



# Corona & Twin Peaks Mine Drainage Treatment Project

A novel approach to cleaning up mine waste and ongoing discharges from three mercury mines on private property

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# Acknowledgement

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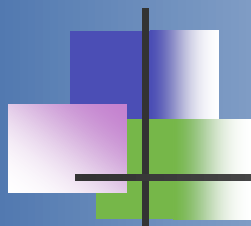


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Additional, related work is being funded by:

- Corona/Twin Peaks Historical Assoc., LLC
- Napa County Regional Park and Open Space District

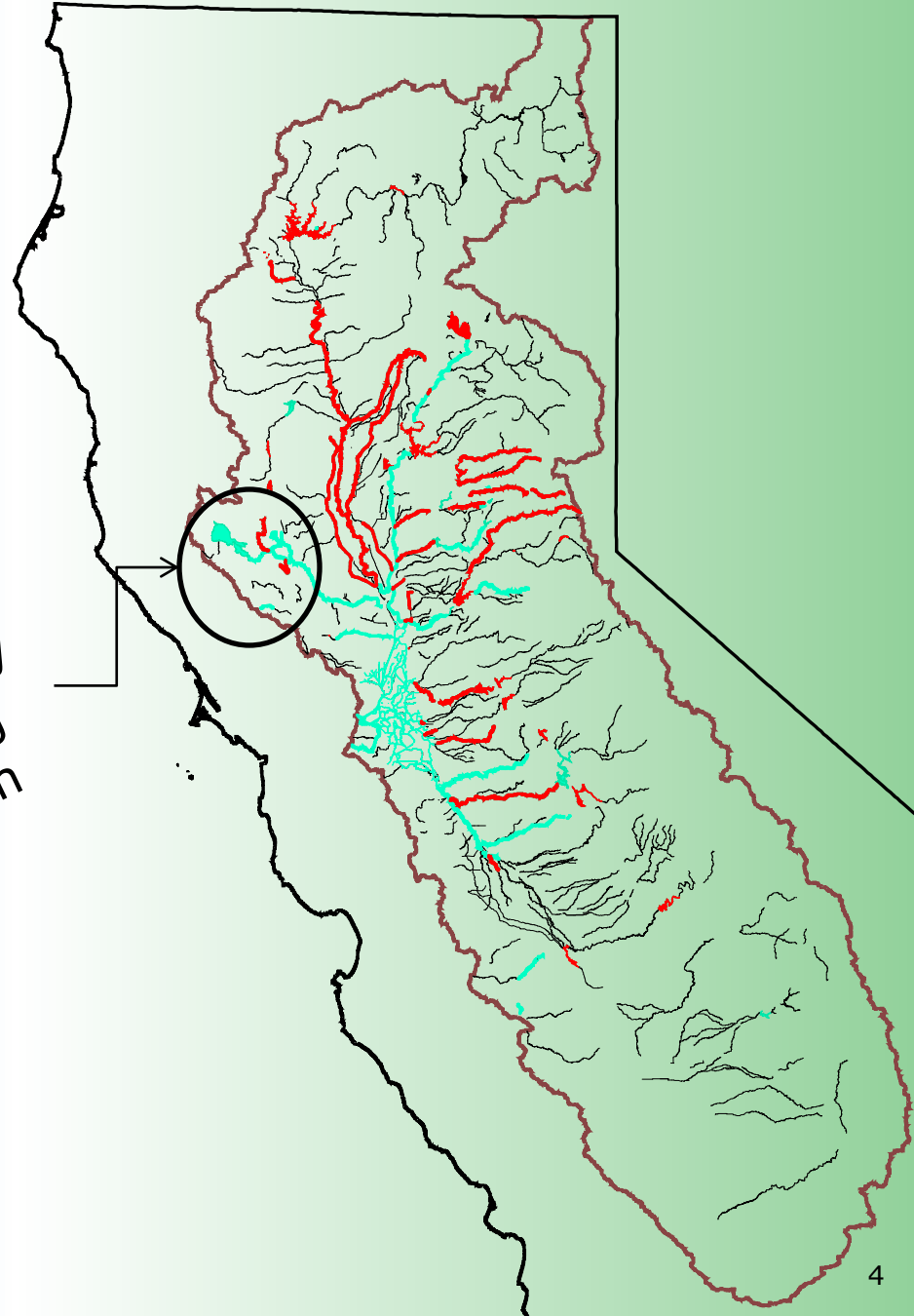


Why this project is a good place to start

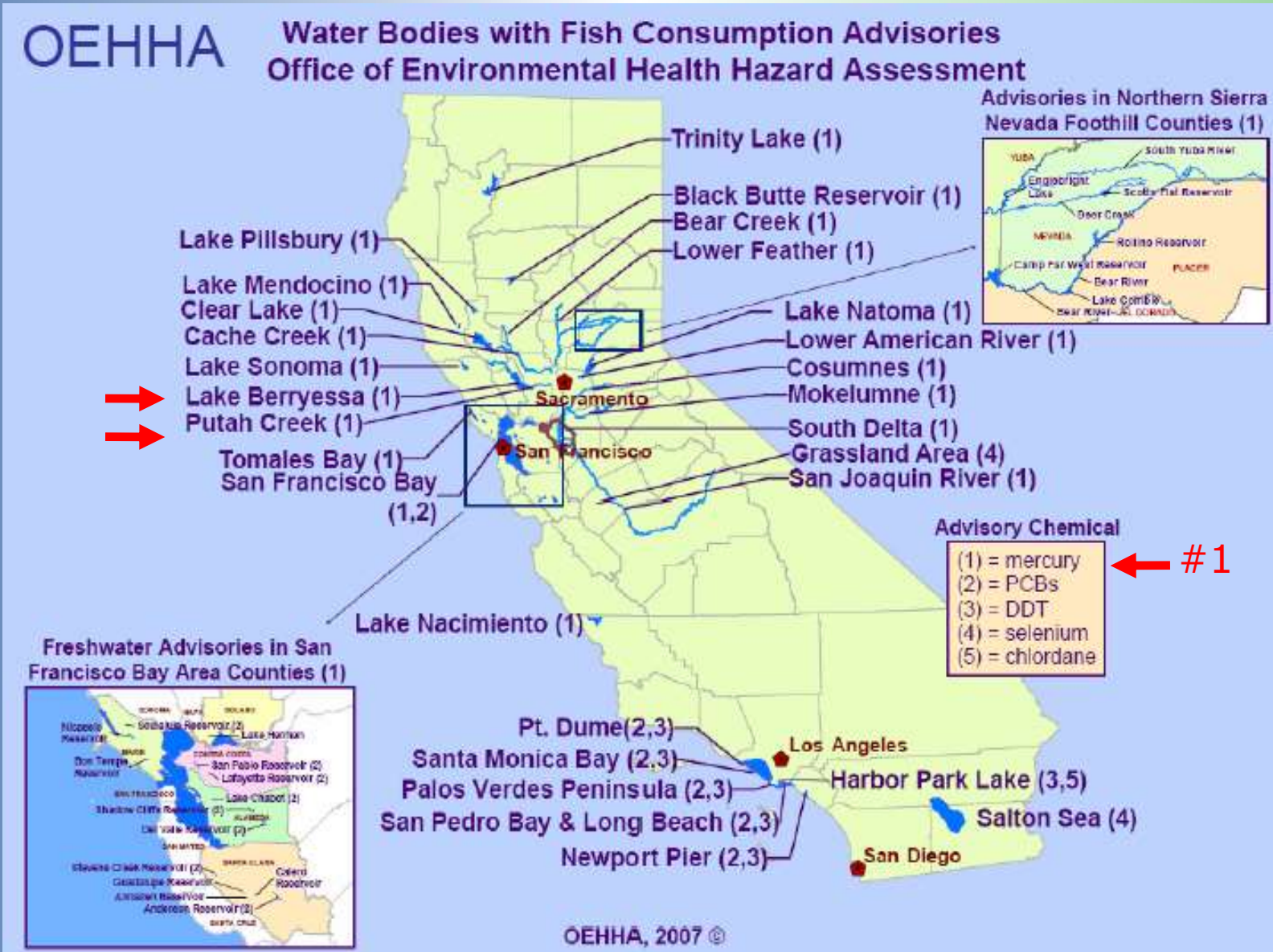
# **REGIONAL MERCURY ISSUES**

There are over 100 water bodies in the Central Valley region listed as impaired by mercury (red = added in 2010)

Mercury  
mining  
region



This map of California identifies water bodies for which a state agency has issued fish consumption advisories. Our project site drains into Lake Berryessa and Putah Creek.



