



# **Sulphur Bank Mercury Mine Superfund Site**

June 5, 2019

# Presentation Overview



- Introduction of EPA Staff
- Site Overview
- Superfund Process
- EPA Actions to-date at SBMM
- Site Impacts on Clear Lake Water Quality
- Next steps
- Discussion



# Key EPA Team Members



Carter Jessop, *Project Manager*

Kelly Manheimer, *Section Chief*

Alejandro Díaz, *Community Involvement Coordinator*

Margot Perez-Sullivan, *EPA Office of Public Affairs*

John Lucero, *E2 Consulting Engineers*

# Site Overview

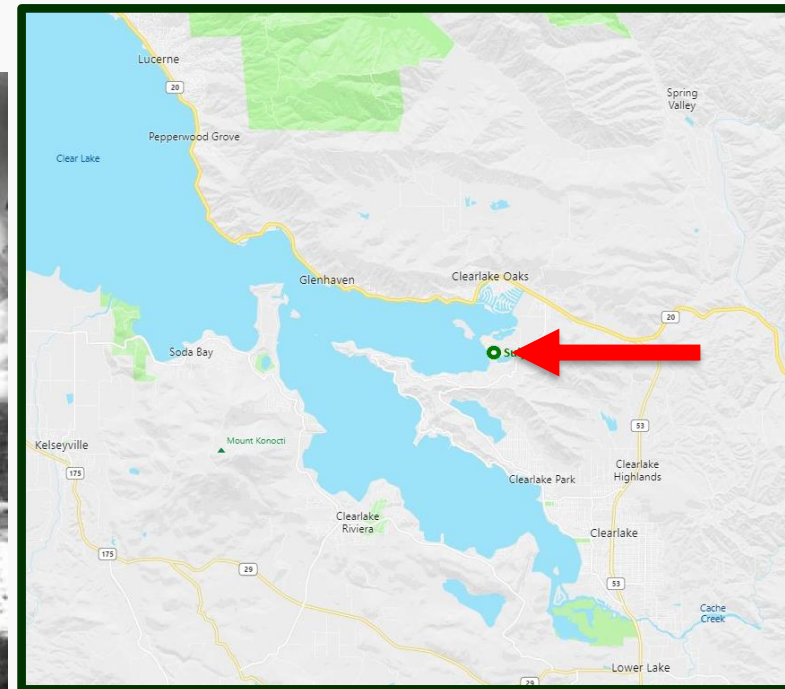
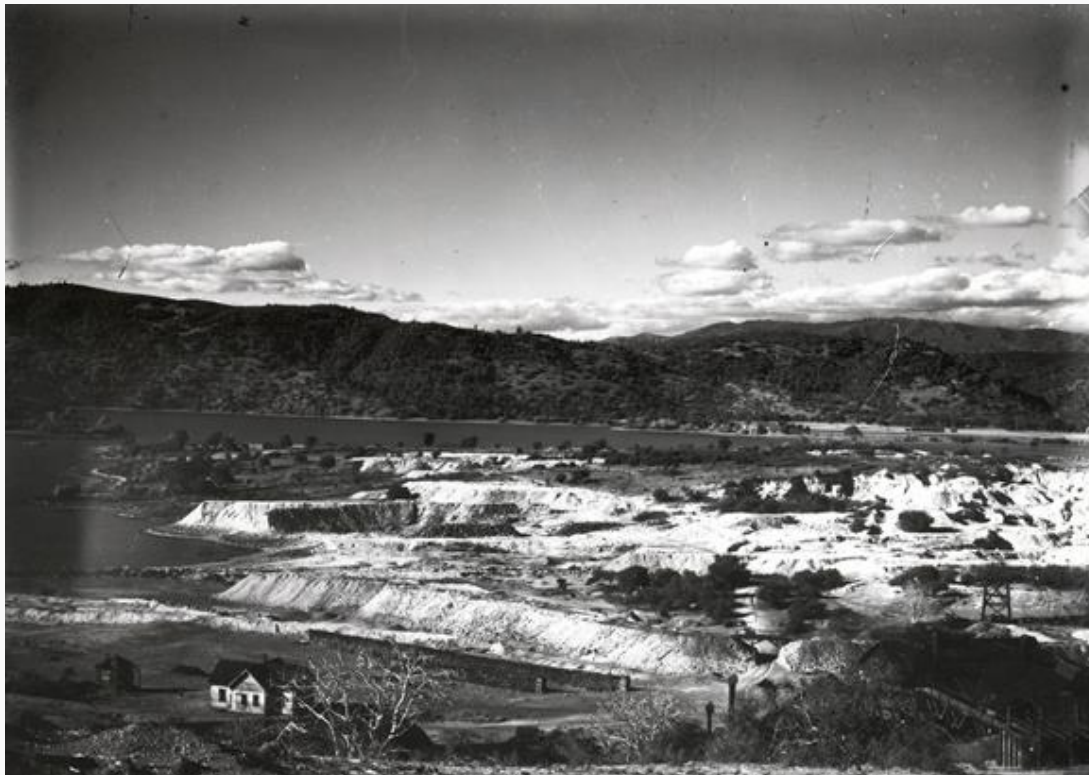


