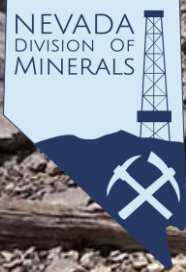


Nevada Division of Minerals AML Program: Advancing Abandoned Mine Cleanup



Rob Ghiglieri
Chief, Abandoned Mine Lands Program
Nevada Division of Minerals

Overview



Nevada's AML Physical Safety Program

1. History
2. Tackling inventory efforts
3. Closure successes
4. Summary

NDOM's AML Program

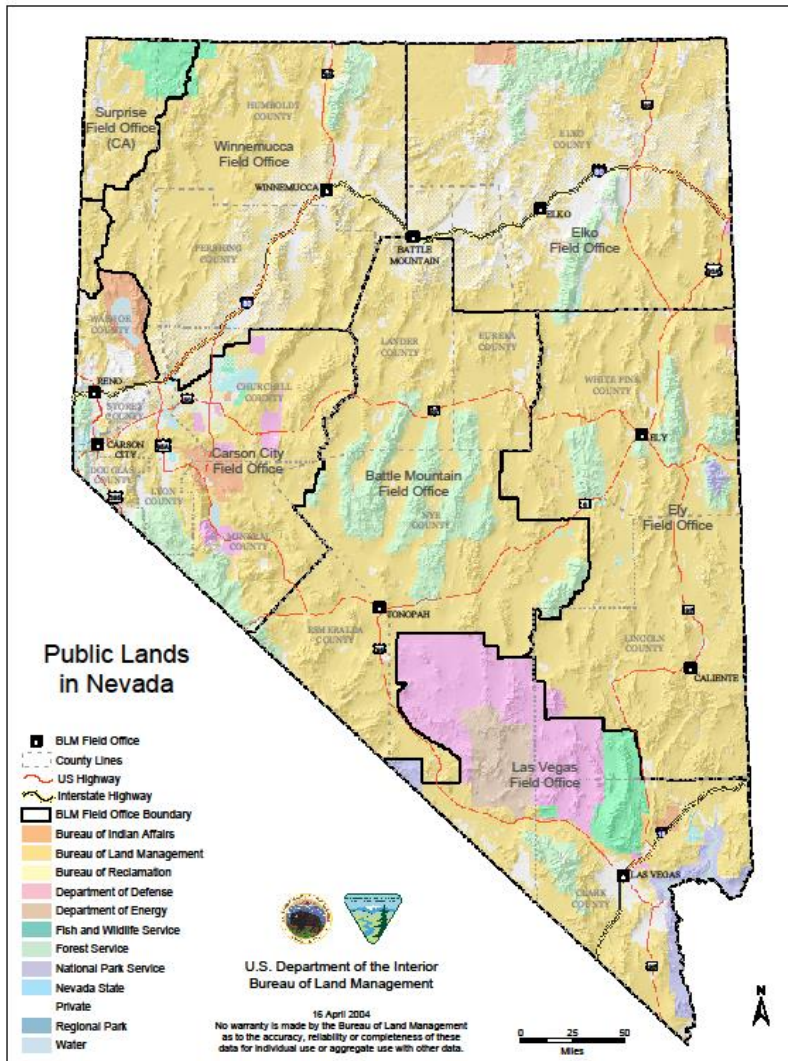
- Legislatively created in 1987 due to the amount of injuries and deaths at AML sites
 - Not initiated by SMCRA
 - Funded by mining claim fees on federal land collected by the county.
 - Assistance / Cooperative agreements
 - No SMCRA or State General Funding
 - Physical Safety only

NDOM's AML Program

- Current Statistics:
 - 22,601 physical safety AML hazards
 - 6,000 closed
 - 12,000 fenced or safeguarded
 - 65% Federal
 - 32% Private
 - 3% Other
 - 85,671 non-hazardous historic mining features cataloged
 - Inventory efforts are estimated to be <50% complete

Public Lands

- ~85 % of Nevada is public land
- Assistance Agreements with federal land managements agencies (BLM, USFS, NPS) is critically important
- NDOM focus AML efforts on public lands first

