



Leviathan Mine Superfund Site Virtual Tour

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Welcome!

- Introduction and Background
- Superfund Process
- Cleanup Progress
- Combining Remedial and Removal Work on Leviathan
- Upcoming Activities

Leviathan Mine Superfund Site



Summary

Abandoned copper and sulfur mine

- Underground mining for copper 1863 – 1872
- Underground mining for sulfur 1935 – 1941
- Open pit mining for sulfur 1952 – 1964

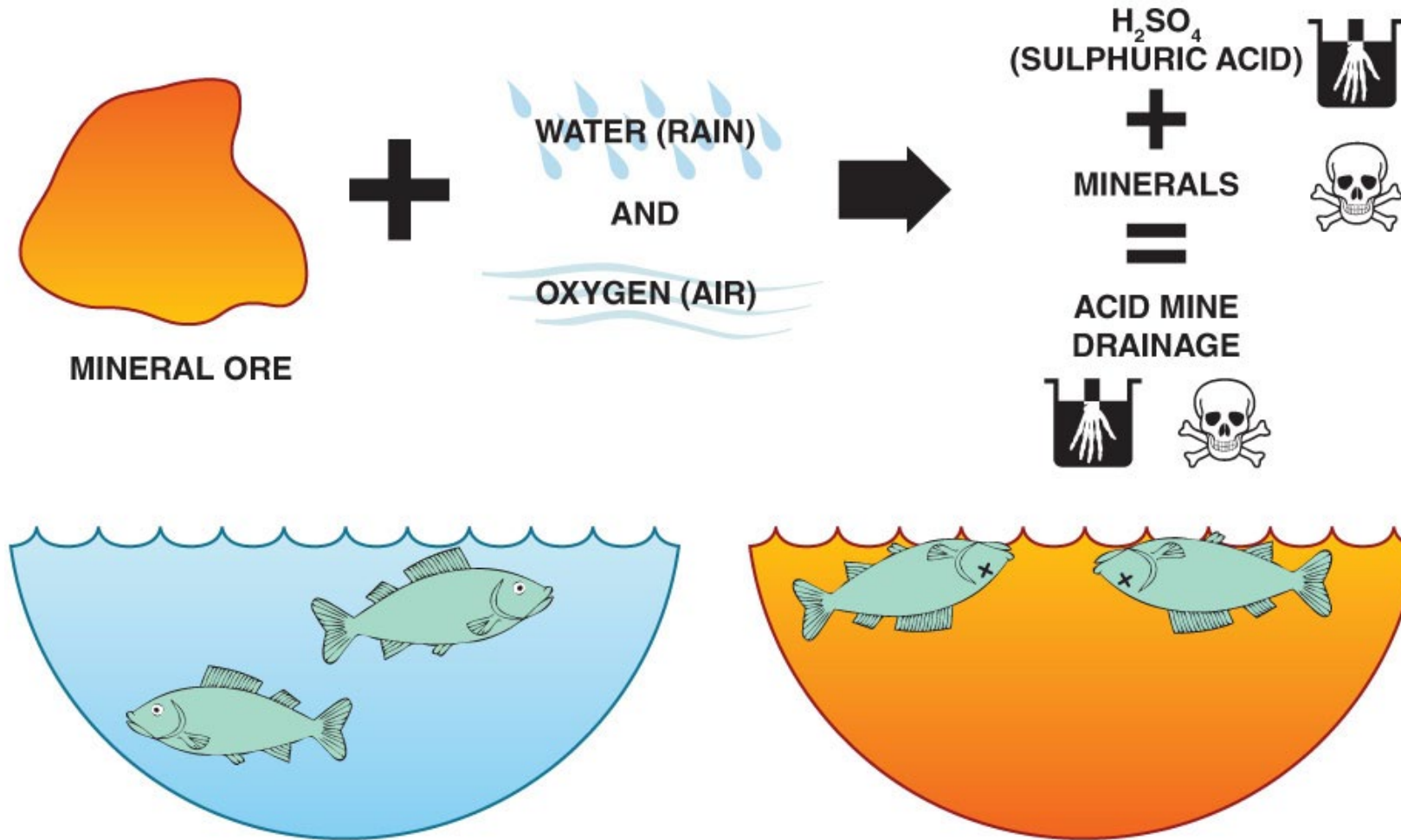
250 acres of disturbed areas

22 million tons of waste rock, overburden, and sub-economic ore

Responsible Parties with EPA oversight

- Atlantic Richfield Company
- State of California

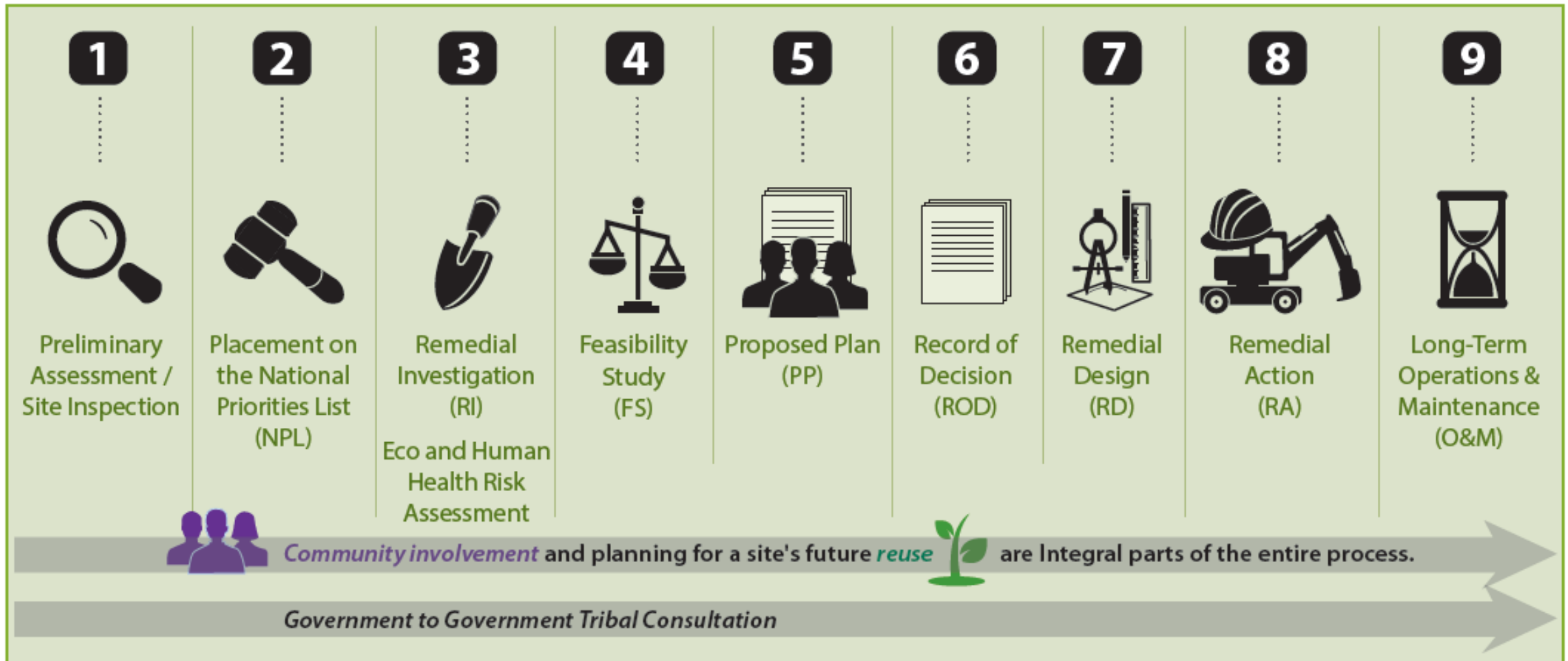
Acid Mine Drainage



Acid Drainage Treatment



The Superfund Process



SUPERFUND REMOVAL PROCESS

Emergency Response: Initiated within hours or days

Assessment



Discovery/
Notification of
Contamination



Site
Evaluation



Removal Action
Determination

Removal



Action
Memorandum



Removal
Action

(Removal Action may occur before
the Action Memorandum)

Post-Removal



Post-Removal
Site Control
(if needed)



Additional
Site Evaluation
(if needed)

Time-Critical Removal: Six-Month Planning Period Available

Assessment



Discovery/
Notification of
Contamination



Removal
Site
Evaluation



Removal Action
Determination

Removal



Action
Memorandum



Removal
Planning



Removal
Action

Post-Removal



Post-Removal
Site Control
(if needed)



Additional
Site Evaluation
(if needed)

Non-Time-Critical Removal: Greater than Six-Month Planning Period Available

Assessment



Discovery/
Notification of
Contamination



Site
Evaluation



Removal Action
Determination

Removal



Engineering
Evaluation/
Cost Analysis



Action
Memorandum



Removal
Planning



Removal
Action

Post-Removal



Post-Removal
Site Control
(if needed)