# Local advisories have been issued for these two water bodies downstream of our project site.

## Lower Putah Creek

## Lake Berryessa



Women of childbearing age, pregnant women, and children 17 years and under

### BEST CHOICES

UP TO 3 MEALS A WEEK

*There are no best choices for this population at Lake Berryessa.*

### EAT IN MODERATION

NO MORE THAN 1 MEAL A WEEK

Bluegill or other sunfish; trout; or kokanee

### AVOID

NO MORE THAN 1 MEAL A MONTH

Largemouth, smallmouth, or spotted bass; catfish; and carp or goldfish



Women beyond childbearing age and men

### BEST CHOICES

UP TO 3 MEALS A WEEK

Trout or kokanee

### EAT IN MODERATION

NO MORE THAN 1 MEAL A WEEK

Largemouth, smallmouth, or spotted bass; catfish; chinook (king) salmon; bluegill or other sunfish



Women of childbearing age, pregnant or breastfeeding women, and children 17 years and under

### BEST CHOICES

UP TO 3 MEALS A WEEK

Trout or Sacramento blackfish

### EAT IN MODERATION

NO MORE THAN 1 MEAL A WEEK

Largemouth, smallmouth, or spotted bass, bluegill or other sunfish, carp or goldfish, catfish (including bullheads), crappie, sucker, hitch, or crayfish



Women beyond childbearing age and men

### BEST CHOICES

UP TO 3 MEALS A WEEK

Trout\*, Sacramento blackfish\*, bluegill or other sunfish, catfish (including bullheads), sucker, carp or goldfish, or crayfish

### EAT IN MODERATION

NO MORE THAN 1 MEAL A WEEK

Largemouth, smallmouth, or spotted bass, crappie, or hitch

\* May be eaten daily by women beyond childbearing age and men



Advisories like this are supposed to be posted in areas where people may be catching and consuming mercury-contaminated fish.

## AVISO

## WARNING

## BABALA

Some fish in the Delta have chemicals that may harm your health. Women age 18 – 45, pregnant or breastfeeding women, and children 17 years and under should not eat more than 1 meal of **striped bass** or **sturgeon** a month. Other adults should not eat more than 2 meals of **striped bass** or **sturgeon** a month.

Algunos pescados en el Delta tienen químicos tóxicos que pueden ser dañinos para su salud. Mujeres entre las edades de 18 a 45 años, mujeres embarazadas o amamantando, y niños menores de 17 años, no deberían comer al mes más de una (1) porción de striped bass o sturgeon. Otros adultos no deberían comer al mes más de dos (2) porciones de striped bass o sturgeon.

ខ្លះៗនៃត្រីដែលប្រើប្រាស់នៅក្នុងតំបន់ដេលតា មានគីមីកាល់ដែលអាចបង្កគ្រោះថ្នាក់ដល់សុខភាពរបស់អ្នកប្រើប្រាស់។ ម្តាយដែលមានវ័យពី ១៨ ទៅ ៤៥ ឆ្នាំ ម្តាយដែលមានកូនកំពុងបង្រៀន ឬកូនក្រោមអាយុ ១៧ ឆ្នាំ គួរតែប្រុងប្រយ័ត្នក្នុងការប្រើប្រាស់ត្រីដែលមានគីមីកាល់។ ម្តាយដែលមានកូនកំពុងបង្រៀន ឬកូនក្រោមអាយុ ១៧ ឆ្នាំ គួរតែប្រុងប្រយ័ត្នក្នុងការប្រើប្រាស់ត្រីដែលមានគីមីកាល់។ ម្តាយដែលមានកូនកំពុងបង្រៀន ឬកូនក្រោមអាយុ ១៧ ឆ្នាំ គួរតែប្រុងប្រយ័ត្នក្នុងការប្រើប្រាស់ត្រីដែលមានគីមីកាល់។

Một vài loài cá ở Vùng Châu Thổ Delta có hóa chất có thể gây nguy hại cho sức khỏe của quý vị. Phụ nữ trong hàng tuổi 18 - 45, mang bầu hoặc cho con bú sữa mẹ, và thiếu niên 17 tuổi và dưới chỉ nên ăn cá vược vẫn hoặc cá lìm không quá một bữa một tháng. Những người trưởng thành khác có thể ăn các loại cá vược vẫn hoặc cá lìm không quá 2 bữa một tháng.