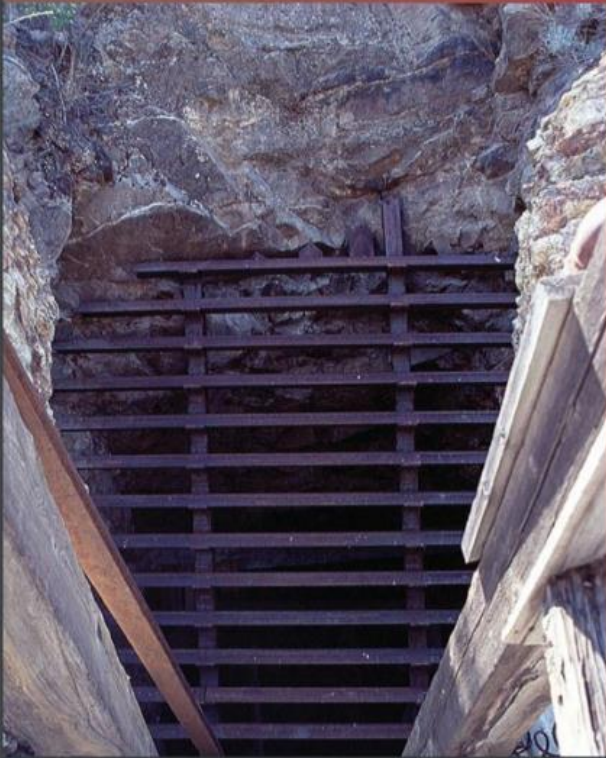


BLM Estimates


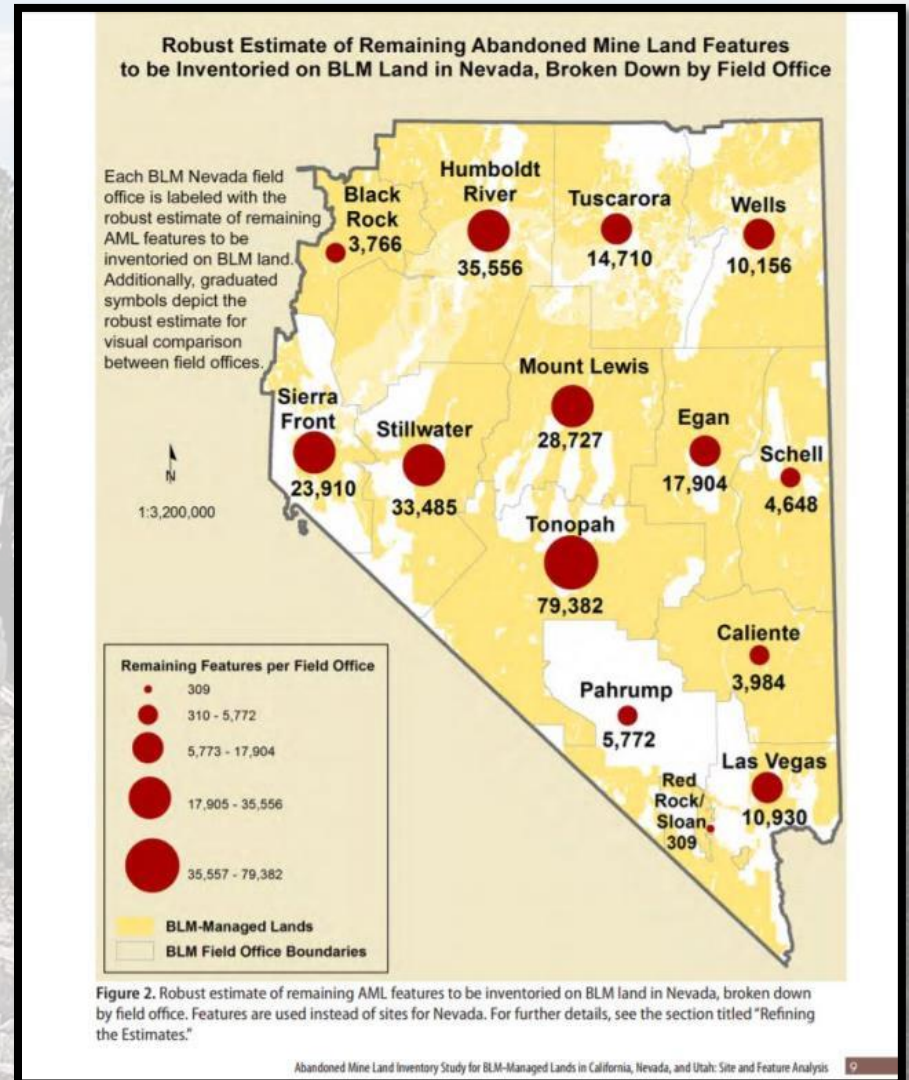
Bureau of Land Management

Abandoned Mine Land Inventory Study for BLM-Managed Lands in California, Nevada, and Utah: Site and Feature Analysis

November 2014



BLM

BLM Estimates

7. Conclusion

Using the USGS symbol approach greatly improves the BLM's ability to build a current, complete, and accurate database of AML sites and features. This is critical to measuring progress and reporting comprehensive results of program activities. Through field validation of the mine symbols, the BLM can inspect suspected AML sites and take appropriate action to mitigate hazards.

