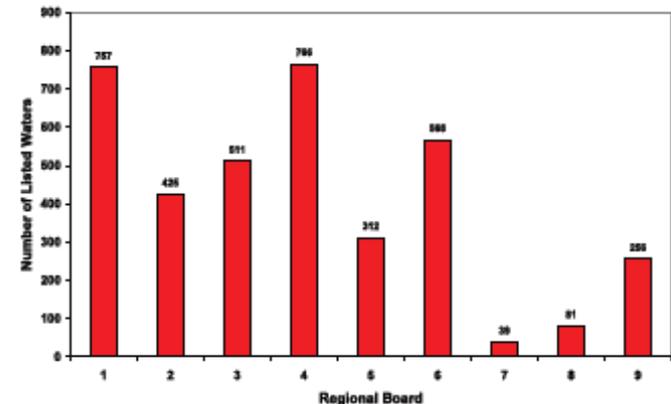
This interactive map shows which of California's waters are listed as impaired for aquatic life uses (i.e., may not protect aquatic life) and which pollutants are involved. Also shown are condition assessments pursuant to Section 305(b) of the Clean Water Act.

### View 2010 303(d) Listing and current TMDL Information:

- Click a county or
- Select County from the pop-up menu above map
- Select Pollutant Category from the pop-up menu
- Use magnifier tool to zoom into an area of interest

### Listed Waters by Water Quality Control Region

This chart shows ...





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## What is Being Done to Protect and Restore Our Streams and Rivers?

A number of programs address existing water quality problems that affect stream health.

### Total Maximum Dally Loads (TMDLs)

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### Clean Water Grant Projects

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### NPS – Watersheds of Focus

### ILRP

### Stormwater

### Flow Studies (DFG and SWRCB)

### Critical Habitat Designations – [\(include link to map of designated critical habitat for salmonids\)](#)

### DPR Pyrethroid Re-registration

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## Tools to Assess Biological and Physical Condition

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### Toxicity Testing

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→ [Link](#)

### Biological Assessment Indicators

→ [Benthic Macro-Invertebrates \(BMI\)](#)

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→ [Algae](#)

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→ [Fish](#)

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### Physical Habitat Assessment

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→ [Link](#)

### Chemical Assessment

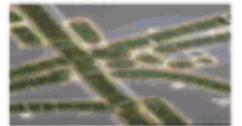
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→ [Link](#)

### Integrated Assessment Methods

→ [California Rapid Assessment Method \(CRAM\)](#)

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## Laws, Regulations, Standards, and Guidelines to Protect Aquatic Life and Ecosystems



This page provides brief summaries and links to additional information for a number of existing laws and regulations currently in place at the federal, State, and local level to protect aquatic resources and associated aquatic life beneficial uses. This should not be viewed as an exhaustive list.

### Federal Clean Water Act

- [Section 303d](#) – **List of Impaired Waters (303[d] Report)** - States, territories, and authorized tribes are required to develop lists of impaired waters, and submit those lists (303[d] Report) to the U.S. Environmental Protection Agency (USEPA). Impaired waters do not meet the water quality standards that have been established for them. The law requires that these jurisdictions establish priority rankings for waters on the lists and develop Total Maximum Daily Loads (TMDLs) for these waters. A TMDL is the maximum mass of a pollutant that can be added to a waterway per day that does not cause an exceedence of the water quality standard for that waterway. In some cases, other regulatory programs will address the impairment instead of a TMDL.
- [Section 305b](#) – **National Water Quality inventory Report to Congress (305[b] Report)** - The 305(b) report is the primary vehicle for informing Congress and the public about general water quality conditions in the United States. This document characterizes the nation's water quality, identifies widespread water quality problems of national significance, and describes various programs implemented to restore and protect our waters. The USEPA has issued guidance to States, which requires the 303(d) and 305(b) reports to be integrated (i.e., [California 303\(d\)/305\(b\) Integrated Report](#)).
- [Section 401](#) - **Certification** - Any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the navigable waters at the point where the discharge originates or will originate.
- [Section 404](#) – **Dredge and Fill Permits** - Establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Examples of activities that may be regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports) and mining projects. Section 404 requires a U.S. Army Corps of Engineer's (Corps of Engineers) regulatory permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation (e.g., certain farming and forestry activities).

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[Federal Rivers and Harbors Act: Section 10 - Work in Navigable Waters](#) - Requires authorization from the Corps of Engineers for the construction of any structure in or over any navigable water of the United States, the excavation/dredging or deposition of material in these water or any obstruction or alteration in a "navigable water". Structure or work outside the limits defined for navigable waters of the U.S. require a Section 10 permit if the structure or work affects the course, location, condition, or capacity of the water body.

[Federal Executive Order 11990 Wetland Protection](#) – The purpose of Executive Order 11990 is to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands". To meet these objectives, the order requires federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided.

[California Department of Fish and Game Streambed Alteration Program](#) - Fish and Game Code (Section 1602) requires an entity to notify DFG of any proposed activity that may substantially modify a river, stream, or lake. This includes proposed activities that will: substantially divert or obstruct the natural flow; substantially change or use any material from the bed, channel, or bank; pr deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. If the Department of Fish and Game determines the activity may substantially adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will be prepared. The agreement includes reasonable conditions necessary to protect those resources and must comply with the California Environmental Quality Act (CEQA).

[Federal Endangered Species Act](#) - The purpose of this Act is to protect and recover imperiled species and the ecosystems upon which they depend. It is administered by the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS). The FWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NMFS are mainly marine wildlife such as whales and anadromous fish, such as salmon.

[California Endangered Species Act \(CESA\)](#) - The CESA states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected or preserved. However, CESA also allows for take incidental to otherwise lawful development projects. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate mitigation planning to offset project caused losses of listed species.



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**Types of Streams and Rivers**

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→ **Large Rivers**

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→ **Streams**

Landscape features with defined beds and banks that have been formed by water and which under typical circumstances are maintained by the flow of water.

→ **Perennial Streams**

A stream with the year-round presence of flowing surface water during a typical water year.

→ **Non-Perennial Streams**

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- **Intermittent Streams**

Streams containing flowing water for only a portion of the year. When not flowing, water may remain in sections (e.g., isolated pools) fed by springs or ground water with dry stretches occurring in the intervening areas.

- **Ephemeral Streams**

Streams that contain running water only seasonally and not necessarily every year.

Future content. Data unavailable.



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### What are the trends in the condition of our streams and rivers?

Trends are assessed over time. Currently, monitoring programs have not been in place long enough to evaluate trends in the data. Condition information available through this portal will be compared to future monitoring results.

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### What are the stressors affecting the condition of our streams and rivers?

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Stressor information is currently being compiled across the State to answer this question.

Thank you