

NEVADA DIVISION OF
**ENVIRONMENTAL
PROTECTION**



Nevada Department of
**CONSERVATION &
NATURAL RESOURCES**

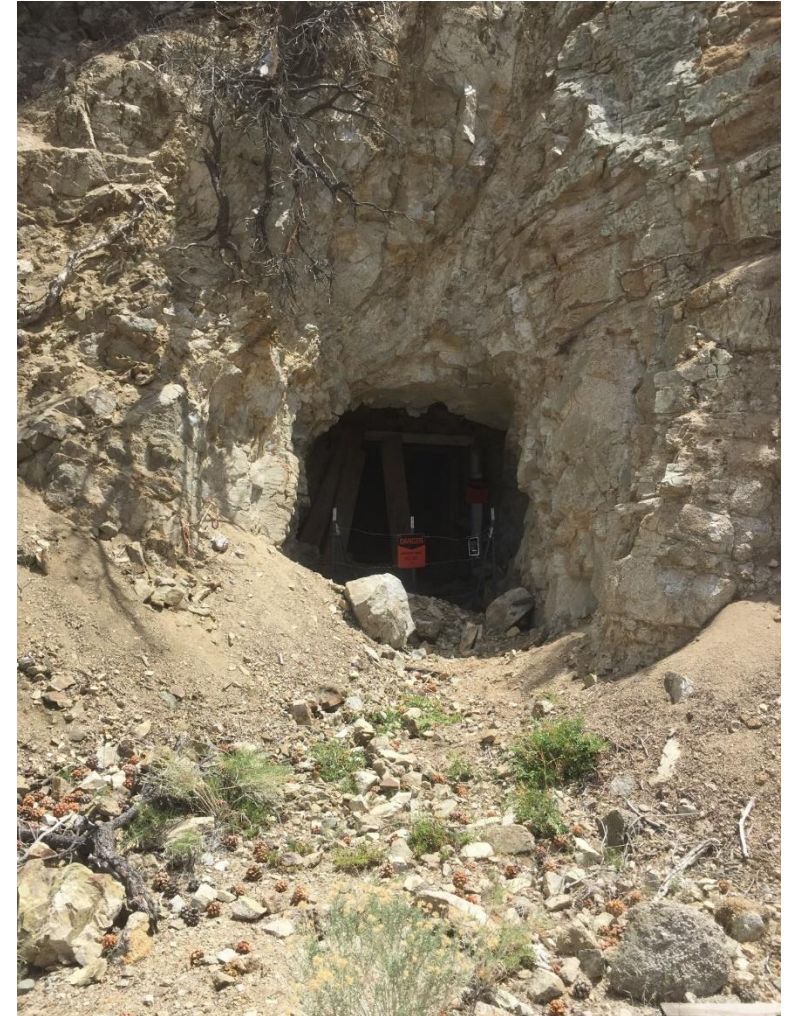
NV Abandoned Hardrock Mine Management

Western States Water Council
Water Quality Committee
June 24, 2021
Cody, WY

Presented by:
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Deputy Administrator

What are NV's Abandoned Mine Land (AML) sites?

- All abandoned hardrock mining or milling operations **before 1989** - when mining regulations were enacted with stricter closure and bonding requirements
- **Post-1989** operations that declared bankruptcy where bonding was insufficient to cover reclamation or closure costs
- May include mine shafts, adits, tunnels, mills, mill tailings, acid mine drainage, waste rock dumps, heap leach pads and ponds, pit lakes, chemical hazards, and associated structures and roads



AML Program Background and Goals

<http://ndep.nv.gov/land/abandoned-mine-lands>

- NDEP AML Program officially started in 2013, with prior work from 1999-2008 to build inventory information
 - **Overarching goal:** Protect human health and environment from AML hazards
 - **Regulatory Framework:** Water Pollution Control Law, Mining Reclamation Law, and Hazardous Materials cleanup regulations
 - **Funding:** discussed further
- Nevada Division of Minerals (NDOM) AML Program started in 1987
 - **Goal:** identify and secure physical safety hazards associated with AML sites
 - **Funding:** mining claim fees and authorization for a percentage of mining operations

