

# Strategies for Preventing Involuntary Exposure to Mercury in the Sierra Nevada

Delta MERP - April 13, 2016

Presentation by The Sierra Fund



# Presentation Overview

1. 2013-2014 Environmental Health Outreach
2. Fish Tissue & Fish Consumption Data Collection
3. Posting Fish Consumption Advisories



The mission of The Sierra Fund is to increase and organize investment to restore and protect the natural resources and communities of the Sierra Nevada.



We do this through:

**Advocacy**

Water Bond  
Mining Law Reform

**Philanthropy**

Fiscal Sponsorships  
Donor-Advised Funds  
Cash Flow Loans  
Collaborative Grants

**Strategic Campaigns**

Addressing impacts of  
legacy mining



# GET THE MERCURY OUT

## Strategic Mercury Cleanup Targets

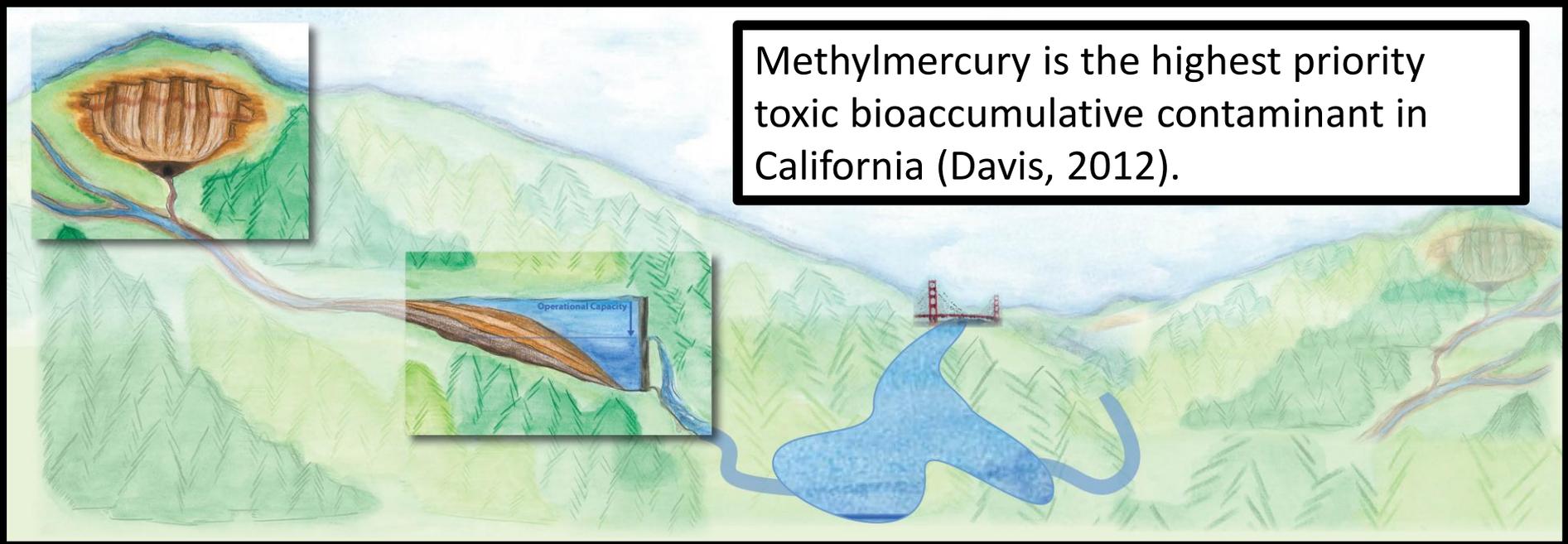
**1 UPLAND SOURCES** such as hydraulic and hard rock mines that are contaminated with mercury

**2 RESERVOIRS** where mercury-laden sediments accumulate

THE SIERRA FUND

Conceptual drawing by Courtney Chatha, for The Sierra Fund - copyright 2013

# Mercury from the Sierra



Methylmercury is the highest priority toxic bioaccumulative contaminant in California (Davis, 2012).

More than 96% of the total mercury loading to the Bay-Delta comes from the streams and rivers of the Sierra Nevada and the Inner Coast Range (Wood et al., 2010).



# Project #1

## 2013-2014 Environmental Health Outreach



Amber Taxiera

Outreach & Events Manager, The Sierra Fund

- Promote awareness around legacy mining impacts on public health
- Prevent and reduce exposure
- Build a movement to clean up sources of legacy mining pollution in the Sierra

# Convened Community Meetings

- Community Meetings held in 4 targeted historic mining communities
- Total of more than 235 people in attendance
- Community-wide outreach strategy used to promote event

The Sierra Fund presents:

## WHAT YOU WANT TO KNOW

about legacy mine pollution around Nevada County

### INFORMATIONAL MEETING

**November 4, 2013, 7:00pm**

Nevada City Veteran's Hall, Downstairs  
415 N. Pine Street, Nevada City, California 95959

**Rescheduled!**

**Hosted by The Sierra Fund, with local co-sponsors:**  
Greater Champion Neighborhood Association, Greater Cement Hill Neighborhood Association,  
San Juan Ridge Taxpayers Association, Yuba Watershed Institute,  
and Nevada County Public Health Department



Representatives from BLM and USGS, as well as other local experts, will provide information and answer questions about recent studies in the Grass Valley/Nevada City area:

1. Results of BLM & USGS mercury assessments at the **Deer Creek Tribute Trail bridge site** (Stocking Flat), **Hirschman's Pond** (in Nevada City) and **Lonesome Lake** (on the Ridge)
2. Do you fish locally? New statewide **fish consumption advice** for children and women
3. Overview of two studies by The Sierra Fund surveying **anglers** and testing **popular local trails**

**SNACKS PROVIDED!**

The meeting will present tips on how to avoid exposure to legacy mercury and other heavy metals related to historic mining in this area, including arsenic and lead.

