

# California's Surface Water Ambient Monitoring Program (SWAMP)

## Freshwater Harmful Algal Blooms (HABs) in California and SWAMP's Statewide Strategy



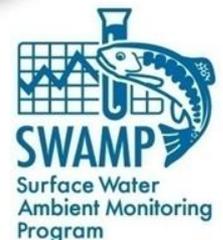
California Water Quality  
Monitoring Council

February 23, 2016

Beverley Anderson-Abbs

SWAMP – OIMA

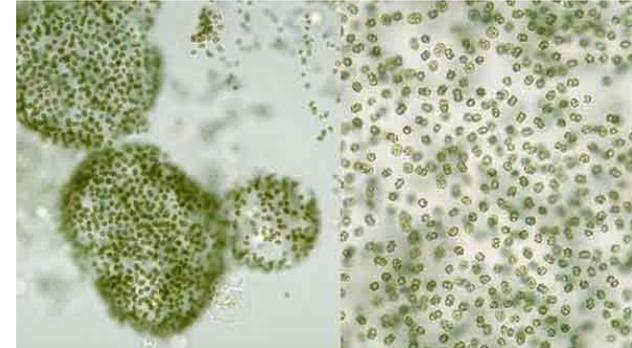
[Beverley.Anderson-Abbs@waterboards.ca.gov](mailto:Beverley.Anderson-Abbs@waterboards.ca.gov)



# Cyanobacteria and other Freshwater HABs

## Cyanobacteria (formerly called blue-green algae)

- Occur in most waterbodies (fresh, brackish, marine)
- Exist as single cells or as colonies
- Can form dense blooms



Potentially harmful (harmful algal bloom, HAB)

## Other HABs

- *Prymnesium parvum* (fish kills)
- *Didymosphenia germinata* (Adverse effects on fish and invertebrate populations)



# Why California needs a Freshwater Harmful Algal Bloom (HAB) Strategy

- HABs increasing worldwide and in California
  - Increasing water temperatures
  - High nutrient concentrations
  - Drought – less water, low flows
- HABs create significant water quality issues
- There is a California marine HABs program



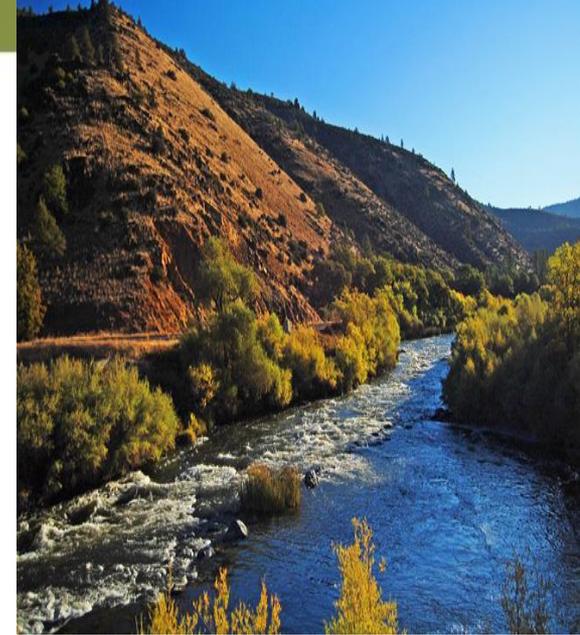
# Where are they?



Lakes



Wetlands



Rivers and streams



Estuaries



Marine waters

# Microcystis

- Most common toxic cyanobacteria
- Produces microcystins
- Microcystin human health thresholds
  - OEHHA recreation = 0.8 ug/L
  - USEPA drinking water = 0.3 ug/L



# Areas in California with Recurrent Toxic Algae Blooms

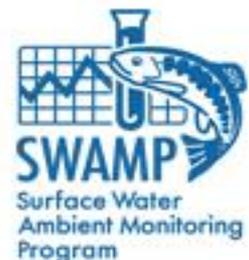
**Klamath Basin**

**Clear Lake**

**San Francisco Bay area/Delta**

**Pinto Lake/Monterey Bay**

**Southern California  
*Prymnesium* “Golden algae”**

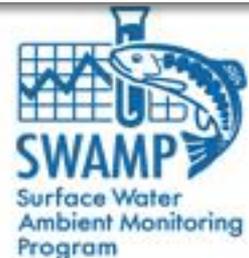
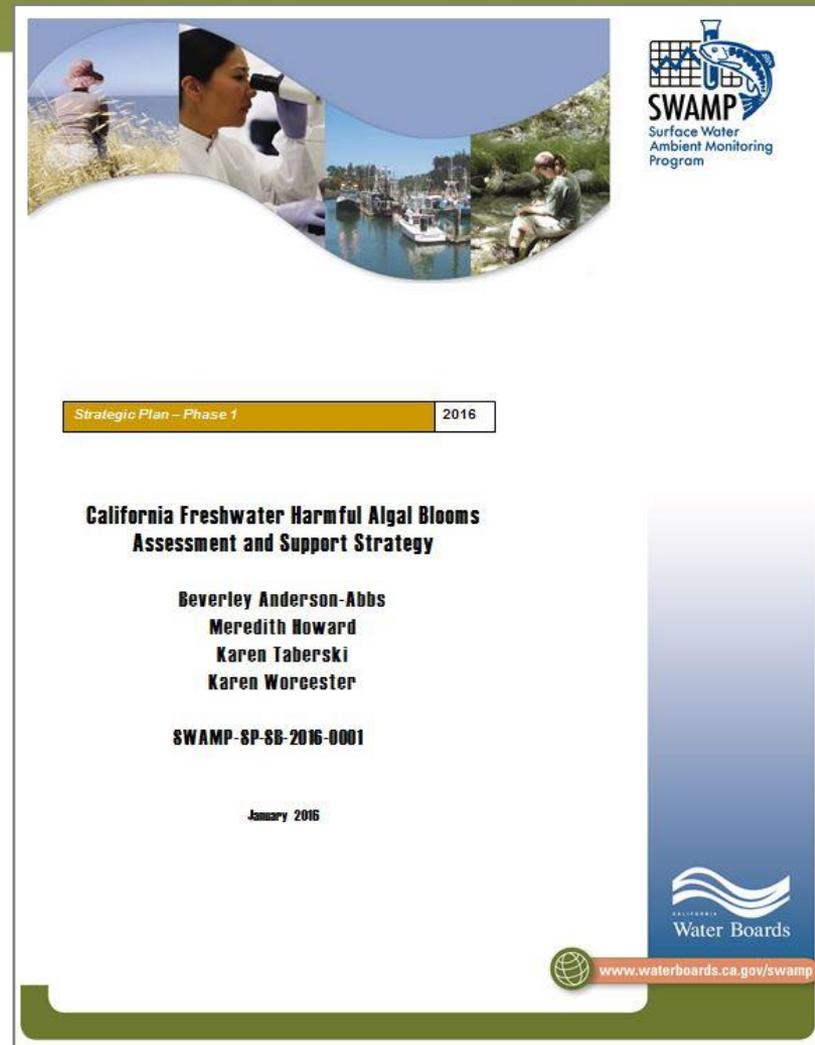


# SWAMPs Freshwater HABs Assessment and Support Strategy

- Goal – articulate a coordinated and widely supported, long-term program to assess, communicate, and manage freshwater HABs