Additional
Site Evaluation
(if needed)

Community involvement is integral to the entire process

Ongoing Early Response Actions

Superfund **REMOVALS**

1985

1996

1999

2001

2009

2022

Aspen Seep Bioreactor

Lahontan RWQCB (now managed by ARC)

HDS System

Lime Treatment System

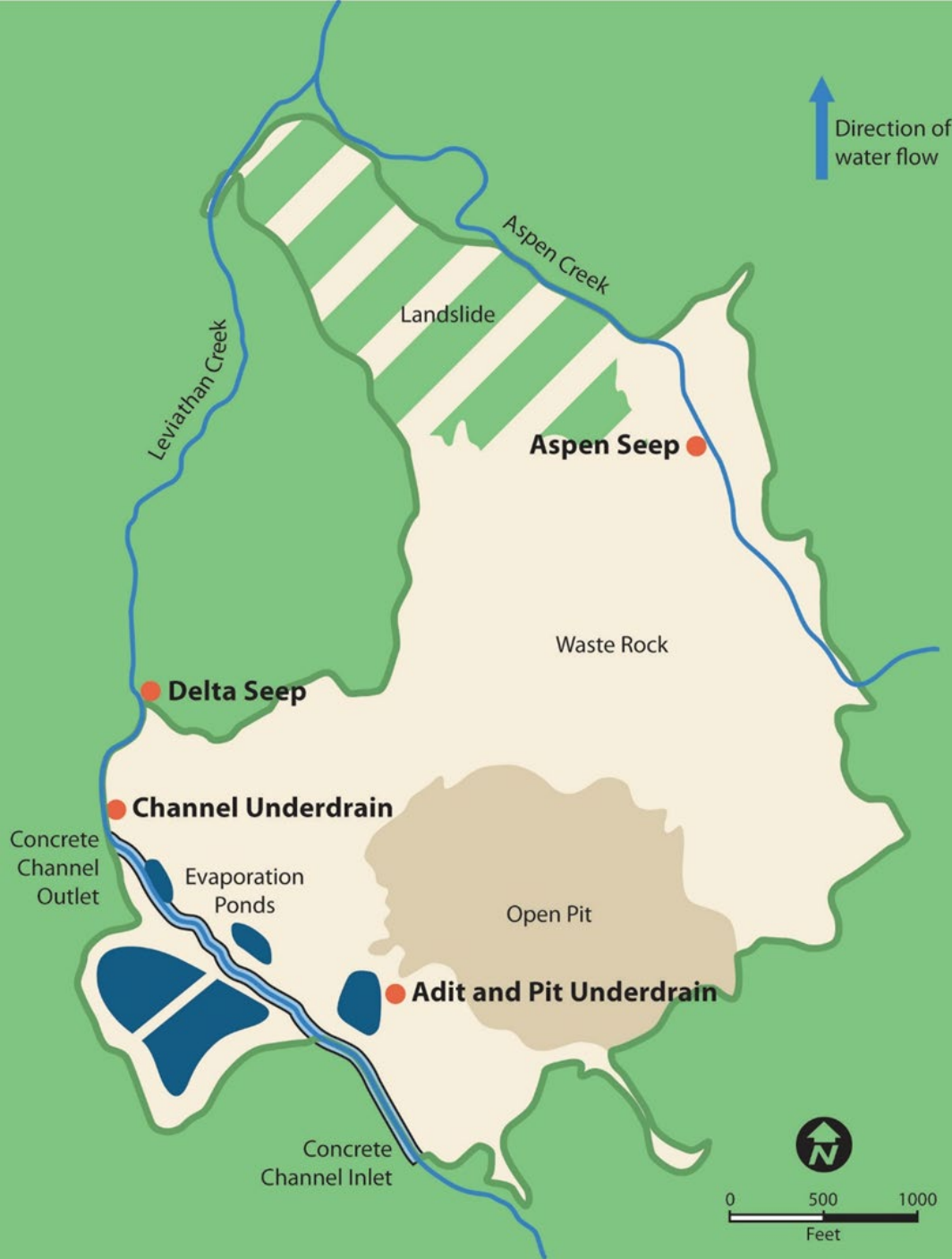
Atlantic Richfield Company

Pond Water (lime) Treatment

Pollution Abatement Project

Lahontan Regional Water Quality Control Board (State of Ca.)

