Our Mission

The Sierra Fund’s mission is to restore resiliency for the environment and communities that are still blighted from centuries-old resource extraction.
Legacy Mining Impacts...
just the beginning of the story

- The ecological footprint of the Gold Rush stretches from the Sierra Nevada to the Sea...
- A century of resource extraction and mismanagement...
- Climate change impacts in the region...
Ecosystem Resiliency

To identify, articulate, assess and implement ways to address lasting impacts with a focus on the disturbance regimes critical to ecosystem resiliency in the Sierra Nevada...

Water Flow Regime
Sediment Regime

Fire Regime
Climate Regime
Ecosystem Resiliency

Flow Regime
- Magnitude
- Frequency
- Duration
- Timing
- Rate of Change

Water Quality
Energy Sources
Physical Habitat
Biotic Interactions

Ecological Integrity

Poff et al 1997
Headwater Mercury Source Reduction Program

- Projects that fill critical data gaps
- Projects that inform policy
- Projects that are a catalyst for broader regional impacts
Malakoff Diggins State Historic Park

- Thousands of Mines of unknown conditions
- Assessment techniques
- Remediation techniques
Photos taken by Dr. C. Monohan 3/14/2012
Monitoring Components
Humbug Gage Location

- Stage
- Turbidity
- Automated Sampler
- Power
Storm Events
Humbug Creek WY 2012 and 2013


Mercury Concentration (ng/L)

- Total Mercury
- Particulate-Bound Mercury
- Dissolved Mercury

Road 1 Hiller 2 Gage 3 Road 1 Hiller 2 Gage 3 Road 1 Hiller 2 Gage 3 Road 1 Hiller 2 Gage 3 Road 1 Hiller 2 Gage 3 Road 1 Hiller 2 Gage 3

Stage Discharge Relationship

\[ y = 14.03x + 0.58 \]
SE = 3 cfs
R^2 = 0.57
p < 0.01
n = 9

Turbidity-TSS Relationship

\[ y = 0.6647x \]
SE = 383 mg/L
R^2 = 0.82
p < 0.0001
n = 25

Turbidity-PHg Relationship

\[ y = 0.1412x \]
SE = 53 ng/L
R^2 = 0.80
p < 0.0001
n = 15
Humbug Discharge
Turbidity Data for Water Year 2012

Humbug Discharge
Particulate Bound Mercury Data for Water Year 2012
Additional Work by Graduate Students: John Ward and Travis Moore
Combie Reservoir Sediment and Mercury Removal

- Reservoir Sedimentation in the Sierra Nevada
- Innovative mercury removal technology
- Led by The Nevada Irrigation District
Backhoe and Shaker Rig

Wheelwash Slurry

Mechanical Mercury Extraction

Polymer Injection

Settling Tanks
The MME System successfully removed an average of 94% of the total Hg (THg), as free elemental mercury (Hg(0)), from the sand size (>0.63mm) fraction in the head material.

The polymers were successful at promoting sedimentation so that water meets regulatory criteria and can be returned to the reservoir.
Headwater Mercury Source Reduction
Debris Control Dams

• Focus on Hydraulic Mines and their features
• Tahoe National Forest-LiDAR data
• Fluvial geomorphological perspective

Photo by Rick Weaver
Additional Work by Graduate Students: John Kelley and Brandon Ertis
Program Objective: Prevent public exposure to legacy mining contaminants and to engage under-represented and disadvantaged community members in projects that improve their access to clean water and safe fish consumption choices.
Mercury Forum and TAC

- Working Group of Advisors
- Coordination of projects in the region
- Establishment of consistent practices
Project Objective: Develop and standardize monitoring techniques to quantify the benefits of meadow restoration and inform the prioritization of future meadow conservation efforts.
Project Objective: Fill critical data gaps that inform volitional fish passage opportunities on the Yuba River, such as sediment management, water temperature and environmental flow targets.
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Together we can!

**Identify** and fill key data gaps needed to address identified problems, and develop pilot projects that demonstrate effective solutions and invite replication.

**Engage** diverse leaders in work to articulate, advocate for, and win adoption of specific policy changes identified through our program that are needed to advance our mission.

**Improve** visibility to target audiences of the problems and solutions that we have developed, and involve these audiences in collaborative action to implement the solutions.

**Build** regional and TSF organizational capacity to be ready to create and seize new opportunities.
Thank you!

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