

**REMOVAL ACTION MEMORANDUM**  
**TIME-CRITICAL REMOVAL ACTION**  
**MAMMOTH STAMP MILL SITE**  
**INYO NATIONAL FOREST**

**I. PURPOSE**

The Mammoth Stamp Mill Site (“Site”) is located solely on National Forest System Lands under the jurisdiction, custody and control of the U.S. Department of Agriculture, Forest Service (“Forest Service”), within the Mammoth Ranger District, Inyo National Forest, Mono County, California. The Forest Service is conducting response actions at the Site pursuant to its lead agency authority under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended under the Superfund Amendments and Reauthorization Act (SARA), 42 U.S.C. 9601 et seq., and Executive Order 12580.

The purpose of this Removal Action Memorandum (AM) is to document the selection of a time-critical removal action to address the presence and continuing release of antimony, arsenic, barium, cadmium, cobalt, copper, lead, mercury, selenium, silver, and zinc from the mill tailings and mill waste piles at the Site. The situation at the Site meets the criteria for a time-critical removal action under Section 300.415 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This decision document presents the Forest Service’s selected removal response action for the Site, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. 9601 et seq., and, to the extent practicable, the NCP. The AM is based upon the administrative record for the Site.

This time-critical removal action involves no nationally significant or precedent setting issues. This removal action will not establish any precedent for how future response actions will be taken and will not commit the Forest Service to a course of action that could have a significant impact on future responses or resources.

**II. SITE CONDITIONS AND BACKGROUND**

**A. Site Location**

The Site, is a former gold ore processing facility dating from the late 1870s. It is within the town of Mammoth Lakes in Mono County, California, about 4 miles east of Highway 395, at an elevation of 8,370 feet above mean sea level. [Figure 1](#) shows the site location and surrounding area.

The site is located within an area historically known as “Mill City,” because of the past gold mining activity in the region ([Forest Service, 2014](#)). The Site is within the geographic boundaries of the town of Mammoth Lakes, California, and is found in the northeast quarter

of the northeast quarter of Section 9, Township 4 South, Range 27 East of Mt. Diablo Meridian. It is represented on the Bloody Mountain Quadrangle 7.5-Minute Series topographic map (U.S. Geological Survey [USGS], 1994). The Site can be accessed from Old Mammoth Road, either at the end of the Mill City Tract or from the Mary Townsend grave site trailhead (Forest Service, 2014).

## **B. Site Characteristics**

The Site includes the remnants of the Mammoth Mining Company Stamp Mill, most notably the iron flywheel, five waste piles and a dry diversion ditch that connects to a flowing perennial tributary to Mammoth Creek. A portion of the Forest Service's Mill City Recreational Cabin Tract is located within the Site. Figure 2 shows the Site features. The remnants of the Mammoth Stamp Mill including the fly wheel, diversion ditch, and waste piles are potentially historically significant and may be eligible for the National Register of Historic Places.

The Site drains to a perennial tributary which flows to Mammoth Creek, which runs north-northeast along the eastern edge of the site. Mammoth Creek flows eastward through the town of Mammoth Lakes. The creek name changes to Hot Creek east of Highway 395, and eventually flows into the Owens River and into a series of playa lakes. Sensitive habitats have not been previously identified at or downstream of the site.

The former mill building and the waste piles are located west of the Mill City Tract, a collection of privately owned recreational cabins built on land owned by the Inyo National Forest and leased to the cabin owners. The Mill City Tract is accessed by Mill City Tract Road, to the south of Old Mammoth Road. The Site is populated during the summer months, primarily on weekends and is a popular destination for hikers because of interest in the historic mill foundations and flywheel. A trail passes between the mill and the waste piles, identified by a sign southeast of the Site as "main trail" (Figure 2). The closest recreational cabins (7, 8, 9, 12, 13, and 26) are located within 100 feet of the waste piles and are accessible via an unpaved road by two-wheel drive vehicles. The waste piles and mill remnants are accessible on foot.

