



2019

Nevada Abandoned Mine Lands Physical Hazards Report



Commission on Mineral Resources

Division of Minerals

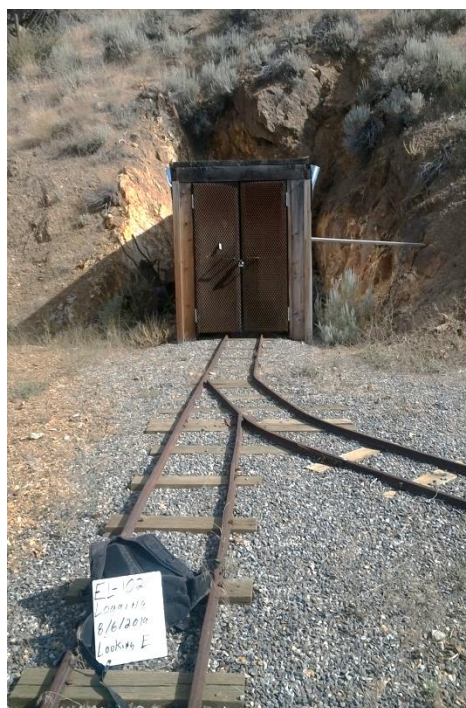
June 2020

State of Nevada Commission on Mineral Resources

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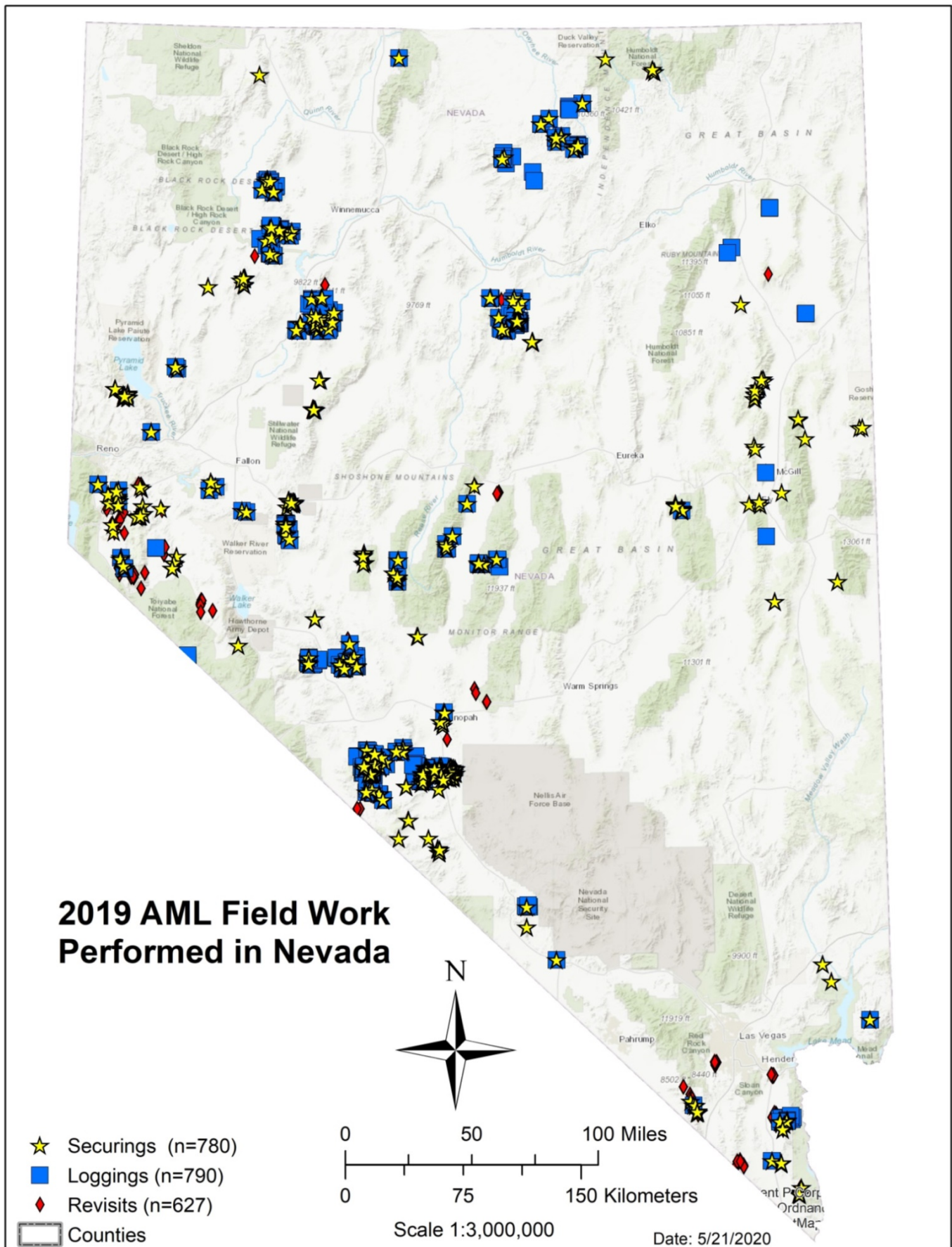
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State contractor, Environmental Protection Services, working on a bat gate in Clark County

Figure 1:



1. Executive Summary

The State of Nevada's Abandoned Mine Lands (AML) program, operated by the Nevada Division of Minerals (the Division), finished its 33rd year in 2019. Details and milestones include:

- NO reported abandoned mine accidents or fatalities, making 2019 the sixth consecutive year without an incident.
- Received a national award for the Gold Butte Closure Project from the National Association from Abandoned Mine Land Programs.
- Over 125,000 historic mining related features cataloged since the inception of the AML program.
- 23,362 total hazards discovered and ranked since the beginning of the program; 18,576 hazards recorded as secured.
- 790 hazards discovered and 780 total hazards secured in 2019.
- 457 hazards secured by the Division, 168 by mining claimants and private property owners, 152 by Federal agencies, and three were caved by nature.
- 627 known hazards were revisited to confirm securing status and make repairs if needed.
- 237 permanent closures completed in 13 of the 17 Nevada counties; 72 of which were completed by the Division's contractor.
- Expended \$497,055 towards closures statewide, of which \$258,087 was funding received from partnering organizations.
- Exceeded the performance indicators required by the State Legislature, with 80% of discovered hazards secured and an average of 43 total public awareness presentations per staff member for the year.
- Reforecasted the time necessary to complete all of the AML program mandates. At current funding levels, it is now estimated to take 37 years to complete AML feature inventory, 40 years to safeguard or fence all hazards, and 119 years to complete permanent closure of 70% of all hazards.
- Collaborated with the Bureau of Land Management (BLM), Clark County Desert Conservation Program, Nevada Department of Wildlife (NDOW), Nevada State Parks, Nevada State Historic Preservation Office and the US Forest Service (USFS) to secure abandoned mine land hazards across the state.



Abandoned loadout in the Pilot Mountains, Mineral County



AML intern building a fence, Pershing County.

2. The Commission on Mineral Resources

The Nevada Division of Minerals (the Division), a part of the Commission on Mineral Resources (the Commission), is charged by statute to encourage and assist in the responsible exploration for, and the production of, minerals, oil, gas, and geothermal energy which are economically beneficial to the State; to provide for public safety by identifying, ranking and securing dangerous conditions at mines that are no longer operating; and to collect and disseminate information on exploration, production and related topics. The seven-member Commission is a public body appointed by the Governor to adopt regulations, formulate administrative policies for the Division, and advise the Governor and Legislature on policy relating to mineral resources. The Division focuses its efforts on four main areas: collection and dissemination of educational information; inventory and securing of abandoned mine hazards; regulation of oil, gas, and geothermal drilling activities, and dissolved mineral resource exploration.

The Division's Abandoned Mine Lands (AML) program addresses public safety by identifying and ranking dangerous conditions at mines that are no longer operating and by securing dangerous mine openings. The Division's program is tasked with physical safety remediation, while the Nevada Division of Environmental Protection (NDEP) is the agency responsible for environmental hazard concerns. Both programs urge the public to recognize and avoid hazardous abandoned mines.

3. Background

Nevada's geology provides ideal conditions for a large variety of valuable and useful minerals, and has attracted the attention of miners and prospectors for over 150 years. The prospectors who traveled across the state exploring for this vast mineral wealth left behind a legacy of shafts, adits, glory holes, stopes, mill sites and other features that are potentially dangerous to people and animals. It is estimated that over 300,000 of these mining-related features exist in the state. Of these, the Division estimates that 50,000 are significant physical safety hazards that require some type of securing.

The Division's AML program was created by the Nevada Legislature in 1987 in response to incidents, both fatal and nonfatal, that had occurred at abandoned mines. The Legislature placed the program within the Division and mandated two primary functions enacted by Nevada Revised Statute (NRS), which can be found in Appendix A:

- 1) Establish a program to discover dangerous conditions that result from mining practices that took place at a mine that is now no longer operating; identify the owner or other person responsible for the condition, if feasible; and apply a hazard ranking based on the location and type of feature.
- 2) Develop a public awareness campaign to educate the public about dangerous conditions that exist as a result of historic mining activities.

In 1989, the Nevada Legislature expanded the program to include the responsibility of securing hazardous conditions on open public lands where no claimant or property owner could be identified. These are referred as "orphan" mine openings. The Legislature also provided an opportunity for companies, individuals, and civic groups to voluntarily assist the program in the construction of a fence or other safeguard around a dangerous condition at an abandoned mine opening under a designated Good Samaritan law. (NRS 41.0331, Appendix A).

The AML program is administered under Nevada Administrative Code (NAC) chapter 513, found in Appendix B. Sections 513.320 through 513.360 of the chapter require that hazardous openings be given a hazard ranking based on its location and degree of danger. The Division notifies claimants and property owners of hazardous conditions on their claims or property and informs them of their responsibility to secure the hazards.

The Division also notifies the county board of commissioners of hazardous conditions discovered within their respective counties. The appropriate county is also notified if a claimant fails to confirm the completion of securing to the Division, or fails to make clear their intention to secure hazards within the timeframe specified by the statutes. The county is authorized to take appropriate enforcement action, which may include warnings issued by the county sheriff, securing work performed under direction of the county at the owner's expense, and possible fines of up to \$250 per violation.

No state general funds are used to operate this AML program. It is funded from the following three sources:

1. A \$4 fee collected by county recorders and remitted to the Division for every unpatented mining claim filed or retained on Federal land, (NAC 513.315).
2. A one-time fee of \$20 per acre for every acre of permitted disturbance associated with new or amended mining or exploration plans of operation on public lands (NRS 519A.250).
3. Assistance agreements in place with multiple partnering organizations including the Bureau of Land Management (BLM), the United States Forest Service (USFS), Clark County Real Property, and Clark County Desert Conservation Program, which provide financial assistance to enhance and accelerate both field investigation activities and work performed by staff, contractors, and volunteers to secure hazards.