For more information contact:  
Amber Taxiera, Community Organizer: 530-265-8454 x216, [ambertaxiera@sierrafund.org](mailto:ambertaxiera@sierrafund.org)  
[www.reclaimingthesierra.org/informational-meeting-october-8th](http://www.reclaimingthesierra.org/informational-meeting-october-8th)



# Conduct Trainings for Healthcare Professionals

Continuing Medical Education

You're invited to:

**Eating Fish Safely** 

Information to Identify, Reduce, and Prevent Mercury Toxicity in the Human Body

**August 9<sup>th</sup>, 2013**  
1:00 – 2:15pm  
2<sup>nd</sup> Floor Large Conference Room  
Plumas County Public Health  
270 County Hospital Road  
Quincy, CA 95971

Call (530) 265-8454 x 216 or email  
Amber.Taxiera@sierrafund.org to RSVP for this event

This training is designed to assist you in identifying patients that may be at risk from methylmercury in their bodies, and to provide these patients with advice on how they can continue to enjoy the benefits of eating fish, while avoiding toxins including mercury and PCBs. Spaces are first come first serve, however if you wish to reserve a seat, please RSVP ahead of time.

This FREE Training is provided by The Sierra Fund in partnership with the California Indian Environmental Alliance, however if you wish to pursue the CME option, UC Berkeley charges a \$15.00 processing fee per certificate. **We offer a Continuing Medical Education (CME) option for doctors and nurses (1.0 AMA PRA Category 1 Credits TM or 1.2 credit hours for nurses), accredited by the Institute for Medical Quality/California Medical Association.**

Training materials include *Eating Fish Safely* brochures, local and national fish consumption advisories and the Mercury Health Toolkit with medical journal summaries, full medical journal articles, and tools to get you up to speed and comfortable providing patients with clear advice.

For more information, or to schedule a private training at your clinic, please contact Amber Taxiera at (530) 265-8454 x 216. Thank you for your interest and dedication to the health of our community members.



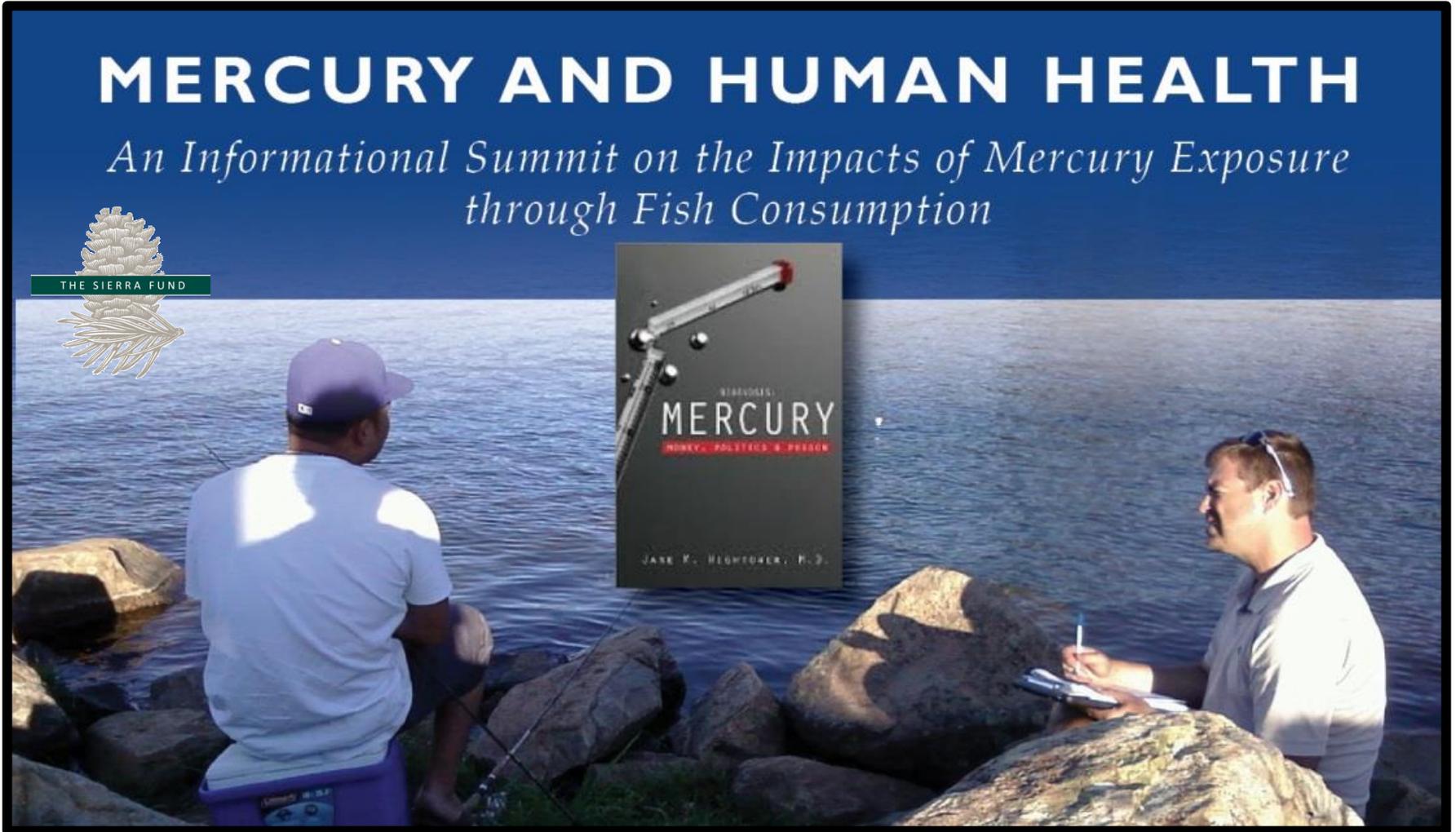
- Offered FREE certified trainings
- Participants were eligible for Continuing Medical Education (CME) credits
- Completed 10 training events and reached 110 healthcare professionals



# Convened Mercury Health Summit

## MERCURY AND HUMAN HEALTH

*An Informational Summit on the Impacts of Mercury Exposure through Fish Consumption*



# Challenges and Successes

- Collaboration with community leaders and stakeholders was central
- Flexibility became a theme in organizing trainings for health care professionals
- Utilized evaluation forms and follow up surveys
- Network of partners strengthened
- Local Leaders and community members informed
- Clinic staff provided information to clients and patient