Based on site reconnaissance, the Site consists of two sub-areas with different current uses: the Mill Area consists of the waste piles and mill remnants, and the Cabins Area consists of Cabins 7, 8, 9, 12, 13, and 26 and cabin grounds, which are downgradient from the Site. Cabin 29 was not considered part of the Cabins Area because it is located on the east side of the tributary, thus it is not downgradient from the Site. The two sub-areas are shown on Figure 2.

## **C. Operational History**

Mining in the area of the Site began in the late 1870s. During this period, ore was extracted from claims to the southwest of the Site at the Old Mammoth Mine. The Mammoth Mining Company purchased and consolidated five of the claims and needed a nearby mill to process the ore (Caldwell, 1990). Ore from the Mammoth area was considered a complex ore, containing both gold and silver at economically viable concentrations (Caldwell, 1990). The Mammoth Stamp Mill was constructed in 1878. Stamp mills, such as the Mammoth Mill, depended on the use of mercury to separate gold and silver from ore that had been crushed in

the stamp mill. The process involved breaking the ore from cobbles and boulders into smaller particles, ranging in size from coarse sand to silt. Particles were suspended in water to which mercury was added; the slurry was then passed over a corrugated surface or was otherwise agitated (Meyerriecks, 2003, as cited in Forest Service, 2014). The gold or silver and mercury would amalgamate to form a paste. This amalgam was then heated to evaporate and recover the mercury and leave the gold or silver (Meyerriecks, 2003, as cited in Forest Service, 2014). Tailings left over from this process were typically deposited near the mill site and allowed to dry. Tailings commonly have significantly elevated concentrations of mercury, because not all mercury was recovered or reused during processing. The ore from the mine was slid down a chute of about 1000 feet to the valley below, and thence carried by tramway for a quarter mile to the mill (Figure 3). In July of 1880 it was reported that the mill was operating at its full capacity with 40 stamps; the whole machinery being run by waterpower alone, with supply sufficient enough to run the 40 stamps, 16 pans, and 8 settlers with quite a stream flowing down the waste ditch. The mill is crushing 75 to 80 tons daily. (Mining and Scientific Press, July 17, 1880).

After 1881 there were no historical records showing operation of the Mammoth Stamp Mill per se, but in the 1888 Annual Report of the State Mineralogist it was mentioned that parties who were presently engaged in extracting and milling ores from the Mammoth Mine were also re-working the tailings from the old Mammoth Stamp Mill. “No provision had been made to save the pyritic minerals in the tailings from the Mammoth Stamp Mill. Samples of these tailings have given high assay returns of gold and silver; and such tailings are now being concentrated on blanket sluices by the parties who are presently engaged in extracting and milling ores from this mine.” (California State Mining Bureau, Eighth annual Report of the State Mineralogist year ending October 1, 1888)

#### **D. Release or Threatened Release into the Environment of a Hazardous Substance, or Pollutant or Contaminant**

The contaminants of potential concern (COPC) - antimony, arsenic, barium, cadmium, cobalt, copper, lead, mercury, selenium, silver, and zinc – are potential hazardous substances or pollutants or contaminants as defined by sections 101 (14) and 101 (33) of CERCLA, as amended, 42 U.S.C. Section 9601(14) and (33).

The PA/SI originally compared concentrations of the COPC’s to background threshold values and to industry accepted screening levels. Figure 4 illustrates the location of the soil and sediment samples and whether the sample concentrations exceeded these screening levels. Due to the close proximity of recreational cabins to the site, the PA/SI was expanded to include a Streamlined Human Risk Assessment. The Streamlined Human Risk Assessment for the recreational cabin occupant receptor was further refined in a companion technical memorandum to reflect site specific usage patterns. Data regarding the nature and extent of mill-waste contamination at the Mammoth Stamp Mill are compared to the Risk-Based Concentrations (RBCs) developed for the Recreational Cabin Occupant Receptor as part of the Streamlined Human Risk Assessment (ERRG, 2017) are summarized in Table 1.