Collected revenues are used for contracted closures, fencing, and inventory work; field supplies such as fence posts, signs and barbed wire, travel and vehicle expenses; required office supplies, hardware and

software. The revenue is also used to support the AML public awareness program through school presentations, videos, handouts, classroom exercises, and other means of outreach. Table 1 shows the historical revenues received by the Division from each funding source.

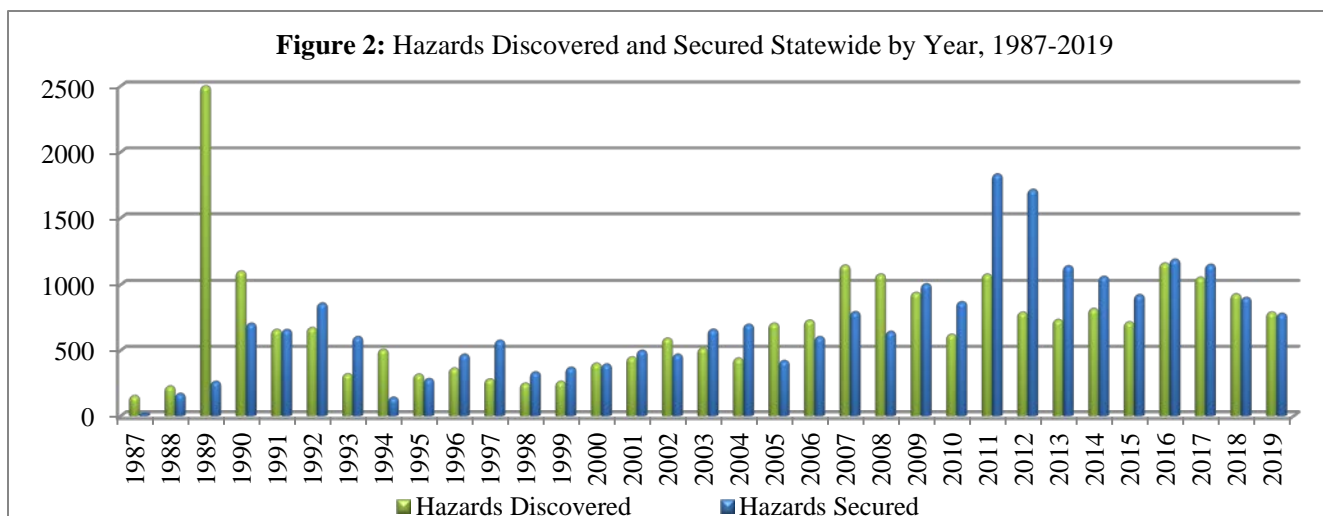
Table 1: Dedicated Revenue to the AML program for the calendar years 2010 through 2019

Year	Assistance Agreements	Mining Claim Fees	Disturbance Fees	Total
2019	\$258,087	\$792,940	\$29,026	\$1,080,053
2018	\$359,910	\$837,688	\$36,630	\$1,234,228
2017	\$137,198	\$802,372	\$84,640	\$1,024,210
2016	\$110,448	\$725,257	\$5,280	\$840,985
2015	\$60,000	\$432,242	\$64,300	\$556,542
2014	\$84,008	\$466,835	\$164,740	\$715,583
2013	\$69,031	\$494,967	\$228,220	\$792,218
2012	\$31,670	\$561,930	\$9,800	\$603,400
2011	\$0	\$481,584	\$139,360	\$620,944
2010	\$75,000	\$463,236	\$41,008	\$579,244

3.a Abandoned Mine Incidents in 2019

There were NO reported abandoned mine injuries or fatalities in 2019. This was the sixth consecutive year without a reported injury or death in Nevada. The first recorded AML incident in Nevada occurred in 1888 when a 14-year-old girl, while chasing her hat that was blowing in the wind, fell down a shaft in Virginia City. She was rescued within an hour by local miners without serious injuries. Appendix C lists a 60-

Figure 2: Hazards Discovered and Secured Statewide by Year, 1987-2019



year history of reported incidents related to abandoned or idle mines.

4. Inventory and Securings

During 2019, the Divisions' AML program surpassed a milestone of 125,000 historic mining related features being inventoried. By the end of 2019, 23,362 hazards have been discovered and ranked, and 101,674 non-hazardous mining features have been characterized. Out of the 23,362 hazards that have been discovered and ranked, 18,576 are currently secured. Figure 2 shows the progression of these securings by year, Table 2 lists hazards by County, and Figure 3 lists all hazards by securing method, 2019 securings by type, and 2019 securings by agency or group.

Each year the Division utilizes its existing AML database and information on the locations of historic mining districts to rank each U.S. Geological Survey 7.5' topographic map within the state to prioritize field work locations. The collection of digital data by tablet, the use of the two Unmanned Aircraft Systems (UAS or drones), and the ranking of field areas has increased the efficiency of the Division's AML field staff.

In 2019, 2,171 hazardous sites were visited for the purpose of completing loggings, securings and revisits and 780 hazards were secured/safeguarded or closed. Of the 780 securings, a total of 540 hazards were safeguarded by fencing or posting, 119 by backfill or polyurethane foam (foam plugged), 118 by bat-compatible closures (BCC), and three were found caved by nature.

Many agencies contribute to the inventory and securing efforts of mine hazards. In 2019, the Division or its contractors accounted for 96% of all hazards inventoried and 58% of all securings in the state, Figure 3. Since 2017, the Division has been responsible for 93% of

all inventories and 55% of all securings within the state. The AML program focuses its securing efforts on "orphan" hazards located on public lands, those not located within an active mining claim. While performing field work, it is the Division's policy to secure a hazard while at the site, if possible, if the feature ranks as a moderate or high hazard, regardless of ownership or land status. This is to safeguard the public from the immediate safety risks. When these securings are on private land or federal land with an active claimant, they are called proactive securings. In 2019, 209 of the 457 Division securings were proactive securings on private lands or federal lands with an active mining claim.

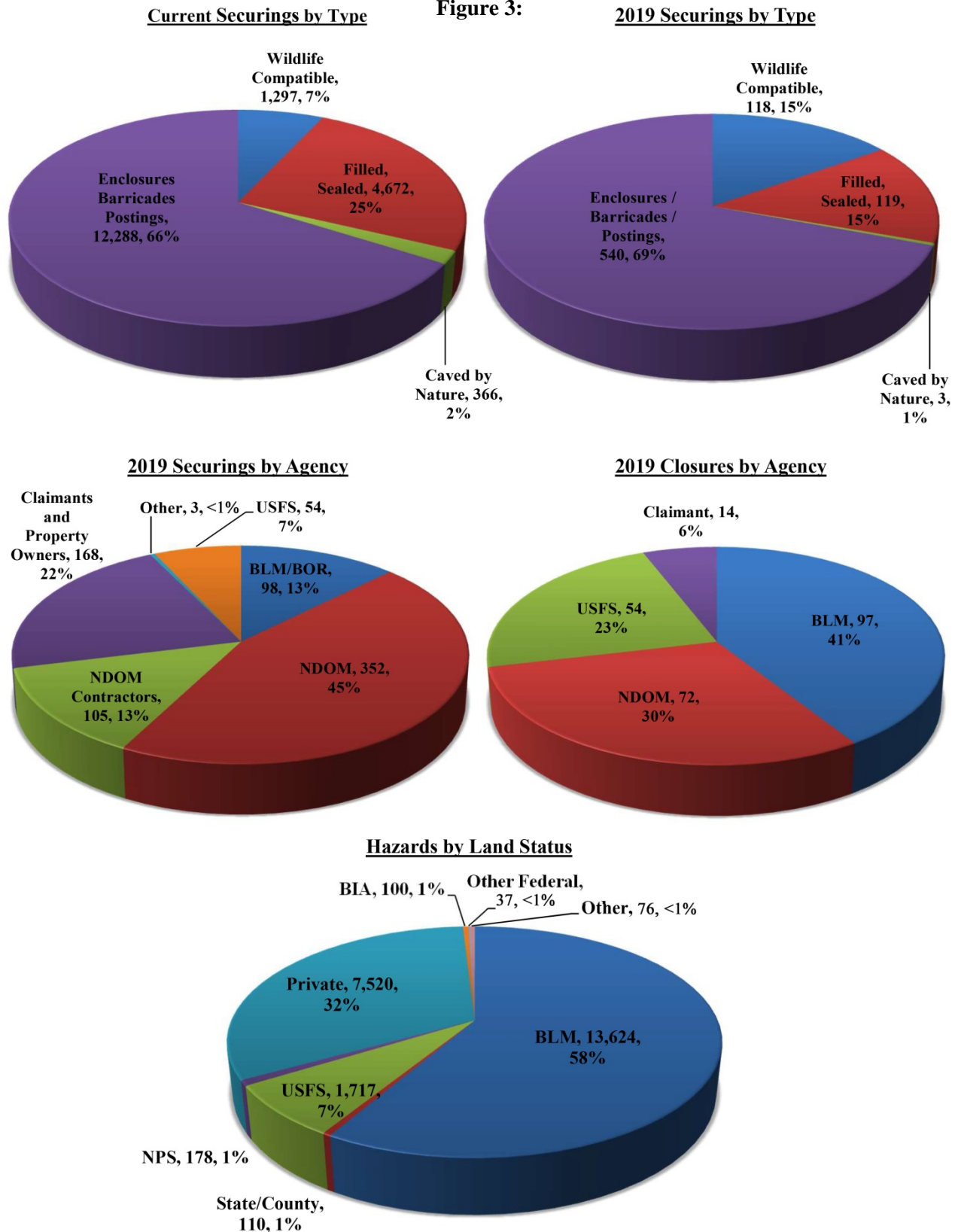
Table 2: Hazards Discovered and Hazards Secured as of December 31st, 2019 by County

COUNTY	SITES DISCOVERED	SITES SECURED	% SECURED
Carson City	76	73	96%
Churchill	901	713	79%
Clark	2,302	2,000	87%
Douglas	216	200	93%
Elko	990	773	78%
Esmeralda	3,645	2,840	78%
Eureka	1,093	891	82%
Humboldt	1,008	826	82%
Lander	753	614	82%
Lincoln	1031	889	86%
Lyon	1,195	1,081	90%
Mineral	2,051	1,588	77%
Nye	3,201	2,437	76%
Pershing	2,005	1,543	77%
Storey	222	207	93%
Washoe	462	417	90%
White Pine	2,211	1,484	67%
TOTAL (Since 1987)	23,362	18,576	80%



Summer intern documenting a hazard securing, Esmeralda County.