- Ca. CyanoHAB Network (CCHAB) anticipated to coordinate/implement strategy



# Freshwater HABs Assessment and Support Strategy Framework

Response to HAB Events

Ambient Monitoring

Risk Assessment

Immediate  
Event  
Response

Long Term  
Event  
Response

Waterbody  
Monitoring

Infrastructure

Monitor at State  
and Regional Scale

Assess Risk at  
all Scales

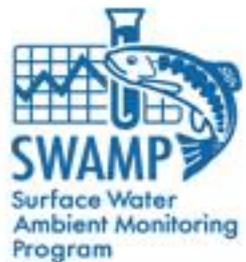
Waterbody Scale

State & Regional Scale

# Infrastructure

## Satellite Imagery

- Historic trends
- Notifications
- Bulletin and Newsletter
- Temporal trends



Search Query

Find By Location

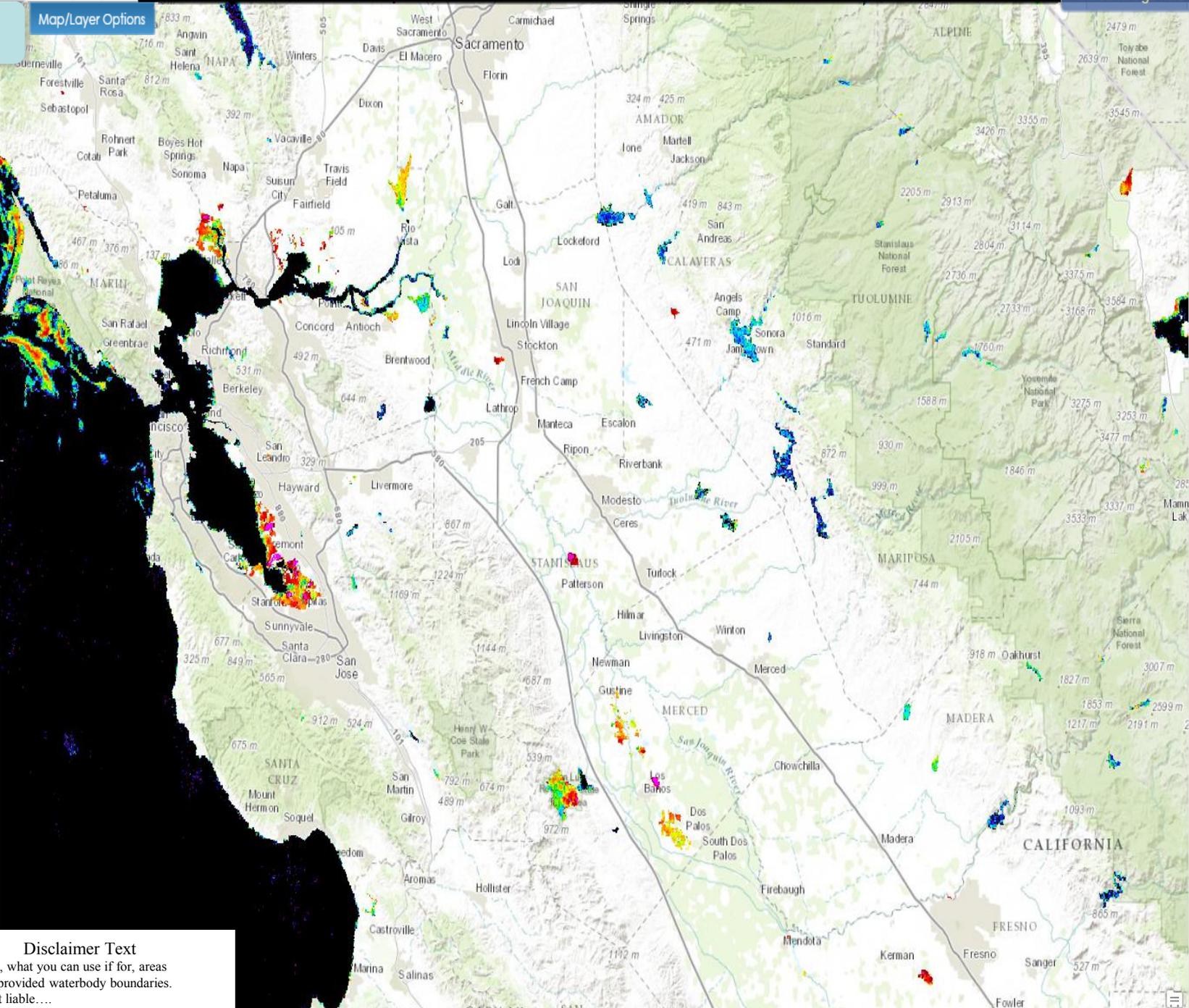
Map/Layer Options

### Water Board Region 2

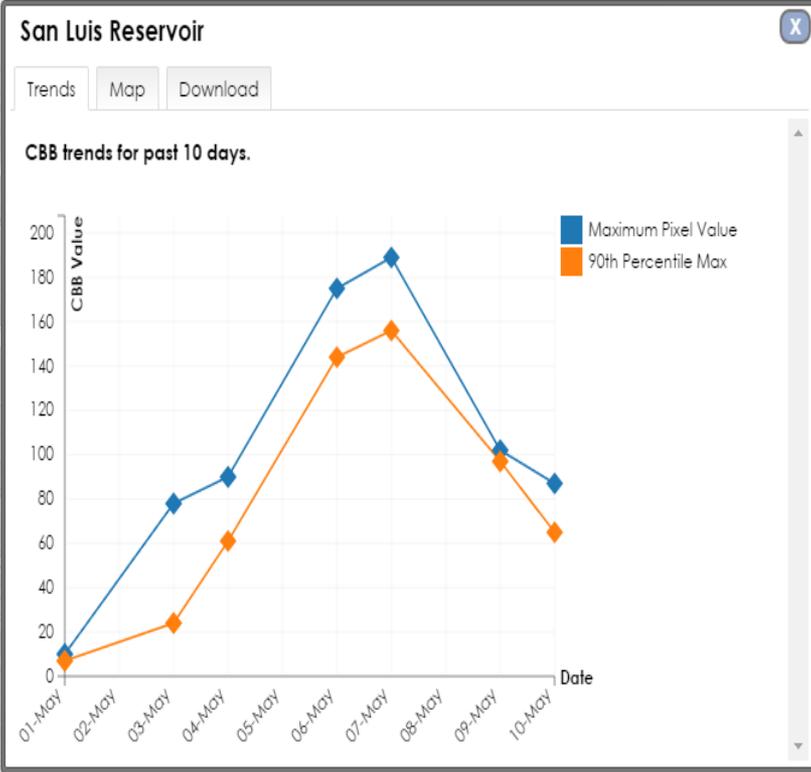
- [Anderson Lake](#)
- [Broad Slough](#)
- [Calaveras Reservoir](#)
- [Carquinez Strait](#)
- [Central Bay](#)
- [Laguna Lake](#)
- [Lake Curry](#)
- [Lake del Valle](#)
- [Lake Hennessey](#)
- [Lower South Bay](#)
- [Napa River island slough complex](#)
- [New York Slough](#)
- [Nicasio Reservoir](#)
- [Quarry Lakes](#)
- [Richardson Bay](#)
- [Sacramento River](#)
- [San Antonio Reservoir](#)
- [San Joaquin River](#)
- [San Pablo Bay](#)
- [South Bay](#)
- [Suisun Bay](#)
- [Upper Crystal Springs Reservoir](#)