## Sulphur Bank Mercury Mine

- Operated on and off 1865 to 1957
- Produced 7 million pounds of mercury
- Added to the Superfund list in 1990
- Fish consumption advisory for Clear Lake

## Principle Site Contaminants:

- Mercury and arsenic in soils
- Mercury in sediment and fish tissue



Located on Oaks Arm of Clear Lake, south of Clearlake Oaks, adjacent to the Elem Indian Colony

# Major Mine Site Features



## Source Areas

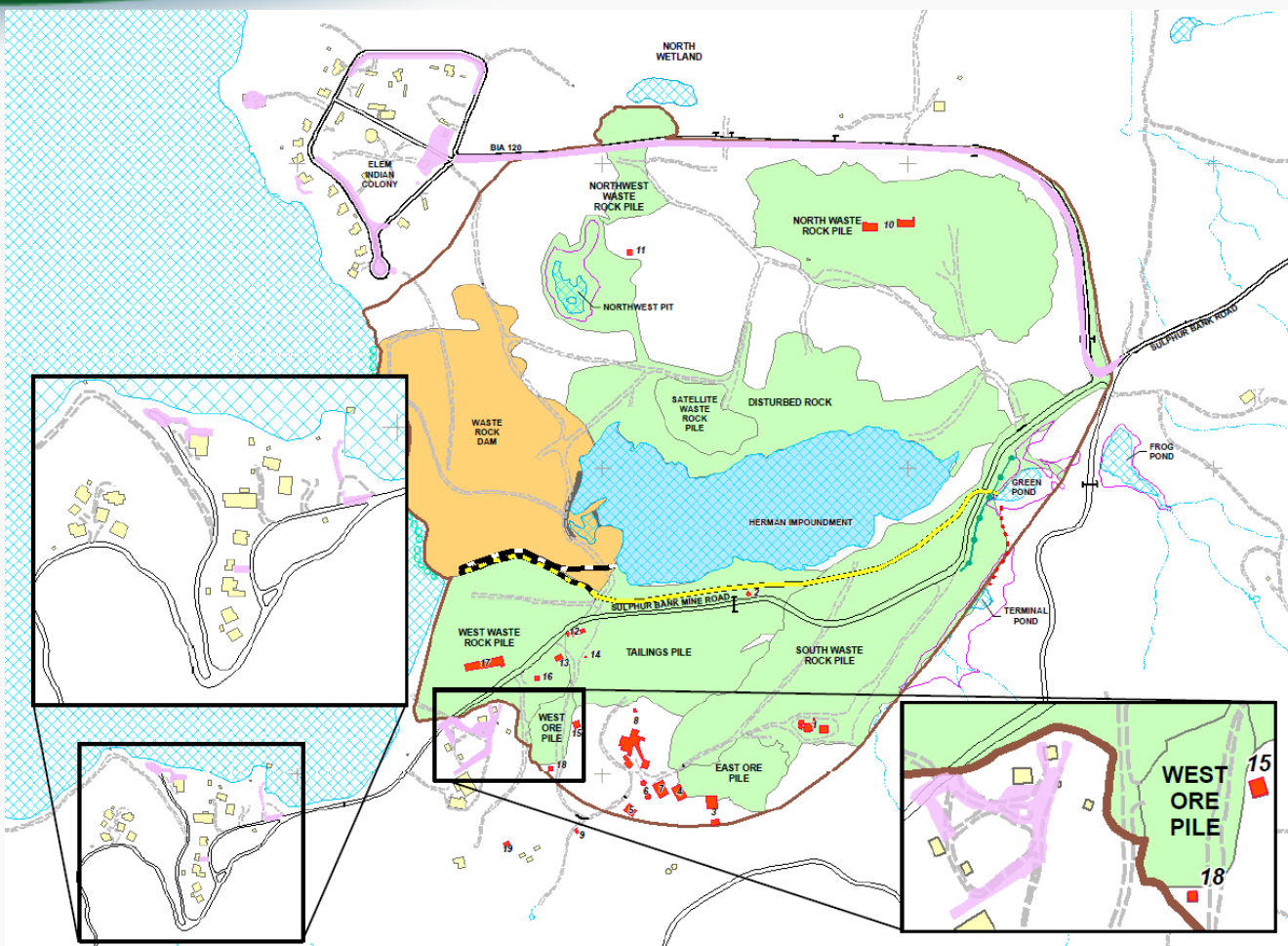
- Waste Rock Piles
- Ores Piles
- Tailings Pile
- Disturbed and Native Rock
- Northwest Pit
- Mining Facilities/Buildings