Figure 3:



The use of customized digital tablets, which have enabled numerous field efficiencies including increased

data integrity and decreased data entry time, has resulted in more thorough and complete inventory efforts. By using Google Earth and available Light Detecting and Ranging (LiDAR) imagery, staff has been successful at

identifying new areas that need inventory work and as a result have a more complete set of data to use when conducting field investigations. This is most evident when looking at the consistent yearly increase in the recording of non-hazardous features in the Division's AML database, which implies that areas are more thoroughly investigated. In 2019, 16,271 non-hazardous mining features were inventoried by staff and interns via ground, UAS, and helicopter surveys. In contrast, the annual average of non-hazards inventoried over the last ten years was much lower at 6,600 features. An example of this work is depicted in Figure 4, where 2019 summer interns re-visited the Tuscarora area in Elko County to conduct a more complete inventory of non-hazards and hazards than were previously documented in the AML database.

Before the fieldwork was completed in 2019, there were 75 hazards and 139 non-hazards documented

around the town. After 2019 fieldwork, 92 hazards and 1,549 non-hazards are now recorded as inventoried in the area.



An intern inventorying a new hazard in the Tuscarora area, Elko County.

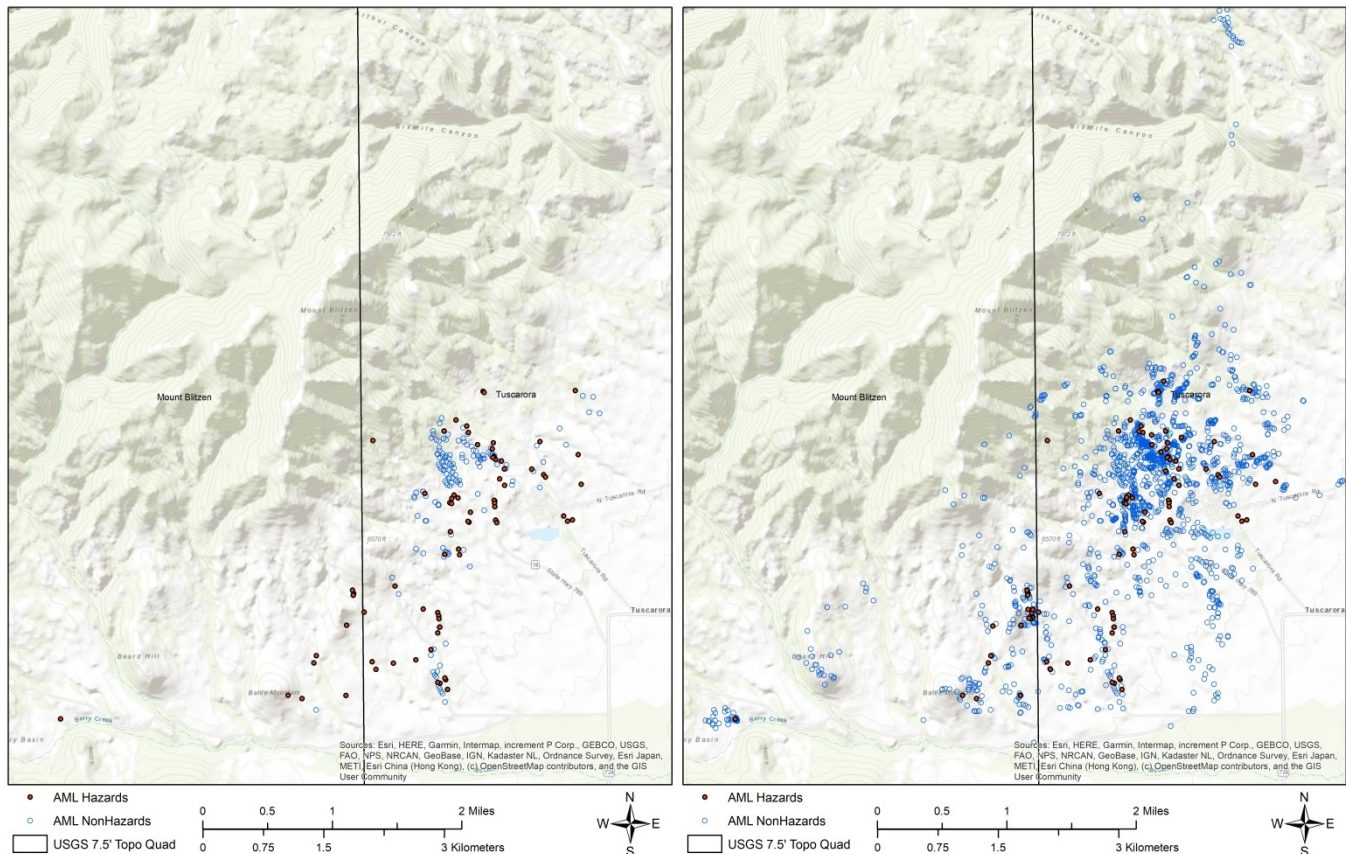


Figure 4: An example of the Division's re-inventorying efforts. The map on the left shows the Tuscarora area pre-2019 and the map on the right shows the same area after the 2019 summer intern fieldwork. An additional 19 hazards were inventoried and 1,413 non-hazardous features were cataloged.

4.a Tonopah NV Point Project

The region directly west of Tonopah was heavily explored in the 1960's trying to locate uranium deposits.

In this area, there are over 4,000 known historic mining features spread over an area of 150 square miles. While satellite imagery showed that the vast majority of the features were likely shallow cuts made by a dozer blade, the imagery resolution was not high enough quality to verify the hazard potential for each feature. The Division estimated that over 95% of the features would be considered to be non-hazardous by the program's standards, but it was likely that several hazardous shafts existed throughout the area.

The project area remained a low priority for years, due to the low ratio of hazard to non-hazard and the significant time required to complete the on-the-ground inventory effort. It was estimated to take six weeks of intern fieldwork at a cost of \$60,000 to complete the project. Recently, the Division evaluated using the newly acquired drones to fly the area but decided that it too would require weeks of flying due to limited battery life and coverage abilities over such a large area. The Division even reached out to a contracting company that

specialized in drone surveys but it was determined that the vast size of the area would require a fixed wing drone, and even then it would take a few weeks to fly. The contracting company recommended using a manned aircraft to complete the job.

In the summer of 2019, the Division created a work plan with its current contractor, Environmental Protection Services (EPS) and the same helicopter company, El Aero Services, that had been utilized in previous closure projects. A digital flight path was developed that would provide sufficient coverage to visually inspect these features from the air. The plan allowed for two days to capture GPS locations and photos for all potential hazards identified during flight. In September, two staff members, one contractor, and the helicopter pilot boarded a helicopter in Carson City, flew to Tonopah and started surveying. After six hours of flying and two refueling stops at the Tonopah airport, the entire 150 square miles were surveyed. Total time consumption for the Division equaled two days of

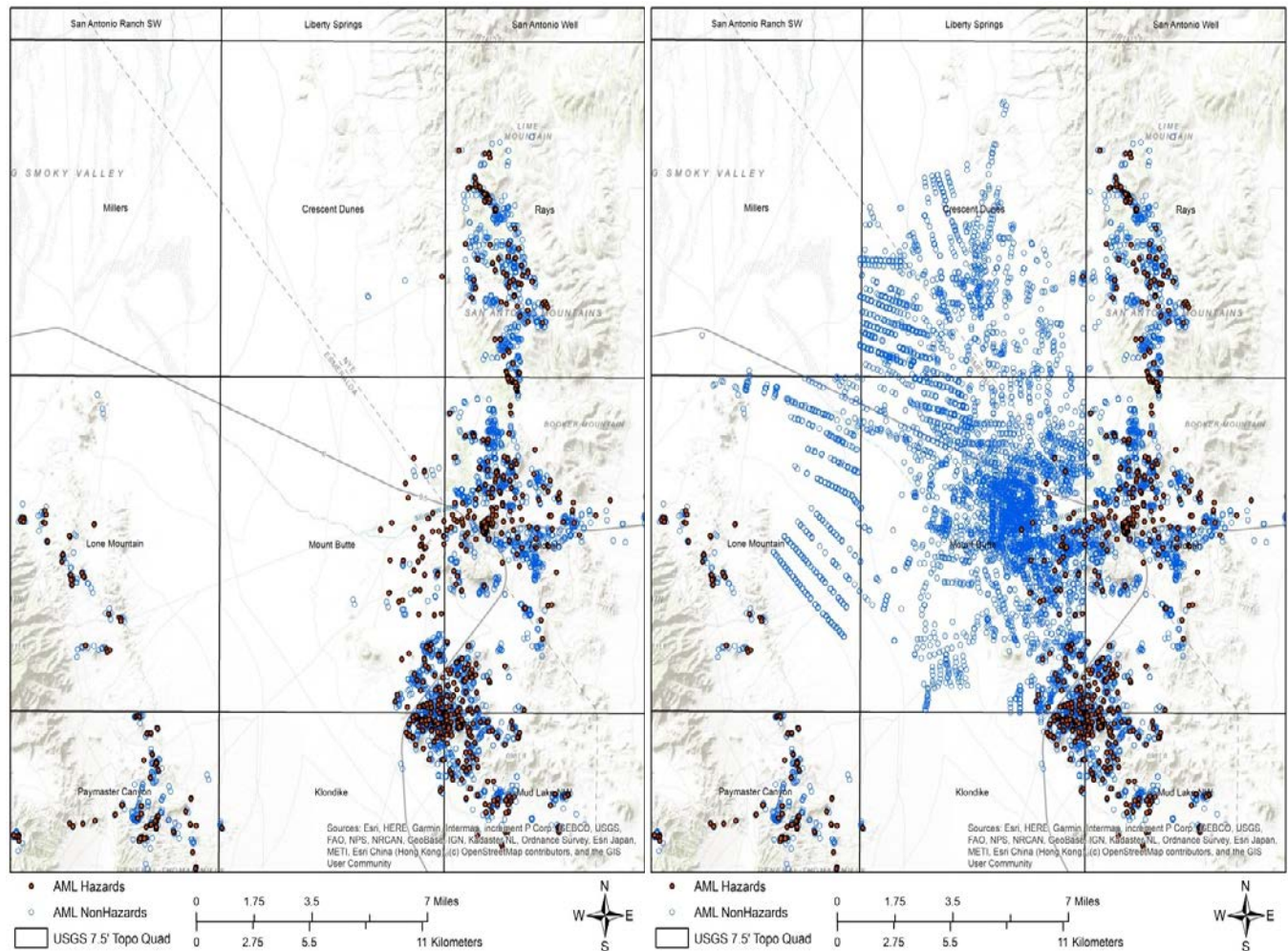
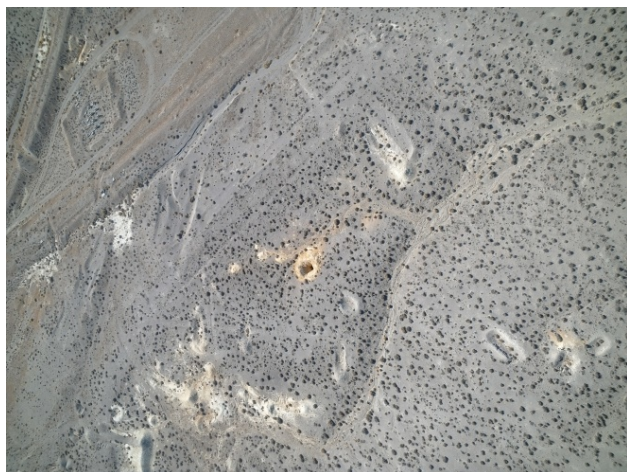


Figure 5: The map on the left shows the Tonopah area before the helicopter survey and the map on the right show after the survey. Each rectangle is a USGS 7.5' topographic map.

planning, one day of flying, and two days of data processing and entry into the AML database.