The BLM currently estimates that the total cost of field validating and recording in the AMSCM

database the estimated remaining 93,000 sites and 368,000 features in California, Nevada, and Utah to be approximately \$212 million (see Table 3 for overall summary). This would require 10 two-person teams approximately 20 years to complete. In California alone, there are an estimated 30,308 features that pose physical safety hazards requiring \$588 million to remediate.

Table 3. Overall summary of the estimated number of sites and features remaining to be inventoried on BLM lands in California, Nevada, and Utah and the estimated time and cost to complete the inventory

	Estimated Number of Sites to be Inventoried	Estimated Number of Features to be Inventoried	Estimated Time to Complete Inventory	Estimated Cost to Complete Inventory
California	22,730	79,757	568 work months	\$118 million
Nevada	68,564	273,239	1,952 work months	\$86 million
Utah	1,399	14,752	105 work months	\$8 million
Total	92,693	367,748	20 years¹	\$212 million

¹ This inventory time is based on 10 two-person work crews.

How Long Will it Take?

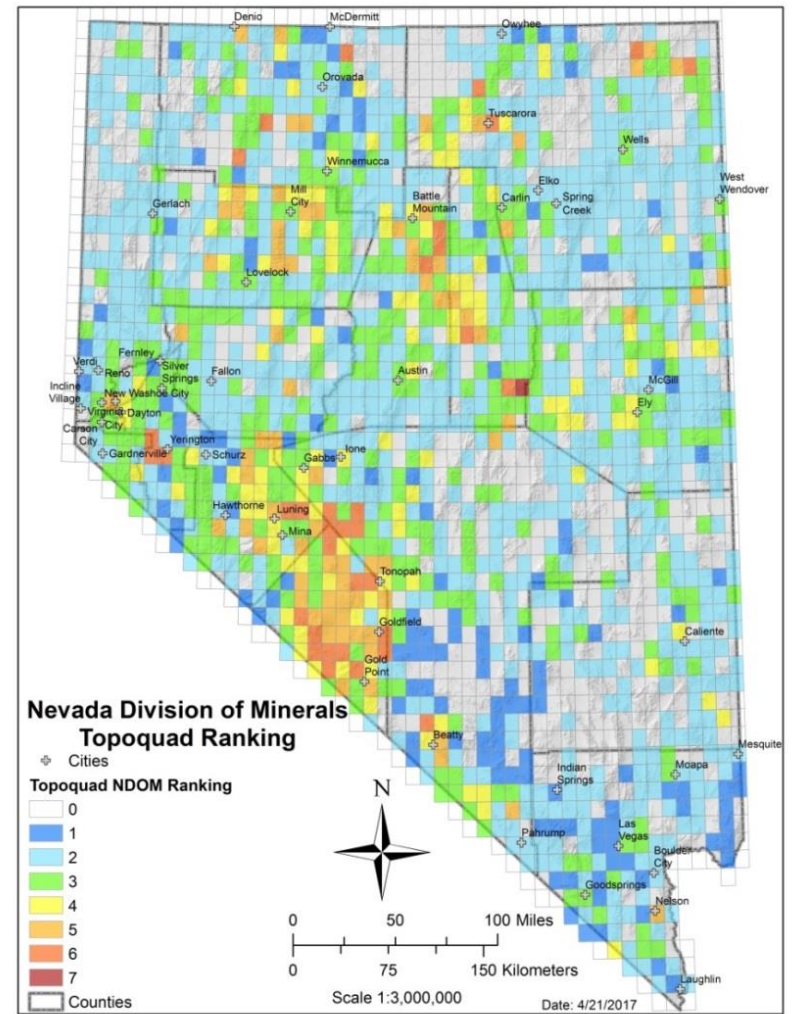
Define “Historic Mining Feature”

- Adit, shafts, stopes, etc...
- Dumps
- Tailings
- Mills
- Prospects
- Cultural features