U.S. Environmental Protection Agency

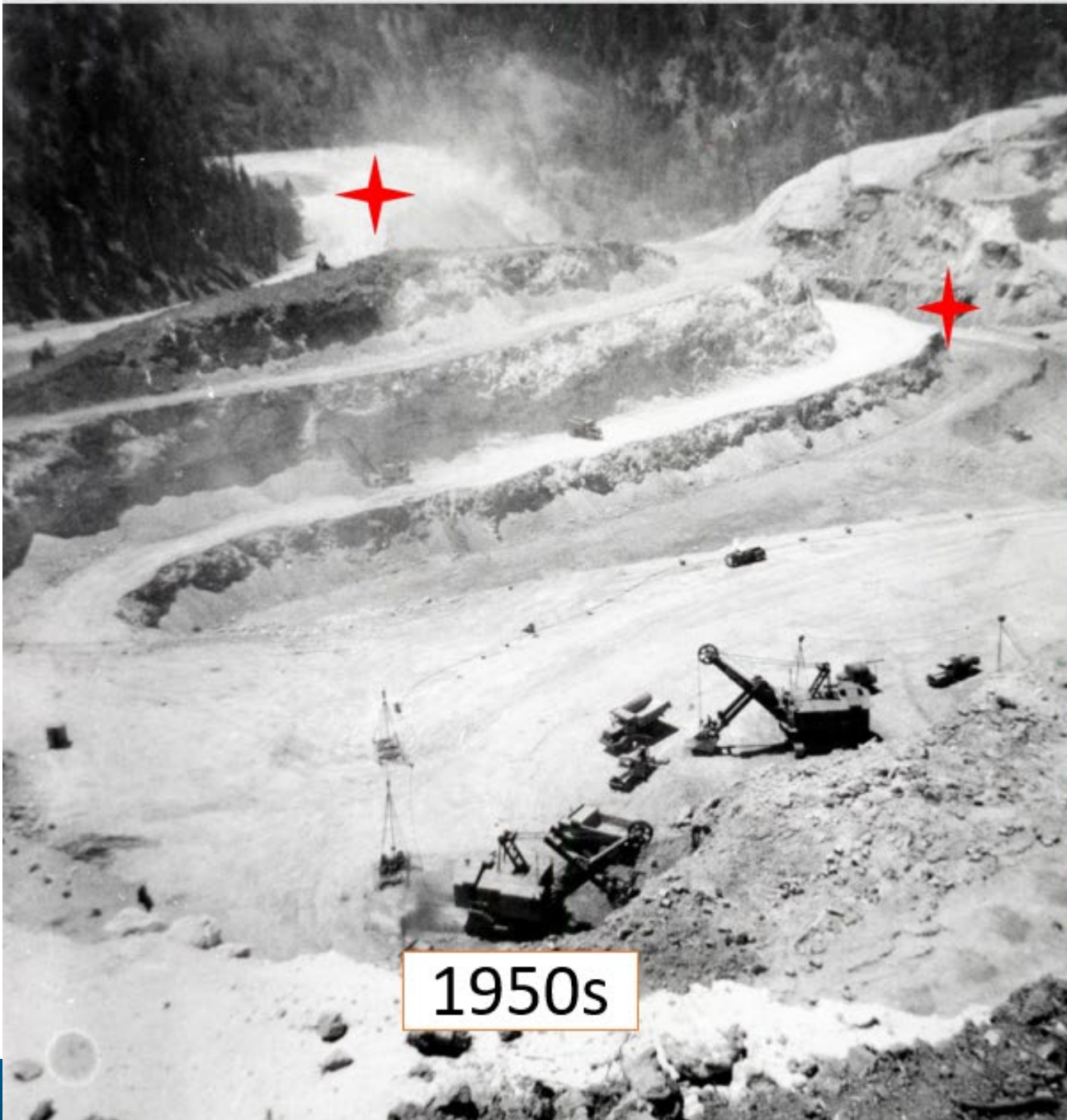






1983





1950s



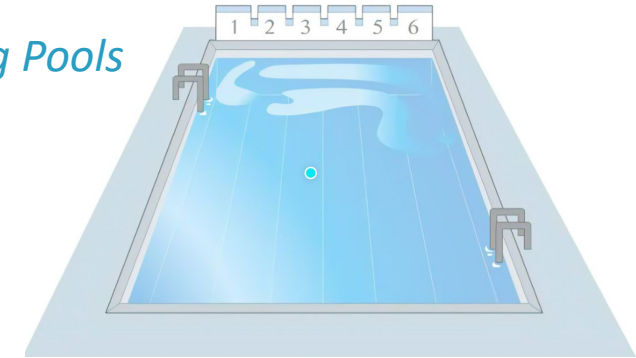
2012

06/06/2012 10:06

Cleanup Progress

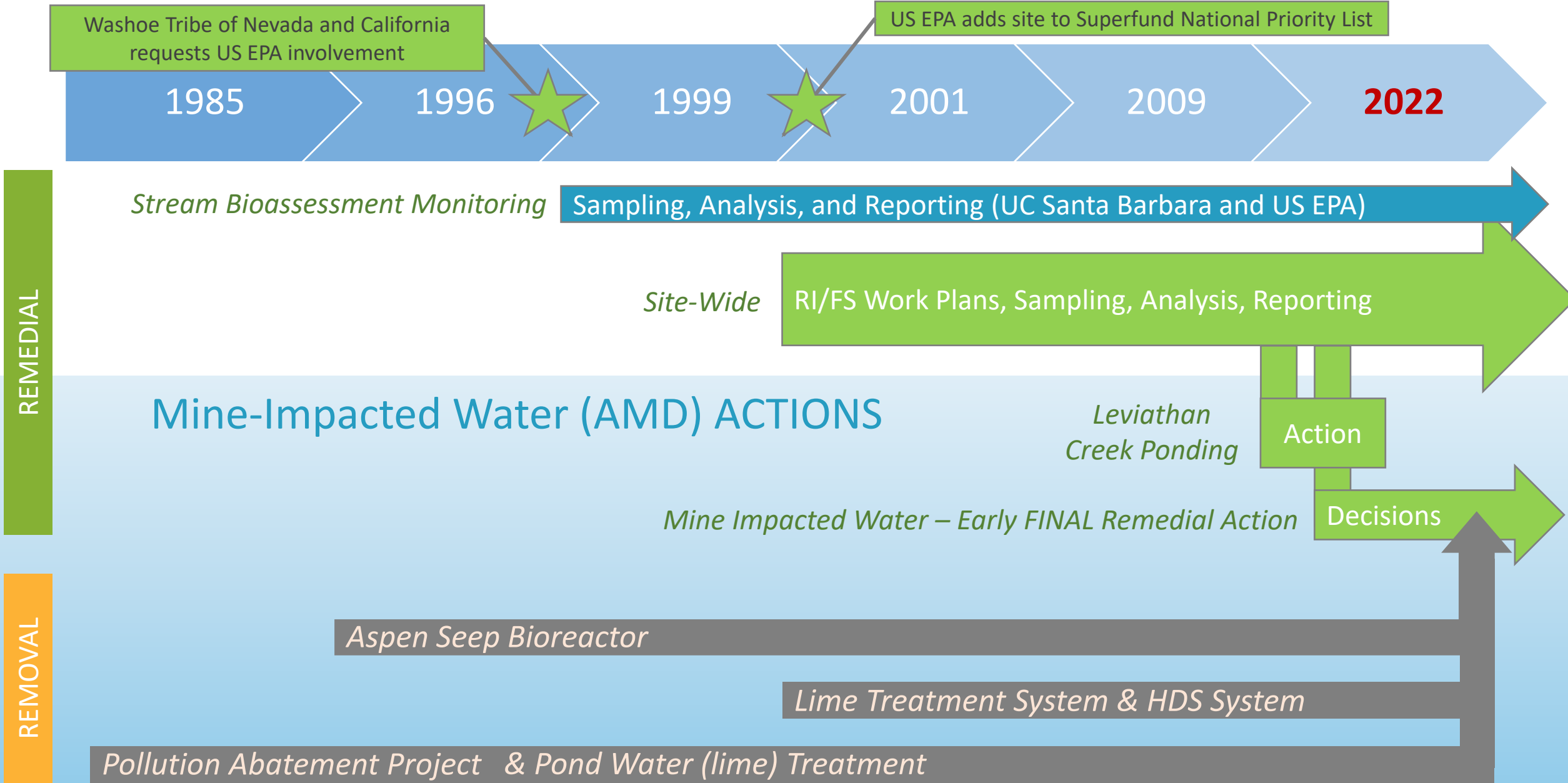
Superfund REMOVALS

~ 570 Olympic Swimming Pools



Treatment System Achievements 1999-2021

	CA RWQCB	ARC	TOTAL	
Water Treated	166,053,904	210,645,233	376,699,137	Gallons
Aluminum Removed	570,900	79,046	649,946	Pounds
Arsenic Removed	8,751	438	9,189	Pounds
Iron Removed	891,872	343,352	1,235,224	Pounds
Nickel Removed	9,297	1,783	11,080	Pounds



* RI/FS = Remedial Investigation and Feasibility Study
* FFS = Focused Feasibility Study
* RA = Remedial Action

What is Next?