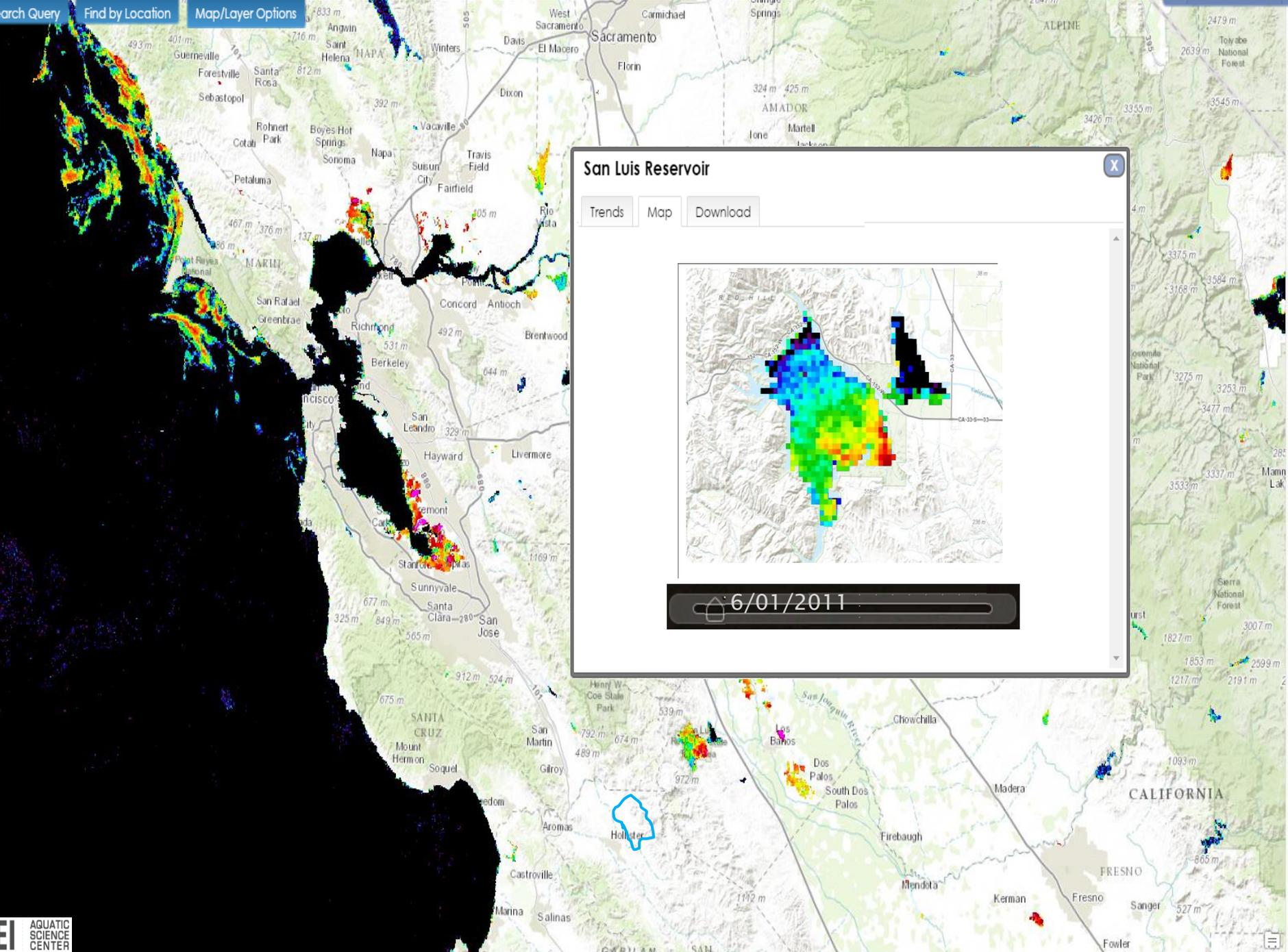
### Water Board Region 3

- [Bernardoz Reservoir](#)
- [Lake San Antonio](#)
- [Nacimiento Reservoir](#)
- [Whale Rock Reservoir](#)
- [Soda Lake](#)



**Disclaimer Text**  
 Use of tool, what you can use if for, areas outside of provided waterbody boundaries. Intent. Not liable....