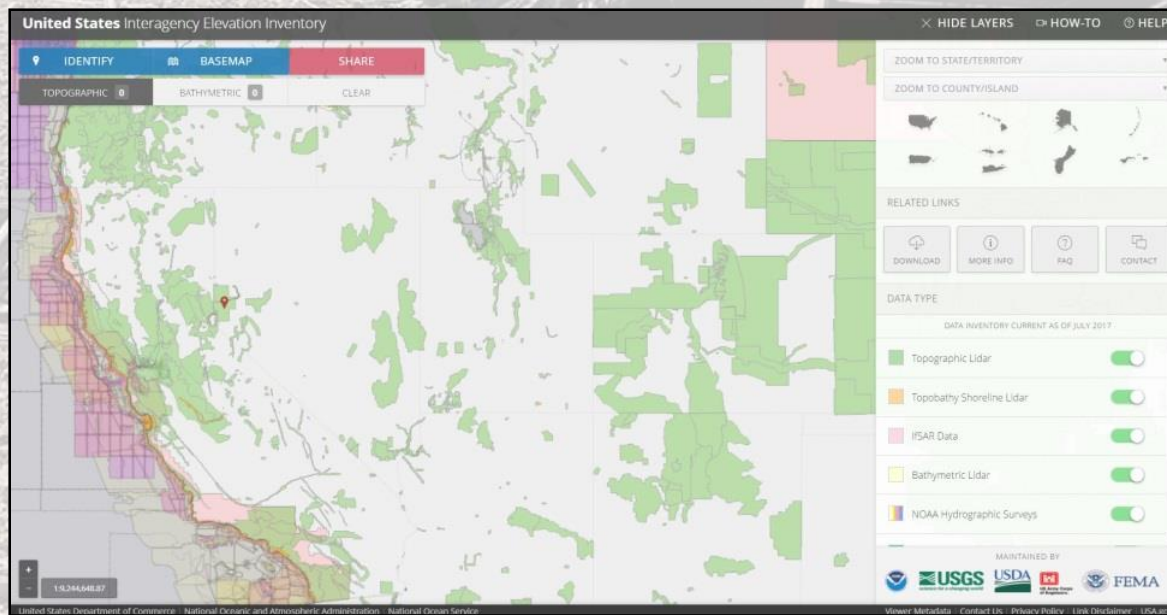
Inventory Prioritization

- Rank every USGS 7.5' Topographic Quad
 - Known hazards
 - Orphan hazards: Secured vs Unsecured
 - Un-inventoried historic mining features
 - Proximity to Roads/Towns/Cities
 - Known recreation areas
 - Accessibility
 - Reports from the public
 - Institutional knowledge



LiDAR / UAS

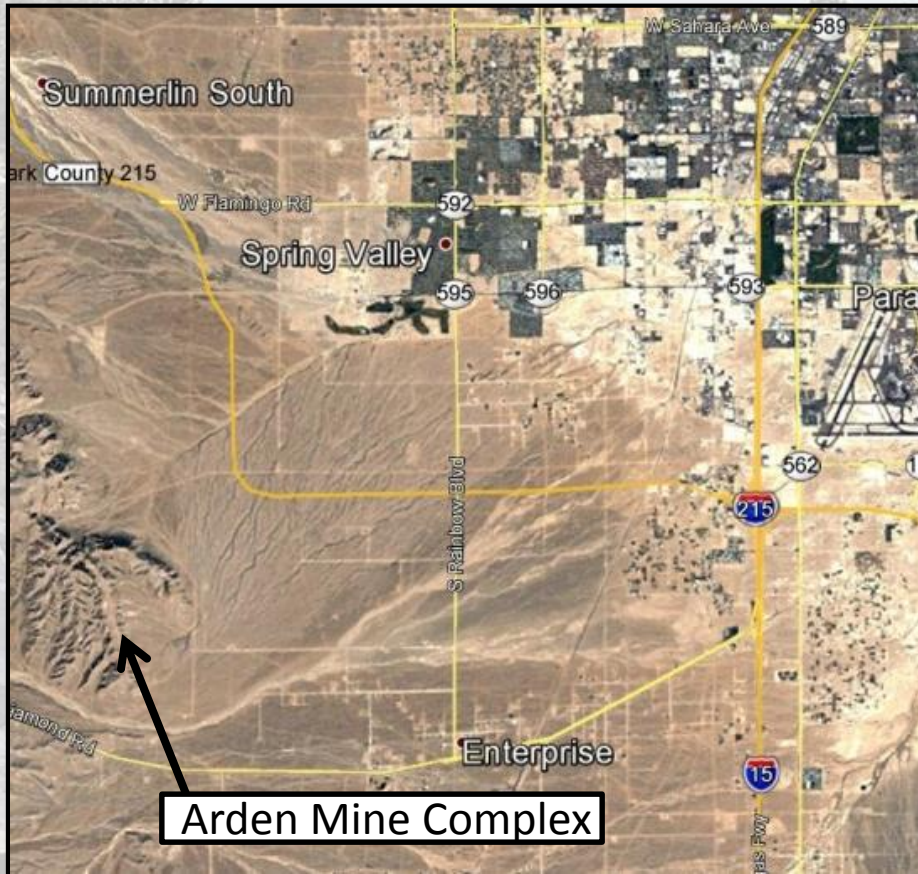
- New local flights provide high accuracy data for a small area
 - Includes the Comstock Lode district
 - Will be used to identify new hazards in areas that inventory had been previously deemed completed outside urban areas
- Nevada has very little LiDAR data making it extremely difficult for large scale use
- Incorporation of UAS has increased efficiency of inventory process.



