

Sacramento River Watershed Conference

Iron Mountain Mine

October 27- 28, 2005

Iron Mountain Mine

“When extraction of the ore was suspended from the various stopes above the Lawson, the ground was in very bad shape, and the condition as regards heat and gas were so terrible that it seemed advisable to abandon any attempt to work from that level. In fact it was a case of walking away and leaving the job for the next generation”

WM.F. Kett, General Manager

August 23, 1944

Iron Mountain Mine

Copper, zinc gold, silver, and pyrite producer

Largest copper mine in California in the early 1900s

200,000,000 pounds 1895-1919

Largest discharger of heavy metals in the U.S.

Listed on NPL September 1, 1983

100 Years of Mining

- ❑ Tunneling
- ❑ Massive blasting
- ❑ Open pit mining
- ❑ Excavations
- ❑ Tailings and waste piles

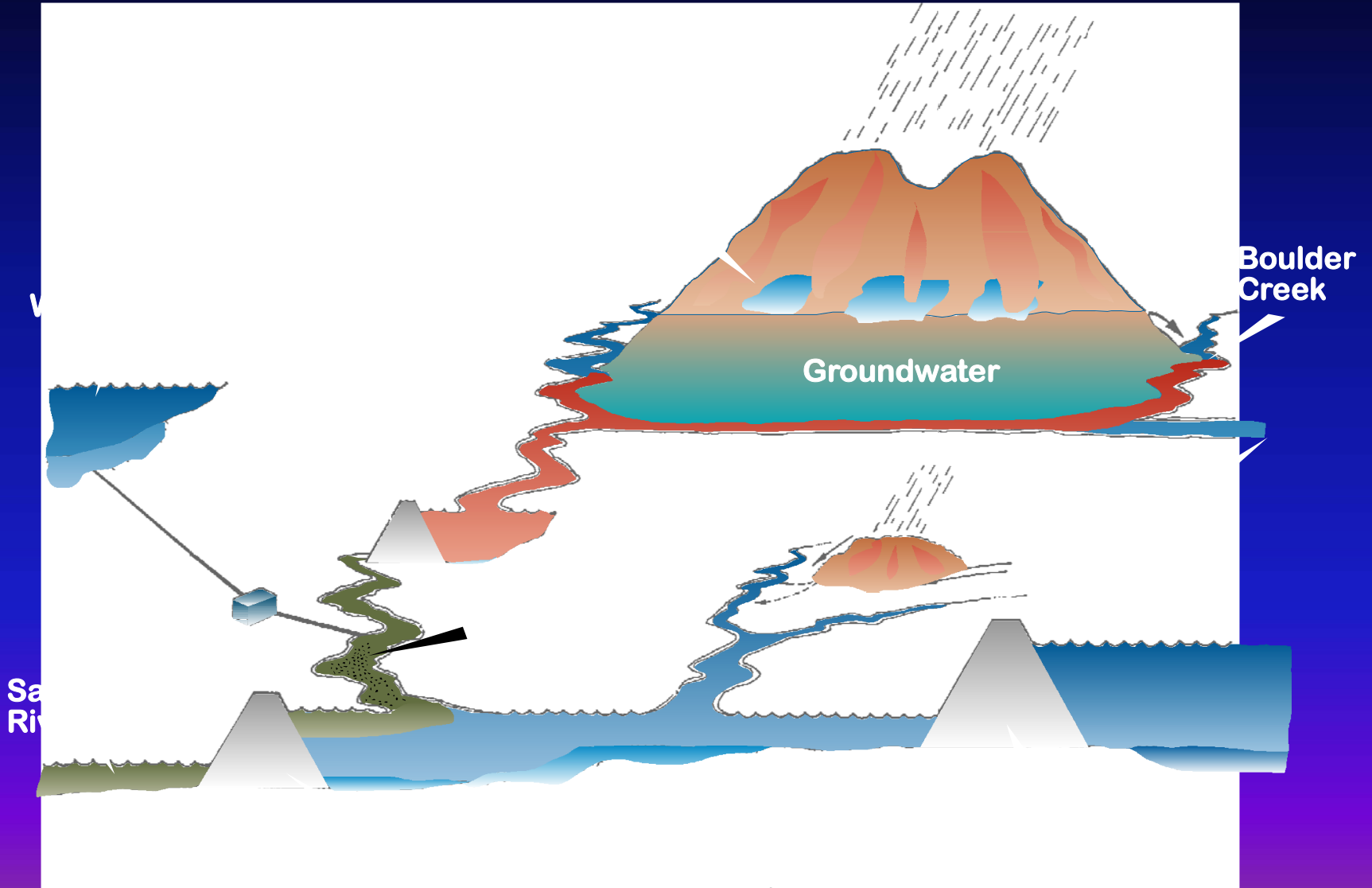


AMD Kills Vegetation and Fish

- Spring Creek
- Boulder Creek
- Slickrock Creek
- SCDD
- Sacramento River

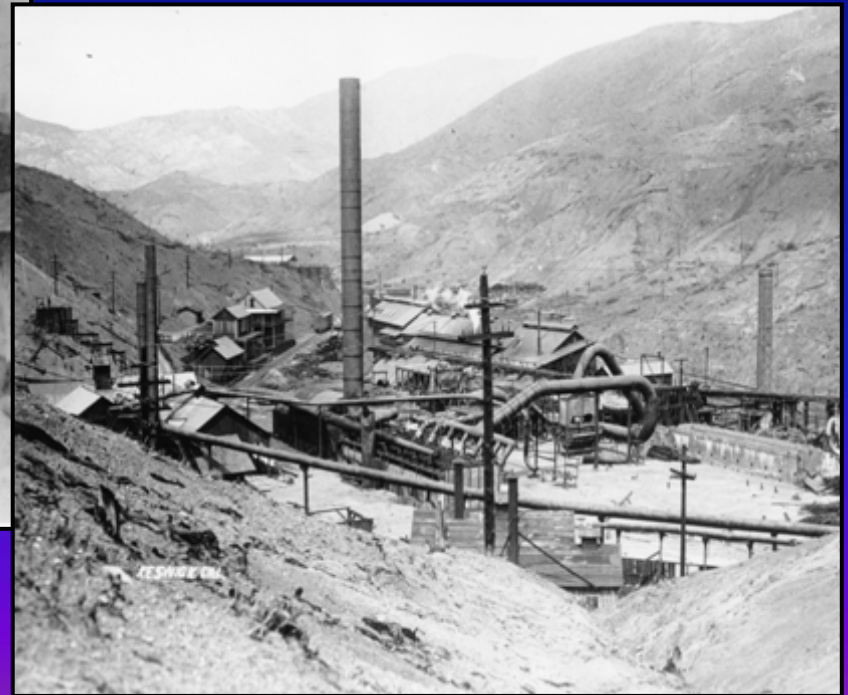
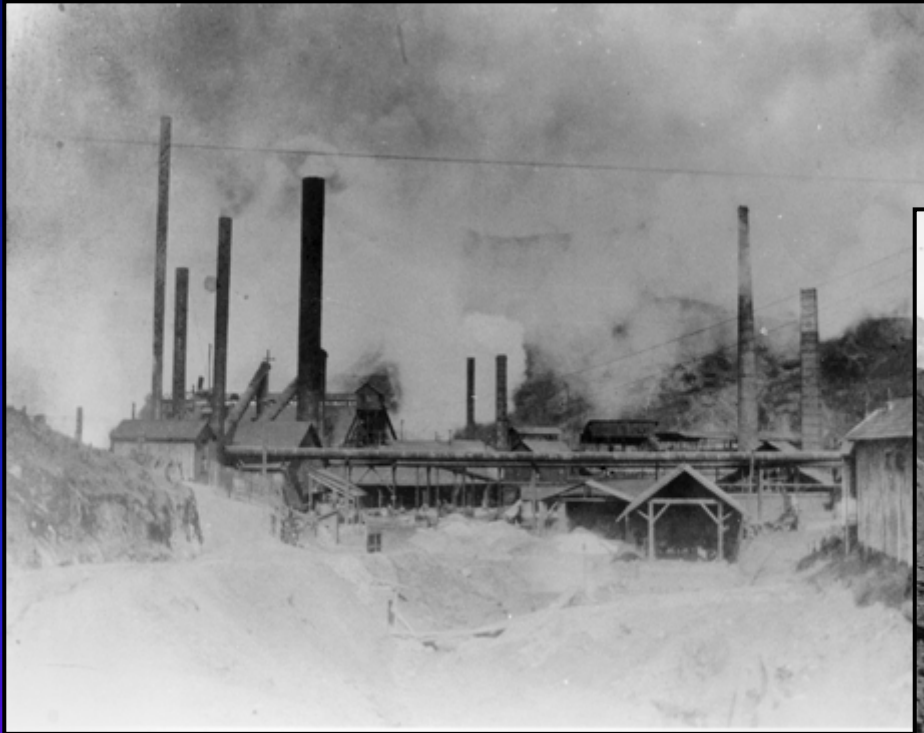