A view from the helicopter looking at one of the 38 sites west of Tonopah that need investigation on the ground, Esmeralda County.

In total, 4,370 non-hazardous features were inventoried and 38 sites were identified as potentially hazardous that would need further fieldwork. By comparison, the ten year average for non-hazards inventoried by summer interns is 4,200 which was surpassed in one week's work. The total project cost is estimated at \$17,000, which will include the cost to inventory and fence the remaining 38 sites. This work is scheduled for the 2020 field season.

5. Permanent Closure Projects

Hazards permanently secured in Nevada totaled 237 in 2019, including 97 by the BLM, 54 by the USFS, 72 by the Division, and 14 by owners or claimants. Figure 3 shows these closures by agency. Prioritization for permanent closures is based on a risk assessment. This assessment may include a recorded incident, hazard rank and the proximity to public or recreation areas. Hazardous sites might also be considered as permanent closure candidates when exclusionary fencing or barricading have been vandalized repeatedly and are determined to not be a suitable securing method. Permanent closures include backfills, bat-compatible structures, foam plugs or a combination of these methods. Unlike fence or barricade securings, permanent closure of an abandoned mine opening may result in alteration of the landscape and character of the site. Under the guidelines of the National Environmental Policy Act (NEPA), all mine openings proposed for permanent closure on Federal lands must be evaluated for cultural and biological

resource impacts. Closure methods are determined based on the outcome of the biological and cultural resource surveys, as well as the safety risk present at the site.

The biological surveys are conducted by the Nevada Department of Wildlife (NDOW), BLM, or the USFS. In 2019, NDOW surveyed and provided closure recommendations for over 300 mines across the state.

The Division completed six closure projects and started a seventh in 2019. Out of the 237 permanent closures completed throughout the year, 118 were completed as bat-compatible closures. All contracted closure work was completed by Environmental Protection Services (EPS).

5.a Gunmetal Closure Project – Mineral County

The Gunmetal mine is a tungsten mine discovered in 1916 with intermittent operations from the 1920s to the 1950s. The mine was brought to the forefront of prioritization in 2018 when a member of the public reported explosives found inside the complex. The BLM worked with the local bomb squad to have the explosives detonated in place. After all explosives hazards were remediated, the Division worked with the BLM to develop a closure project and received a Categorical Exclusion to perform the closure work, which included 14 total closures of which six were wildlife-compatible closures.

During wildlife surveys completed by NDOW, a total of 14 openings were found to interconnect within the Gunmetal mine complex. Because the complex hosted all types of bat habitat, the wildlife biologist determined which openings were best suited for bat-compatible closures, and the remainder scheduled for foam plugging or backfilling. One pit was scheduled for fencing due to its large size and the difficult terrain. Three of the gates spanned over 20' in width and 15' in height. The backfilling was difficult because of the minimal nearby loose material and bedrock being an abnormally hard garnet-bearing tactite at the openings.

The project started in October of 2018 but was delayed due to early snowfall. Multiple attempts to re-enter the site to continue work were held off by heavy spring snows. EPS was finally able to re-enter the site in May and a total of six bat-compatible closures, four foam plugs, three backfills, and one large pit perimeter fence were completed. The total cost of the project was \$50,464.



A 22' wide by 13' tall bate gate at the Gunmetal Complex, Mineral County.



After photo of a completed polyurethane foam closure with the collar timbers still intact, Washoe County.

5.b Mullen Pass Closure Project – Washoe County

Mullen Pass is part of the Pyramid mining district, which was founded in 1866. Gold, silver, copper, zinc, lead and uranium were mined or prospected within the district. The Division has performed multiple closures in the area over the last two decades and the 2019 the Mullen Pass project finished permanent closures on all known AML hazards on BLM lands within the district.

The district is located in the Virginia Mountain Range of Washoe County, north of Reno and Sparks, an area that has been greatly affected by the increase in population during recent years. The Pyramid district has become a large recreation area for four-wheelers and target shooters. In July 2018, an arson-started wildfire burned over 80 square miles in the Virginia Mountain Range, consuming 10 structures and burning most of the district. In August 2018, the Division revisited all known AML hazards to evaluate the status of previous closures, which included foam plugs that could be susceptible to fire, and to finish inventory to identify all remaining hazards for potential closure. The Division found all previous foam closures to be intact and only two gates with minor vandalism. The Division worked with the local BLM office to receive a Categorical Exclusion to remediate all remaining hazards on BLM lands.

During the wildlife survey conducted by NDOW, the biologist noticed significant owl habitat use inside the features, particularly in the shafts surveyed. Since a majority of the tree roosting habitat for owls was lost due to a recent wildfire, the biologist suggested incorporating owl access in two of the bat-compatible closure designs to protect the remaining habitat.



Bat grate with owl access for roosting, Washoe County.

In total, 23 hazards were gated, foam plugged or backfilled in the Mullen Pass area during 2019, for a cost of \$67,000. Over the past ten years, this brings the total hazards closed by the Division in the district to 68.

5.c Valley of Fire Closure Project – Clark County

The Magnesite mine which is located just inside the boundary of the Valley of Fire State Park in Clark County, was first discovered in 1915 and had some production in the 1930s. The site hazards consist of one large adit and a connecting decline, with a total of a few hundred feet of workings. In 2013, the Division worked with a local Boy Scout to barricade the adit and decline,

however the barricades had been repeatedly vandalized over the years. In 2017, NDOW identified a significant bat colony inside the Magnesite mine.

Wildlife surveys in 2018 confirmed the continued use of the mine by a large colony of yuma myotis bats, along with significant human disturbance, including ATV tracks found inside the mine. The Division and NDOW determined that bat-compatible closures were the best method to help protect the bat habitat and safeguard the mines from the public. The Division inventoried the Valley of Fire Park for additional AML features to include in the project and found one additional adit that did not contain wildlife habitat.



Before photo of Magnesite Mine in Valley of Fire State park, Clark County.

The Division entered into a contract with Nevada State Lands and State Parks that required review from the State Historic Preservation Office before receiving approval to perform the work. In March of 2019, EPS built two bat-compatible gates at the Magnesite mine and foam plugged the third hazard, located at the north end of the park. The existing contract between the Division and Clark County Desert Conservation Program was utilized to fund the gates and the Division paid for the foam closure.

In late summer of 2019, five months after the construction of the gates, NDOW revisited the sites to monitor the bat population and found that the gates had already been vandalized, but not breached. There was even evidence of digging to gain entry underneath the gate but the lowest bar was secured into the bedrock floor preventing access. The wildlife biologist also noticed that people were using the lower gate as a shooting target. After finishing a separate project in Clark County, EPS went to Valley of Fire and repaired the gates, adding

additional vertical angle-iron supports to help protect the closure.



After photo of the main haulage adit at the Magnesite Mine in Valley of Fire State Park, Clark County.

5.d Goodsprings Closure Project – Clark County

The Goodsprings mining district is located in the Spring Mountains southwest of Las Vegas and was discovered by Mormon pioneers in 1855. The district's main commodity is lead, but silver, gold, zinc, copper, cobalt, molybdenum, vanadium, platinum, and palladium have all been mined in the district. Production of lead and silver started in 1856 and resulted in the first hardrock mining district in the state, pre-dating the Comstock in Virginia City by three years. This mining district was home to the first crude lead smelter west of the Mississippi, which was built in 1857. The main production occurred between 1910 and 1920 but intermittent mining continued until the 1950s. Mineral exploration in the district continues even today. Planning for the Goodsprings closure project started in 2008 with the identification of 181 hazards surrounding the historic mining town of Goodsprings.

The closure project planning stage lasted many years due to the need for renewed and detailed ownership research of the hazards. Some of the patented mining claims had not been surveyed in over 100 years, and a

number of hazards were located right on the boundary of the patents. There are over 900 known AML hazards within a 100 square mile region of the Spring Mountains,



Helicopter slinging a load of materials to the portal of one of the Goodsprings project adits. In the foreground are the ore cart rails leading to the ore bin and remnants of an aerial tramway that once led to the bottom of the hill, Clark County.

and more than 400 of those hazards are located on patented lands. The wildlife surveys were contracted by the BLM and over 200 hazards were surveyed from 2008-2010. The BLM worked with its archeological crews to identify culturally significant artifacts and a Categorical Exclusion was issued in 2010.

In total, 207 AML hazards have been backfilled, foam closed, or gated on BLM managed land since 2010. The majority of the closure work was completed by the Bureau of Reclamation's AML closure crew during the winter months from 2010 to 2018. In 2019, EPS continued the closure efforts in the Goodsprings area, closing the remaining 15 sites, of which 13 required helicopter support. While measuring the portal of one adit for a gate, EPS discovered desert tortoise scat and contacted the local NDOW biologist. A tortoise portal was installed at this site to allow access and preserve the habitat of this protected species.



EPS working with very small landing zones and confined work areas, Goodsprings project, Clark County.

The total cost for closure of the 15 hazards was \$79,000 and was funded through a partnership between Clark County Desert Conservation, BLM, and the Division. The area is scheduled to be re-inventoried over the next few winters to identify the remaining hazards that are located on BLM-managed land. These hazards will be part of a future closure project to remediate physical safety hazards in the oldest hardrock mining district in the state.



After photo of a completed gate at the Goodsprings Project, Clark County.

5.e Tonopah Historic Mining Park, Silver Top Headframe – Nye County

The Division coordinated with the Tonopah Historic Mining Park (the Park), the Town of Tonopah, and the State Historic Preservation Office to start the Silver Top headframe restoration project in 2018. The wooden Silver Top headframe was originally constructed 1906 and has started to lean due to weathering of the timbers. In 2017, the Division used a downhole camera to evaluate the integrity of the Silver Top shaft to a depth of 600', beyond that depth debris blocked the remainder of the shaft and inspection was not possible.



Before photo of the Silver Top headframe showing the lean, in October 2018, Nye County.

The Park took the lead in the project and worked with Robison Engineering to develop an engineering plan for dismantling and rebuilding the headframe. In December 2018, the Division utilized its contractor, EPS, to level out the Silver Top waste rock dump for a laydown yard and eventual park viewing area, a process that

required the plugging of three stopes using polyurethane foam to provide a safe working platform.