## Herman Impoundment (HI)

## Waste Rock Dam (WRD)

## Off-Site Residential Soils

- Elem Indian Colony
- BIA 120
- Sulphur Bank Mine Road neighborhood



### LEGEND

- OU-1 BOUNDARY
- MINING OPERATION RELATED BUILDINGS
- BUILDING
- EARTH DAM
- WATER

### AREA OF CONCERN

- HERMAN IMPOUNDMENT
- SOURCE
- WASTE ROCK DAM
- RESIDENTIAL SOILS

# Site Overview



## Terrestrial Mine Site and Residential Soils

Operable Unit 1

## Lake Sediments and North Wetlands

Operable Unit 2



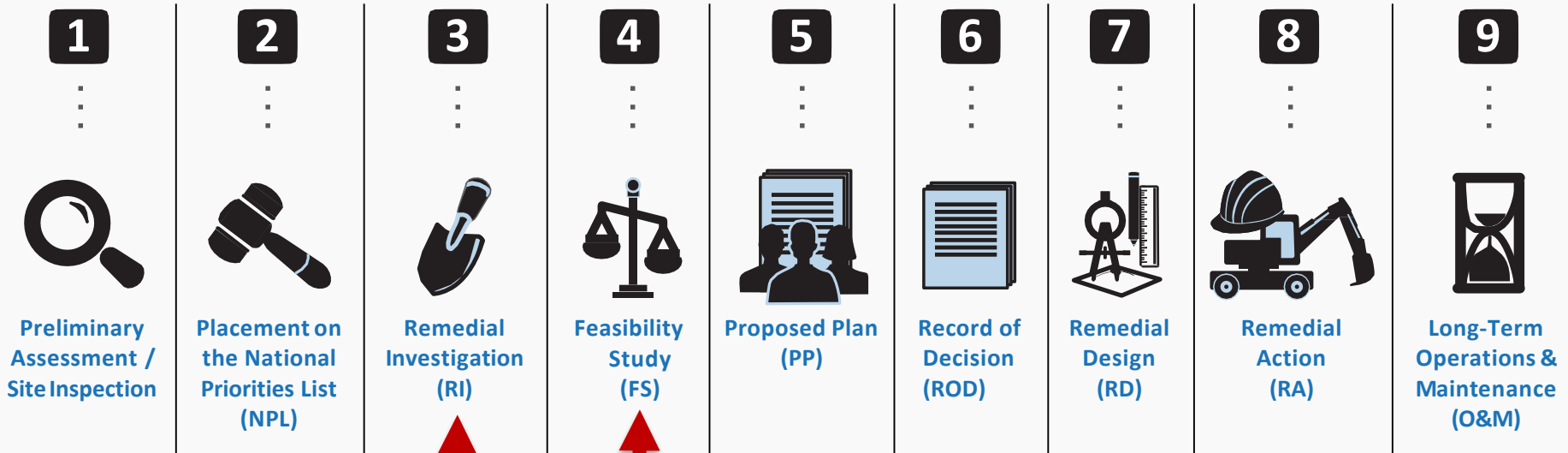
# Superfund Process



- Comprehensive Environmental Response and Compensation Act (CERCLA) - “Superfund”
- Established in 1980
- EPA performs cleanups performed under two authorities:
  - Removal Process – discrete action, usually < \$2 million
  - Remedial Process – more complex, higher cost