Conceptual Model



Iron Mountain Mine

Smelter Operations 1895-1907



Iron Mountain Mine

Pyrite (Iron Sulfide Ore)
+ Oxygen + Water + Bugs =



Acid Mine Drainage
(AMD)

Iron Mountain Mine

IMM Discharges

650 lb. copper

10 lb. cadmium

1,800 lb. zinc

10,000 lb. iron

on an average day

- ❑ **Clean Water Diversion (1988, 1991, 2004)**
- ❑ **Partial Capping (1990)**
- ❑ **Waste Pile and Tailings Removal (1991, 1994)**
- ❑ **Plug the Mountain**
- ❑ **Move the Mountain**
- ❑ **Treat the Mountain (1988-2004)**
- ❑ **Fill the Mountain**
- ❑ **Dam and Treat (2001-2004)**

Richmond Adit Rehab

- ❑ \$1.2 million RD/RA for mine access
- ❑ Reconstructed 1,500 feet of Adit



Iron Mountain Mine

Richmond Mine

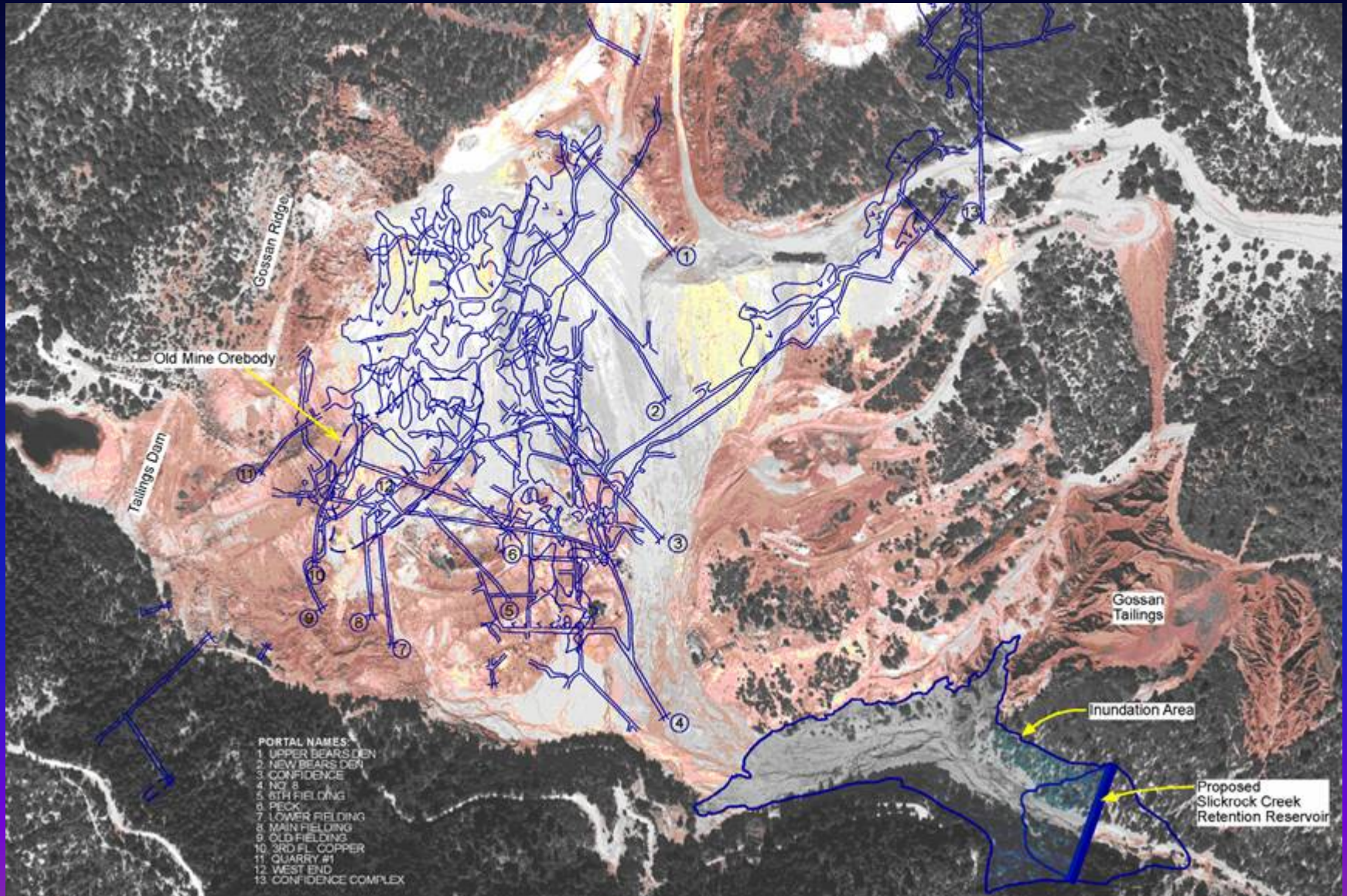


IMM Treatment Plant



HDS Treatment Process: Reduces Sludge Production and O&M Cost

Slickrock Creek Project