Data regarding the nature and extent of mill-waste contamination compared to Ecological Screening Levels are summarized in [Table 2](#).

**TABLE 1: SUMMARY OF COPC CONCENTRATIONS COMPARED TO RBCs FOR HUMAN HEALTH**

COPC	RBC Soil (mg/kg) or BTV* LSL**	Mill Area Soil Conc (mg/kg)		Cabin Area Soil Conc (mg/kg)		Ditch Soil Conc (mg/kg)		Tributary Sediment Conc (mg/kg)	
		Min	Max	Min	Max	Min	Max	Min	Max
Antimony	92	ND	230	ND	5.8	0.26	6.2	0.24	0.34
Arsenic	13.3*	4.4	210	3.1	39	5.7	50	36	50
Lead	280**	5.6	2,500	2.7	240	4.2	360	7.0	7.2
Mercury	31	0.61	2,200	0.62	140	0.5	740	2.6	2.9

**Notes:**

\* BTV=Background Threshold Value. The BTV will be used as clean up level for this removal action when the BTV is greater than the RBC.

\*\*LSL=Lead Screening Levels based on CalEPA blood lead model (CalEPA, 2011)

The estimated quantity of soils or sediment that exceed either the Human Health RBCs, BTV, or LSL as shown in Table 1 for each subarea are summarized below.

Mill Area: The total estimated quantity within the waste piles is 4290 CY. Additional impacted soils within the Mill Area not included in the Waste Piles is estimated at 1900 CY.

Cabin Area: The quantity of impacted soils within the Cabin Area is estimated at 3300 CY.

Mill Diversion Ditch: The quantity of impacted soils within the Mill Diversion Ditch Area is estimated at 19 CY.

Perennial Tributary of Mammoth Creek: The quantity of impacted soils within the perennial tributary is estimated at 45 CY.

Total estimate of contaminated soils at the site is approximately 9554 CY. These quantities are estimated and the full extent of contamination has not yet been determined.

**TABLE 2: SUMMARY OF COPC CONCENTRATIONS COMPARED TO ECOLOGICAL SCREENING LEVELS**

COPC	RBC Soil (mg/kg)	Mill Area Soil Conc (mg/kg)		Cabin Area Soil Conc (mg/kg)		Ditch Soil Conc (mg/kg)		Tributary Sediment Conc (mg/kg)	
		Min	Max	Min	Max	Min	Max	Min	Max
Antimony	0.27	ND	230	ND	5.8	0.26	6.2	0.24	0.34
Arsenic	18	4.4	210	3.1	39	5.7	50	36	50
Barium	330	76	1300	49	720	26	400	38	81
Cadmium	0.36	0.083	2.4	0.017	1.3	0.17	1.4	0.18	0.22
Copper	28	6.7	240	5.1	45	2.5	85	5.1	5.2
Lead	11	5.6	2500	2.7	240	4.2	360	7.0	7.2
Mercury	8	0.61	2,200	0.62	140	0.5	740	2.6	2.9
Selenium	0.52	ND	14	ND	0.59	ND	2	0.53	0.7
Silver	4.2	0.098	140	ND	19	0.23	19	0.66	1.1
Zinc	46	34	570	20	130	19	140	25	33

**E. NPL Status**

The Mammoth Stamp Mill Site is not listed on the National Priorities List nor has the Site been proposed for the NPL.