# Project #2

## Fish Tissue & Fish Consumption Data Collection



### Mercury in Fish of the Cosumnes, American, Bear, Yuba Watershed Region

*Data Collection & Tissue Analysis*

**Alexandria Keeble-Toll**

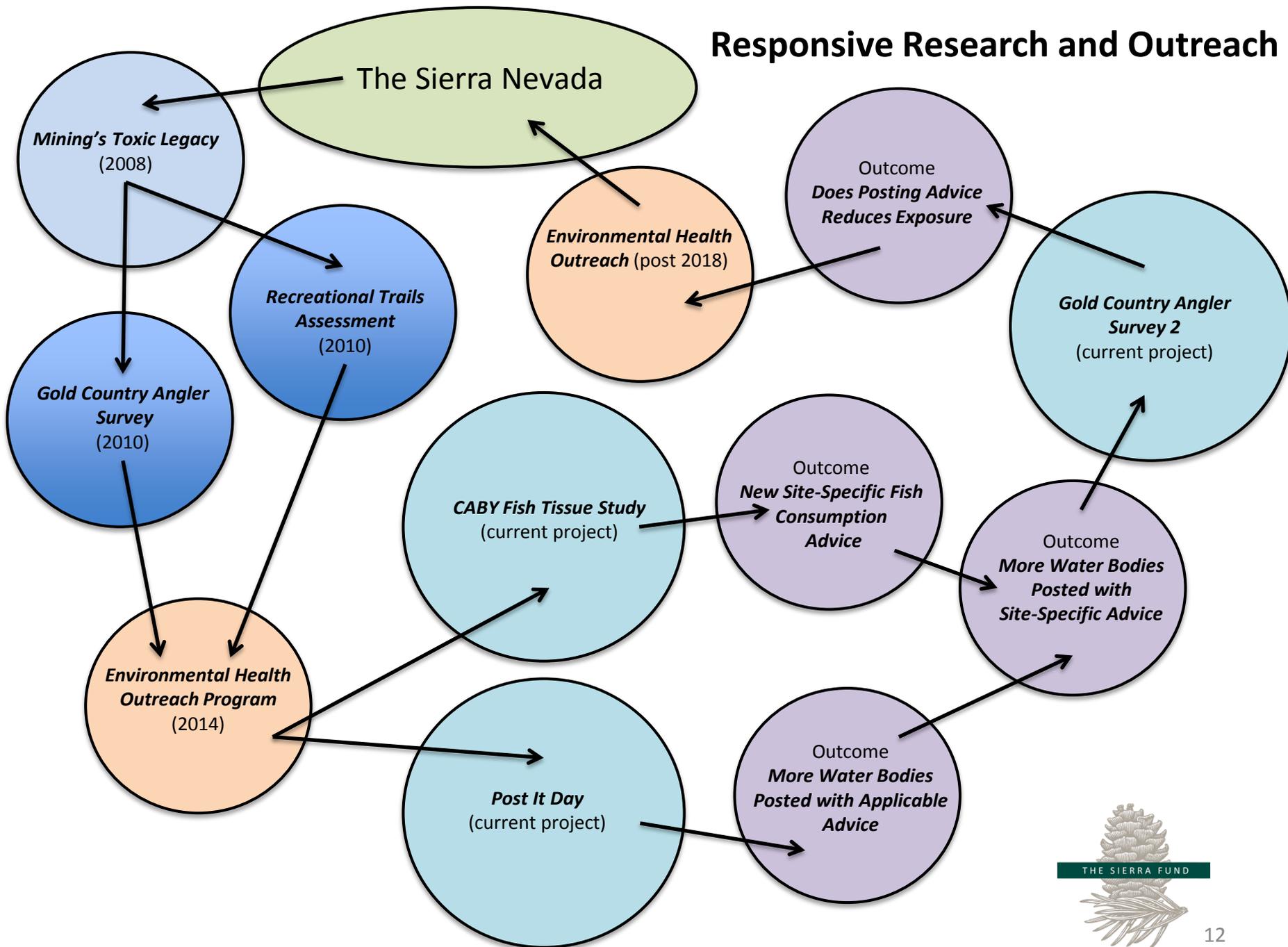
**Development & Program Assistant, The Sierra Fund**

M.S., Environmental Science, In Progress, CSU Chico

M.A., Sociology, CSU Sacramento, 2006



# Responsive Research and Outreach



# The Problem:

Anglers are catching and consuming fish from Clean Water Act section 303(d) listed reservoirs that lack fish tissue data



Surveying a Ukrainian Angler at  
Lake Clementine, Auburn State  
Recreation Area  
May 1, 2015



# The Solution: CABY Fish Tissue Study

Sacramento Pikeminnow at Lake Clementine – not in the sampling plan, but angler surveys may indicate that this species should be included



- Identify catch and consumption patterns for target reservoirs (Angler Surveys)
- Design fish tissue sampling plans that reflect angler behavior
- Collect data in a manner that is useful for the Office of Environmental Health Hazard Assessment (OEHHA)



# Research Outcomes

**NOTICE TO SIERRA ANGLERS**

**A healthy guide to eating fish from California lakes and reservoirs**  
This information applies to all lakes and reservoirs in California without site-specific advice.

**Women 18 - 45 and children 1 - 17**

Low	Medium	High
Rainbow trout	Bullhead Catfish Bluegill or Other Sunfish Brown trout 16 inches or less	Bass Carp Brown trout over 16 inches
2 servings a week	OR 1 serving a week	Do not eat

♥ = High in Omega-3s

**Women over 45 and men can safely eat more fish**

6 servings a week	OR	2 servings a week	OR	1 serving a week
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**What is a serving?**  
  
 For Adults: The recommended serving of fish is about the size and thickness of your hand.  
 For Children: Give children smaller servings.

**Why eat fish?**  
 Eating fish is good for your health. Fish have Omega-3s that can reduce your risk for heart disease and improve how the brain develops in unborn babies and children.

**What is the concern?**  
 Some fish have high levels of mercury. Mercury can harm the brain, especially in unborn babies and children. Women over 45 and men have lower risk and can eat more fish.

The only lakes and reservoirs that have site-specific guidelines in the Sierra are: Rollins, Combie, Camp Far West, Englebright, Donner, Oroville, Folsom, and Natoma. For site-specific information about eating fish from these and other locations in California, go to [www.oehha.ca.gov/fish.html](http://www.oehha.ca.gov/fish.html).

This health advisory information is issued by the California Office of Environmental Health Hazard Assessment. Posting this information is a project of The Sierra Fund, in collaboration with the South Yuba River Citizens League, Wolf Creek Community Alliance, and Nevada Irrigation District, among others. This project is funded by grants from the Clarence E. Heller Charitable Foundation, California Department of Water Resources, California Environmental Protection Agency, and The California Wellness Foundation.