In 2019, the Park and their contractor, Simerson Construction, removed the headframe, rebuilt it and then placed it back in its original location. This project began initially by personnel climbing the headframe to remove all loose timbering and other materials, then tie-downs were used to hold the headframe in one piece and it was removed by crane. Once the headframe was removed, Simerson replaced rotten timbers, and reconstructed the joints, restoring the structural integrity of the headframe.



The Park's Contractor, Simerson, lifting the reconstructed Silver Top headframe to place on the new foundation, Nye County.

While the headframe was removed and being rebuilt, park staff replaced all rotten timbers found in the top 10' of the shaft and used polyurethane foam between the timbers and the bedrock around the shaft to fill any voids and stabilize the collar. The Park and Simerson Construction then poured concrete around the collar to create a platform and footings for the headframe's new foundation.

The headframe was lifted back into place and re-attached to the new foundation. EPS then built a bat-compatible cupola with removable grates so the park can maintain lighting that will be inserted inside the shaft.

This cupola was treated with acid to give the bars a rustic and weathered appearance.



The Park's Contractor, Simerson, placing the reconstructed Silver Top headframe into place on the new foundation, Nye County.

Now, the 114 year old headframe stands tall and strong, allowing the public to safely look down the 1,200' deep shaft. Additional safety railing and installation of an original manway skip next to the cupola will be completed by the Park in 2020. The total cost to the Division was \$37,000 which covered foaming three stopes, regrading of the dump, concrete work around the collar, and the construction and installation of the cupola.



The bat cupola built by the Division's contractor, EPS, covering the 1,200' deep shaft, Nye County.

5.f Birthday Mine – Humboldt County

The Birthday Mine is located in the National mining district near the border with Oregon in the Santa Rosa Mountains. The district was discovered in 1907 and its primary commodity was gold with peak productions from 1909 to 1917. The Birthday Mine portal was backfilled sometime between the 1930s and 1950s. The mine eventually filled with water and had enough pressure to create a seep at the backfilled portal. This seep acted as a watering source for wildlife and cattle, however the arsenic levels in the seep ranged between 60 and 200

times the drinking water standard maximum contaminant level. From the 1990s through 2012, cattle were periodically found dead near the seep. A necropsy was performed on one of the bulls that died in 2012, determining the cause of death as acute arsenic poisoning.



The view of the Birthday Mine caved portal in the foreground with the 2018 well being drilled in the background, Humboldt County.

As a temporary protective measure an exclusion fence was constructed around the water source in 2013. These efforts temporarily stopped cattle from watering but did not prohibit native wildlife from drinking from the mine water seep.

For many years, the BLM and Nevada Division of Environmental Protection (NDEP) performed site visits, reviewed data and discussed possible solutions but there was insufficient funding for a remediation project. In 2016, NDEP acquired funding to investigate the site further, with the objective of creating a viable remediation design. Site investigations, including geophysical surveys, percolation tests, and water quality analyses continued through 2018. Historical information about the Birthday Mine is scarce, limiting efforts to determine the exact location of the portal and approximate the direction of the adit. Another challenge at the site is its complex land status. The portal is on BLM-managed public lands with the main portion of the mine being located on a private patented mining claim. The USFS also administers a cattle grazing permit encompassing the project. NDEP collaborated with their contractor, Broadbent and Associates, BLM, private property owner, US Army Corps Restoration of Abandoned Mine Sites (RAMS) Program, and USFS in order to be able to move the project forward.

In 2017, NDEP constructed a drill road uphill from the plugged adit so a water monitor well could be

established in the adit. Water monitoring equipment was installed in order to determine the recharge rate within the adit. In 2018, a second well was drilled for a pilot treatment study and successfully pumped and treated approximately 60,000 gallons of water; the estimated amount of water contained within the adit. After evaluation of the pilot treatment study results, an iron terrace system was chosen as the preferred remediation design. This design utilizes the chemistry of the water along with iron-reducing bacteria to encourage iron to precipitate out of the water when it flows over a flat surface. As the iron precipitates, it naturally bonds to the arsenic and forms a hardpan of iron and arsenic. The design required a drain be installed in the adit to transmit the water through the treatment system. The need for the drain necessitated removal of the backfill plug. NDEP collaborated with the Division on planning for the creation of a road into the working area, the removal of adit plug, construction and installation of the culverts needed to channel the waters onto the iron terrace, and the re-fencing of the area once the project was completed.

In 2019, construction began on the treatment system. Before excavating the plug, the adit was drained, the Division's contractor, EPS, was then able to excavate the oversaturated earthen material down to the original working floor of the adit, as indicated by ore cart rails. The design estimated the adit to be open at 20 feet beyond

sufficiently drained. The next morning the culvert was inserted into the adit with a bentonite seal and 30 cubic yards of foam, sealing the opening and forcing all water to flow through the culvert to the iron treatment area.



The completed iron terrace with the interior perimeter fence, Humboldt County.

NDEP and Broadbent constructed the iron terrace passive treatment system and re-contoured the hillside covering the culvert. Once the iron terrace was completed, EPS returned to the site to build an interior fence directly around the iron terrace and repair the original outer perimeter fence. To remove the adit plug, build the iron terrace, and fence the site took approximately six weeks. The Division was able to contribute \$52,000 in funding towards this project resulting in an exceptional example of how multiple agencies and property owners can work together to successfully complete an AML remediation project. Long-term water quality monitoring will determine the effectiveness of the system and provide insight into how often maintenance may be needed.

6. Intern Program

The Division employs college interns majoring in the geosciences to assist with inventorying, revisiting, and safeguarding of AML hazardous features. These interns are trained and supervised by Division staff.

The interns worked 13 weeks of the summer and three weeks of the winter. Interns in this program are trained in field safety, operation of 4WD vehicles, GPS data collection, map reading, and working in teams. The work is very physically demanding and interns camp in the field for extended periods of time. Work is completed independently, with a partner, or as a team.



Left photo: EPS excavating the Birthday Mine. Right photo: The culverts being installed, Humboldt County.

the exterior plug at the portal but excavation continued for a total of 60 feet before the adit was exposed. The adit was left open overnight to ensure any standing water had

Since the inception of the intern program in 2000, it has expanded from two to eight students in the summer and for the past four winters, 4-6 interns have been rehired during their winter break to perform work in southern Nevada. The intern program has been a successful application of providing field experience to college students while achieving the goals and mission of the Division. Since 2013, the intern program has fenced, barricaded, or posted over 3,000 hazards, inventoried nearly 5,000 hazards, cataloged over 41,000 non-hazardous mining features, and revisited nearly 2,000 hazards. Figure 6 shows the accomplishment of the 2019 intern program.



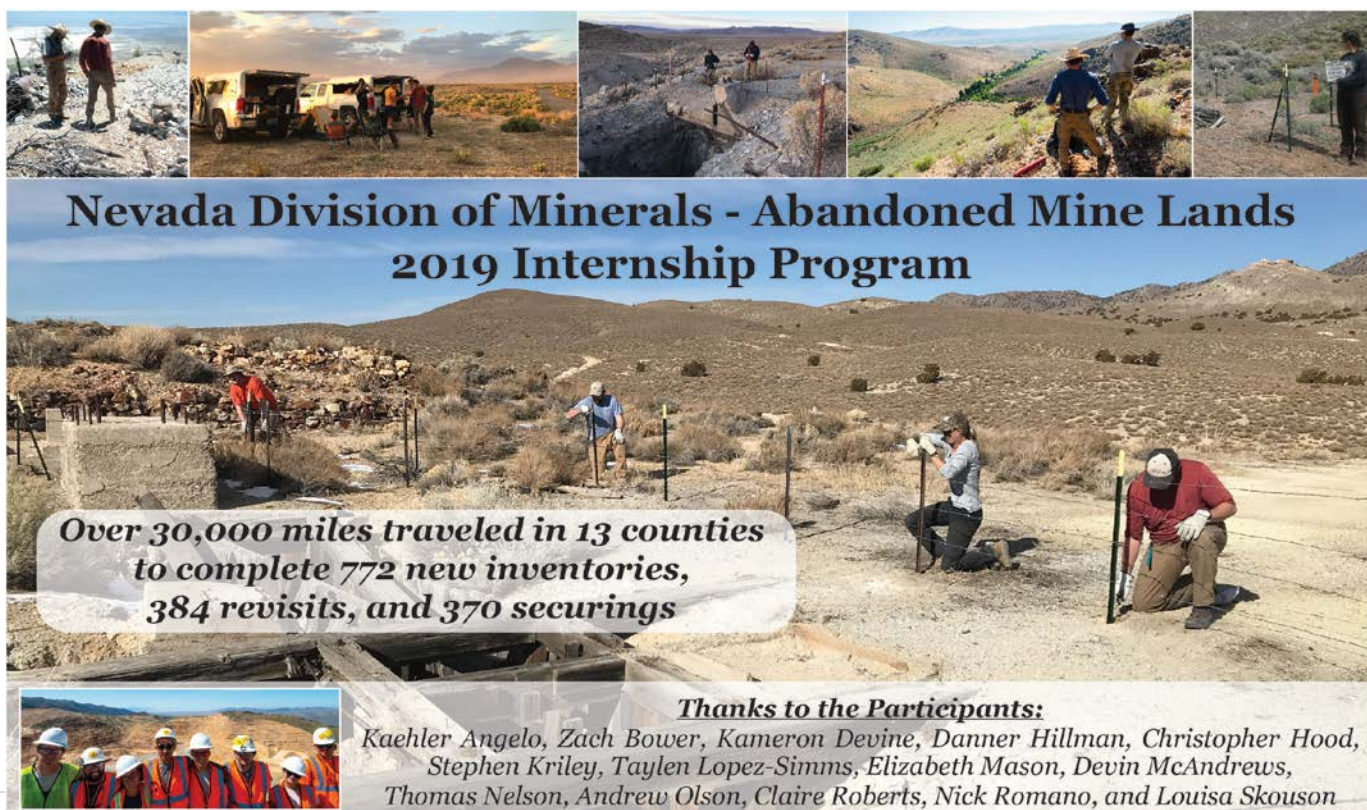
Intern taking securing photos after building an enclosure fence around the inclined shaft, Pershing County.

7. Public Awareness

In the area of public awareness, the Division's AML theme is "Stay Out, Stay Alive". This message is presented to the public through several mediums, including an 11-minute "Stay Out, Stay Alive" video available on the Division's YouTube channel, informational brochures, curriculum guides and classroom material targeting fourth-grade students. These guides have been distributed to every school and library in Nevada, and are downloadable from the Division's website. The classroom material includes an AML exercise detailing Nevada's historic mining legacy. This project-based learning module was developed in cooperation with the Alice Maxwell Elementary School in Sparks and includes applicable Nevada Academic Content Standards.

In 2019, the Division staff gave 327 presentations statewide. "Stay Out, Stay Alive" handouts, bumper stickers, hard hat stickers, buttons, pencils, and other items are distributed at presentations, conferences and other statewide events. Presentations target K-12 student science nights, classrooms, student career fairs, prospector club meetings, professional association meetings, outdoor recreation events, media interviews, and the annual Earth Science Education workshops for teachers.