**F. Maps, Pictures and Other Graphic Representations**

- Figure 1: Site Location and Vicinity Map
- Figure 2: Site Features (Current)
- Figure 3: Map of Lake District (circa 1878)
- Figure 4: Soil and Sediment Sample Results

**G. Other Actions to Date**

Pursuant to the authority found at 42 U.S.C. 9604(a) and in Executive Order 12580, the Forest Service has initiated actions to respond to the above mentioned release of hazardous substances. The Forest Service has implemented a response in accordance with the NCP time critical removal process, which has included the following:

- *Removal Preliminary Assessment*, completed in January, 2014 by Forest Service On-Scene Coordinator.
- *Preliminary Assessment/Site Investigation (PA/SI)*, completed in November, 2016 by Engineering/Remediation Resources Group, Inc.
- *Potentially Responsible Party Search, Final Report, Mammoth Stamp Mill*, (PRP Search), completed in June, 2016 by TLI Solutions, Inc
- *Technical Memorandum for Refinement of Streamlined Human Risk Assessment, Mammoth Mining Company Stamp Mill Site, Inyo National Forest, Mono County, California*, completed on January 23, 2017 by Engineering/Remediation Resources Group, Inc.

#### **H. State and Local Authorities Role**

This AM will be provided as formal notification to State and Local authorities who otherwise do not, at this time, have an active role in the response actions for the Site. State and local authorities have informally been kept apprised of Forest Service plans for the Site through Community Relations and Public Outreach.

The Site and the milling activities conducted at the Site were located on National Forest System lands pursuant to the 1872 Mining Law. As such, the Forest Service is neither the owner or operator of the Site pursuant to CERCLA. The Forest Service is conducting response actions at the Site pursuant to its lead agency authority under CERCLA and Executive Order 12580. Pursuant to 42 U.S.C. Section 9621(e); and 40 C.F.R. Section 300.400(e), no Federal, State or local permits are required for the on-site portion of this removal action.

### **III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES**

#### **A. Threats to Public Health, or Welfare or the Environment**

The release of hazardous substances from the drainage emanating from the Site supports the determination that it poses threats to public health, welfare and the environment and that it is appropriate to implement the response actions described in this AM. In accordance with Title 40 Code of Federal Regulations, Part 300, Section 415 (40 CFR 300.415), the following conditions indicate that removal action is warranted for the Site:

- i. Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby human populations, animals, or the food chain;**
  1. Public Health and Welfare: The elevated concentrations of antimony, arsenic, lead and mercury found in the Site waste piles, soils, and sediment indicate that the air and soil (inhalation and ingestion) human exposure pathways exists. There are 6 recreational cabins within the Site impacted by contaminants from the historic mill

operation. Contaminant concentrations in the soils in the vicinity of the cabins are 39 mg/kg for arsenic and 140 mg/kg for mercury. The contaminant concentrations in soils in the diversion ditch that runs between cabins 9 and 26 are 50 mg/kg for arsenic, 360 mg/kg for lead, and 740 mg/kg for mercury. All occupants of the 26 cabins within the Mill City Tract recreate within the area of impacted soils; mill area, cabin area and diversion ditch/tributary area.

The Mammoth Stamp Mill is a historic site and is a very popular tourist destination. The access trail to the Site goes through the mill waste piles creating a direct exposure to the metals-impacted soil by visitors and recreation cabin occupants with contaminant concentrations of 230 mg/kg for antimony, 210 mg/kg for arsenic, 2,500 mg/kg for lead, and 2,200 mg/kg for mercury. Studies have indicated the following health effects of exposure to antimony, arsenic, lead, and mercury:

- a. Antimony. Respiratory effects, such as inflammation of the lungs, chronic bronchitis, and chronic emphysema are associated with long term inhalation exposure.
  - b. Arsenic. Gastrointestinal irritation, neuropathy, skin lesions, vascular disease, and deaths due to cardiopulmonary collapse (acute dose).
  - c. Lead. Neurological and central nervous system effects and hematological and kidney effects (with higher susceptibility in children).
  - d. Mercury. Effects of inorganic mercury compounds are skin rashes and dermatitis, mood swings, memory loss, mental disturbances, and muscle weakness.
2. Threats to the Environment: Ecological receptors could become exposed to site contaminants through direct contact with mill waste contaminated soils and sediments; ingestion of mill-waste contaminated soils and sediments; and ingestion of contaminated food (e.g., sediment-or soil-dwelling insects, vegetation)

