



THE SIERRA FUND

# COMBIE RESERVOIR

*An innovative pilot project to remove mercury contaminated sediment from a reservoir*



*Reservoirs are areas where mercury contaminated sediments accumulate in the Gold Country, resulting in elevated fish mercury concentrations, lost water storage space and impaired water quality. Reservoirs as man-made facilities present unique opportunities to address legacy mercury contamination with innovative maintenance activities.*

## **BACKGROUND**

The Nevada Irrigation District (NID) reservoirs on the Bear River are 303(d) listed as impaired for mercury. Private aggregate mining companies have removed sediments that migrate into the reservoirs. At Combie Reservoir, dredging operations were halted in 2003 as a result of mercury levels, affecting NIDs efforts to maintain reservoir storage capacity.

## **PROJECT**

This project removes sediment from Combie Reservoir while introducing an innovative recovery process to reduce mercury in the Bear River watershed. If successful the process can be applied at other reservoirs throughout the Sierra Nevada. In time, there could be a beneficial effect toward remediation and reduction of mercury contamination.

## **IMPACT**

Reservoir sedimentation in Gold Country reservoirs presents unique challenges to ensure that mercury in the aquatic environment is removed safely and effectively. Basic principles are to avoid creating turbid water and to dispose material out of the 100 year floodplain. Project benefits include: water supply reliability, water quality protection and improvement, ecosystem restoration and enhanced recreation.

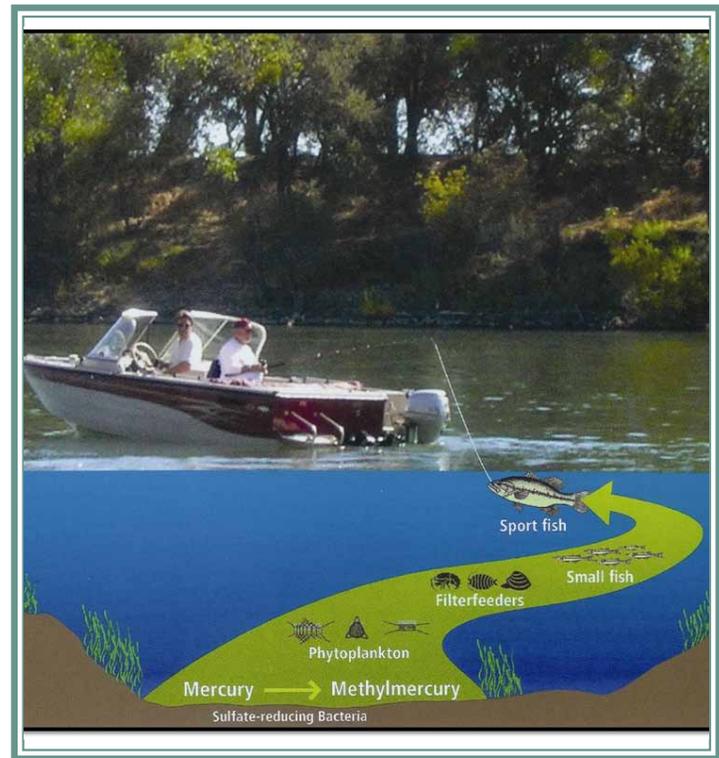


## NEXT STEPS

NID begins full scale removal of accumulated sediments in 2018 and will continue through 2020 under a DWR grant. Sediment will be removed in the dry and by dredging. The effectiveness of sediment and water treatment steps will be monitored so that an adaptive management approach can be used to improve the engineering processes throughout the pilot project. Monitoring reservoir biota before during and after sediment removal remains a critical project performance measure. And real time monitoring of effluent will ensure that only clean water be returned back into the reservoir. Project outcomes will help inform reservoir best management practices in similarly affected water bodies within the Sierra Nevada.

## BY THE NUMBERS

From 2009 to 2015 The Sierra Fund conducted **10 PILOT EQUIPMENT EFFICIENCY TESTS.** **93% OF LIQUID ELEMENTAL MERCURY** in the head material was removed by the treatment process, with **200,000 YD<sup>3</sup> OF SEDIMENT** to be removed and treated.



Mercury in sediment at the bottom of reservoirs can methylate and be incorporated into the aquatic food web, biomagnifying to dangerously high levels in top predatory fish that people and wildlife eat.

Source: Figure from SFEI (San Francisco Estuary Institute) Mercury report.

### PROJECT FUNDERS

Past and present project funders include: Sierra Nevada Conservancy, Department of Water Resources through the CABY IRWMP, The Nevada Irrigation District.