Provide data that can be used by OEHHA to issue site-specific advice, if it is warranted

The OEHHA Advisory for California Lakes and Reservoirs Without Site Specific Advice is based on the 90<sup>th</sup> percentile lake mean mercury concentrations from the Statewide Advisory data set

Diagram Source: OEHHA

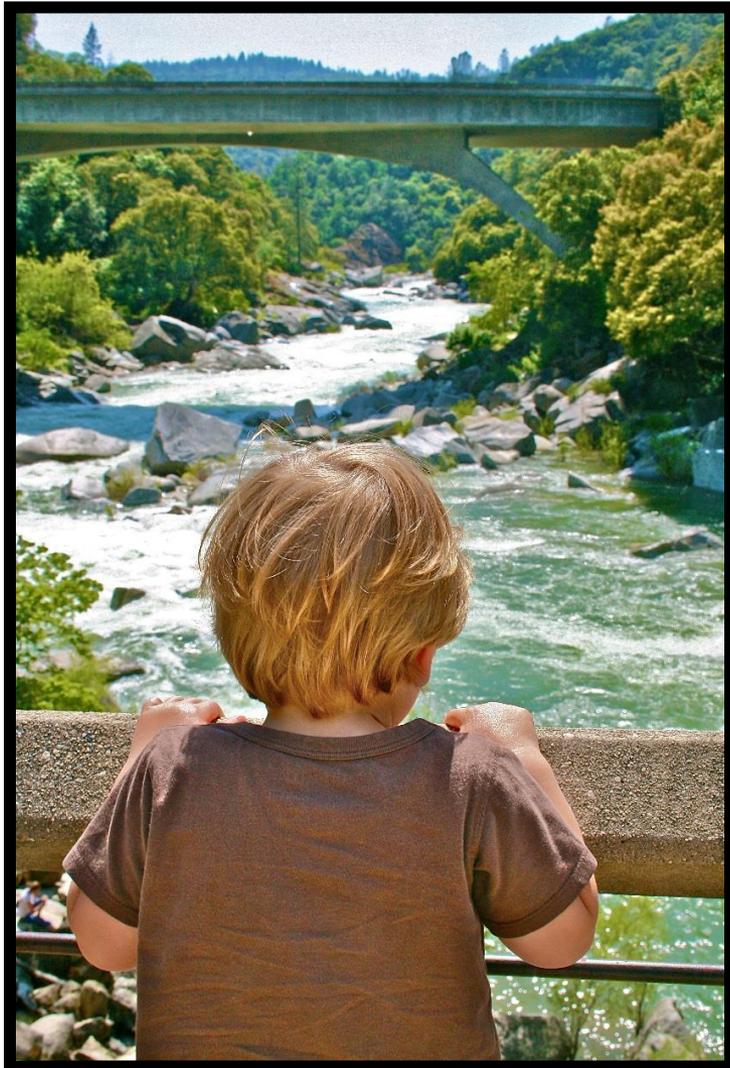


# Mercury in Fish



- Fish Consumption is the primary pathway of human exposure
- Mercury is responsible for 80% of all fish consumption advisories in the United States

# Mercury in Watersheds

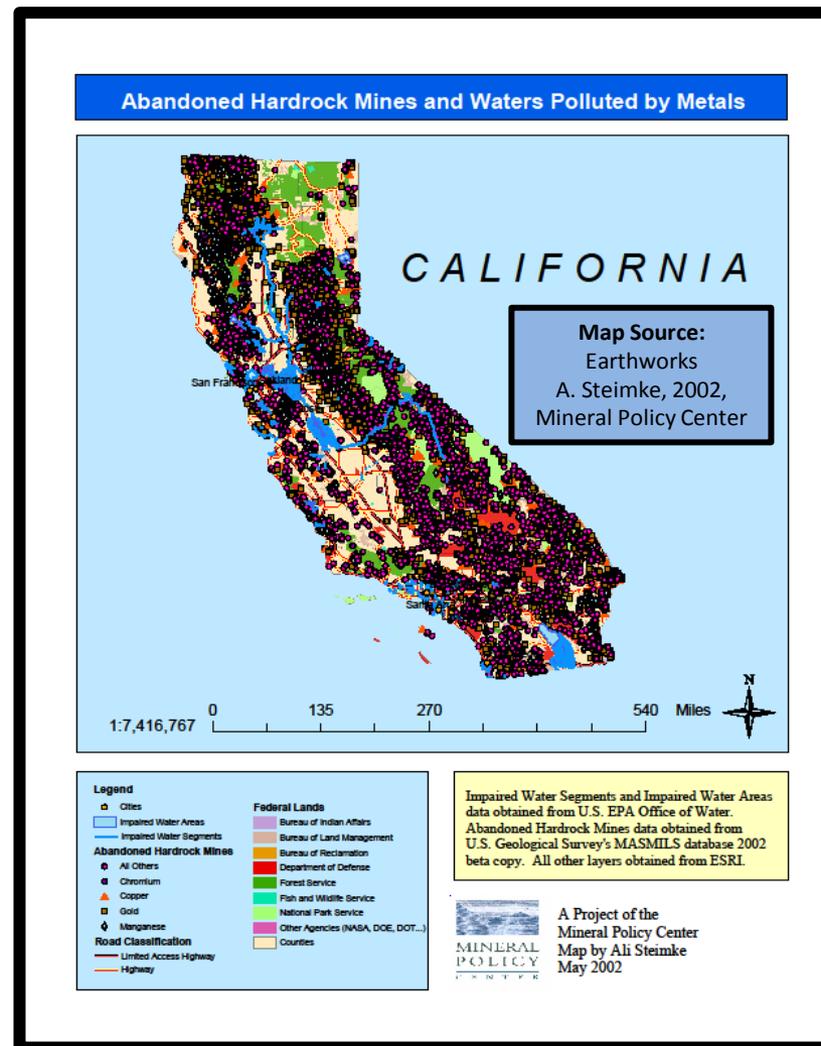


The main source of mercury in the aquatic environment in California is past gold and mercury mining activities