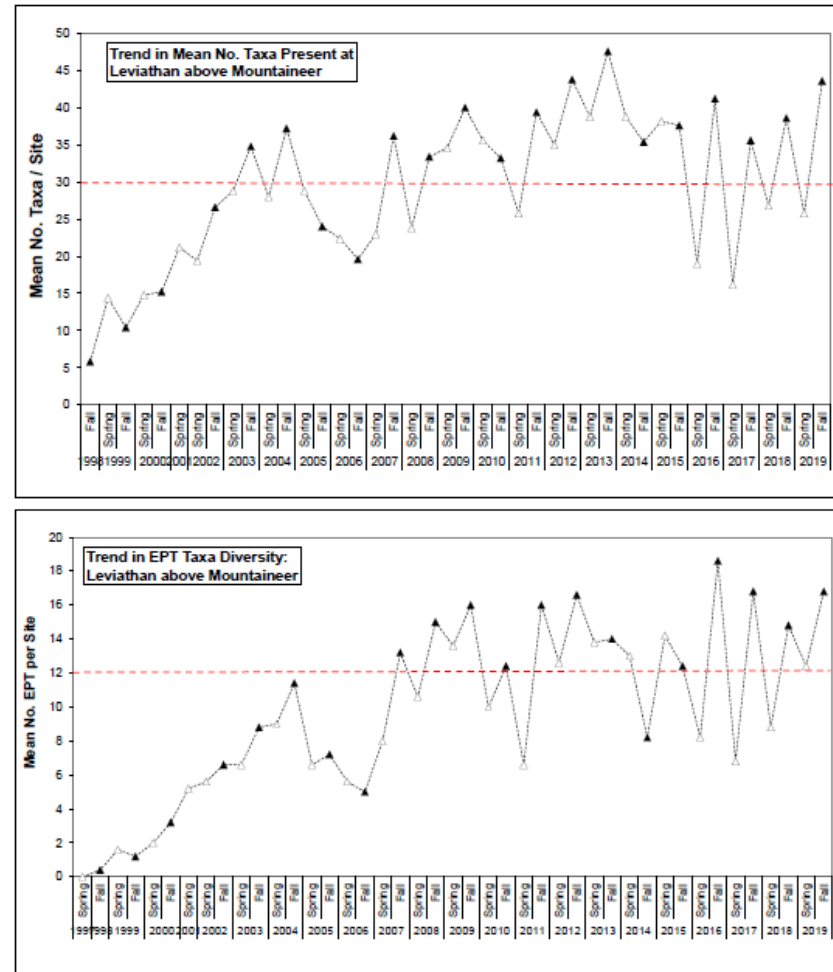
Decision: Year-round Capture and Treatment of AMD

Site-Wide Remedial Investigation Results

Update to EPA Community Involvement Plan

Biomonitoring and Stream Health

- Overall trend of recovery in Leviathan Creek, above Mountaineer Creek
- Seasonal relapse patterns which coincide with end of seasonal treatment operations (2 of 5 sources discharge directly to creek November – April)



1998 – 2019: Trends in mean number of taxa, and EPT (sensitive) taxa diversity



Biomonitoring and Stream Health

- Visual evidence of seasonal treatment effectiveness at confluence of Leviathan and Mountaineer Creeks