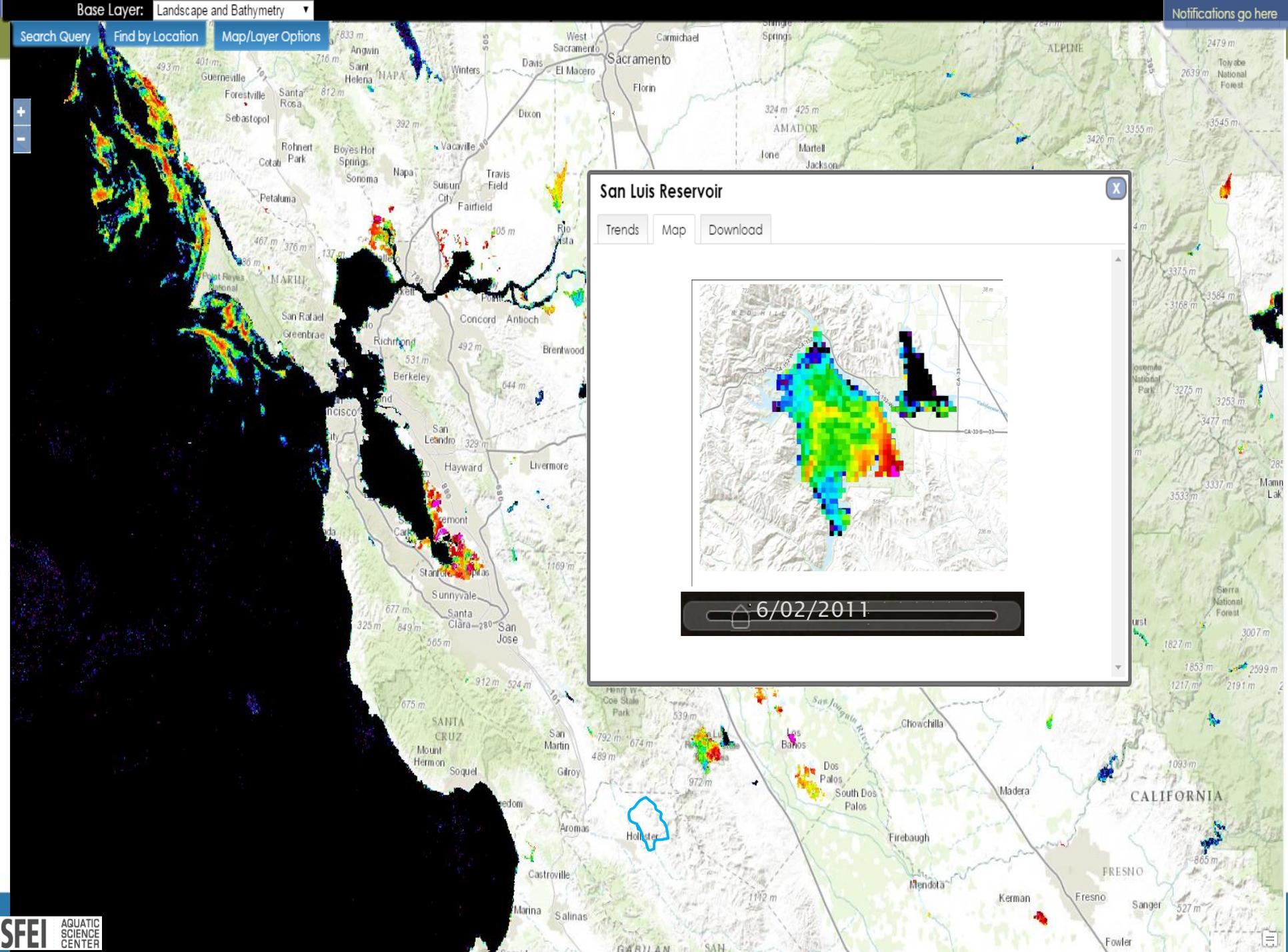




### San Luis Reservoir

Trends Map Download

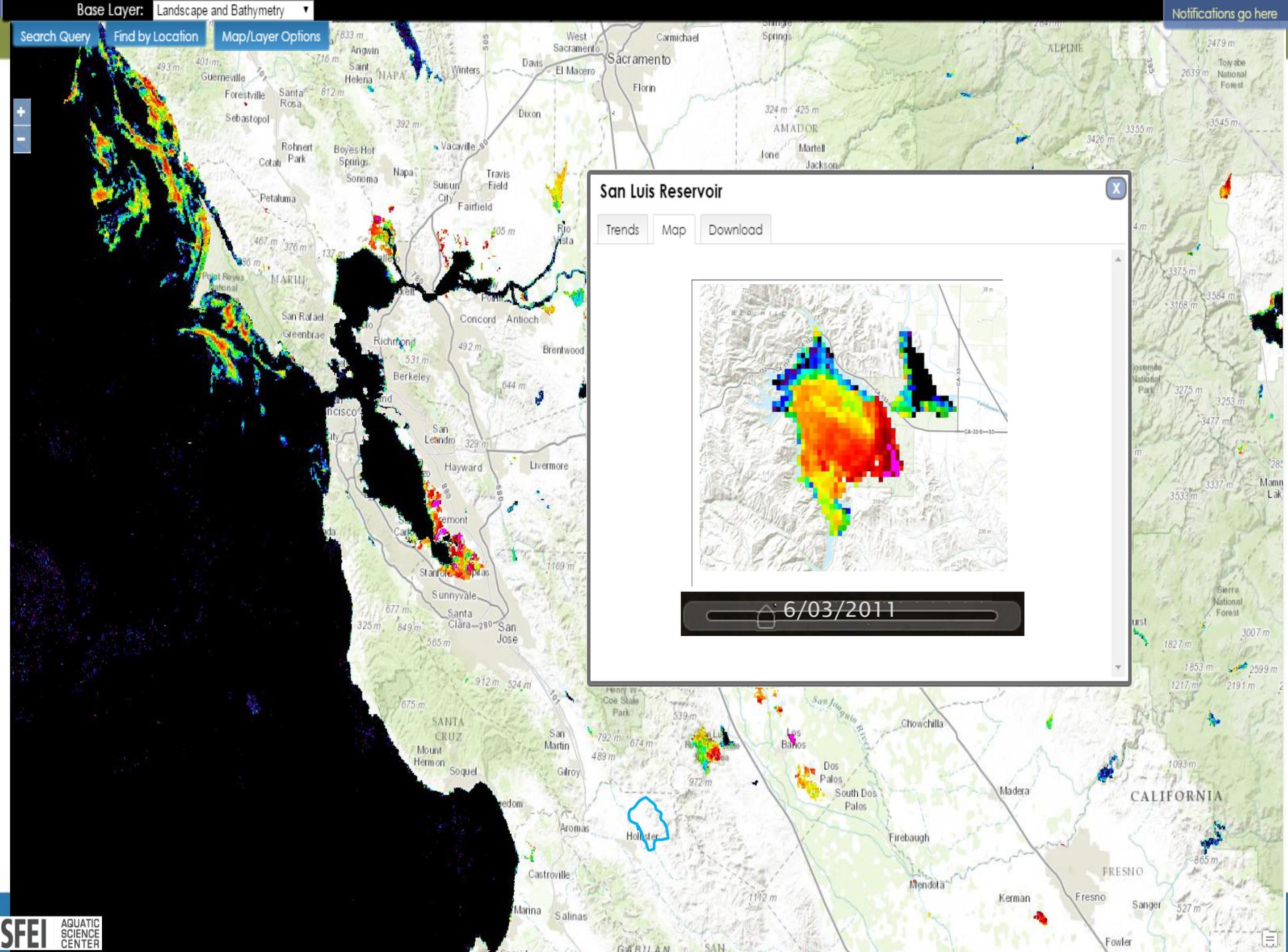
6/01/2011



### San Luis Reservoir

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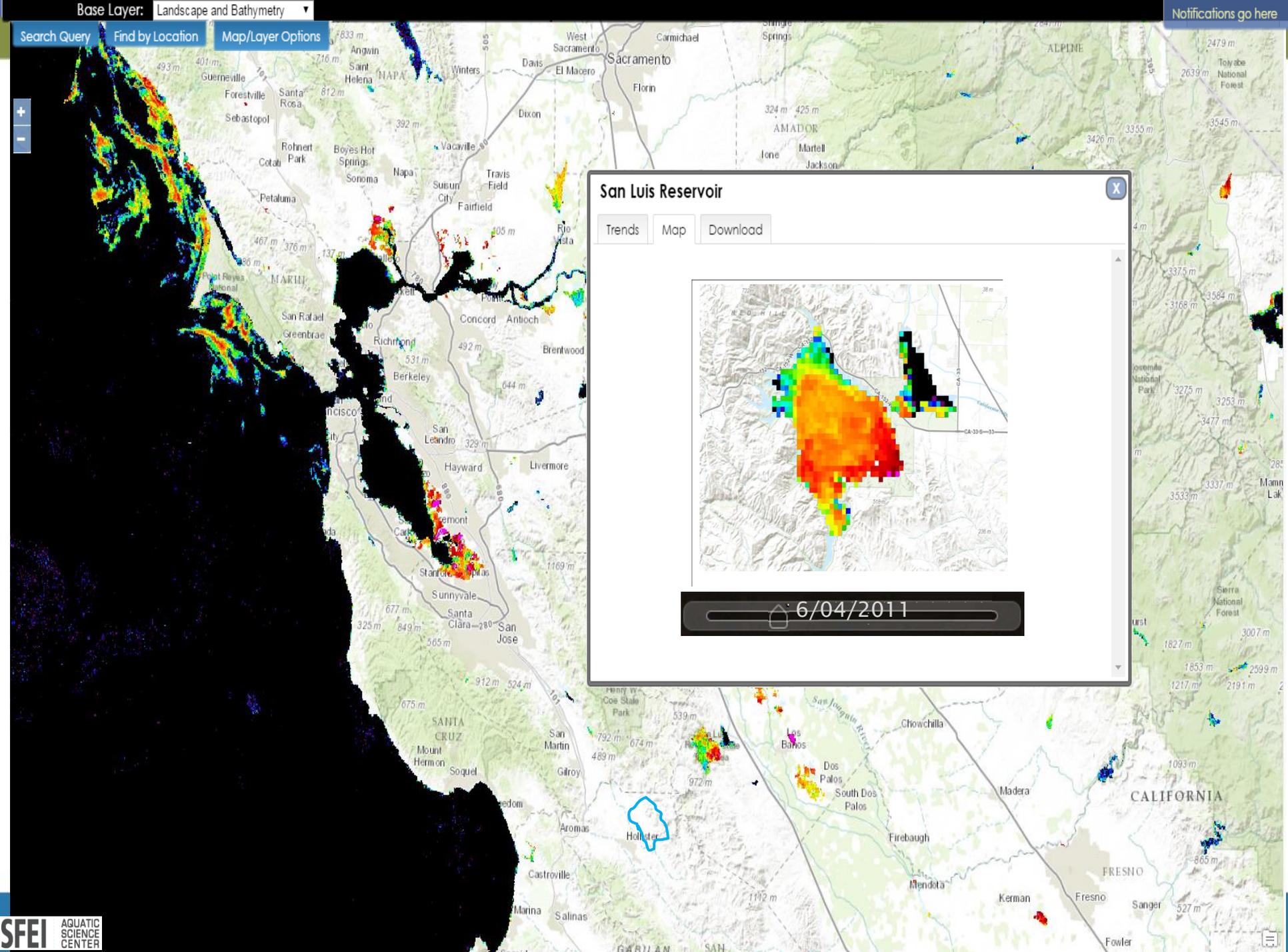
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### San Luis Reservoir