**ii. Actual or potential contamination of drinking water supplies or sensitive ecosystems;**

The entire Site drains either overland or through the diversion ditch to a tributary of Mammoth Creek. Sediment within the tributary downstream of the Site contains elevated metal concentrations of antimony, arsenic, and lead, indicating metals have been released to sediment that has the potential to migrate downstream to Mammoth Creek. Mammoth Creek flows through the town of Mammoth Lakes to Hot Creek. Hot Creek flows into the Owens River and then into Crowley Lake. Crowley Lake is a primary water supply for the Los Angeles area, representing 50% of the water entering the Los Angeles-Owens River Aqueduct ([California Trout, Inc., 2014](#))

**iii. High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate;**

1. Human Health and Welfare: Elevated concentrations of antimony (230 mg/kg), arsenic (210 mg/kg), lead (2500 mg/kg) and mercury (2200 mg/kg) in mill-waste contaminated soils which exceed risk based human health exposure thresholds are present in exposed un-vegetated soils at the Site. These contaminated soils are susceptible to migration because of water- and wind-borne influences. Evidence of migration of these mill-contaminated soils into water bodies has been documented based on elevated levels of arsenic (50 mg/kg) in downstream sediments.
2. Threats to the Environment: Elevated concentrations of antimony (230 mg/kg), arsenic (210 mg/kg), barium (1300 mg/kg), cadmium (2.4 mg/kg), copper (240 mg/kg), lead (2500 mg/kg), mercury (2200 mg/kg), selenium (14 mg/kg), silver (140 mg/kg), and zinc (570 mg/kg) in mill-waste contaminated soils which exceed ecological soil screening levels are present in exposed un-vegetated soils at the Site. These contaminated soils are susceptible to migration because of water- and wind-borne influences. Evidence of migration of these mill-contaminated soils into water bodies at levels that pose a potential threat to the environment based on elevated levels of antimony (0.34 mg/kg), arsenic (50 mg/kg) and selenium (0.7 mg/kg) in downstream sediments.

**iv. Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;**

Mill-waste contaminants are present in un-vegetated soils at the Site and exposed to the elements. The Site drains to a tributary of Mammoth Creek. During the spring snow melt, rainfall, or other forms of run-off inducing events will tend to spread the contaminated materials further from the site. The snow pack in the Mammoth Creek watershed for the winter of 2016-2017 is 240 percent of normal and may bring unprecedented run-off inducing events this spring.

**B. Availability of Other Appropriate Federal or State Response Mechanisms to Respond to the Release**

The Site is located on National Forest System lands under the jurisdiction, custody and control of the U.S.D.A. Forest Service, within the boundaries of the Inyo National Forest. No other federal or state response mechanisms are available to respond to the release.

**IV. ENDANGERMENT DETERMINATION**

Actual or threatened releases of hazardous substances, pollutants and contaminants from the Site, if not addressed by implementing the response actions selected in this AM, may continue to present an imminent and substantial endangerment to public health, or welfare, or the environment.

## V. PROPOSED ACTIONS AND ESTIMATED COST

### A. Proposed Actions

The proposed actions are integral to a comprehensive effort to address mill waste-related human health and ecological impacts in the Mammoth Creek watershed.

The scope of this time-critical removal action is abatement of the threat of exposure to humans and the off-site migration and erosion of mill-waste contaminated soils above the Site-specific Risk Based Concentrations developed for protection of human health or welfare at the Mammoth Stamp Mill Site. The goal for the time critical removal action at the Site is to address the immediate threat posed by “High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;” as defined under section 300.415(b) (2) (iv) of the National Contingency Plan (NCP). This goal would adequately address the actual and/or potential threats to humans due to the level of antimony, arsenic, lead, and mercury present.