# The Remedial Process



**OU-2**

**OU-1**

*Community involvement* and planning for a site's future *reuse* are integral parts of the entire process.

**Early actions to protect human health**



# Actions to Reduce Exposure



## Human Health

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- Site Controls (Fencing)
- Removal of soils, replacement of homes and infrastructure on EIC (1997,1998,2006)
- Geothermal well closures (2000-2001)
- Removal of soils from Sulphur Bank Mine Road residential area (2008)
- Pomo Road cleanup (2010)

## Clear Lake

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- Stabilization of Waste Rock Dam (1992)
- Stormwater Diversion/Pipeline (1999-2000)
- Sediment test caps in Clear Lake (2012-2016)



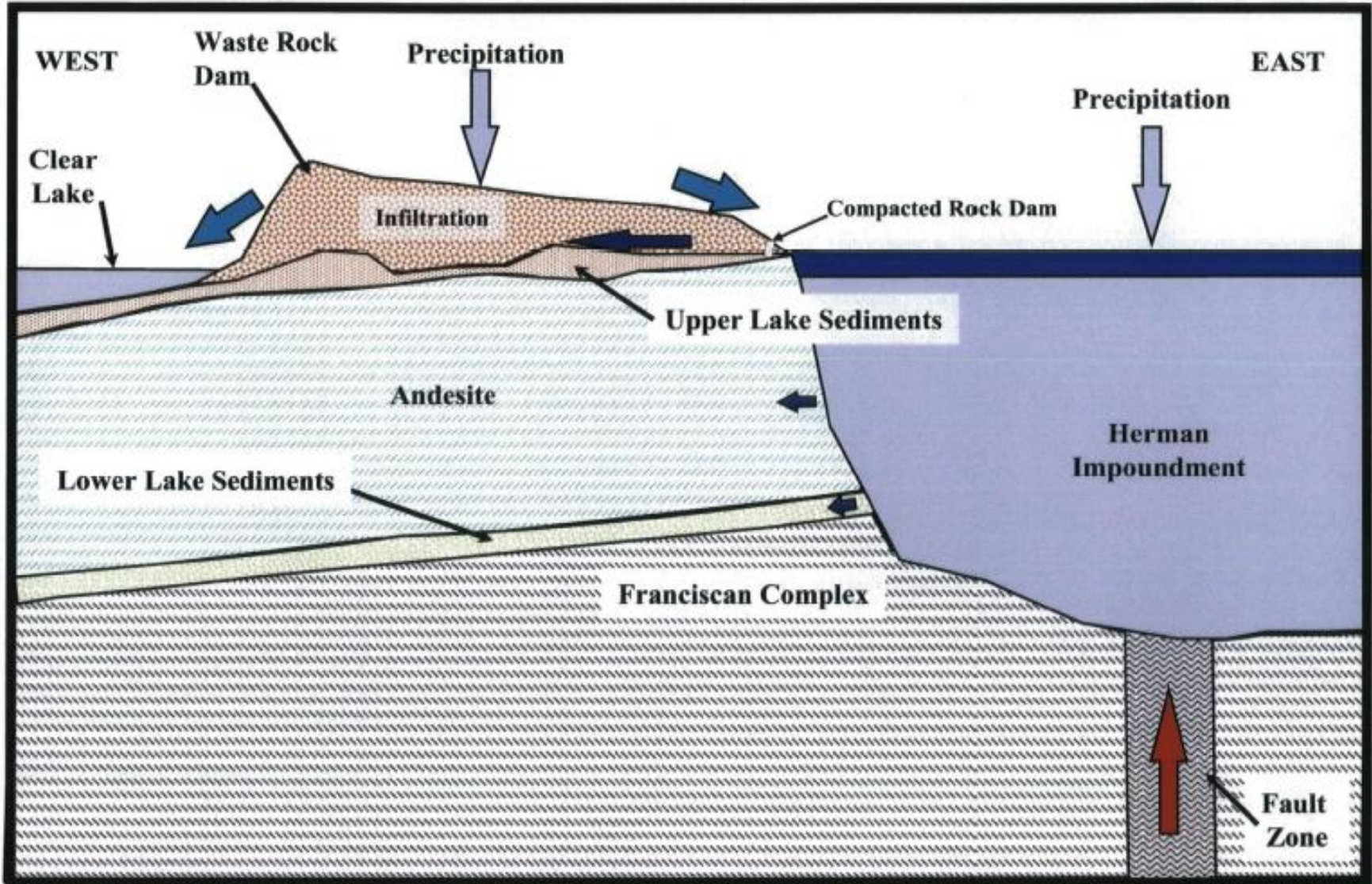
## SBMM Impacts on Clear Lake Water Quality