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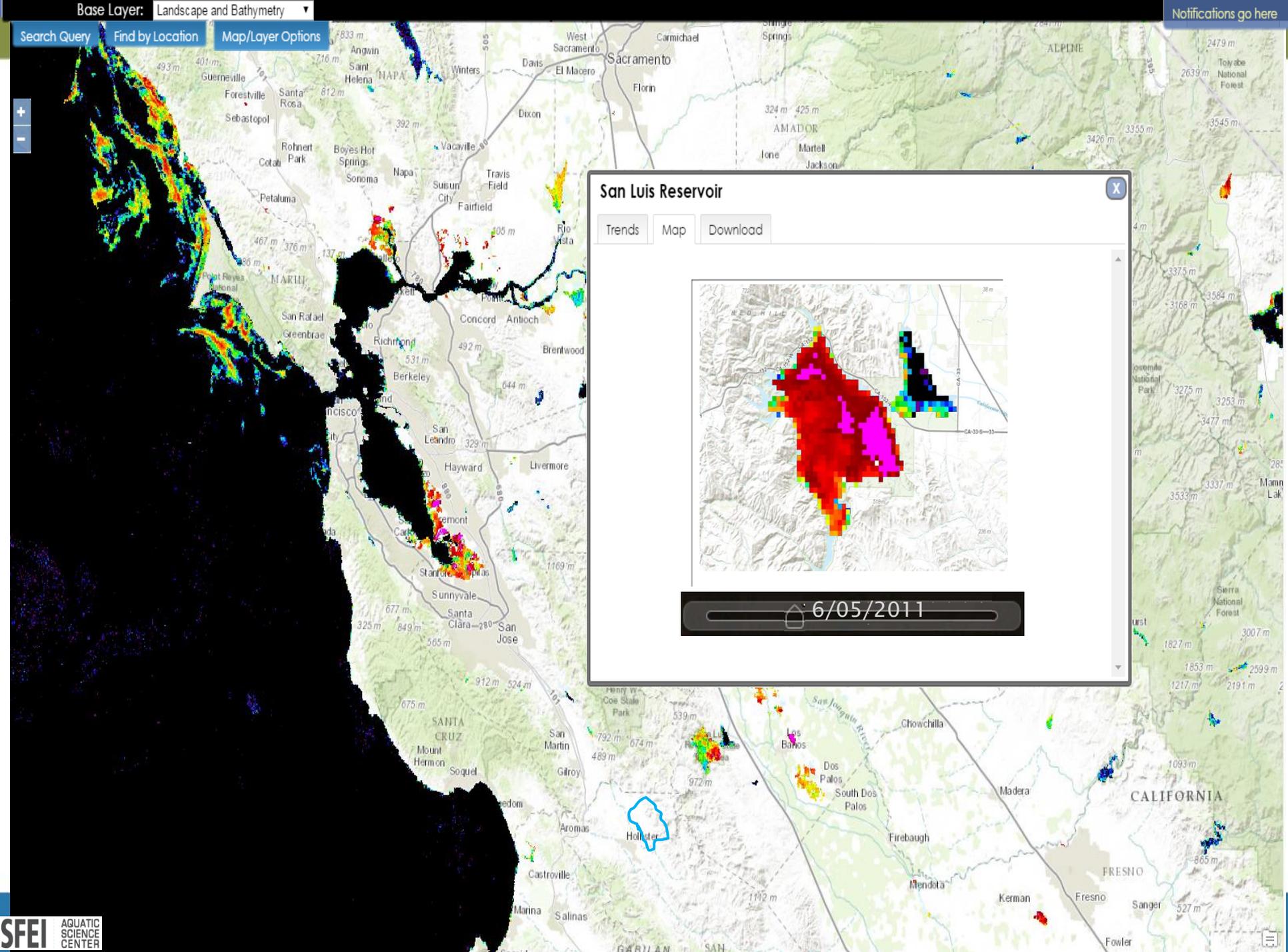
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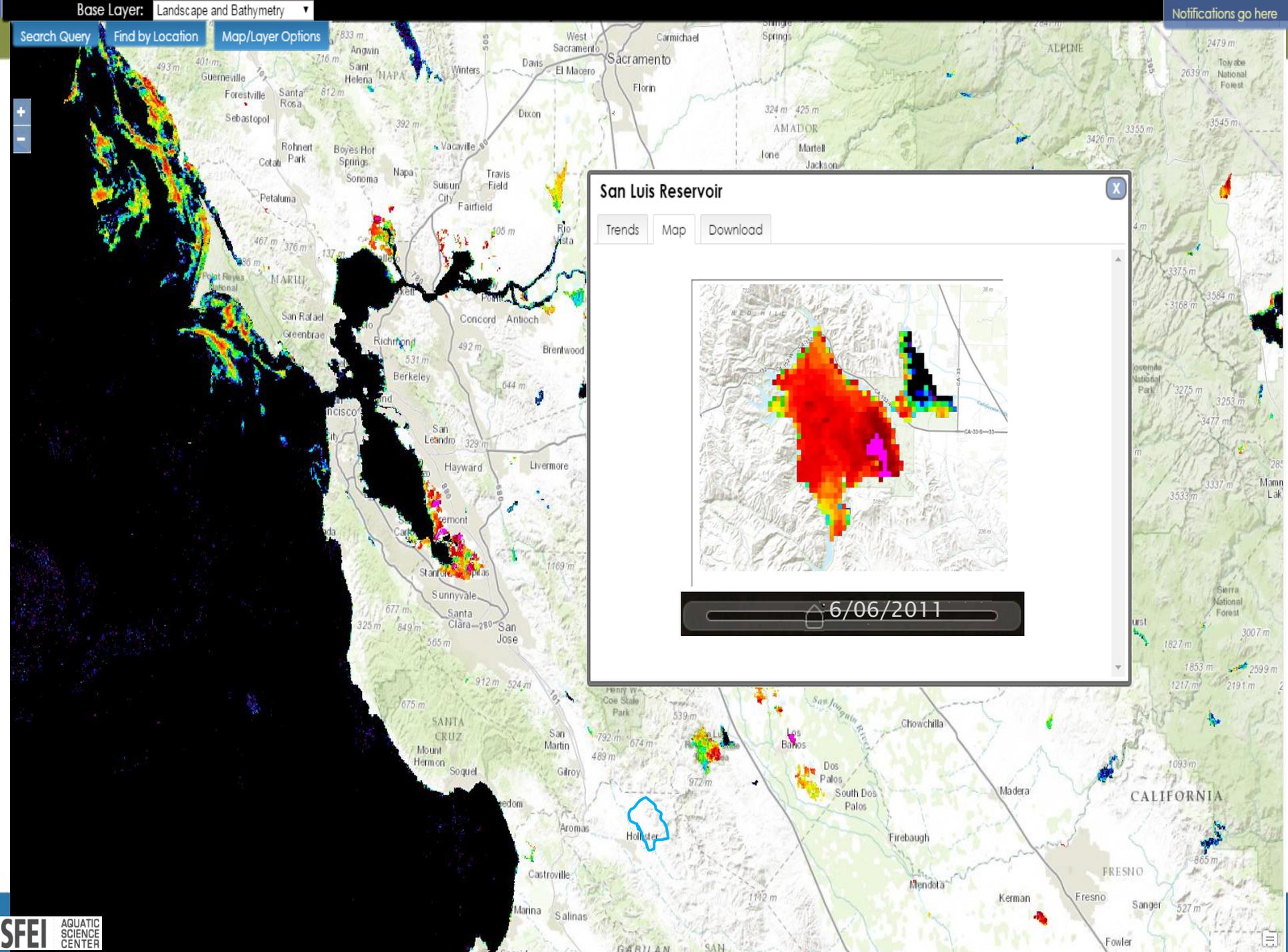
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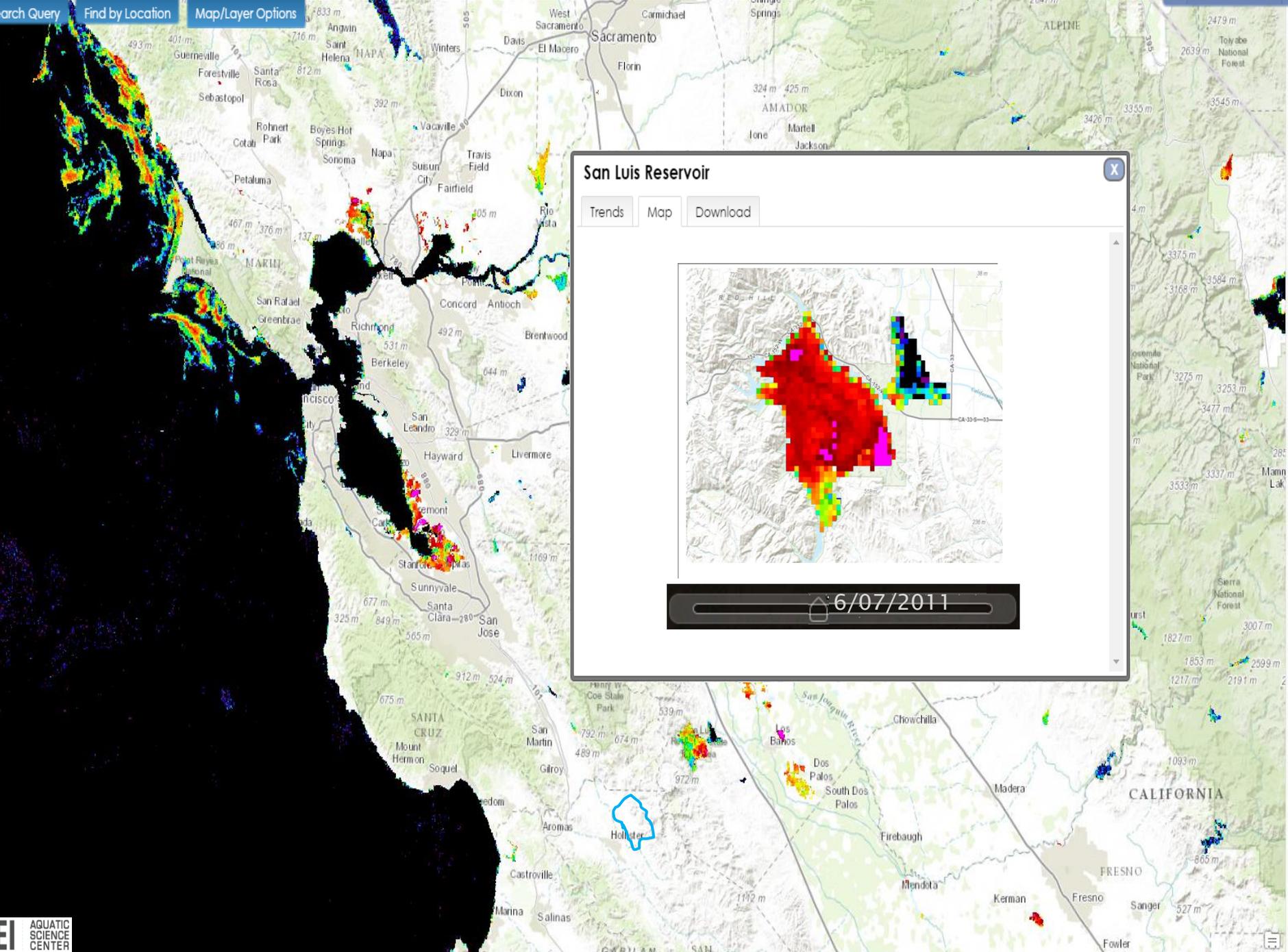
