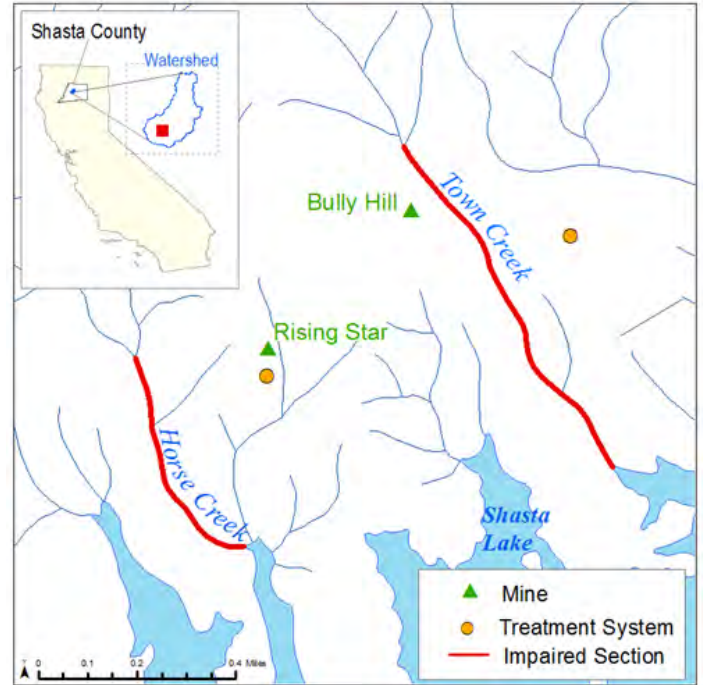


Water Quality Report Card		Copper and Zinc in Horse Creek and Town Creek	
Regional Water Board:	Central Valley, Region 5	STATUS	<input checked="" type="checkbox"/> Conditions Improving
Beneficial Uses Affected:	WARM, COLD		<input type="checkbox"/> Data Inconclusive
Implemented Through:	NPDES Permits, WDR Permits		<input type="checkbox"/> Improvement Needed
Effective Date:	2012	Pollutant Type:	<input checked="" type="checkbox"/> Point Source <input checked="" type="checkbox"/> Nonpoint Source <input checked="" type="checkbox"/> Legacy
Attainment Date:	To Be Determined	Pollutant Source:	Abandoned Mines

### Water Quality Improvement Strategy

Horse Creek and Town Creek are located in Shasta County and flow into the East Squaw Creek arm of Shasta Lake. Rising Star Mine is located on Horse Creek and Bully Hill Mine is located on Town Creek. Though both mines closed operations in 1927, discharges of metal-laden waters (acid mine drainage, or AMD) from the two main mine portals (openings) and storm water runoff from the waste rock piles have resulted in water quality impairments to both creeks, namely cadmium, copper, lead, zinc, and pH. These water bodies were first placed on the State's 303(d) List in 1992 for these pollutants due to the AMD discharges. Beginning in 1997, the mine owners implemented several remediation actions to reduce AMD, including site grading, waste rock containment and capping, constructing bulkhead seals (concrete barriers) in the mine entrance tunnels, and AMD treatment. [Anaerobic passive treatment](#) systems and infiltration basins were installed at both mines to intercept the seepage from the tunnels and to collect water from behind the seals for treatment and land discharge. Remediation actions have significantly decreased the effluent metal concentrations at both mine sites.

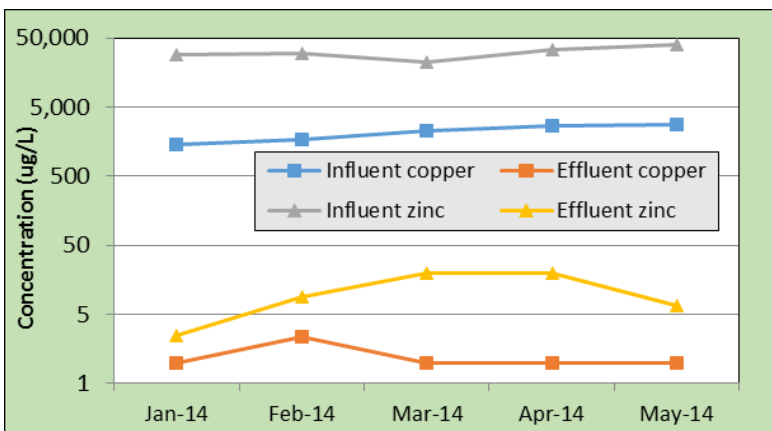
### Horse and Town Creeks



### Water Quality Outcomes

- All mine portal discharges, and their associated copper and zinc loadings, are routed to treatment systems and are no longer discharging to surface waters.
- Copper and zinc loads, from the treatment systems, have been reduced almost completely (greater than 99 percent).
- The pH in the treated water is trending toward neutral, averaging about 7 in the effluent, which is up from 5.01 and 3.36 in the respective influent to each treatment system.
- Next steps will be to continue operation of the treatment systems, other remediation activities, and the collection and analysis of water quality data.

### Treatment Efficiency at Rising Star Mine



### Treatment Efficiency at Bully Hill Mine