The soils and sediment contaminated with antimony, arsenic, lead, and mercury as well as barium, cadmium, cobalt, copper, selenium, silver, and zinc above ecological screening levels within the Mammoth Stamp Mill Site may require a future CERCLA response action.

The scope and goal for this removal action results in the following objectives:

1. Mitigate ingestion and inhalation exposure to mill-waste contaminated soil.
2. Mitigate the likelihood of release of metals from mill-waste contaminated soil at the Site to non-impacted soils.
3. Mitigate the likelihood of release of mill-waste contaminated soil at the Site to downgradient surface water bodies.

Attaining these objectives is expected to result in protection of human receptors and water quality in the Mammoth Creek watershed.

#### Cleanup Standard

The following have been identified as the soil and sediment cleanup goals for the removal action based on the Site-specific Risk Based Concentrations for the Recreational Cabin Occupant as identified in the Technical Memorandum for Refinement of Streamlined Human Risk Assessment, Mammoth Mining Company Stamp Mill Site or BTV if the RBC is lower than the BTV.

Risk Based Concentrations or Background Threshold Value

	Antimony (mg/kg)	Arsenic (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
Mill-waste contaminated soils	92	13.3	280	31

**i. Description of Alternatives**

a. No Action

The No Action Alternative would represent leaving the mill-waste contaminated soils and sediment at the Site in their current condition. There would continue to be exposure of recreational cabin occupants and visitors to the mill-waste contaminated soils. This Alternative would not meet any of removal action objectives and would not be protective of human health and the environment.

b. Contaminated Material Removal and Consolidation in On-Site Repository

The actions proposed under this alternative consist of implementation of institutional controls to restrict public access, removal of the mill-waste contaminated soils and consolidation of waste at an on-site repository. All mill-waste contaminated soils within the mill area, cabin area, and diversion ditch with concentrations of antimony, arsenic, lead, and mercury above the following site established risk based exposure thresholds would be excavated, consolidated, and placed in an on-site repository with an engineered cap:

	Antimony (mg/kg)	Arsenic (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
Mill-waste contaminated soils	92	13.3	280	31

This Alternative also requires subsequent regrading, restoring, and re-vegetation of the Site. During the implementation of this response alternative Institutional Controls (ICs) would be implemented to restrict public access to the areas of contamination and work zones. A temporary Forest Closure order will be issued to enforce these restrictions.

This alternative would require long-term inspection and maintenance of the mine waste repository cover system for perpetuity as long as wastes remain in place at the site. This will require the issuance of a permanent Forest Closure order for long term site access and use restrictions to protect the remedy and prevent ground disturbance of the cap.

This alternative will prevent people and wildlife exposure to hazardous substance concentrations of antimony above 92 mg/kg, arsenic above 13.3 mg/kg, lead above 280 mg/kg, and mercury above 31 mg/kg in soils. It would also mitigate the threat of release of hazardous substances into the sensitive ecosystem represented by the Mammoth Creek riparian area resulting from future erosion of the mill-waste contaminated soils.

This alternative is not considered a viable alternative due to the space limitations of the Site which do not provide adequate room for an on-site repository. Residences are located within the Site boundary. The Site is frequented by the residents and by recreational users. The heavy use of the Site would make it very difficult and costly to maintain the integrity of the repository cap in perpetuity.

c. Contaminated Material Removal and Offsite Disposal (Proposed)

The actions proposed under this alternative consist of implementation of institutional controls to restrict public access, removal of the mill-waste contaminated soils and disposal off-site at an approved disposal facility. All mill-waste contaminated soils within the mill area, cabin area, and diversion ditch with concentrations of antimony, arsenic, lead, and mercury above the following site established risk based exposure thresholds would be excavated and removed:

	Antimony (mg/kg)	Arsenic (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
Mill-waste contaminated soils	92	13.3	280	31

This Alternative also requires subsequent regrading, restoring, and re-vegetation of the Site. During the implementation of this response alternative Institutional Controls (ICs) would be implemented to restrict public access to the areas of contamination and work zones. A temporary Forest Closure order will be issued to enforce these restrictions.