Figure 6:



8. Performance Indicators

Figure 7 shows the reported incidents by year, and cumulative securings in Nevada since the inception of the program. The Legislatively-approved performance indicators, for the abandoned mine lands public safety program are:

1. Maintain a 70% securing rate, meaning the percentage of secured hazardous mine openings compared to the total number of hazardous mine openings inventoried. The Division finished 2019 with 80% of hazards secured.
2. Maintain a minimum of 18 public awareness and education presentations per year per staff member, including topics concerning the Nevada mineral industry and abandoned mines. The Division staff averaged 43 presentations per staff member in 2019.

9. Current Forecasts

The Division undertook an exercise to re-forecast the estimated amount of time and cost for the AML program to finish inventory, fencing or other safeguarding efforts, and closure of all AML hazards. For this exercise the Division analyzed 33 years' worth of AML data to forecast when inventory efforts of the estimated 50,000 dangerous conditions statewide would be complete.

Securing efforts forecast for this exercise include continued safeguarding of known hazards by fencing and

posting, and sustained work with partner agencies and property owners to perform permanent closures. A growing component of the program is the need to revisit hazards to assess their securing status, and to re-secure hazards, as needed. Fencing and postings are a short-term safeguarding effort and all will eventually need repair or replacement. Even the permanent closure methods need occasional maintenance, particularly bat-compatible closures and foam plugs located near towns and recreation areas. Over the past 10 years, an average of 819 revisits have been conducted per year. The number of needed revisits is expected to grow as the number of hazards being safeguarded every year increases and require maintenance. In 2019, over 20% of all securings were in fact the re-securing of known hazards, Figure 8. The number of re-securings completed has doubled since 2009; by extrapolating this trend it is expected that by 2031 half of all securings statewide will be re-securings.

At current funding levels and with an estimated 50,000 hazards, we forecast it will take the Division's AML program and its partners 37 years to finish inventory efforts, 40 years to finish safeguarding, and 119 years to permanently close 70% of the hazards in the state. The total cost would be approximately \$115,000,000 not factoring inflation, and more importantly it does not incorporate ongoing maintenance or the re-securing of damaged or vandalized fencing and closures. These estimates could change drastically with changes in future funding, or technological innovations that advance inventory or securing efforts.

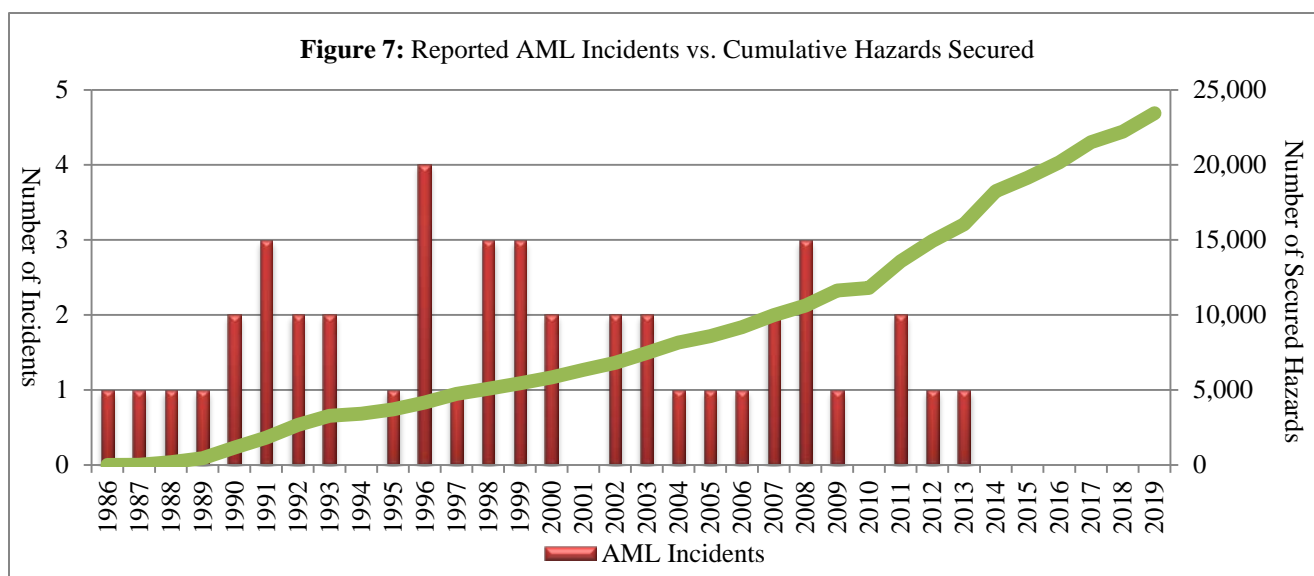
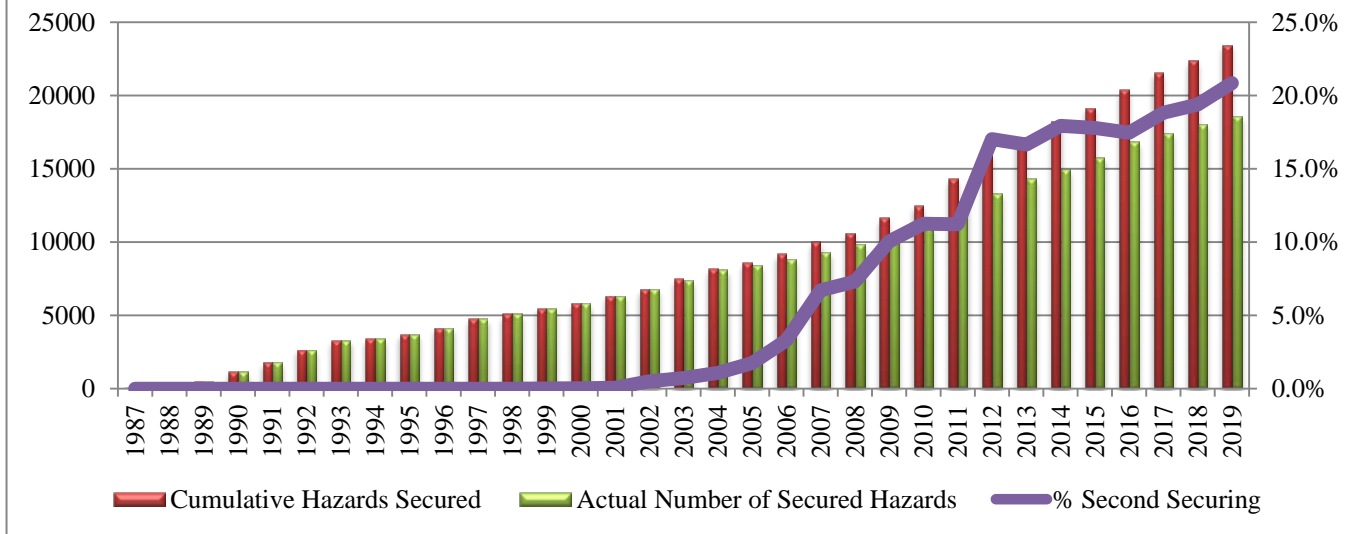


Figure 8: Percentage of Hazards Second Securing by Year

10. Summary

The Division continued its legislative mandate to inventory and secure AML hazards statewide while continuously improving efficiencies within the program. The year 2019 was very productive for the Division's AML program, with above average inventory and securing numbers. The Division continued advancing AML efforts by streamlining field work with digital data collection, incorporating the use of unmanned aerial systems, and improving the field accessible database. Maintaining strong relationships with federal and county land management agencies, the mining industry, and numerous volunteers, proved vital in the advancement of the program. Despite growth in population and increased recreation on public lands in Nevada, there has been a decrease in the number of reported safety incidents from abandoned mine hazards in the state. The efforts of Nevada's AML public safety program have clearly helped save lives and decrease incidents. The public can report hazards using the Report of an Abandoned Mine Hazard form, Appendix D or through the Division's website.

11. Acknowledgements

We would like to recognize: John Callan and the entire Nevada BLM AML team for their commitment and assistance to the State's AML program; Ken Maas, Humboldt-Toiyabe National Forest, for all of his inventory and closure work completed on USFS managed land; the AML crew of the Bureau of Reclamation for their closure work; Jason Williams and the entire NDOW AML team for their statewide biological survey efforts; and Stefanie Ferrazzano and the Clark County Desert

Conservation Program, for their continued partnership in work and funding. Lastly, we would also like to call attention to, and thank, the many claimants and landowners who work with the Division to secure AML sites statewide.



Abandoned mine buildings with a warning message about the mines in the area, Mineral County.

Appendix A

Nevada Revised Statutes (NRS) pertinent to the AML Program

NRS 455.010 Erection of fence or other safeguard around excavation, hole or shaft required. Any person or persons, company or corporation, who shall dig, sink or excavate, or cause the same to be done, or being the owner or owners, or in the possession under any lease or contract, of any shaft, excavation or hole, whether used for mining or otherwise, or whether dug, sunk or excavated for the purpose of mining, to obtain water, or for any other purpose, within this State, shall, during the time they may be employed in digging, sinking or excavating, or after they may have ceased work upon or abandoned the same, erect, or cause to be erected, good and substantial fences or other safeguards, and keep the same in good repair, around such works or shafts, sufficient to guard securely against danger to persons and animals from falling into such shafts or excavations.

NRS 41.510 Limitation of liability; exceptions for malicious acts if consideration is given or other duty exists.

1. Except as otherwise provided in subsection 3, an owner of any estate or interest in any premises, or a lessee or an occupant of any premises, owes no duty to keep the premises safe for entry or use by others for participating in any recreational activity, or to give warning of any hazardous condition, activity or use of any structure on the premises to persons entering for those purposes.

2. Except as otherwise provided in subsection 3, if an owner, lessee or occupant of premises gives permission to another person to participate in recreational activities upon those premises:

(a) The owner, lessee or occupant does not thereby extend any assurance that the premises are safe for that purpose or assume responsibility for or incur liability for any injury to person or property caused by any act of persons to whom the permission is granted.

b) That person does not thereby acquire any property rights in or rights of easement to the premises.

3. This section does not:

(a) Limit the liability which would otherwise exist for:

(1) Willful or malicious failure to guard, or to warn against, a dangerous condition, use, structure or activity.

(2) Injury suffered in any case where permission to participate in recreational activities was granted for a consideration other than the consideration, if any, paid to the landowner by the State or any subdivision thereof. For the purposes of this subparagraph, the price paid for a game tag sold pursuant to [NRS 502.145](#) by an owner, lessee or manager of the premises shall not be deemed consideration given for permission to hunt on the premises.

(3) Injury caused by acts of persons to whom permission to participate in recreational activities was granted, to other persons as to whom the person granting permission, or the owner, lessee or occupant of the premises, owed a duty to keep the premises safe or to warn of danger.