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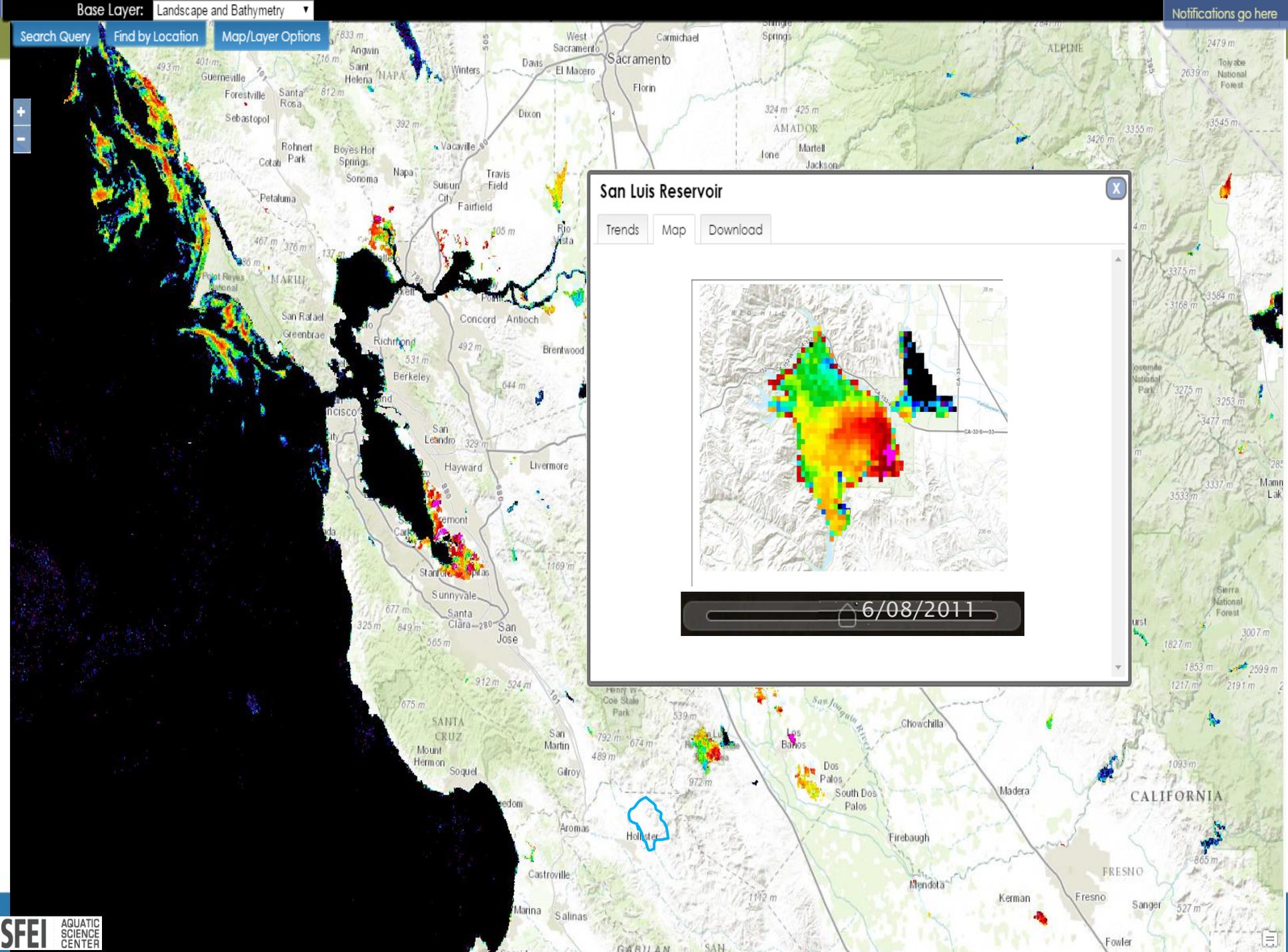
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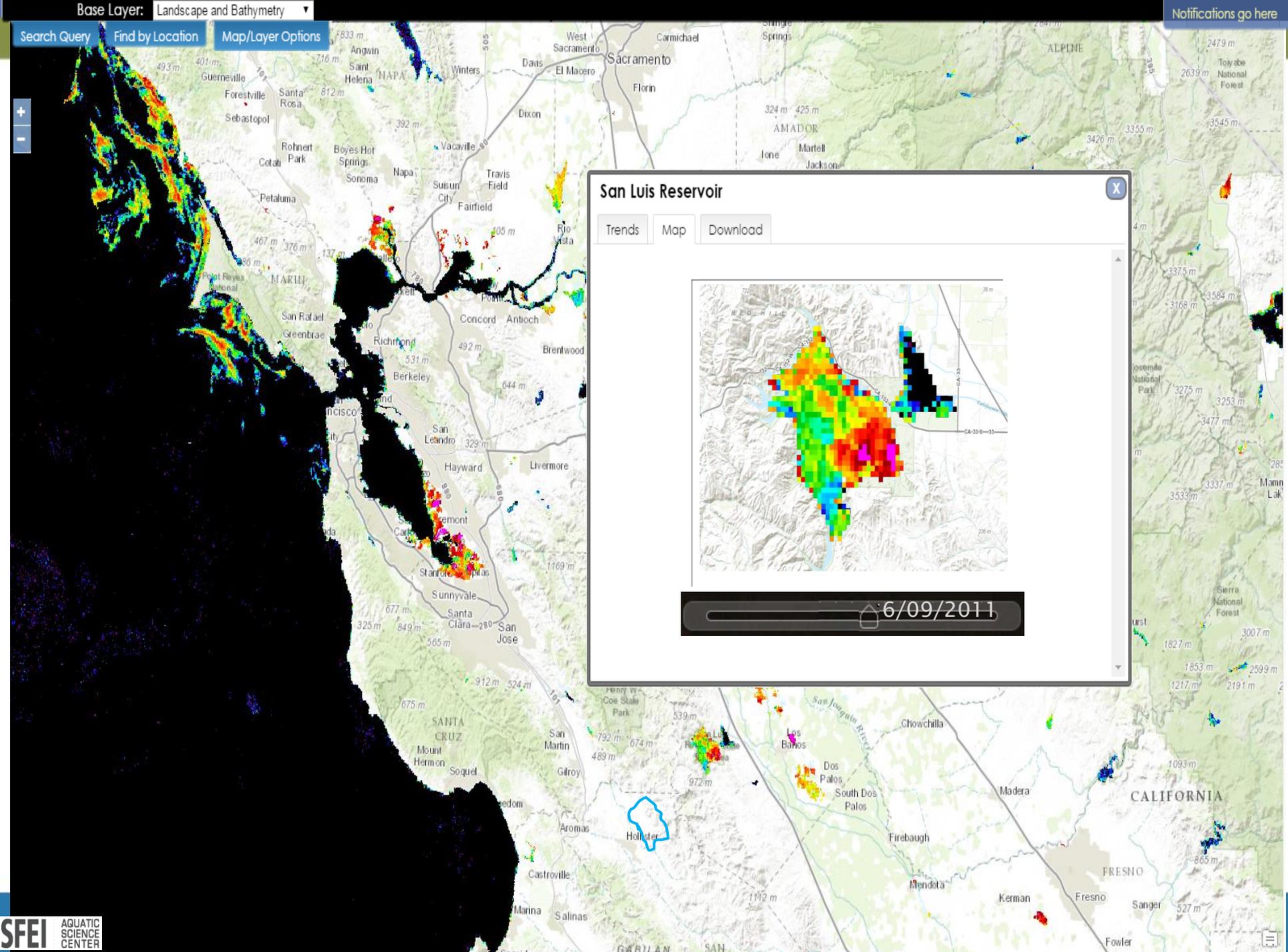
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