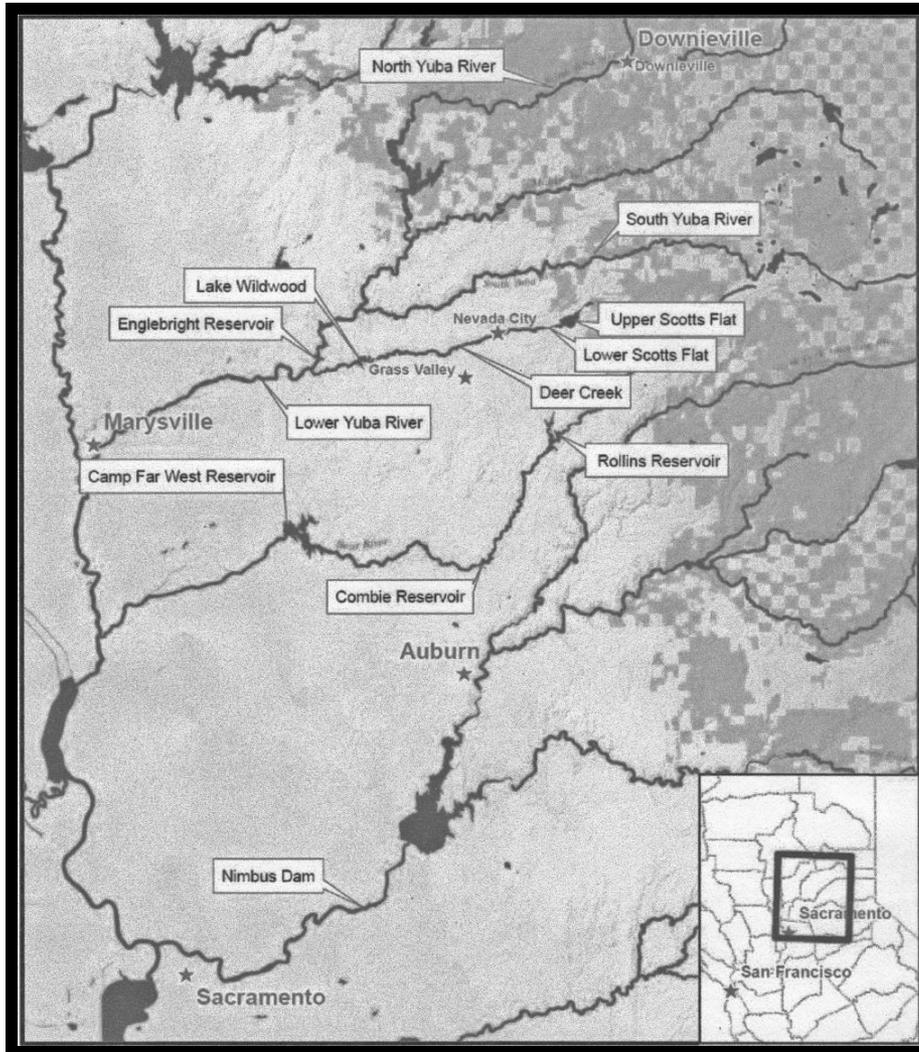
**During the Gold Rush:**  
*26 million pounds used*  
*10 -13 million pounds LOST*



# Abandoned Mines: Statewide



# Project Background



## CABY Region

- *Cosumnes-American-Bear-Yuba*
- *303(d) Clean Water Act*

## THg Levels in Fish

- *Exceed OEHHA SVs*

## Angler Consumption Patterns

- *Gold Country Angler Survey (2011)*



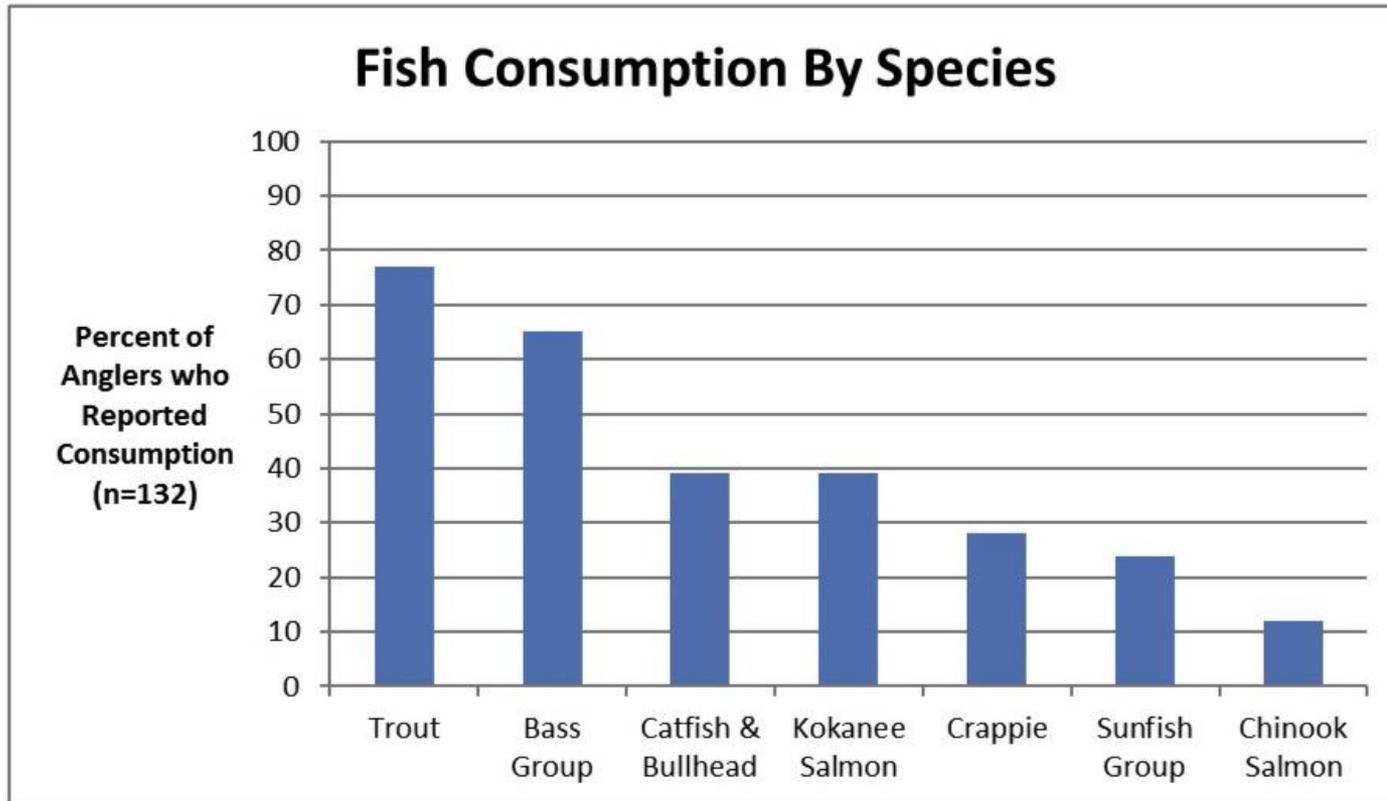
# Water Bodies: Lakes & Reservoirs



**Table 1: Lakes and Reservoirs Selected For Analysis**

<b>Site Identification</b>	<b>County</b>	<b>Elevation (feet)</b>	<b>Surface Area (acres)</b>	<b>Shoreline (miles)</b>	<b>Number/Names of Arms</b>
Rollins Reservoir	Nevada and Placer	2100	900	26	2 Arms: Greenhorn Creek & Bear River
Camp Far West Reservoir	Nevada, Placer, and Yuba	320	2000	29	3 Arms: Rock Creek, Bear River, & Rocky Area
Lake Combie	Placer	1605	276	9	N/A
Lake Clementine	Placer	718	280	8	N/A
Lake Englebright	Nevada and Yuba	527	815	24	N/A
Scotts Flat Reservoir	Nevada	3100	850	7.5	N/A