Slickrock Creek Project

- **150-foot high rock shell dam**
- **220 acre-foot retention reservoir**
- **Tailings piles consolidation**
- **Sedimentation basin**
- **Road construction**
- **Clean water diversions**

Completed August 2004

Slope Stabilization



**198 High Capacity Anchors
Each Stressed to 700 kips**



Iron Mountain Mine

Foundation Grouting 2002 - 2003



Iron Mountain Mine

Foundation Grouting 2002 - 2003

25,400 ft grout holes
78,000 cu ft grout
118 tons cement



Iron Mountain Mine

Gossan Tailings

High Arsenic Content



Iron Mountain Mine

SCRR Foundation Prep

Excavation
Washing
Vacuuming



Iron Mountain Mine

SCRR Dedication May 6, 2004



Iron Mountain Mine

SCAKR Sediments RI/FS

300,000 CY Sediment Cleanup

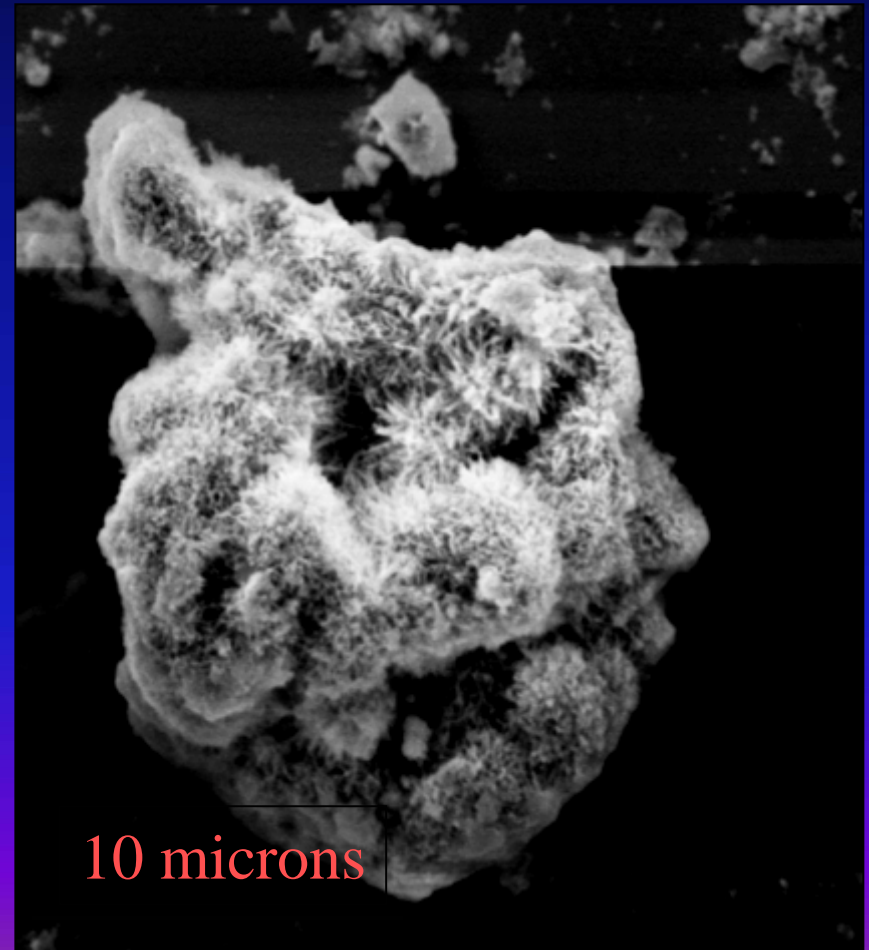
- Bathymetry, Side Scan Sonar
- Field Investigation
- Toxicity/ Treatability Testing