(b) Create a duty of care or ground of liability for injury to person or property.

4. As used in this section, "recreational activity" includes, but is not limited to:

(a) Hunting, fishing or trapping;

(b) Camping, hiking or picnicking;

(c) Sightseeing or viewing or enjoying archaeological, scenic, natural or scientific sites;

(d) Hang gliding or paragliding;

(e) Spelunking;

(f) Collecting rocks;

(g) Participation in winter sports, including cross-country skiing, snowshoeing or riding a snowmobile, or water sports;

(h) Riding animals, riding in vehicles or riding a road or mountain bicycle;

(i) Studying nature;

(j) Gleaning;

(k) Recreational gardening; and

(l) Crossing over to public land or land dedicated for public use.

NRS 455.030 Board of county commissioners to transmit information concerning dangerous condition at mine no longer operating to sheriff or constable; service of notice upon owner or responsible person.

1. If a board of county commissioners receives information from the division of minerals of the commission on mineral resources that there is in the county a dangerous condition that results from mining practices which took place at a mine that is no longer operating, if the information identifies a person responsible for the condition, the board shall transmit this information to the sheriff or the constable of the township where the condition exists.

2. Upon receipt of information pursuant to subsection 1 or upon the filing of the notice, as provided for in NRS 455.020, the sheriff or constable shall serve a notice, in the same manner and form as a summons, upon each person identified as owner or otherwise responsible.

[3:16:1866; B §§ 111; BH §§ 292; C §§ 273; RL §§ 3235; NCL §§ 5632]—(NRS A 1983, 905; 1987, 1869; 1993, 1625; 1999, 3624)

NRS 455.040 Contents of notice; judgment; criminal penalty.

1. The notice served pursuant to subsection 2 of NRS 455.030 must require the person or persons to appear before the justice of the peace of the township where the hole, excavation, shaft or other condition exists, or any municipal judge who may be acting in his place, at a time to be stated therein, not less than 3 days nor more than 10 days from the service of the notice, and show, to the satisfaction of the court, that the provisions of NRS 455.010 to 455.180, inclusive, or the standards established by the commission on mineral resources for the abatement of dangerous conditions have been complied with, or if he or they fail to appear, judgment will be entered against him or them for double the amount required to abate the condition.

2. All proceedings had therein must be as prescribed by law in civil cases.

3. Such persons, in addition to any judgment that may be rendered against them, are liable and subject to a fine not exceeding the sum of \$250 for each violation of the provisions of NRS 455.010 to 455.180, inclusive, which judgments and fines must be adjudged and collected as provided for by law.

[4:16:1866; B § 112; BH § 293; C § 274; RL § 3236; NCL § 5633]—(NRS A 1979, 1476; 1987, 1869; 1993, 881)

NRS 513.094 Additional fee; administrator to establish program to discover dangerous conditions of nonoperating mines; employment of qualified assistant; regulations.

1. An additional fee, in an amount established pursuant to subsection 4, is imposed upon all filings to which NRS 517.185 applies. Each county recorder shall collect and pay over the additional fee, and the additional fee must be deposited in the same manner as provided in that section.

2. The administrator shall, within the limits of the money provided by this fee, establish a program to discover dangerous conditions that result from mining practices which took place at a mine that is no longer operating, identify if feasible the owner or other person responsible for the condition, and rank the conditions found in descending order of danger. The administrator shall annually during the month of January, or more often if the danger discovered warrants, inform each board of county commissioners concerning the dangerous conditions found in the respective counties, including their degree of danger relative to one another and to those conditions found in the state as a whole. In addition, the administrator shall work to educate the public to recognize and avoid those hazards resulting from mining practices which took place at a mine that is no longer operating.

3. To carry out this program and these duties, the administrator shall employ a qualified assistant, who must be in the unclassified service of the state and whose position is in addition to the unclassified positions otherwise authorized in the division by statute.

4. The commission shall establish by regulation:

(a) The fee required pursuant to subsection 1, in an amount not to exceed \$4 per claim.

(b) Standards for determining the conditions created by the abandonment of a former mine or its associated works that constitute a danger to persons or animals and for determining the relative degree of danger. A condition whose existence violates a federal or state statute or regulation intended to protect public health or safety is a danger because of that violation.

(c) Standards for abating the kinds of dangers usually found, including, but not limited to, standards for excluding persons and animals from dangerous open excavations.

(Added to NRS by 1987, 1867; A 1993, 298, 1683; 1995, 579; 1999, 890, 3627; 2001, 66)

NRS 513.103 Account for the Division of Minerals: Creation; sources, lapse and use of money in Account.

1. The Account for the Division of Minerals is hereby created in the State General Fund.

2. The following special fees and money must be deposited in the Account:

(a) All fees collected pursuant to [NRS 513.094](#), [517.185](#) and [chapter 522](#) of NRS.

(b) All money collected pursuant to [NRS 235.016](#).

(c) Any money received by the Division from a county pursuant to [NRS 513.108](#).

(d) All fees collected pursuant to [NRS 534A.080](#).

(e) Any money appropriated to the Division from the State General Fund.

3. No money except that appropriated from the State General Fund lapses to the State General Fund.

4. The money in the Account is appropriated to the Division. The money deposited in the Account pursuant to paragraph (a) of subsection 2, and the interest earned thereon, must be expended for the purposes of administering [chapter 522](#) of NRS and the provisions of this chapter, except for [NRS 513.108](#). The money deposited pursuant to paragraphs (b) and (c) of subsection 2, and the interest earned thereon, must be distributed to the counties pursuant to [NRS 513.108](#), except that portion required to pay the cost of administering the provisions of that section. All interest earned on the Account must remain in the Account.

(Added to NRS by 1983, 2070; A 1985, 303; 1987, 1868; 1989, 141; 1991, 1779; 1993, 111, 1684; 1995, 509)

NRS 513.108 Abatement of dangerous condition of non-operating mines; reimbursement of Division.

1. The board of county commissioners in each county may apply to the Division for money to abate a dangerous condition resulting from mining practices which took place at a mine that is no longer operating.

2. The Division shall, within the limits of the money available pursuant to paragraphs (b) and (c) of subsection 2 of [NRS 513.103](#), provide counties with money to abate such dangerous conditions based on the relative degree of danger of those conditions.

3. If a county which receives money from the Division subsequently receives monetary compensation from the mine owner or other person responsible for the existence of the dangerous condition, it shall reimburse the Division to the extent of the compensation received. Any money received by the Division pursuant to this subsection must be deposited in the Account for the Division of Minerals created pursuant to [NRS 513.103](#). (Added to NRS by 1989, 141; A 1991, 1780; 1993, 1684)

FEE FOR FILING PLAN OF OPERATION

NAC 519A.634 Amount of fee. (NRS 519A.250) The amount of the fee that an operator must pay pursuant to subsection 1 of NRS 519A.250 is \$20 per acre or part of an acre.

(Added to NAC by Commission on Mineral Resources by R069 -99, eff. 8-19-99)

Appendix B

Nevada Administrative Code (NAC) pertinent to the AML Program

DANGEROUS CONDITIONS CREATED BY ABANDONMENT OF MINES

NAC 513.200 Definitions. (NRS 513.094) As used in NAC 513.200 to 513.390, inclusive, unless the context otherwise requires, the words and terms defined in NAC 513.205 to 513.290, inclusive, have the meanings ascribed to them in those sections. (Added to NAC by Commission on Mineral Resources, eff. 12-21-88; A by R069 -99, 8-19-99)

NAC 513.205 “Administrator” defined. “Administrator” means the administrator of the division.
(Added to NAC by Commission on Mineral Resources, eff. 12-21-88) (Substituted in revision for NAC 513.250)

NAC 513.210 “Animal” defined. “Animal” means any member of the bovine, equine, porcine or caprine species as well as dogs, cats or other animals under the restraint or control of a person.
(Added to NAC by Commission on Mineral Resources, eff. 12-21-88)

NAC 513.220 “Commission” defined. “Commission” means the commission on mineral resources.
(Added to NAC by Commission on Mineral Resources, eff. 12-21-88)

NAC 513.230 “Dangerous condition” defined. “Dangerous condition” means a condition resulting from mining practices which took place at a mine that is no longer operating or its associated works that could reasonably be expected to cause substantial physical harm to persons or animals.
(Added to NAC by Commission on Mineral Resources, eff. 12-21-88)

NAC 513.240 “Division” defined. “Division” means the division of minerals of the commission on mineral resources.
(Added to NAC by Commission on Mineral Resources, eff. 12-21-88)

NAC 513.270 “Owner” defined. “Owner” means the owner of real property who is shown to be the owner on records located in the courthouse of the county in which the real property is located.
(Added to NAC by Commission on Mineral Resources, eff. 12-21-88)

NAC 513.280 “Person” defined. “Person” means a natural person.
(Added to NAC by Commission on Mineral Resources, eff. 12-21-88)

NAC 513.290 “Responsible person” defined. “Responsible person” means the owner of a patented claim or the claimant of an unpatented claim.
(Added to NAC by Commission on Mineral Resources, eff. 12-21-88)

NAC 513.300 Scope. The provisions of NAC 513.200 to 513.390, inclusive, apply to all owners or other responsible persons for dangerous conditions on private or public land.
(Added to NAC by Commission on Mineral Resources, eff. 12-21-88)

NAC 513.310 Waiver of provisions. Upon the approval of the administrator, the division may grant a waiver from any provision of NAC 513.200 to 513.390, inclusive, if the waiver does not defeat the purpose of NRS 513.094.
(Added to NAC by Commission on Mineral Resources, eff. 12-21-88)

NAC 513.315 Additional fee. (NRS 513.094) The amount of the additional fee that is imposed on filings pursuant to subsection 1 of NRS 513.094 is \$4 per claim.
(Added to NAC by Commission on Mineral Resources by R069 -99, eff. 8-19-99; A by R199-08, eff. 8-14-2008)

NAC 513.320 Assignment of points to dangerous condition. The administrator or his representative shall assign a dangerous condition one to five points for the location of the condition and an additional one to five points for the degree of danger associated with the condition. The condition must then be ranked according to the total number of points for location and degree of danger.
(Added to NAC by Commission on Mineral Resources, eff. 12-21-88)

NAC 513.330 Rating of location. The location of a dangerous condition must be rated in the following manner:

1. One point must be assigned to a dangerous condition located at least 5 miles from an occupied structure or a public road maintained by some governmental entity.
2. Two points must be assigned to a dangerous condition located between 1 and 5 miles from an occupied structure or a public road maintained by some governmental entity.
3. Three points must be assigned to a dangerous condition located ½ to 1 mile, inclusive, from a town.
4. Four points must be assigned to a dangerous condition located not more than ½ mile from a town or not more than 1 mile from an occupied structure or a public road maintained by some governmental entity.
5. Five points must be assigned to a dangerous condition located within a town or within 100 feet of an occupied structure or a public road maintained by some governmental entity.

