

Total Maximum Daily Load Progress Report

Upper Sacramento River TMDL for Cadmium, Copper and Zinc

Regional Water Board	Central Valley, Region 5
Beneficial uses affected:	COLD and MUN
Pollutant(s) addressed:	Cadmium, Copper, and Zinc
Implemented through:	Cleanup and Abatement Orders, Interagency MOU, NPDES permits, WDRs, U.S. EPA Superfund
Approval date:	June 27, 2002

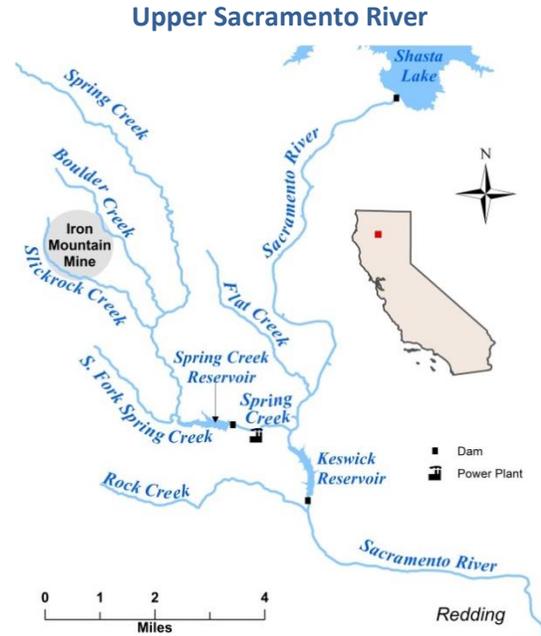
STATUS

- Conditions Improving
- Data Inconclusive
- Improvement Needed
- TMDL Achieved/Waterbody Delisted**

TMDL Summary

The Upper Sacramento River had elevated levels of cadmium, copper, and zinc that exceeded water quality standards developed to protect aquatic organisms. The impairment was primarily caused by discharges of acid mine drainage from inactive mines in the upper Sacramento River watershed, predominantly from the Iron Mountain Mines (IMM) site upstream of Keswick Dam and other mines upstream of Shasta Dam. To address the impairments, the Central Valley Regional Water Board developed the [Upper Sacramento River TMDL for dissolved copper, cadmium, and zinc](#), which was approved by the U.S. EPA in June 2002.

The TMDL established numeric targets and load allocations for cadmium, copper, and zinc. The TMDL was implemented through existing remedial activities at IMM, NPDES permits, and cleanup and abatement orders, and the TMDL requires a reduction of metals discharges from mines in the watershed to meet the numeric targets and allocations.



TMDL Numeric Targets

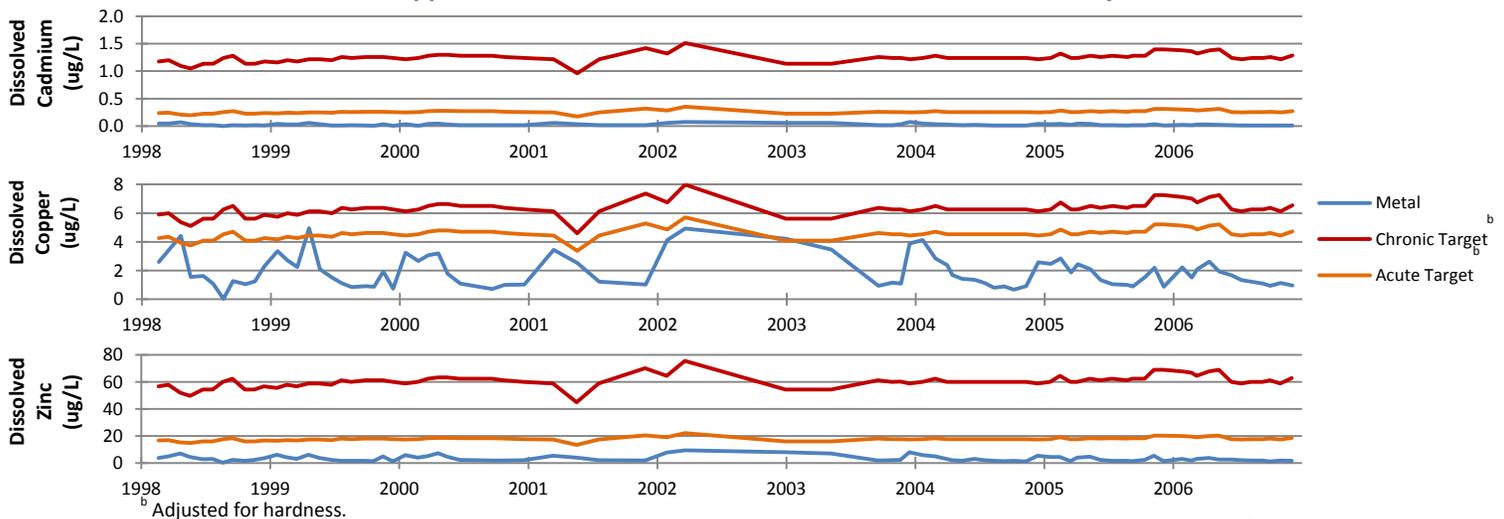
Metal	Numeric Target (µg/L) ^a	
	Acute	Chronic
Cadmium	0.22	0.22
Copper	5.6	4.1
Zinc	16	16

^a Numeric targets are hardness-dependent; in general, the harder the water, the higher the allowable concentration of metal. These numbers are based on a hardness of 40mg/L as calcium carbonate.

Water Quality Outcomes

- TMDL has been achieved; the Upper Sacramento River was delisted for cadmium, copper, and zinc in 2010.
- Evaluation of water quality data collected between June 2004 and December 2006 showed zero exceedances of chronic targets for cadmium, copper, and zinc.
- Construction of the Slickrock Creek Dam in May 2004 resulted in [significant load reductions](#) of historic copper, cadmium, and zinc discharges.
- Mine wastes (pyrite ore) were removed from the Matheson Rail Loading Station site on the banks of Keswick Reservoir.

Upper Sacramento River Below Keswick Dam Water Quality



^b Adjusted for hardness.