4 pathways SBMM contaminants to enter Clear Lake

1. Direct placement during mining operations
2. Erosion of mine waste, usually stormwater or direct sloughing of unstable areas
3. Overflow of Herman Impoundment
4. Mine-impacted groundwater discharges into the lake, primarily HI water moving through the WRD



# Conceptual Site Model



# Revised Site Understanding



## Changes in Herman Impoundment water quality

- Stormwater divisions and drought led to improved water quality in Herman Impoundment – pH from around 3 to nearly 5
- Capping the exposed mine waste at the site would further:
  - Reduce acid rock drainage
  - Reduce hydraulic head pushing water through WRD
  - Reduce contaminant loading into Clear Lake
- Once waste is capped, HI water chemistry modeled to move toward background groundwater quality





*The Focused FS brings together all of the information gathered about OU-1 of the SBMM Site and compares remedial alternatives*

- Draft-Final Focus Feasibility Study complete
- Incorporating input from CA Department of Toxic Substances Control, Central Valley Waterboard, and Elem Tribe
- 3 new alternatives proposed by Elem Tribe - screening of these alternatives now complete
- Finalization of FFS will allow next steps toward Proposed Plan for OU-1 cleanup

# Water Quality

## Part 2



- Mercury binds to soil and sediment
- Clear Lake water contains low/safe levels of mercury
- Methylation of mercury makes it available for biological uptake
- Primary pathway for exposure – methylmercury in fish
- Poor correlation between sediment concentrations and fish tissue concentrations - additional study needed



# Fish Consumption Advisory



CA OEHHA Fish Advisory, Updated August 2018



**Women**  
(18-49 Years)

**Children**  
(1-17 Years)

**7** TOTAL  
SERVINGS  
A WEEK

OR

**3** TOTAL  
SERVINGS  
A WEEK

OR

**1** TOTAL  
SERVING  
A WEEK

**0** DO NOT  
EAT

### Serving Size

A serving of fish is about the size and thickness of your hand. Give children smaller servings.



For Adults



For Children



**Women**  
(50+ Years)

**Men**  
(18+ Years)

**7** TOTAL  
SERVINGS  
A WEEK

OR

**7** TOTAL  
SERVINGS  
A WEEK

OR

**3** TOTAL  
SERVINGS  
A WEEK

OR

**1** TOTAL  
SERVING  
A WEEK

## A GUIDE TO EATING FISH from CLEAR LAKE (LAKE COUNTY)

### Eat the Good Fish

Eating fish that are low in chemicals may provide health benefits to children and adults.