Space for logos

### Health Advisory for Striped Bass and Sturgeon



STRIPED BASS



STURGEON



Women age 18-45, Breastfeeding or Pregnant women, Children and teens



1 MEAL A MONTH

NO Striped Bass over 27 inches



Other Adults



2 MEALS A MONTH

NO Striped Bass over 35 inches



### Some Chemicals



Catfish

Carp

Pikeminnow

Crappie

Largemouth Bass

### Less Chemicals



Salmon

Sunfish

Trout

Bluegill

ឱ ត្រីខ្លះនៅក្នុងតំបន់ដេលតា មានគីមីកាល់ដែលអាចបង្កគ្រោះថ្នាក់ដល់សុខភាពរបស់អ្នកប្រើប្រាស់។ ម្តាយដែលមានវ័យពី ១៨ ទៅ ៤៥ ឆ្នាំ ម្តាយដែលមានកូនកំពុងបង្រៀន ឬកូនក្រោមអាយុ ១៧ ឆ្នាំ គួរតែប្រុងប្រយ័ត្នក្នុងការប្រើប្រាស់ត្រីដែលមានគីមីកាល់។ ម្តាយដែលមានកូនកំពុងបង្រៀន ឬកូនក្រោមអាយុ ១៧ ឆ្នាំ គួរតែប្រុងប្រយ័ត្នក្នុងការប្រើប្រាស់ត្រីដែលមានគីមីកាល់។

នៅក្នុងតំបន់ដេលតា មានត្រីខ្លះដែលមានគីមីកាល់ដែលអាចបង្កគ្រោះថ្នាក់ដល់សុខភាពរបស់អ្នកប្រើប្រាស់។ ម្តាយដែលមានវ័យពី ១៨ ទៅ ៤៥ ឆ្នាំ ម្តាយដែលមានកូនកំពុងបង្រៀន ឬកូនក្រោមអាយុ ១៧ ឆ្នាំ គួរតែប្រុងប្រយ័ត្នក្នុងការប្រើប្រាស់ត្រីដែលមានគីមីកាល់។

Эта рыба не обработана и не ополаскивается. Она содержит бактерии, которые могут повредить вашему здоровью. Употребляйте, пожалуйста, на свой страх и риск. Будьте осторожны. После пребывания в этой воде мойте руки и тщательно вымойте продукты питания горячей водой с мылом.

在三角州水域內的魚類含有危害健康的化學元素。婦女年齡在 18 至 45 歲，並且懷孕或哺乳者，兒童年齡在 17 歲以下，吃鱸魚或鱈魚每月不要超過一餐，一般成人每月不要超過兩餐為宜。

Space for local contact information

កម្រិតប្រើប្រាស់  
BНИМАНИЕ!  
警告事項

# EAT DELTA FISH SAFELY

# The State's 2000 Report to the Legislature found:

~47,000 abandoned mines in California:

- 67% on federal land (BLM, NPS, USFS...)
- 2% on state/local land
- 31% on private land

**The database is not complete!**







Here is an example of a similar mine site cleanup project. The Abbott – Turkey Run Mercury Mine in the Cache Creek watershed had not been touched since mining ceased in the mid-1900's.

These photos show the Abbott-Turkey Run Mine cleanup project conducted in 2006-2007 under EPA's leadership. One component of our project will do similar work.





# Other mine cleanup efforts can look like this



**Clockwise from top left:  
fence, backfill, culvert gate,  
cupola, bat gate, PUF.**





Sierra Nevada hydraulic mining used elemental mercury to separate gold from the hillsides washed away, as exemplified in this photo of Malakoff Diggings, Nevada County, in the late 1800s



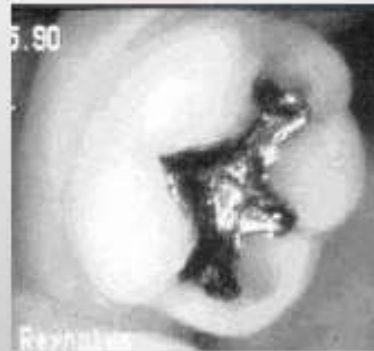


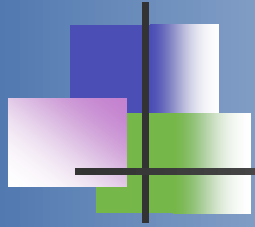
Mineral springs like this one in Sulphur Creek are ongoing, natural sources of mercury. No springs are on our project site, but there are others in the area.