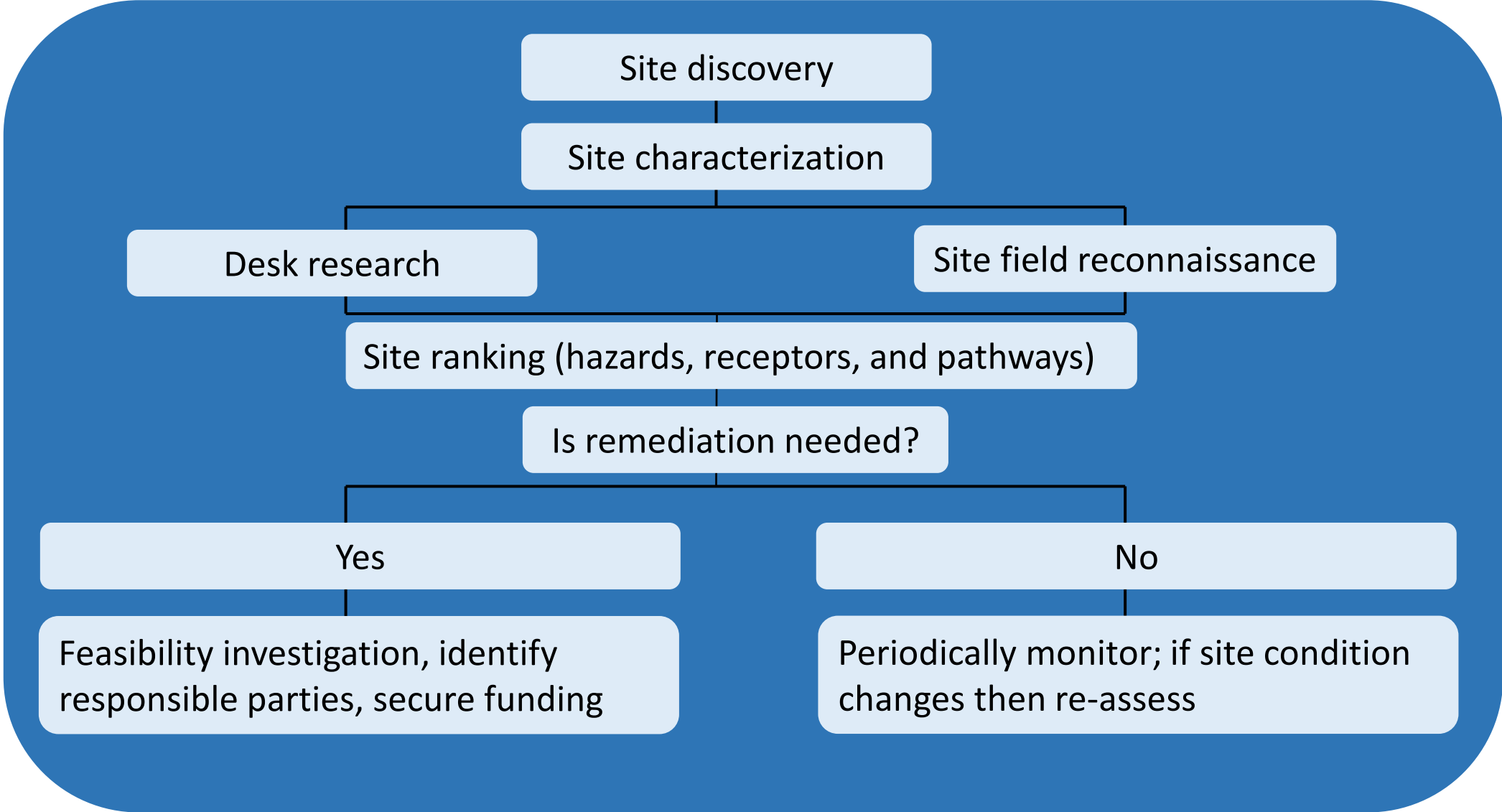
Stay Out – Stay Alive

Overview of AML Branch Objectives

- **Identify, characterize** (potential human or ecological hazards), and prioritize AML sites in Nevada.
- **Communicate** with landowners/agencies conducting investigation and remediation work on AML (BLM, USFS, NDOM, BMRR, and others) and maintain a current geospatial database of all AML environmental sites in Nevada
- **Remediate** sites with known environmental hazards or potential risks, and where viable funding sources are identified or likely to be secured
- NDEP AML hazard ranking, site investigations, and remediation are modeled after CERCLA processes to standardize vocabulary for the public and Agencies