### Avoid the Bad Fish

Eating fish with higher levels of chemicals like mercury or PCBs may cause health problems in children and adults.



### Choose the Right Fish

Chemicals may be more harmful to unborn babies and children.



Asian Clam  
(Corbicula)



Winged Floater Mussel



Inland Silverside



Threadfin Shad



Blackfish



Bullhead



Catfish



Common Carp



Crappie



Crayfish



Mosquitofish



Prickly Sculpin



Sunfish Species

\*Clear Lake Hitch removed from advisory. See note below.



Black Bass Species



California Office of  
Environmental Health  
Hazard Assessment

web [www.oehha.ca.gov/fish](http://www.oehha.ca.gov/fish)  
email [fish@oehha.ca.gov](mailto:fish@oehha.ca.gov)  
phone (916) 324-7572

Inland silverside photo: North American Native Fishes Association.  
Threadfin shad photo: Island Thomas, Ohio Department of  
Natural Resources

Eat only the  
skinless fillet



Some chemicals are higher in the skin, fat, and guts.

Eat only the meat



\*Clear Lake Hitch:  
No take permitted per  
the California  
Endangered Species  
Act.

Updated 08/2018

# Remedial Investigation

## OU-2



### Additional Study Needed

- Data collection since 1980
- EPA sponsored work by UC Davis, USGS, others
- No firm answers on effect of remedial action alternatives
- Proposed USGS partnership
- Coordination with Blue Ribbon Committee sampling work





# Other Ongoing Work



## Site-wide Human Health Risk Assessment

- Sampling in coordination with Elem cultural practices
- Looking at exposure pathways and rates specific to tribes
- Considering traditional foods

## Waste Rock Dam Flux Monitoring

- Better quantify total Hg moving through the WRD

## Background Soils Investigation

- What would levels of contaminants be were it not for SBMM mine?