Increased Public Interaction with Hazardous Sites

Las Vegas 1984

Las Vegas 2017



Database Management

- Without a functional database, you're dead in the water.
- Bad data in, bad data out
- QA/QC
- Must have the ability to adapt to future needs

The screenshot displays a web-based map viewer interface. At the top, there is a navigation bar with the text "Stay Out Stay Alive" and several menu items: "Staff Tasks", "Mobile Tasks", "Admin Tasks", "Queries", and "Help". A "Log off" link is located in the top right corner. The main area is titled "MapViewer" and features a left-hand sidebar with a legend. The legend includes categories such as "NDOMINDOM", "Sites", "Nontaxlands", "NV Points", "PLSS", "Background", "Nevada Counties", "24k Quads", "USFS Boundary LMP", and "Landstatus". Under "Landstatus", various agencies and land types are listed with corresponding color swatches, including Bureau of Indian Affairs, Bureau of Land Management, Bureau of Reclamation, Department of Defense, Department of Energy, Forest Service, Fish and Wildlife Service, National Park Service, Nevada State, Regional Park, Private, and Water. The main map area shows a topographic map with a data overlay of red and green dots. A popup window titled "Site: WP-1829" is open, displaying details for the selected site. The popup has tabs for "Details", "Latest Visit", "Latest Owner", and "Photos". The "Details" tab is active, showing the following information: County: WP, Topo Sheet: Mount Hamilton, Township: 16N, Range: 57E, Section: 25, Grtr. Section: NESE, Elevation: 7820, NAD Source: NAD83_UTM, Source: GPS Garmin, and Accessibility: Moderate. The map also shows a scale bar and the text "Treasure Hill" and "Copyright © 2013 National Geographic Society, i-cubed".