# Today's new mercury sources add to the historic and natural sources.

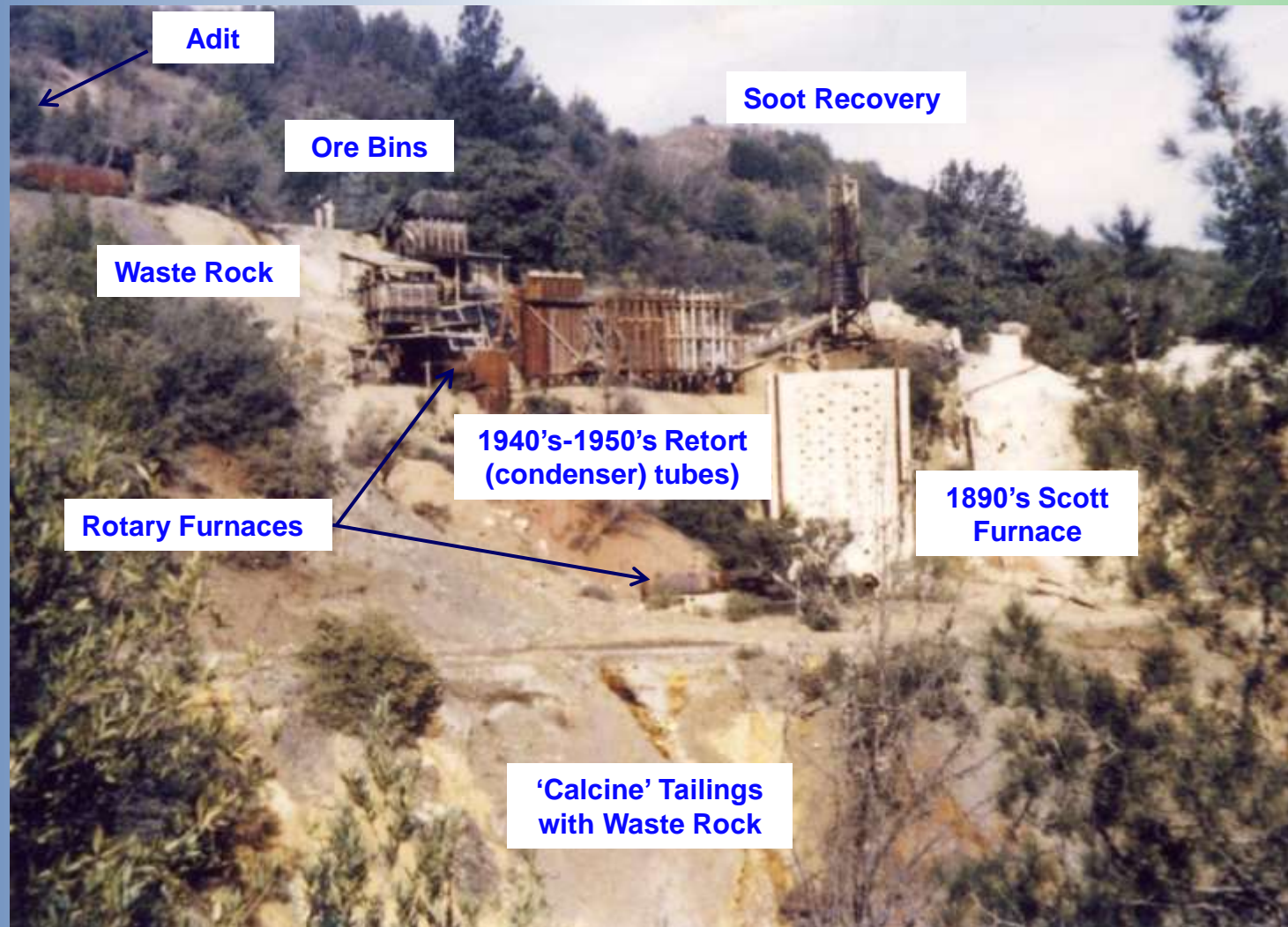




The project's objectives, schedule, and key activities

# **PROJECT OVERVIEW**

Conditions in this 1950's photo of our project site exemplify the development of mercury mining in CA