Iron Mountain Mine

Oxyhydroxide Precipitates

Average Surface Area
21.5 - 69.6 m²/g



Iron Mountain Mine

Matheson Restoration



Scheduled Completion Summer 2005

Iron Mountain Mine

Matheson Ore Transfer Station Restoration



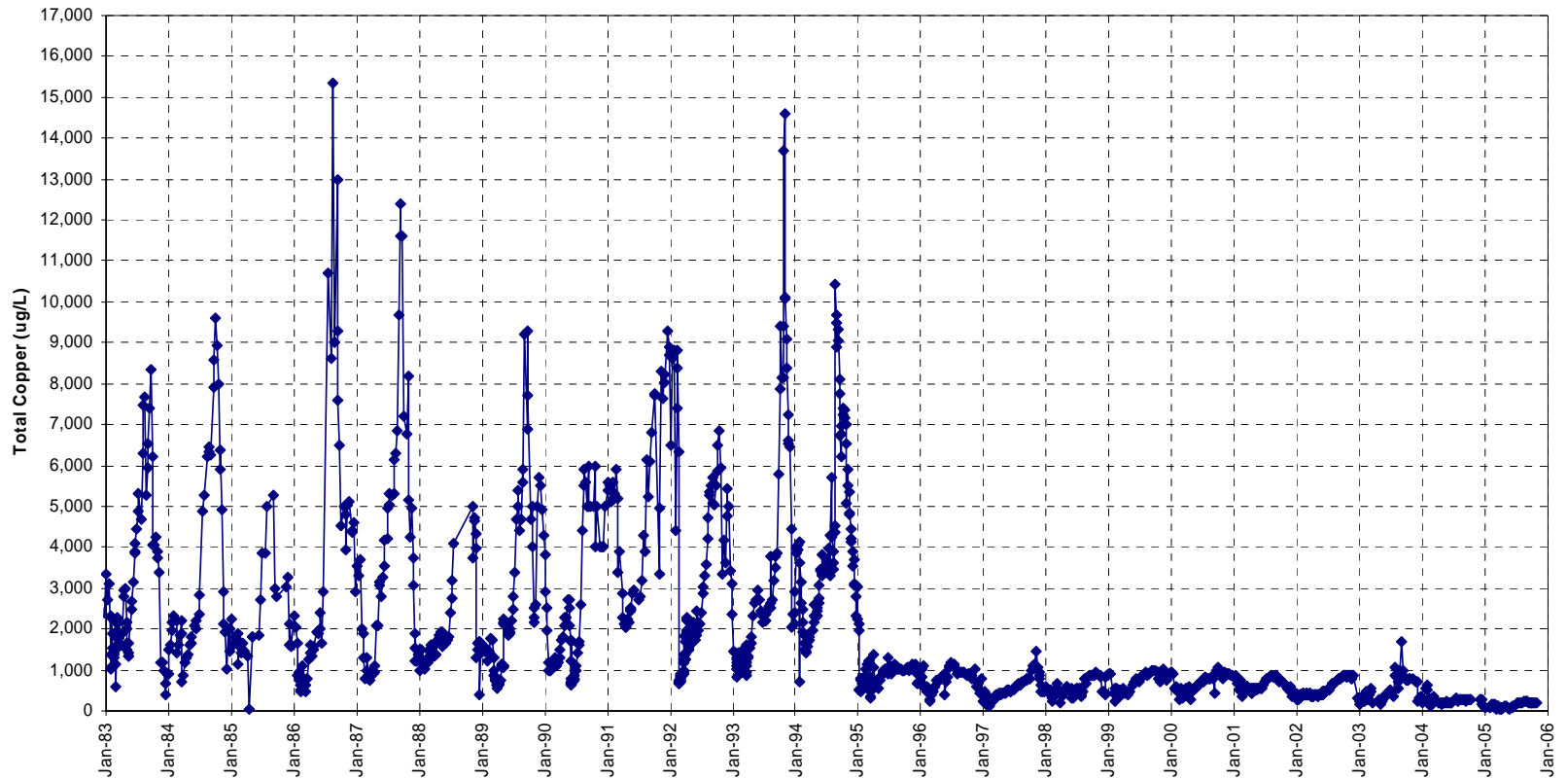
Iron Mountain Mine

Matheson Restoration

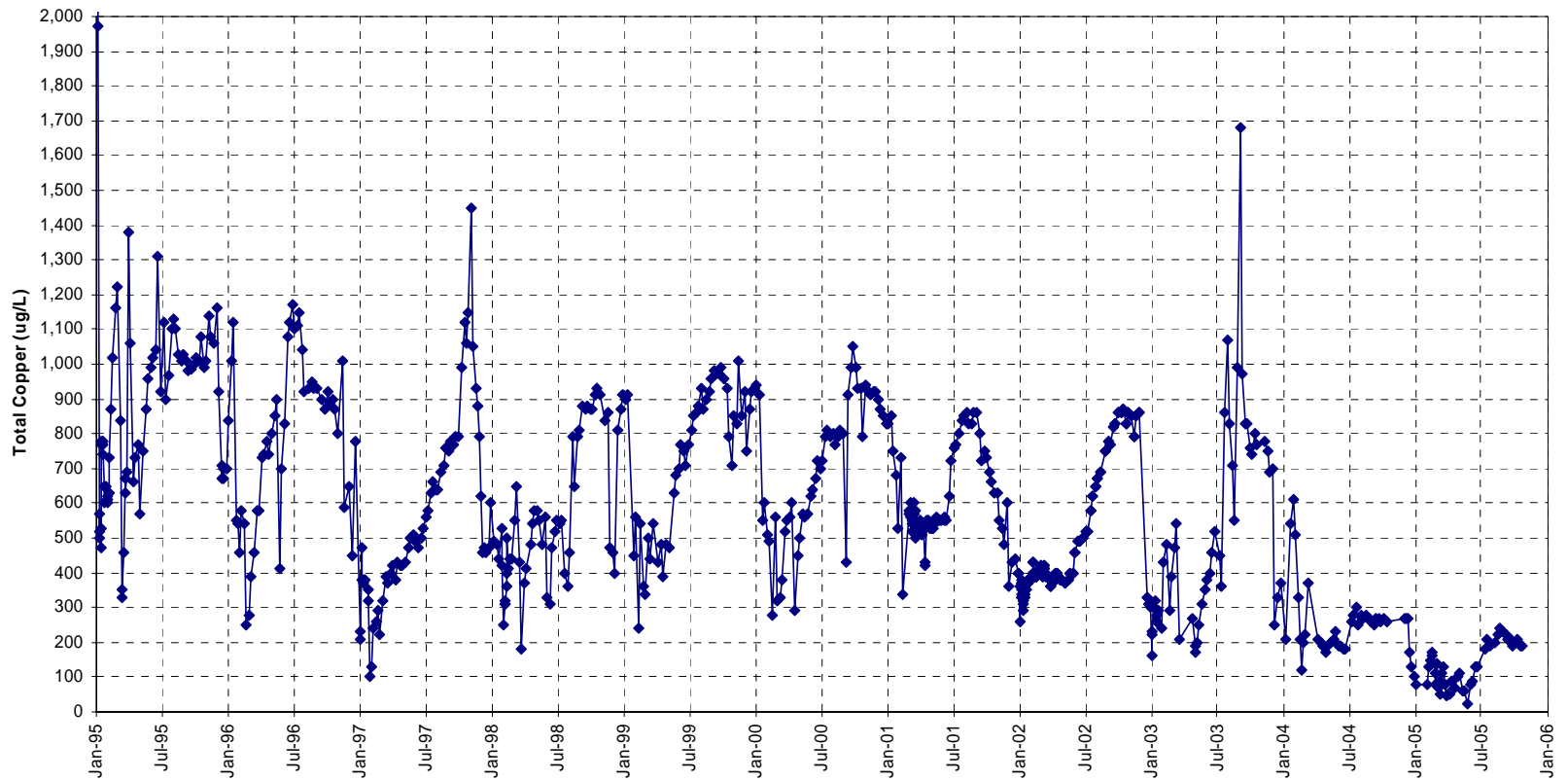


Completed September 2005

Spring Creek Debris Dam Discharge Copper Concentration



Spring Creek Debris Dam Discharge Copper Concentration



EPA Success Story

- **5 Records of Decision**
- **Reduced Contaminant Discharge Over 95%**
- **Stopped 2 million lbs copper and 7 million lbs zinc from entering Sacramento River**
- **Largest Settlement With Single Private Party in History of Superfund Program**