Developed for the USACE RAMS Program
by TerraSpectra Geomatics

Closures



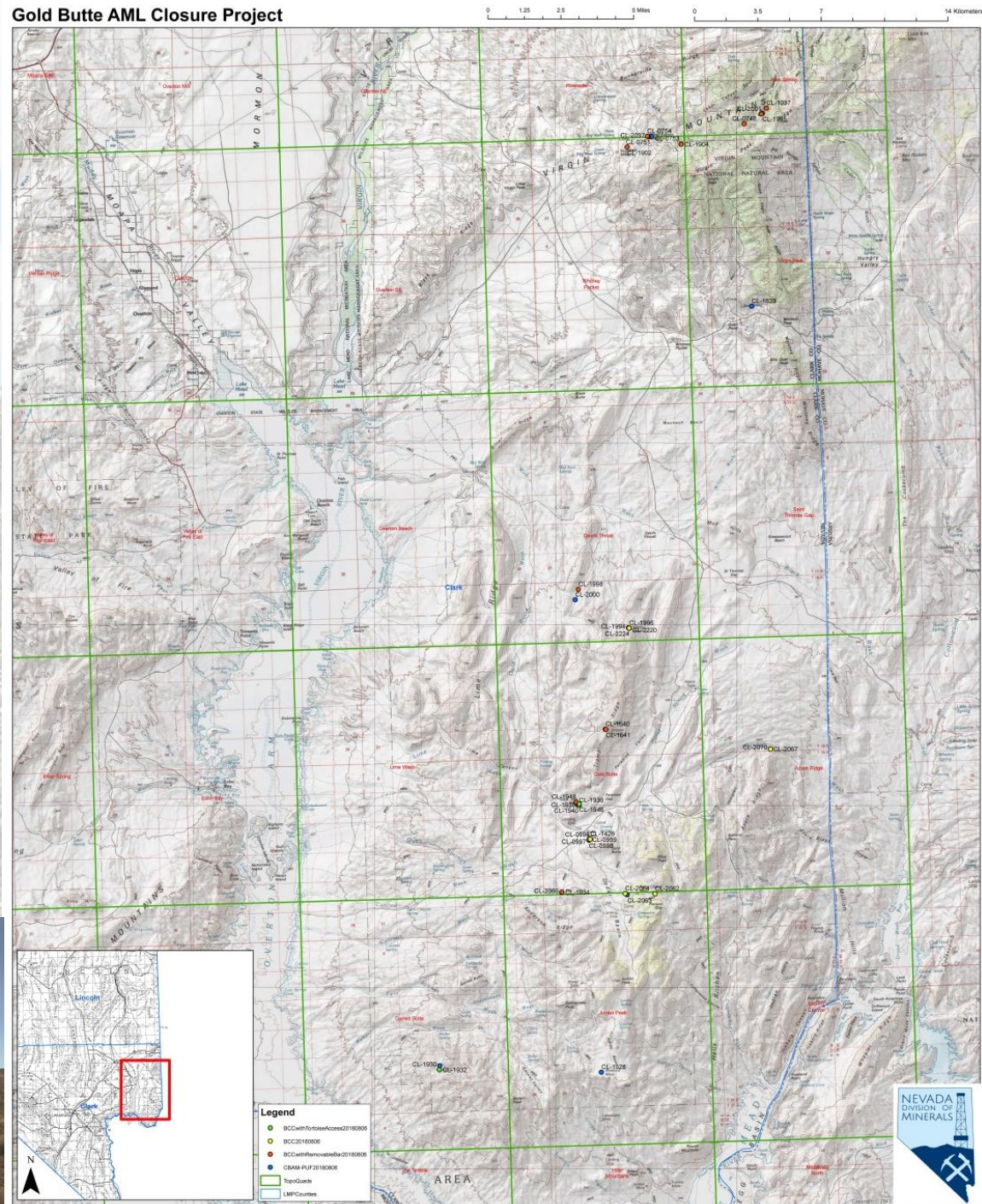
- Develop closure projects
 - High recreation/proximity to public
 - Confirm land status
 - Wildlife surveys by Department of Wildlife
 - Cultural surveys by contractor or Federal agency
 - Request Categorical Exclusions from Federal land agency
 - Can be a large time sink for federal staff
- Perform closure project

Gold Butte

- 40 Hazards
 - 30 BCCs
 - 3 with Tortoise Door
 - 10 PUFs
- 29 total days
- Spread across an area greater than 220 square miles
- Total Cost = \$269,349
 - Clark County Desert Conservation Program (DCP) funded \$149,950
- Partnering Agencies
 - NDOM
 - NDOW
 - BLM
 - DCP



Gold Butte AML Closure Project

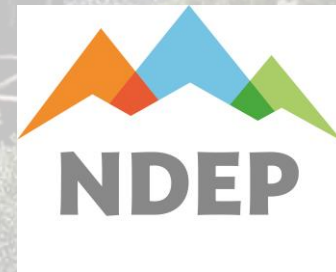
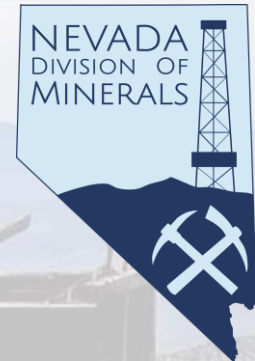


Recent Hard Closure Projects

- Recent Projects
 - Arden (47)
 - Broken Hills (40)
 - LY-1172 (1)
 - ST-19 (1)
 - Prison Hill (2)
 - Gold Butte (40)
 - Fort Churchill (1)
 - THMP (3)
 - Valley of Fire (3)
 - Gunmetal (ongoing)
- 134 Total Closures in 2018
 - Program Record
- Completed by State Contractor: Environmental Protection Services



Recent Project Partners



Summary



- Prioritize inventory and closure efforts
- Have a single database that can be used by partners
- Continue to look for technological advancements
- Partnership is key for Hardrock AML closure projects