# Species Selection



**Figure 1: Fish Consumption by Species, Gold Country Angler Survey (Source: The Sierra Fund, 2011):** Trout: Rainbow & Brown (n=101), Bass Group: Largemouth Bass, Smallmouth Bass, and Stripped Bass (n=86), Catfish & Bullhead (n=51), Kokanee Salmon (n=51), Crappie (n=37), Sunfish Group (including Bluegill) (n=32), Chinook Salmon (n=16). *For the 2009 survey no distinction was made between Rainbow Trout and Brown Trout, so these species are grouped in the analysis – this oversight was addressed in subsequent survey efforts.*

# Preliminary Fish Tissue Data



**112 Samples** Collected in 2015

**3 Water Bodies:** Lake Clementine, Rollins Reservoir, Combie Reservoir

**7 Species:** Rainbow Trout, Bluegill, Green Sunfish, Redear Sunfish, Smallmouth Bass, Spotted Bass, Pikeminnow

**No Existing Data for Lake Clementine**

**Existing Data Used for Rollins Reservoir:** USGS (1999) and SLSCS (2007); TSMP (1984 and 1985) not used because TL not recorded on CEDEN

# Does Posting Advice Reduce Exposure?



- 79% Seen or Heard Health Warnings
- 2% Aware of all three aspects of the health issue
- 57% Get trusted information from health care providers

# Components of Advisories

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This information applies to all lakes and reservoirs in California without site-specific advice.

**Women 18 - 45 and children 1 - 17**

 Rainbow trout ♡	 Bullhead Catfish Bluegill or Other Sunfish Brown trout 16 inches or less ♡	 Bass Carp Brown trout over 16 inches
2 servings a week	OR 1 serving a week	Do not eat

**Women over 45 and men can safely eat more fish**

6 servings a week	OR 2 servings a week	1 serving a week
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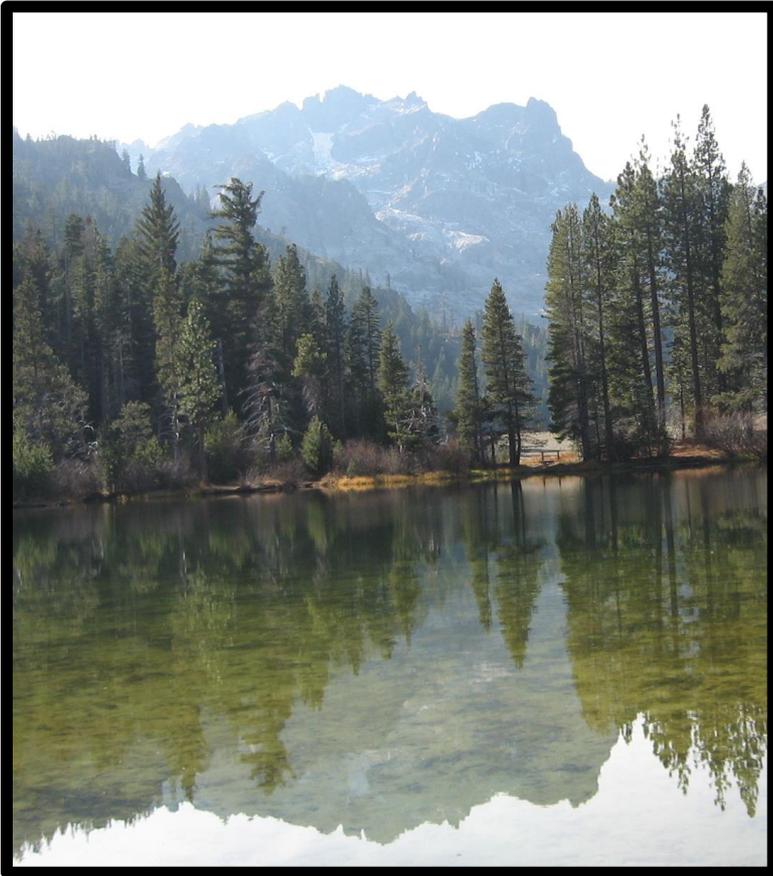
1. Species
2. Population Group
3. Frequency of Consumption

Diagram Source:  
OEHA



# Project #3:

## Posting Fish Consumption Advisories



**Kelsey Westfall**  
Outreach Coordinator, The Sierra Fund

Sport fish consumption is likely the single most significant route by which people are exposed to mercury that remains in the Sierra Nevada foothills from legacy mining activity



# Identifying & Responding to a Critical Communication Gap

- No agency or organization is mandated to post fish consumption advisories at water bodies where people fish
- The Sierra Fund stepped in to fill this communication gap by coordinating a volunteer event to post existing advisories.
- Last July, The Sierra Fund held the first “*Post It Day 2015*”



# Post It Day 2015

## Saturday, July 11, 2015



- Nearly 100 fish consumption advisories posted
- Over 25 water bodies and recreation facilities

# Post It Day 2015... Success!



- Positive local and regional media
- Every volunteer would volunteer again

# Behind the scenes effort: Designing a Sierra advisory

**NOTICE TO SIERRA ANGLERS**

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**Women 18 - 45 and children 1 - 17**

  Rainbow trout ♡	  Bullhead	  Bass
  Catfish	  Bluegill or Other Sunfish	  Carp
  Brown trout ♡ 16 inches or less	  Brown trout over 16 inches	

♡ = High in Omega-3s

2 servings a week **OR** 1 serving a week **Do not eat**

**Women over 45 and men can safely eat more fish**

6 servings a week **OR** 2 servings a week **OR** 1 serving a week

**What is a serving?**  
  
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 The recommended serving of fish is about the size and thickness of your hand. Give children smaller servings.