Site Investigation and Remediation Decision Process

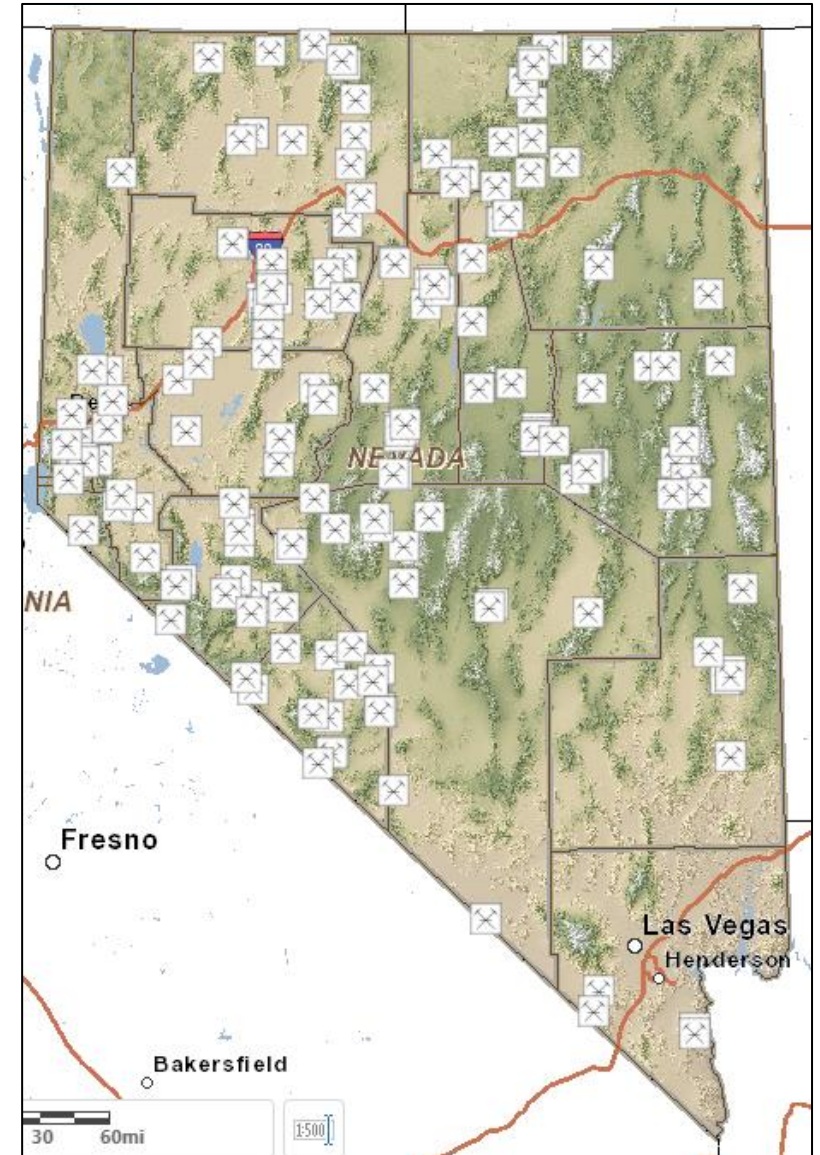


AML Site List Status

- NDEP AML geodatabase contains 209 sites
- Potentially thousands of AML sites in Nevada, but with limited risk

Recent Actions Taken	# sites
Desk research	150
Site reconnaissance	100
Remediated*	25
NDEP AML Active remediation	5

*conducted by various agencies (NDEP-BCA, BLM, USFS, NAMLET etc.)