## Stormwater BMP Repairs

- Scheduled for fall 2019

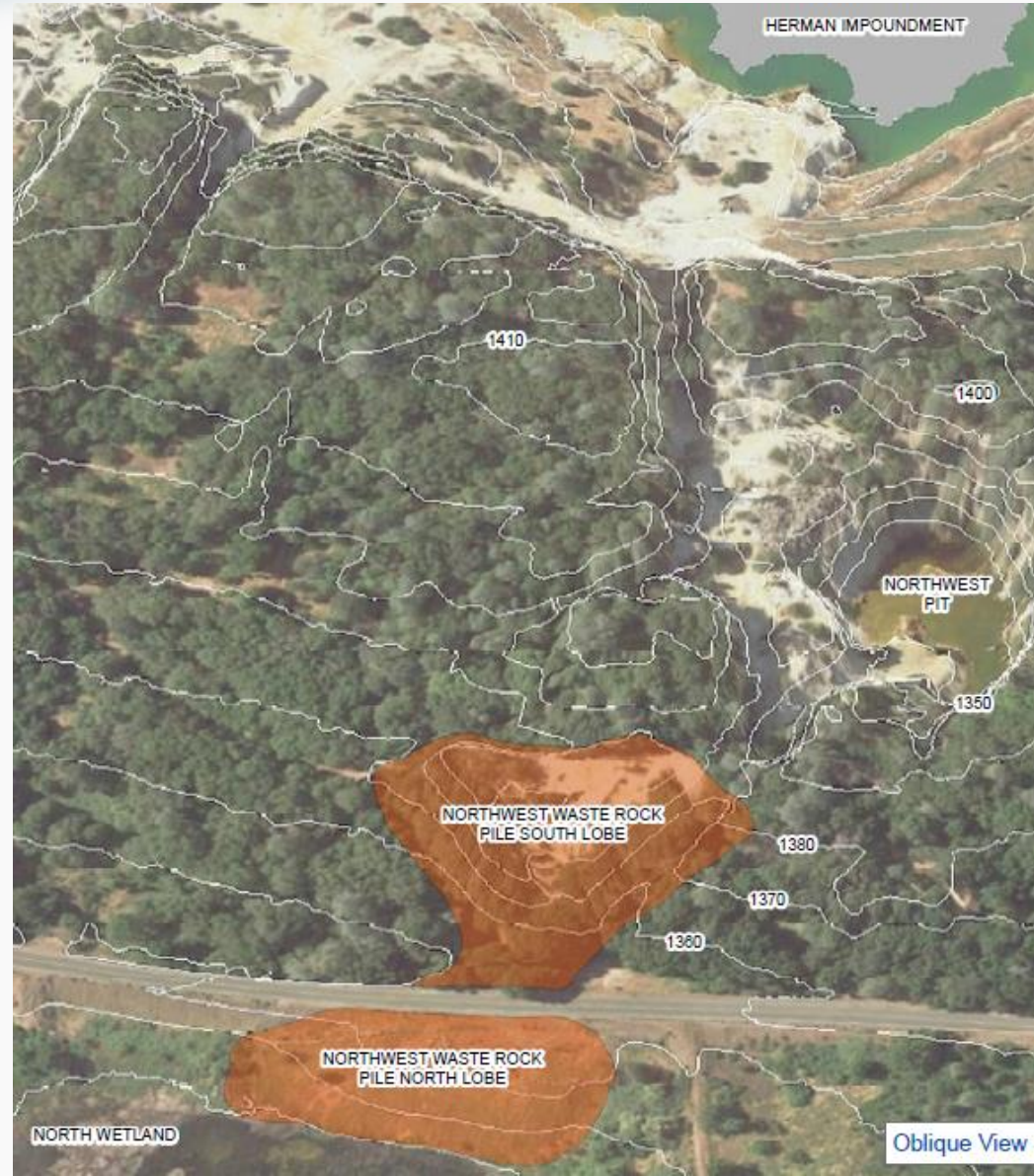


# Non-Time Critical Removal Action



## Northwest Waste Rock Pile

- Adjacent to and partially in North Wetlands, Elem lands
- Placement into NW Pit
- Consistent with final remedy
- Reduces risk to public and environment
- Engineering Evaluation/Cost Analysis pending – late 2019
  - Public meeting before finalization



6/6/2019

U.S. Environmental Protection Agency

# Tribal Consultation

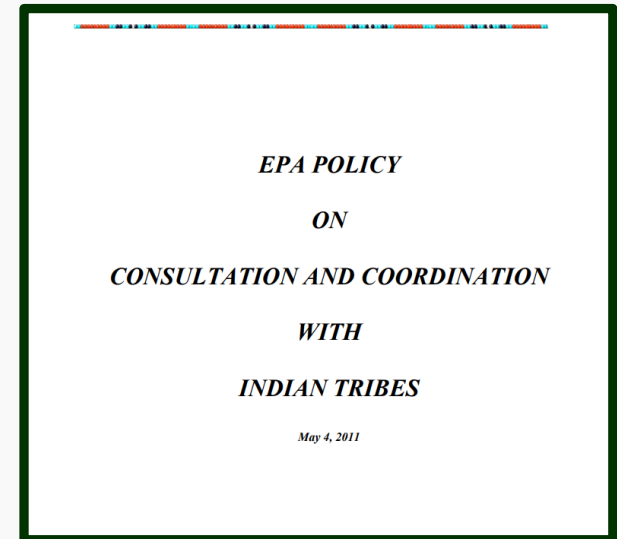


## Government-to-government consultation

- Meaningful communication and coordination between EPA and tribal official
- Invite open dialog with all interested Lake County Tribes

## Coordination with Elem Tribe

- Working with the Elem Environmental Department since 1990
- Superfund Cooperative Agreement to facilitate Elem involvement
- Feedback throughout FFS process
- Regular communication and coordination on field work, site plans and document development
- Input on outreach and education
- Tribal monitors



# Discussion