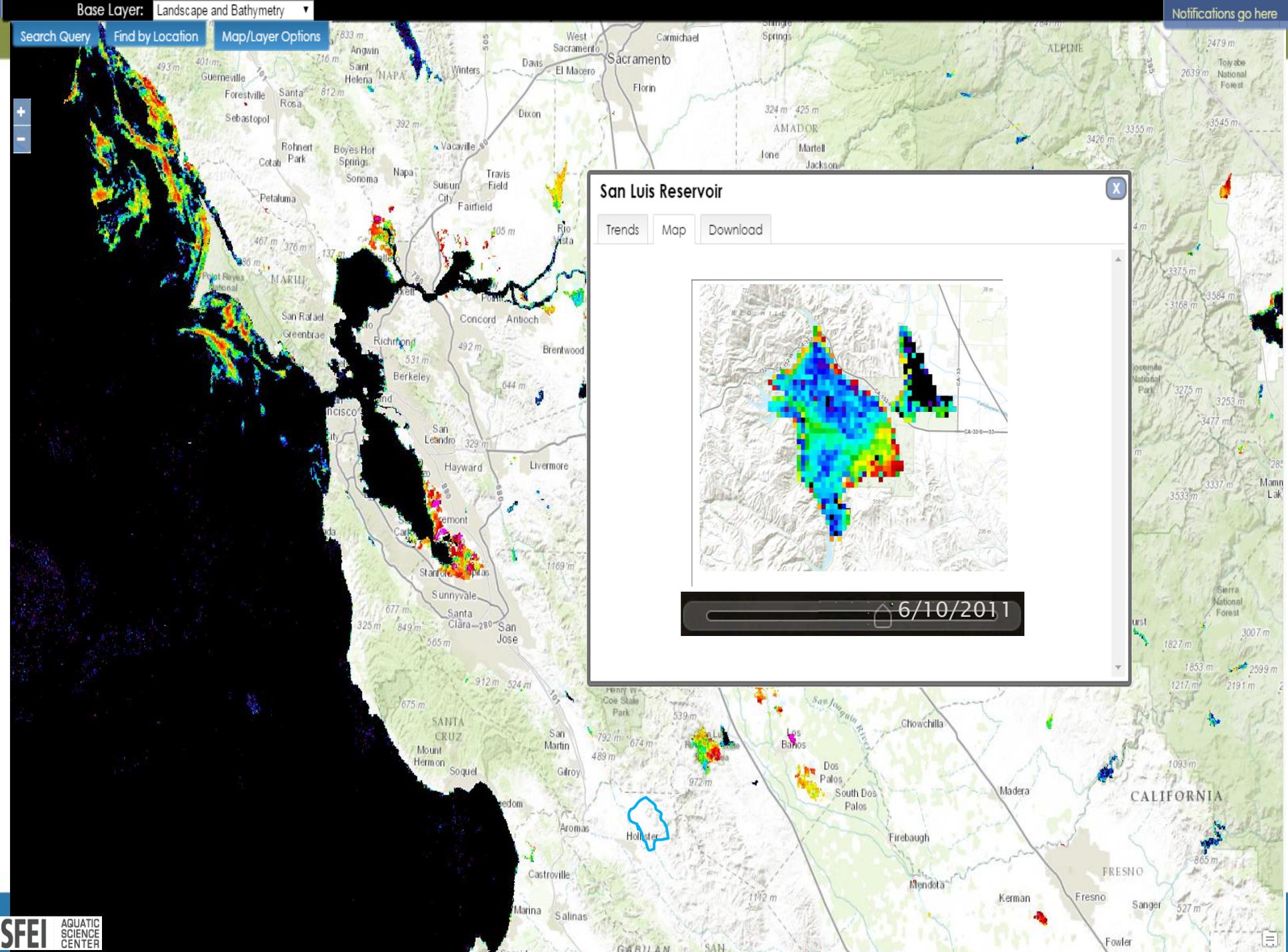
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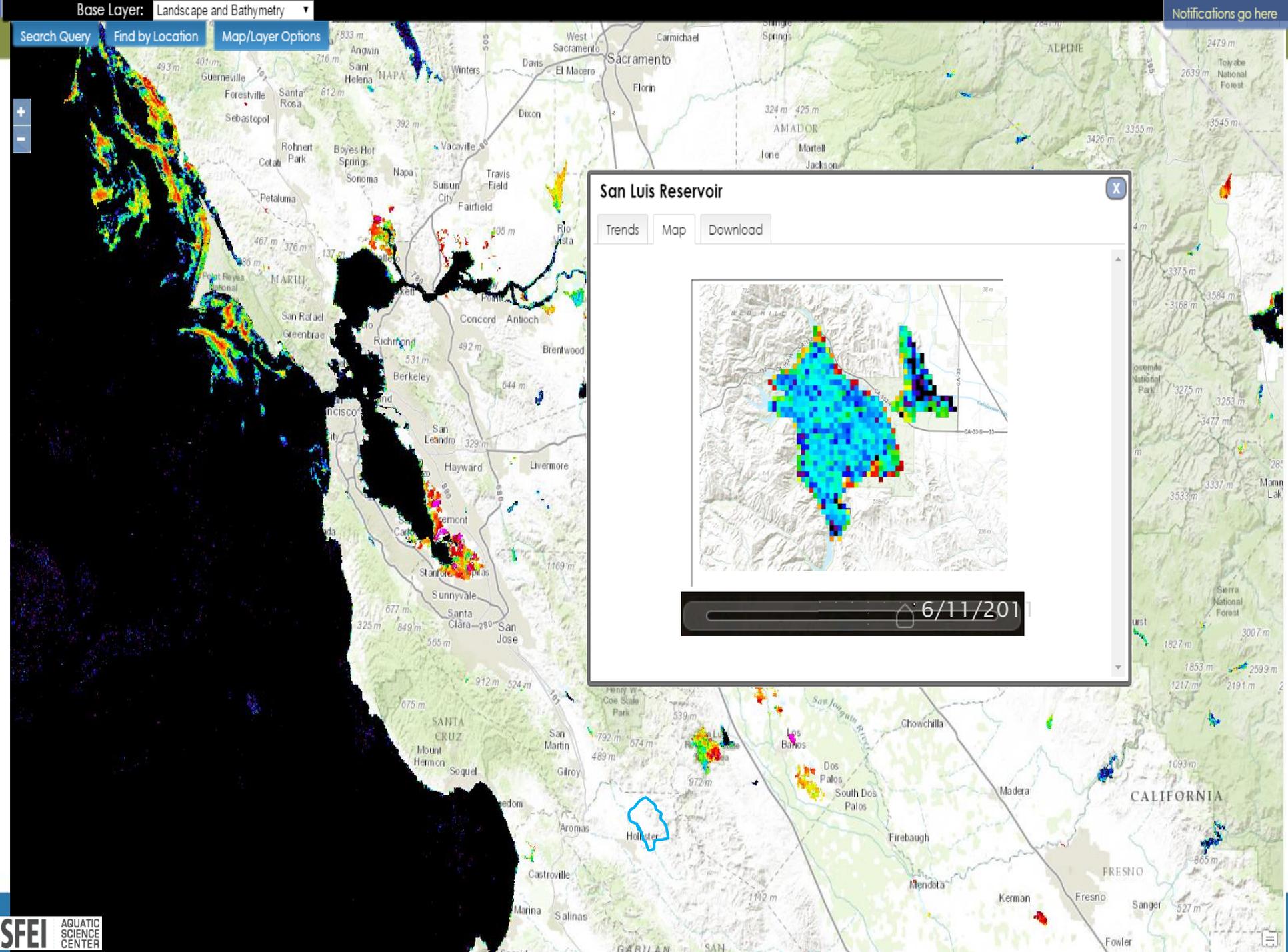
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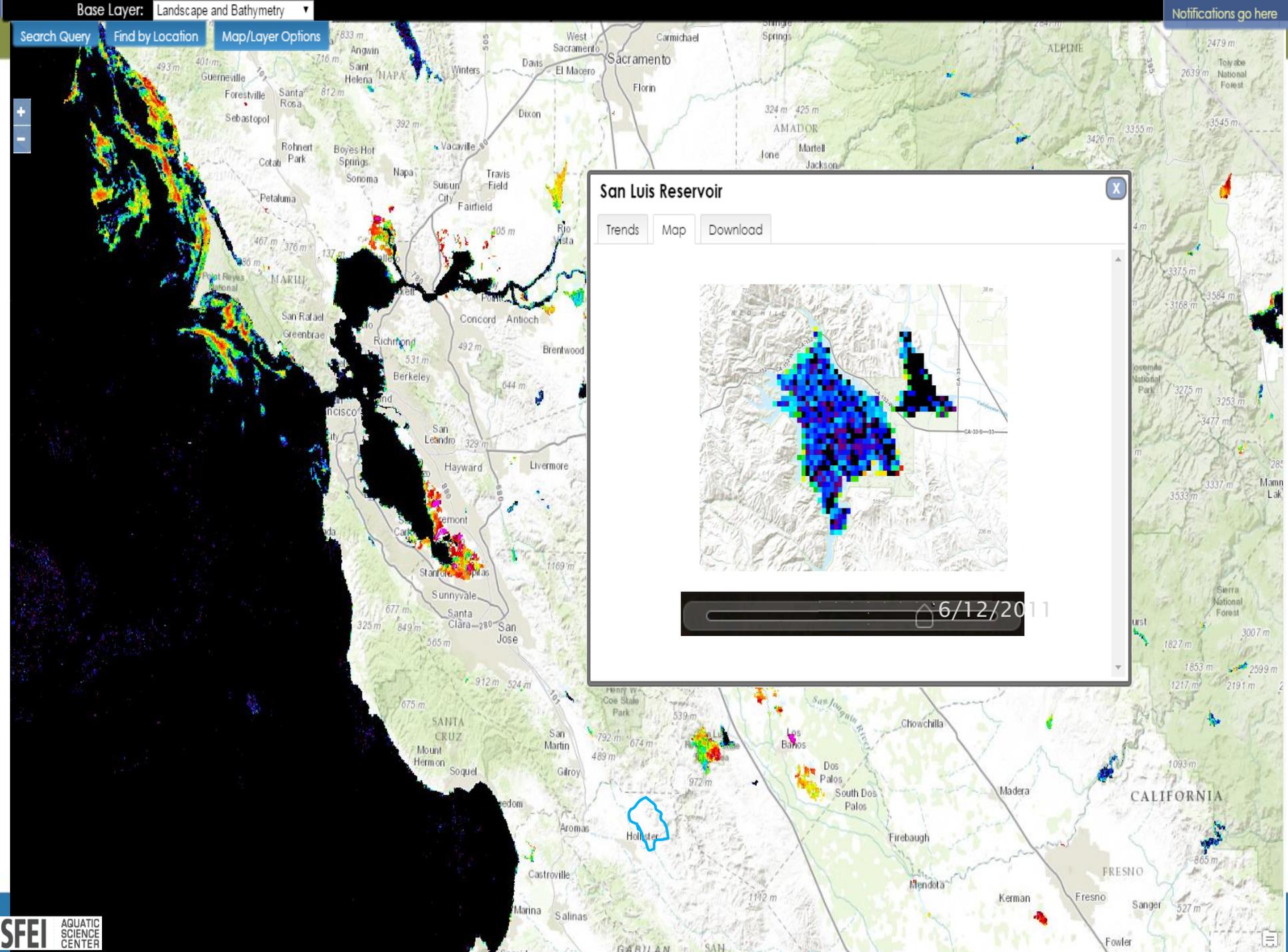
6/10/2011