The Administrator or his or her representative may assign a different rating to a dangerous condition in a location if other factors affecting accessibility warrant the modification, but the rating for a dangerous condition in a single location may not be scored higher than five points.

(Added to NAC by Commission on Mineral Resources, eff. 12-21-88; A by R127-15, 6-28-2016)

NAC 513.340 Rating of degree of danger. The degree of danger for a dangerous condition must be rated in the following manner:

1. One point must be assigned to a dangerous condition consisting of:
 - (a) A vertical or near vertical hole 8 to 20 feet, inclusive, in depth and highly visible upon approach;
 - (b) An inclined hole less than 50 feet deep from which a person could climb out;
 - (c) A horizontal hole with no associated stopes, winzes or raises; or
 - (d) A high wall of an open pit.
 2. Two points must be assigned to a dangerous condition consisting of:
 - (a) A vertical or near vertical hole 8 to 20 feet, inclusive, in depth which is not visible upon approach;
 - (b) Any vertical or near vertical hole 20 to 50 feet, inclusive, in depth; or
 - (c) Any inclined hole greater than 50 feet deep from which a person could climb out with no associated stopes, winzes or raises.
 3. Three points must be assigned to a dangerous condition consisting of:
 - (a) Any vertical or near vertical hole 50 to 100 feet, inclusive, in depth; or
 - (b) Any horizontal or inclined hole with associated stopes, winzes or raises with less than a 20 -foot vertical opening.
 4. Four points must be assigned to a dangerous condition consisting of:
 - (a) Any vertical or near vertical hole which is at least 100 feet deep and visible upon approach; or
 - (b) Any horizontal or inclined hole with associated stopes, winzes or raises with a vertical opening greater than 20 feet.
 5. Five points must be assigned to a dangerous condition consisting of any vertical or near vertical hole which is at least 100 feet deep and not visible upon approach.
- The administrator or his representative may assign a higher degree of danger to a dangerous condition if other factors such as loose ground or the presence of water increase the danger, but the degree of danger for a single dangerous condition may not be scored higher than five points.
- (Added to NAC by Commission on Mineral Resources, eff. 12-21-88)

NAC 513.350 Dangerous condition causing fatality or injury. Any dangerous condition that has been the cause of a documented fatality or injury must be ranked as a high hazard, regardless of its numerical score.

(Added to NAC by Commission on Mineral Resources, eff. 12-21-88)

NAC 513.360 Ranking of dangerous condition. Dangerous conditions must be rated as follows:

1. A dangerous condition with a total number of 2 or 3 points is a minimal hazard;
 2. A dangerous condition with a total number of 4 or 5 points is a low hazard;
 3. A dangerous condition with a total number of 6 or 7 points is a moderate hazard; and
 4. A dangerous condition with a total number of at least 8 points is a high hazard.
- (Added to NAC by Commission on Mineral Resources, eff. 12-21-88; A by R127-15, 6-28-2016)

NAC 513.380 Period after notification to secure dangerous condition. If notified by the Commission of the existence of a dangerous condition, the owner or responsible person shall:

1. Post within 180 days a warning sign in a prominent location near a dangerous condition ranked as a minimal hazard; and
2. In the manner prescribed in NAC 513.390:
 - (a) Secure within 180 days a dangerous condition ranked as a low hazard;
 - (b) Secure within 120 days a dangerous condition ranked as a moderate hazard; and
 - (c) Secure within 60 days a dangerous condition ranked as a high hazard .

(Added to NAC by Commission on Mineral Resources, eff. 12-21-88; A by R127-15, 6-28-2016)

NAC 513.390 Methods for securing dangerous condition; approval by Administrator to modification of method.

1. Except as otherwise provided in subsection 4, a dangerous condition ranked as a low, moderate or high hazard must be secured by one or more of the following:
 - (a) A barricade or other structure, including, without limitation, a structure consisting of metal posts and four strands of barbed wire, or other durable materials, constructed to prevent a person or animal from accidentally exposing himself or herself to the dangerous condition.
 - (b) Permanently anchored seals constructed of material not subject to rapid decomposition and, if used to secure a vertical opening, strong enough to support the weight of any person or animal.
 - (c) Backfilling so that no void spaces remain.
2. In addition to securing a dangerous condition pursuant to subsection 1, if the dangerous condition ranked as a low, moderate or high hazard is secured only by the method set forth in paragraph (a) of subsection 1, the owner or responsible person must post a warning sign in a prominent location near the dangerous condition. The warning sign must be posted within the period set forth in subsection 2 of [NAC 513.380](#) for securing the dangerous condition.
3. Regardless of the method used pursuant to subsection 1 to secure a dangerous condition, the owner or responsible person shall maintain the integrity of that structure.
4. The Administrator or his or her representative may approve the modification of a method of securing a dangerous condition to accommodate features or characteristics that are specific to the location of the dangerous condition.

(Added to NAC by Comm'n on Mineral Resources, eff. 12-21-88; A by R127-15; 6-28-2016)

Appendix C

Table 1: History of Nevada AML Incidents Since 1961

Date	Incident	County
Sep. '13	17 year old male received minor injuries in fall down 60-foot deep mine shaft (rider on motorcycle)	Lyon
Nov. '12	Adult male (33) received moderate injuries after falling 35' down a winze	Clark
Jul. '11	Dog fell down shaft, rescued 8 days later	White Pine
Mar. '11	Adult male (28) suffered fatal injuries after falling 190 feet down a shaft	Pershing
May. '09	Dog fell down inclined shaft, rescued 10 days later	Esmeralda
Oct. '08	Adult male (62) suffered fatal injuries after falling 60' down a winze	Lyon
Sep. '08	Dog reportedly fell down 100' shaft, not recovered	Washoe
Aug. '08	Adult male (58) injured in 50' fall down inclined winze	Esmeralda
May. '07	Adult male (mid-20's) injured in fall down ~200' inclined winze	Clark
May. '07	Adult male (63) suffered fatal injuries after rolling his jeep ~450' into the Loring Pit in Virginia City	Storey
May. '06	Dog rescued from 22 foot-deep mine shaft	Washoe
May. '05	Woman of unknown age, received cuts and bruises from fall down a 35 ft. winze	Carson
Apr. '04	30 year-old man received moderate injuries from fall down 25 ft. winze near Las Vegas	Clark
Jan. '03	Dog fell down shaft	Humboldt
Jan. '03	62 year-old man received minor injuries from fall down 25 ft. winze (same as 10/2002)	Clark
Oct. '02	37 year-old CA male received severe injuries from fall down 25 ft. winze	Clark
Jul. '02	41 year-old male drowned swimming in open pit lake	Storey
Dec. '00	Dog rescued from fall down 60 ft. winze. Minor injury to hip	Pershing
Nov. '00	Dog rescued from fall down 40 ft. mine shaft. Moderate injury to hip	Storey
Oct. '99	Adult male (62) killed in mine cave-in	Lyon
Oct. '99	Female juvenile (11) killed in fall down 130 ft. deep mine shaft near Beatty	Nye
Jun. '99	Male juvenile (15) drowned swimming in open pit lake	Lander
Oct. '98	Two male adults seriously injured in fall down 50 ft. winze near Las Vegas	Clark
Sep. '98	Dog rescued from 20 ft. deep mine shaft	Douglas
Jul. '98	Male adult (20's) slightly injured in fall down mine winze in Brougner Divide Mine near Tonopah,	Esmeralda
Apr. '97	Two male adults (50's) injured in fall down hand dug well in town of Luning	Mineral
Oct. '96	Male juvenile (16) injured in fall down 19 ft. deep hole in concrete at American Flats millsite	Storey
Sep. '96	Two male adults (35) killed in mine adit near Virginia City by suffocation	Storey
May. '96	Male adult (44) fatally injured in fall off ATV at American Flats millsite	Storey
Mar. '96	Male adult (31) injured in fall down mine winze on west side of Las Vegas	Clark
Jun. '95	Male adult (30) killed scuba diving in mine shaft filled with water at the old Crown Copper Under	Humboldt
Nov. '93	Dog rescued from 30 ft. deep mine shaft near Iron Mtn. Estates	Storey
Jan. '93	Dog rescued from 25 ft. deep shaft	Humboldt
Oct. '92	Male adult (27) news reporter injured in dynamite blast at Happy Creek in the Jackson Mountains	Humboldt
Sep. '92	Female adult (28) injured (cuts and bruises) in fall down mine shaft Hot Springs Mtn.	Douglas
Dec. '91	Male adult (44) killed in fall down a mine winze at an abandoned copper mine in the Malachite	Lyon
May. '91	Male juvenile (13) injured (minor) in fall down 20 ft. deep mine shaft	Washoe
Feb. '91	Male adult (40) killed in fall down mine winze	Douglas
May. '90	Dog killed in mine shaft at the MGL Mine near Winnemucca Dry Lake	Pershing
Mar. '90	Male juvenile lost for 19 hours in mine shaft at Mizpah mine in Tonopah	Nye
Sep. '89	Male adult seriously injured in fall down a mine winze near Henderson	Clark
Sep. '88	Body of elderly male found at bottom of mine shaft	Lyon
May. '87	Female child (5) injured in fall down 35 ft. deep mine shaft	Washoe
Feb. '86	Young adult male (20) killed in fall down a mine winze	Lyon
Apr. '79	Two teenagers killed in fall down mine shaft at the Oest Mine	Lyon
Dec. '78	Juvenile killed in fall down mine shaft (Ninety-Nine Mine), body never recovered	Clark
Apr. '75	Two male juveniles killed when motorcycles fell into mine shaft near Searchlight	Clark
May. '71	Male juvenile (15) injured in fall down 200 ft. deep mine shaft on Duck Hill	Carson
Nov. '70	Male juvenile (12) injured in fall down 110 ft. deep mine shaft	Washoe
Jan. '61	Male juvenile (15) injured in 50 ft. fall down mine ventilation shaft	Storey

Appendix D

State of Nevada
Abandoned Mine Lands
Report of Abandoned Mine Land Hazard

Person Reporting the Hazard:

Name: _____

Please keep my name confidential: ☐

Phone #: _____

E-mail: _____

Date Found: _____

County Hazard is Located In: _____

Hazard Location _____ UTM E/Long. _____ UTM N/Lat.

(Coordinate Type - Select One): ☐ UTM NAD27 ☐ UTM NAD83 (WGS84)

☐ Longitude/Latitude ☐ Do Not Know

☐ Photo or Image of Hazard is Enclosed/Attached

Additional Comments or Information (if desired):

Please send this form along with any photos (If available) to:

Attention: Abandon Mine Lands
Nevada Division of Minerals

400 W. King St. #106

Carson City, NV 89703

Phone: 775-684-7040

Fax: 775-684-7052

Email: ndom@minerals.nv.gov

or

or

or

375 E. Warm Spring Rd. #205

Las Vegas, NV 89119

702-486-4343

702-486-4345

ndomlv@minerals.nv.gov