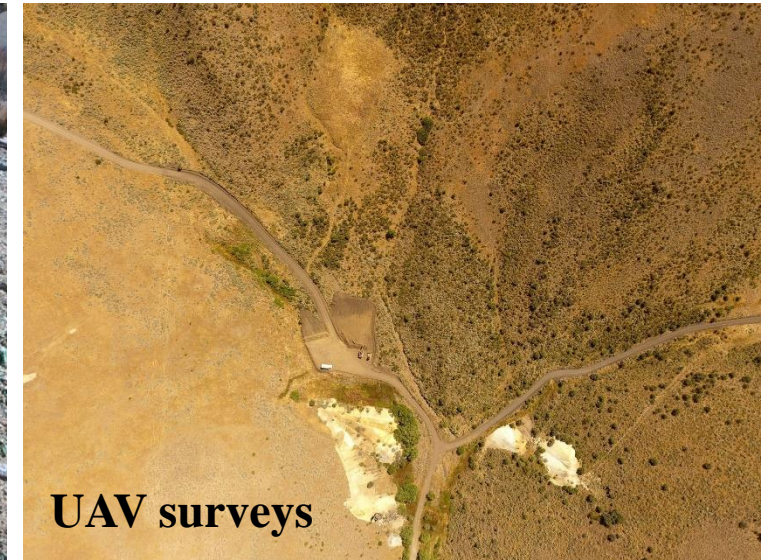


Site Characterization Field Methods

- Identify potential human health or environmental hazards
- Screen for COCs
- Delineate site (extent of potential hazards)
- Identify mine/mill features

Methods

- In-situ XRF screening and water quality testing
- Arsenometer screening (in site Arsenic)
- Soil and water sample collection
- UAV surveys
- Data collected in ArcCollector (ESRI product) with Panasonic FZ-G1 TOUGHPAD tablets



Remediation Methods

- Collaboration with landholder(s), responsible party, and community
- Remediation activities vary for each site, but can include:
 - stabilization and erosion control
 - Stormwater management
 - water quality treatment, both active and passive

Example - Birthday Mine Methods

- Geophysical survey determined location of mine pool
- Pumping well installed to drain mine pool and test mine pool water quality
- Bench-scale testing to determine effectiveness of an active treatment system
- Active treatment: pumped and treated water from mine pool
- Most Recent steps: removed adit plug, installed passive treatment system (PTS -iron terraces), implement long-term site and PTS monitoring