### San Luis Reservoir

Trends Map Download

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### San Luis Reservoir

Trends Map Download

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# Infrastructure

## Satellite Imagery

- Historic trends
- Notifications
- Bulletin and Newsletter
- Temporal trends

## Centralized Website and Reporting System

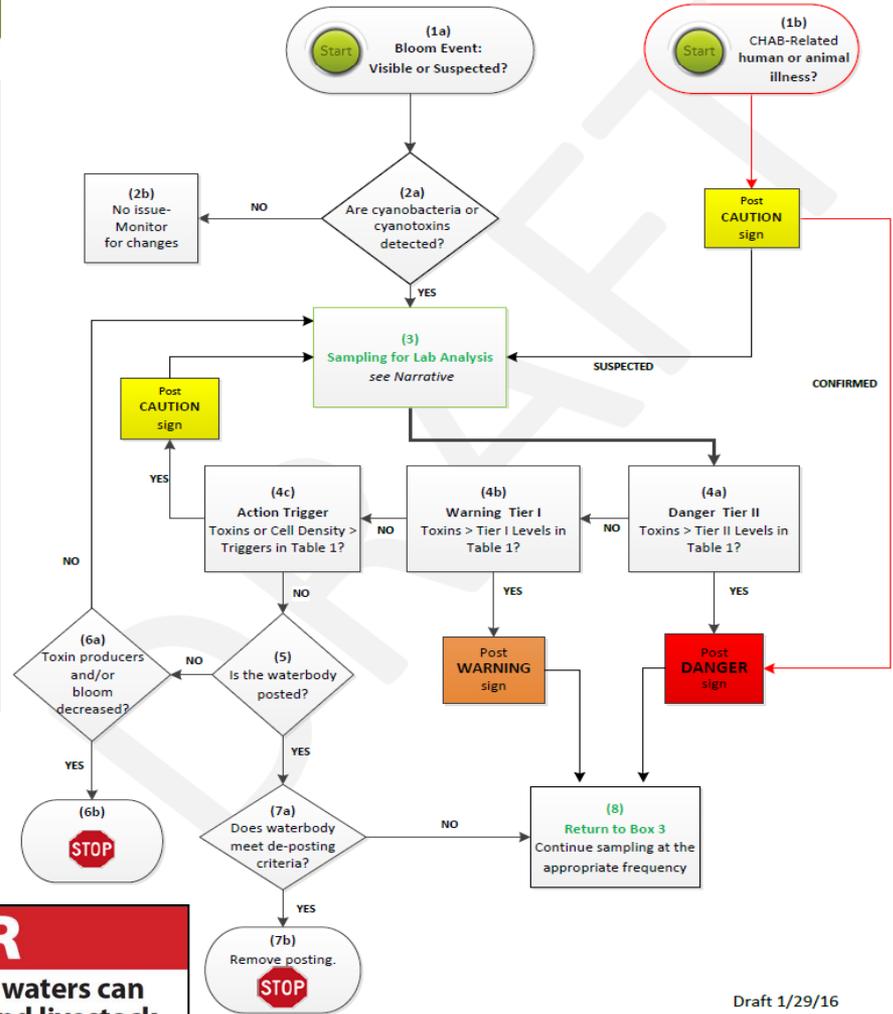
- Data
  - storage
  - visualization
  - access
- CWQMC portal

**Table 1. CyanoHAB Trigger Levels for Human Health**

**DRAFT**

	Caution Action Trigger	Warning TIER I	Danger TIER II
<b>Primary Triggers<sup>a</sup></b>			
<b>Total Microcystins<sup>b</sup></b>	0.8 µg/L	6 µg/L	20 µg/L
<b>Anatoxin-a</b>	Detection <sup>c</sup>	20 µg/L	90 µg/L
<b>Cylindrospermopsin</b>	1 µg/L	4 µg/L	17 µg/L
<b>Secondary Triggers</b>			
<b>Cell Density (Toxin producers)</b>	4,000 cells/mL	--	--
<b>Site Specific Indicators of Cyanobacteria</b>	Blooms, scums, mats, etc.	--	--

- a. The primary triggers are met when ANY toxin exceeds criteria
- b. Microcystins refers to the sum of all measured microcystin variants. (See Box 3)
- c. Must use an analytical method that detects ≤ 1µg/L Anatoxin-a



# CAUTION

Harmful algae may  
For your

DO NOT SWIM OR WA  
near algae or scum

KEEP CHILDREN AWAY  
from algae in the water  
on the shore.

DO NOT drink this water  
use it for cooking.

Call your doctor or veterinarian if  
For more information, contact:

# WARNING

**Toxins from algae in  
harm people and kill**

NO SWIMMING

STAY AWAY from scum, and  
cloudy or discolored water.

DO NOT use these waters for  
drinking or cooking.  
Boiling or filtering will not  
make the water safe.

**For people, the toxins can cause:**  
• Skin rashes, eye irritation  
• Diarrhea, vomiting

Call your doctor or veterinarian if you or your  
For more information, contact:

# DANGER

**Toxins from algae in these waters can  
harm people and kill pets and livestock**

STAY OUT OF THE WATER UNTIL  
FURTHER NOTICE. Do not touch scum  
in the water or on shoreline.

DO NOT let pets or livestock drink or go into the water or  
go near the scum.

DO NOT eat fish or shellfish from these waters.

DO NOT use these waters for drinking or cooking.  
Boiling or filtering will not make the water safe.

**For people, the toxins can cause:**  
• Skin rashes, eye irritation  
• Diarrhea, vomiting

**For animals, the toxins can cause:**  
• Diarrhea, vomiting  
• Convulsions and death

Call your doctor or veterinarian if you or your pet get sick after going in the water.  
For more information, contact:

Draft 1/29/16



February 2016

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***Standard Operating Procedures  
And  
Health and Safety Protocols  
– For –  
Sampling and Monitoring of  
Freshwater Cyanobacterial Harmful  
Algal Blooms and Other Nuisance  
Blooms in California***



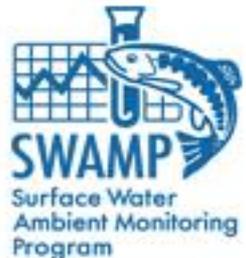
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Prepared for:

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California State Water Resources Control Board

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# Infrastructure

## Satellite Imagery

- Historic trends
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## Centralized Website and Reporting System

- Data
  - storage
  - visualization
  - access
- CWQMC portal

## Event Response Guidance Documents

- CCHAB Guidance
- Sampling and analysis
- Management and remediation

## Laboratory Resources

- Chemical analysis of toxins
- Taxonomic identification

# The End



**NOTICE**

**Blue Green Algae is Present in Lake Del Valle**

During summer and fall, the presence of blue green algae in lakes can result in a buildup of toxins. While near-water activities such as picnicking, biking, and hiking are safe, take the following precautions to help protect yourself, your family (including pets), and your friends:

- **No bodily contact with the water. Supervise children and pets at all times—they are particularly vulnerable.**
- **Keep pets, especially dogs, out of the water.**
- **Skin in contact with blue green algae should be rinsed with tap water.**
- **Fish may be consumed after removing guts and liver, and rinsing fillets in tap water.**

For more information, contact East Bay Regional Park District at (510) 544-2328 or visit the California Department of Public Health online [www.cdph.ca.gov/healthinfo/environmental/water/Pages/bluegreenalgae.aspx](http://www.cdph.ca.gov/healthinfo/environmental/water/Pages/bluegreenalgae.aspx)