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- All info on 1 page
- Easy to understand
- Colorful
- Consistent message



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# A Healthy Guide to Eating Fish from Rollins Reservoir

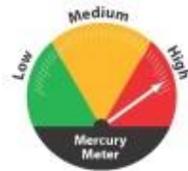
Women 18 - 45 and children 1 - 17



There are no fish in this group\*



Catfish



There are no fish in this group\*

2 servings a week

OR

1 serving a week

Do not eat

Women over 45 and men can safely eat more fish: ● Safe to eat 2 servings per week of catfish

## What is a serving?



For Adults For Children

The recommended serving of fish is about the size and thickness of your hand. Give children smaller servings.

\*NOTE: If you do not see a fish species listed above, it does not mean you can eat it as often as you like. Rather, it is missing because the species has not been tested.

For additional information about eating fish from other lakes and reservoirs in California, refer to the general advisory to the right, or for site-specific information about eating fish from other locations in California, go to [www.oehha.ca.gov/fish.html](http://www.oehha.ca.gov/fish.html)



## Why eat fish?

Eating fish is good for your health. Fish have Omega-3s that can reduce your risk for heart disease and improve how the brain develops in unborn babies and children.

## What is the concern?

Some fish have high levels of mercury. Mercury can harm the brain, especially in unborn babies and children. Women over 45 and men have lower risk and can eat more fish.

### A healthy guide to eating fish from California lakes and reservoirs

Small text: This advisory applies to all fish and wildlife in California unless otherwise specified.

Women 18 - 45 and children 1 - 17



Rainbow Trout



Catfish



Bass



Rainbow Trout



Catfish



Bluegill or Other Sunfish



Carp



Brown Trout over 18 inches

● High in Omega-3s

2 servings a week

OR

1 serving a week

Do not eat

Women over 45 and men can safely eat more fish

6 servings a week

OR

2 servings a week

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# Providing Accurate Advice



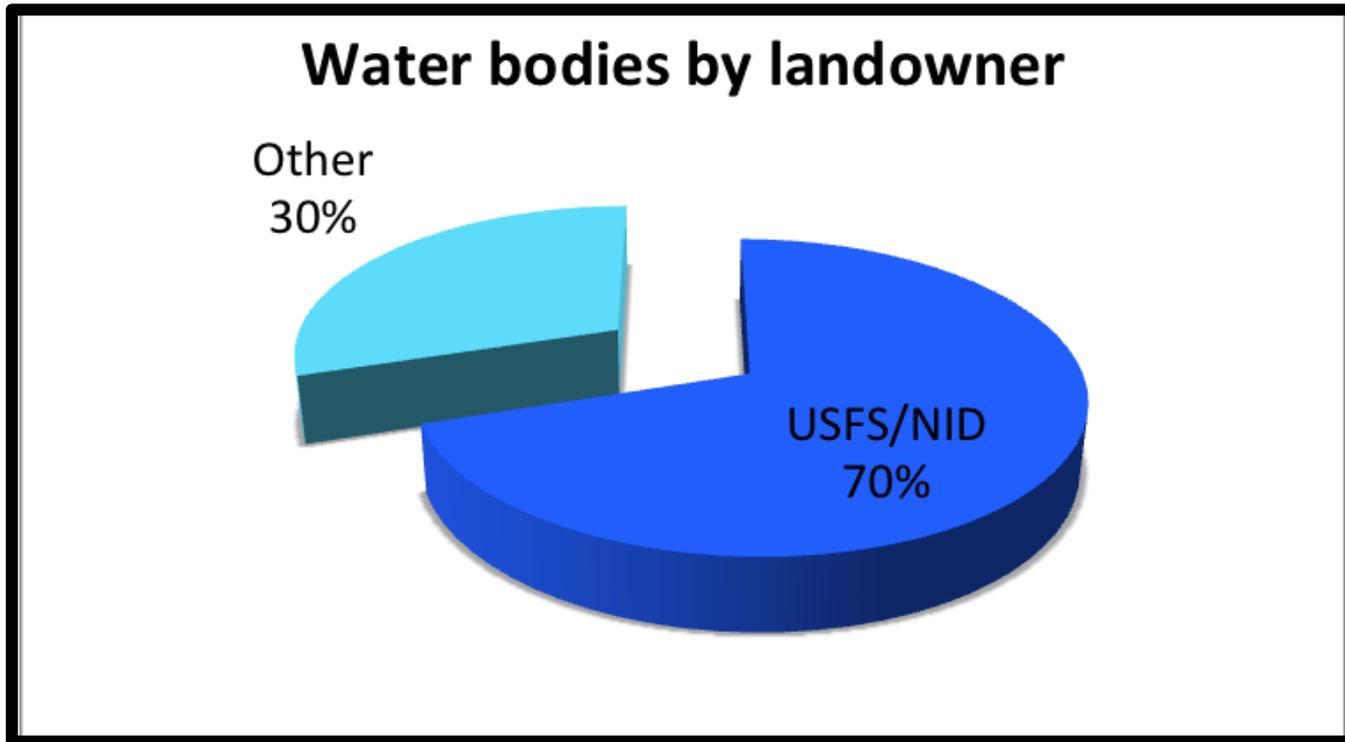
# Behind the scenes effort: Working with landowners



Supporters of the 2015 project include:

- US Forest Service
- US Army Corps of Engineers
- Nevada Irrigation District
- City of Nevada City
- Auburn State Recreation Area
- Lake Wildwood Association
- Bear Yuba Land Trust
- Yuba County Water Agency
- Cascade Shores Homeowners Association