# Project Objectives

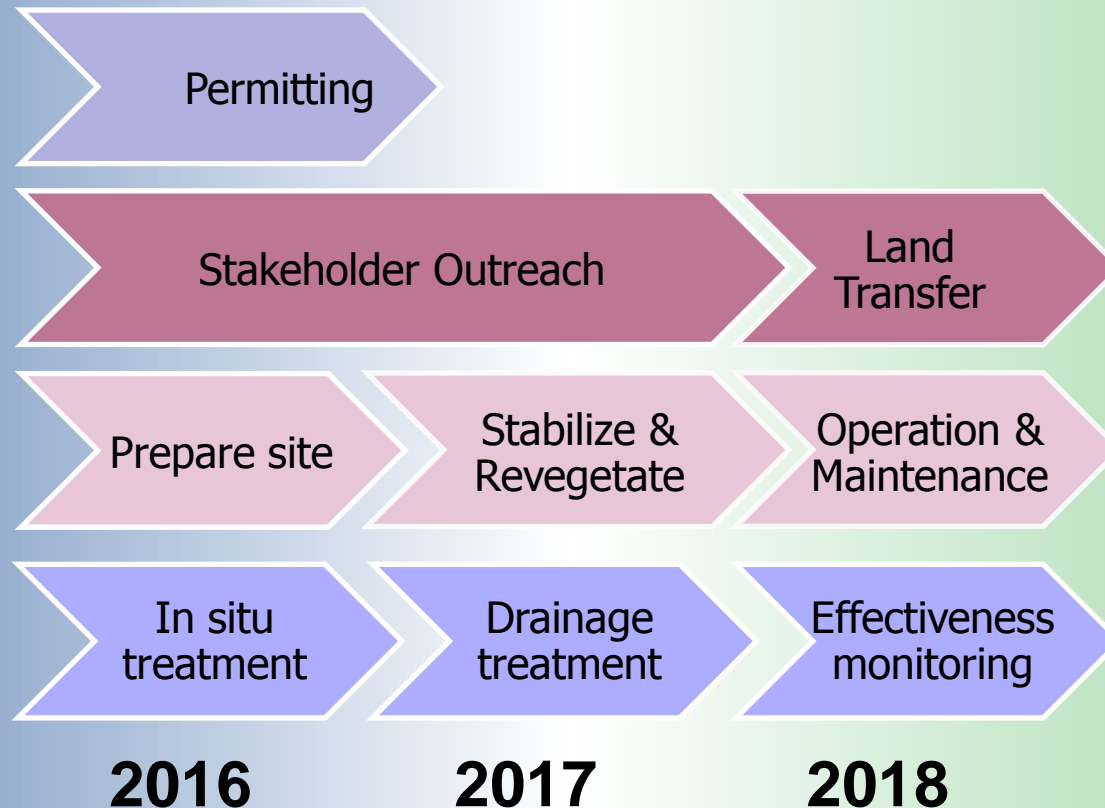
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- Improve the effectiveness of two existing adits drainage treatment systems
- Minimize leaching and mobilization of nickel and acid in drainage from the mined ore body
- Address physical and chemical hazards on the site.



# Overall Schedule

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*We are currently addressing these key regulations:*

- **CERCLA** (Superfund) regulates current and future risks
- **Clean Water Act** regulates discharges of pollutants to waters of the US
- California's **Water Code** regulates mine waste and drainage



# Key Regulatory Issue

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The previous landowner *voluntarily* controlled erosion and abated discharges. This project will improve upon those efforts. The property is now owned in trust. But given current regulations:

Is it possible to effectively address risks and water quality issues at abandoned mine sites without incurring perpetual liability as an owner/operator?





# Key Messages that Tuleyome Shares with Stakeholders

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- Prioritize legacy sources for remediation
- Stabilize erodible, contaminated soils
- Try to break the methylation cycle that converts inorganic mercury into its toxic, bioaccumulating form
- Outreach and educated in the interim
- Seek external funding for a widespread legacy problem