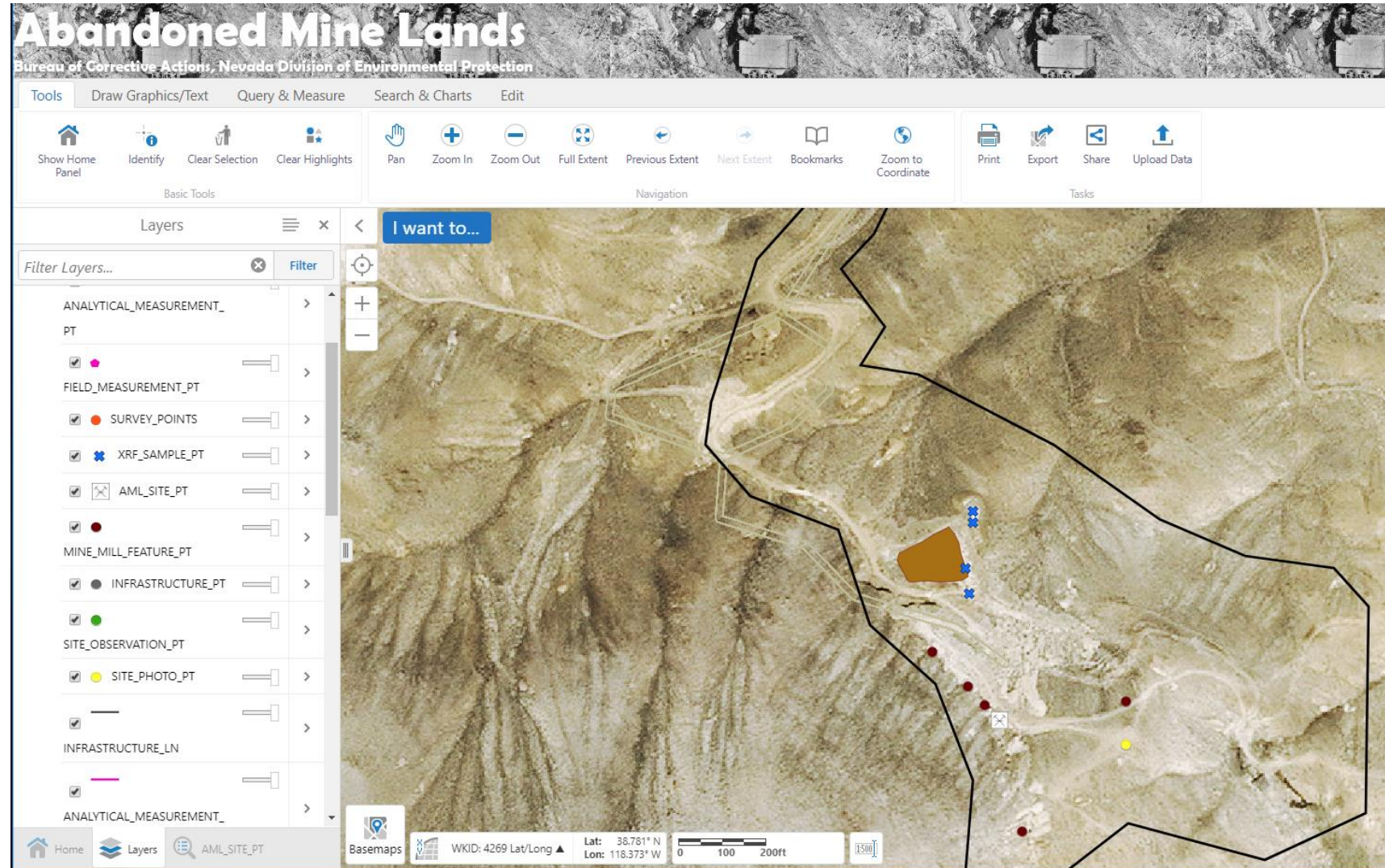


Birthdays Mine (Before & After)



NDEP AML Geospatial Database

- Designed, developed and implemented with RAMS funded contractor, and managed with AML staff
- Features (points, lines, polygons) are collected in the field with tablets
- Stores analytical water/soil quality data and hazard ranking data
- Can generate reports and share data with partner agencies



NDEP AML Branch Partners

State

- Nevada Division of Minerals (NDOM)
- Nevada Department of Wildlife (NDOW)
- Desert Research Institute (DRI)
- University of Nevada Reno (UNR)
- Nevada Bureau of Mines and Geology

Federal:

- Bureau of Land Management (BLM): Nevada state office and district/field offices
- US Forest Service (USFS)
- US Army Corps of Engineers (USACE)
- US Environmental Protection Agency (EPA)
- US Geological Survey (USGS)
- US Fish and Wildlife Service (USFWS)

Associations and NGOs

- Nevada Mining Association (NvMA)
- Interstate Mining Compact Commission (IMCC) and
- National Association of Abandoned Mine Lands Programs (NAAMLN)
- Trout Unlimited (TU)
- The Nature Conservancy (TNC)

AML Program Funding

- **Site characterization:** Nevada Hazardous Waste Fund and previous EPA PA/SI Grant
- **Database:** RAMS funding (USACE)
- **Remediation projects:** Responsible Party, voluntary contributions, in-kind services, BLM and other agency partners (NDOM, NDOW, USFS)
- **Water quality improvement projects:** BWQP 319(h) Grant funds, voluntary contributions, NGOs
- **Other AML reclamation work:** Alternative energy development –The Nature Conservancy, Mining the Sun Initiative
- ***Future Creative Options?*** – *Enforcement Settlements? Supplemental Environmental Projects? NV Environmental Quality Improvement Account?*

Discussion Areas

- What can States provide to Federal Partner Agencies during Appropriations & Budgeting to get \$\$ to leverage?
- Where water quality degradation is of concern (small percentage) and multi-million dollar cleanups are needed – start with pilot or demonstration projects with federal funds? (*RAMS 2021 Auth?*)
- Success by getting “out-of-the-box” and the Regulatory mindset

The “Million Dollar” Question:
Solutions to Liability Challenges

Questions?



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