# Project moves toward regional self-sufficiency



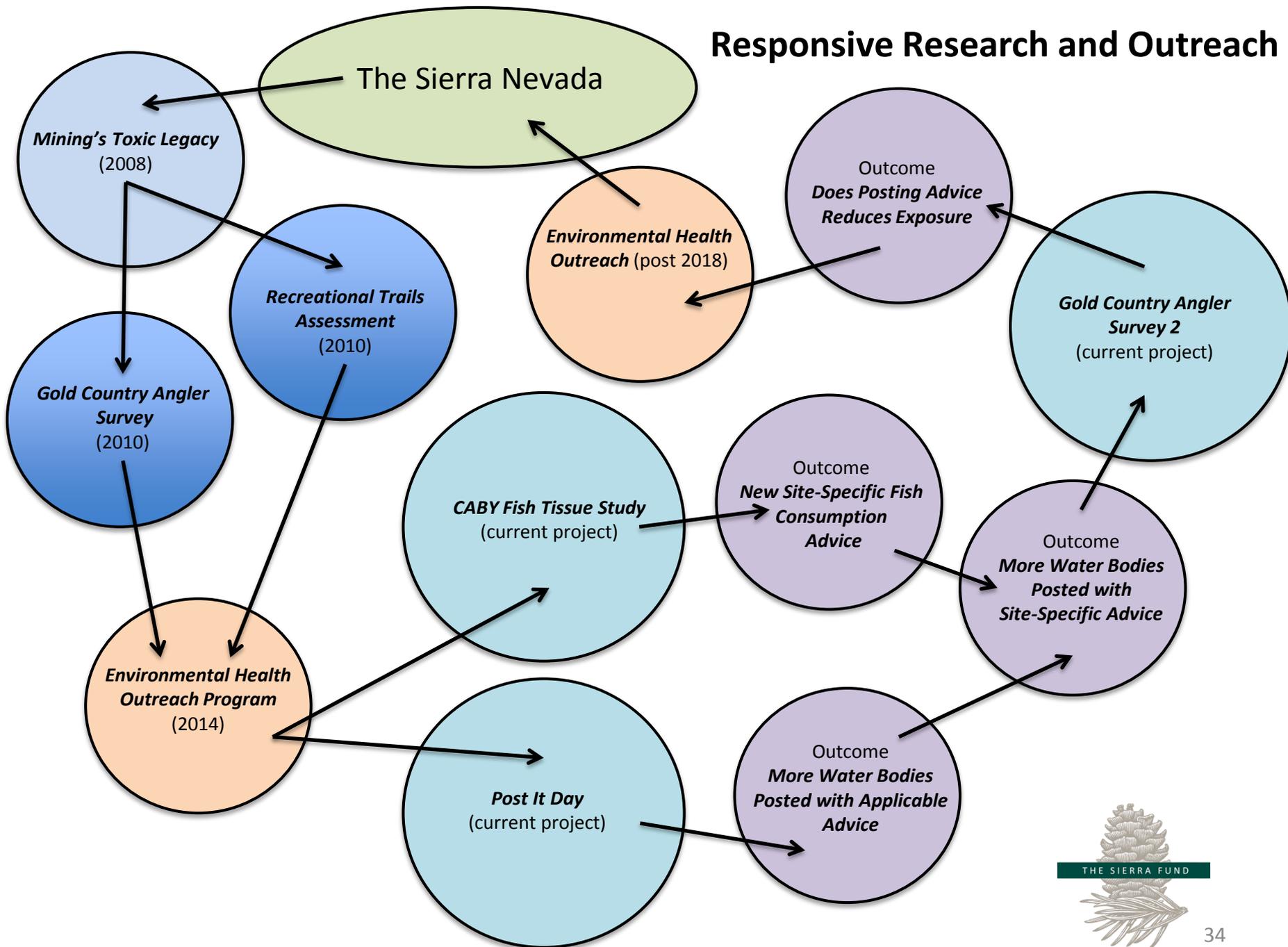
Yuba River Ranger District (USFS) and Nevada Irrigation District agreed to post themselves!

# Post It Day 2016

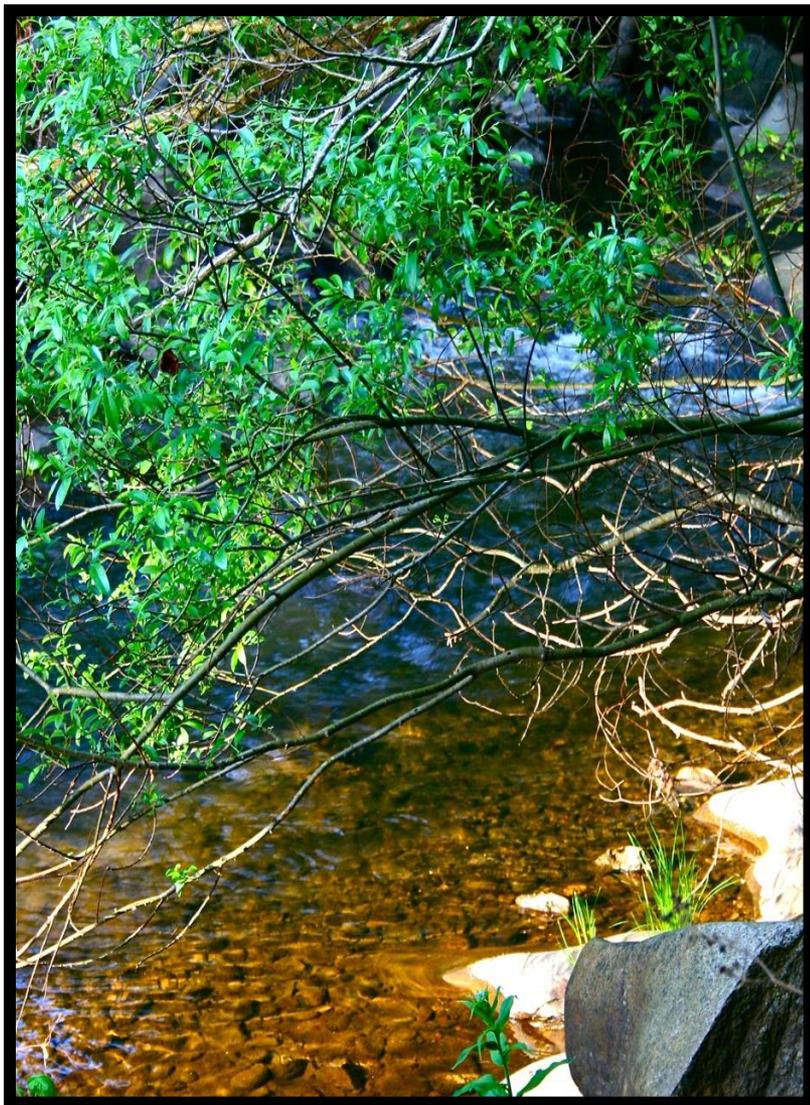
## Saturday, May 21, 2016



# Responsive Research and Outreach



# Contact Information



[www.sierrafund.org](http://www.sierrafund.org)

[www.reclaimingthesierra.org](http://www.reclaimingthesierra.org)

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