Prior to seasonal treatment



During seasonal treatment



First Final Remedial Action

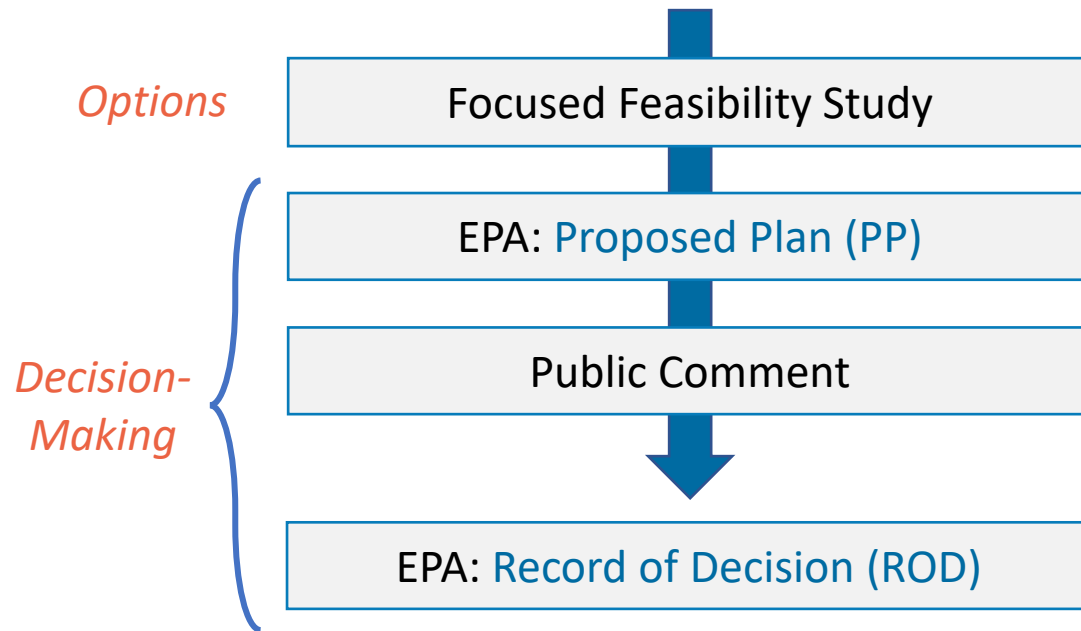
Year-Round Capture & Treatment of Major Sources of Acid Mine Drainage

- Uses information from site-specific pilot studies and 20+ years of data collection
- EPA will initiate formal Consultation with Washoe Tribe of Nevada and California
- Public will be invited to comment on **Proposed Plan**
- EPA will respond to Public Comments and issue a **Record of Decision**
- The Responsible Parties and EPA will negotiate a legal agreement for the parties to design and implement the selected remedy: **Remedial Design** and **Remedial Action**

Options and Decision Making: 2023-2024

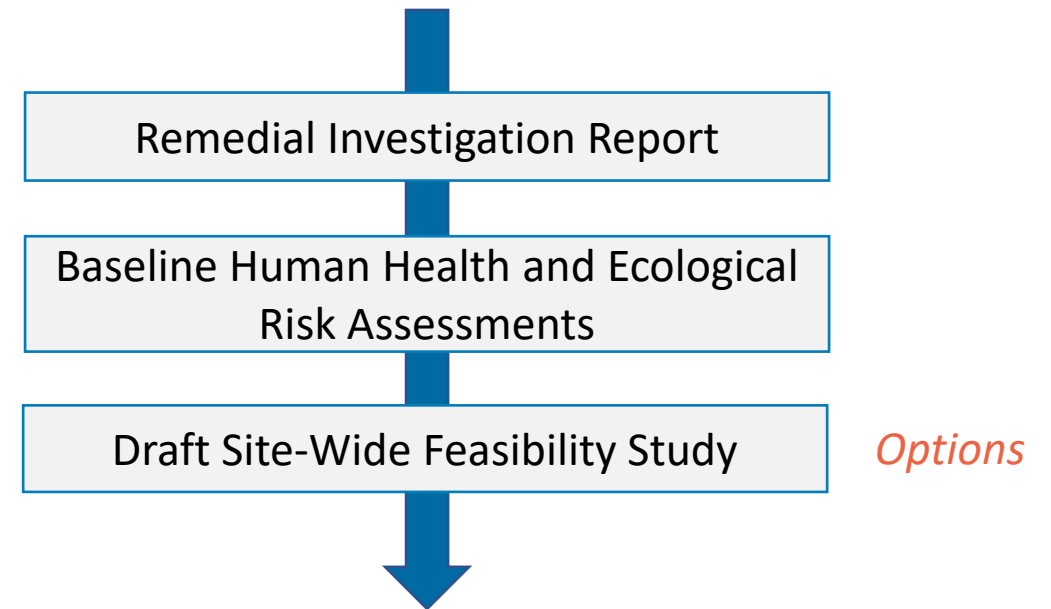
HDS:

Year-Round AMD Capture and Treatment



RI/FS:

Site-Wide



* RI/FS = Remedial Investigation and Feasibility Study
* HDS = High Density Sludge (treatment facility)

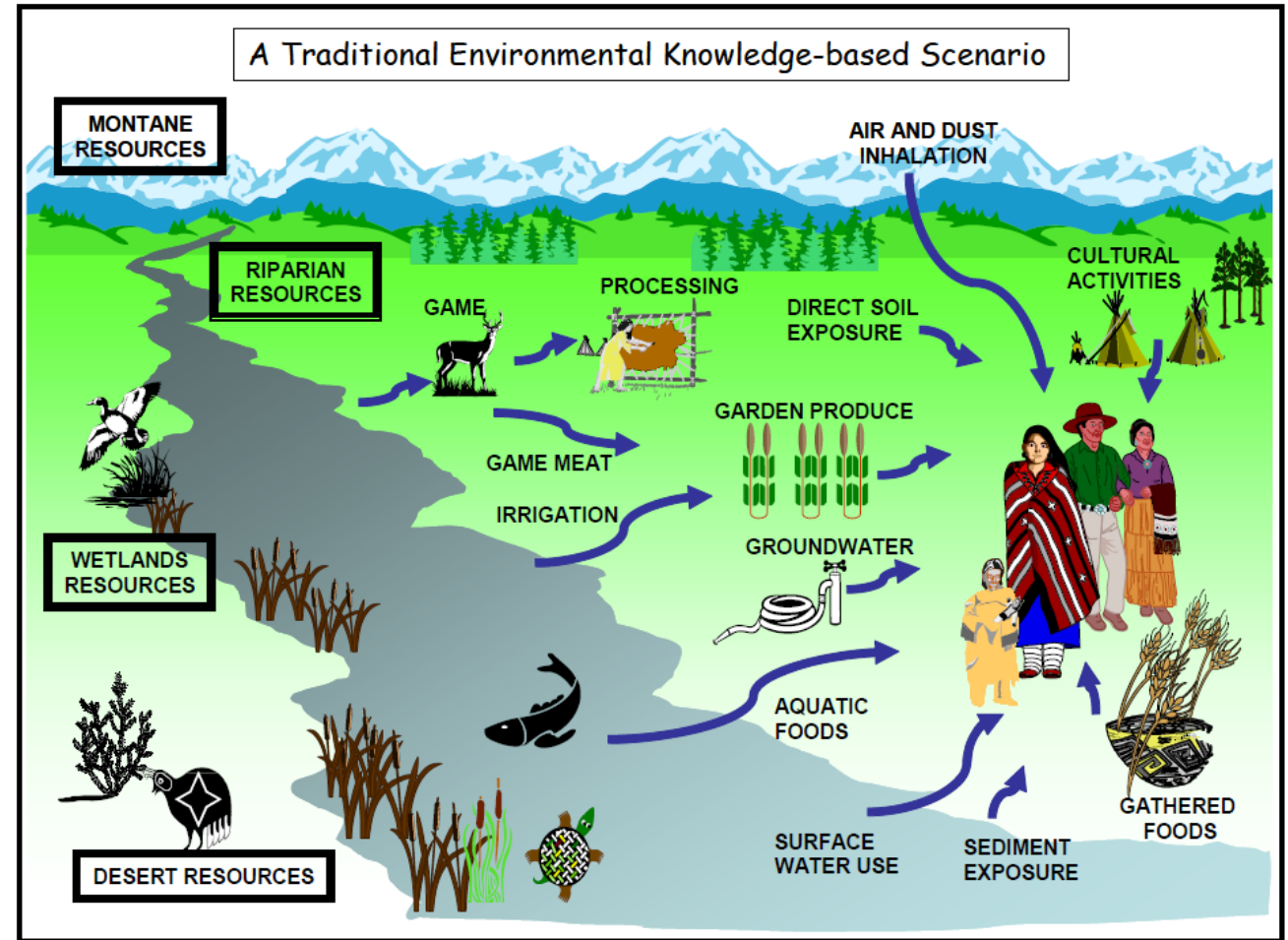
U.S. Environmental Protection Agency

Additional Activities: 2023-2024

Review and Comment on Site-Wide Results:

- *Remedial Investigation Report*
- *Baseline Human Health Risk Assessment*
- *Baseline Ecological Risk Assessment*

Update to EPA's Community Involvement Plan





Thank You

Freyja Knapp

~ Project Manager for Leviathan Mine ~

US EPA Region 9

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