This alternative will prevent people and wildlife exposure to hazardous substance concentrations of antimony above 92 mg/kg, arsenic above 13.3 mg/kg, lead above 280 mg/kg, and mercury above 31 mg/kg in soils. This alternative would also mitigate the future threat of release of hazardous substances into the sensitive ecosystem represented by the Mammoth Creek riparian area resulting from future erosion of the mill-waste contaminated soils, by removing the source of the hazardous substance releases and placing them in a stable location already approved for the consolidation of such material. Off-site disposal will also significantly reduce the cost of long-term annual operations and maintenance costs necessary to maintain an engineered on-site mill waste repository.

ii. **Contribution to Long Term Performance**

a. No Action Alternative

The No Action Alternative would leave cabin occupants and recreational users exposed to the mill-waste contaminated soils, and sediments and leave these vulnerable to anticipated overland and channel flow and release of hazardous substances to the downstream environment. There would be no contribution to the final response at the Site.

b. Contaminated Material Consolidation in On-Site Repository

This alternative would consolidate and place mill-waste contaminated soil in an on-site repository with an engineered cap. The mill-waste contaminated soils at the Site would be capped mitigating exposure pathways within six months of the approval of the AM mitigating additional release of hazardous substances. The proposed removal action will address the threats discussed in Section III, in accordance with the removal criteria of NCP Section 300.415(b)(2). This alternative is not considered a viable alternative due to the space limitations of the Site which do not provide adequate room for an on-site repository. Residences are located within the Site boundary. The Site is frequented by the residents and by recreational users. The heavy use of the Site would make it very difficult and costly to maintain the integrity of the repository cap in perpetuity to ensure the integrity of the cap is not compromised, thereby allowing mill-waste contaminated soils to be released.

c. Contaminated Material Removal and Offsite Disposal (Proposed)

This alternative would remove the mill-waste contaminated soils at the Site within six months of the approval of the AM eliminating additional release of hazardous substances. The proposed removal action will immediately address the threats discussed in Section III, in accordance with the removal criteria of NCP Section 300.415(b)(2). The removal action contemplated in this Action Memorandum is consistent with any future removal actions that could be anticipated at the Site.

iii. **Engineering Evaluation/Cost Analysis (EE/CA)**

An engineering evaluation/cost analysis (EE/CA) is not required for a time-critical removal action.

iv. **Applicable or Relevant and Appropriate Requirements (ARARs)**

ARARs include "applicable" or "relevant and appropriate" requirements. In addition to these promulgated standards, EPA may also use guidance and health advisories as matters "to be considered."

**Applicable Requirements:** Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. "Applicability" implies that the remedial action or the circumstances at the site satisfy all of the jurisdictional prerequisites of a requirement.

**Relevant and Appropriate Requirements:** Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.

The proposed action shall attain ARARs under federal or state environmental or facility siting laws. Other federal and state advisories, criteria or guidance may, as appropriate, be considered in formulating the removal action. The recommended time-critical removal action will comply with the following ARARs to the extent practicable, considering the exigencies of the situation:

**Potential Action-Specific ARARs for this response action are:**

- **Hazardous Materials Transportation Act, 49 CFR 107, Parts 171-179; 383, 391-397.** Transportation requirements.
- **California Hazardous Waste Control Law and Hazardous Waste Disposal Regulations; Title 22, CCR 66262.1 *et seq.*** Requirements for hazardous waste management, including manifesting, record keeping, storage, and packaging procedures for hazardous waste.
- **Federal Noxious Weed Act, 7 U.S.C. 2801 *et seq.*** Requires efforts to avoid the introduction and spread of identified noxious weeds.
- **Fish and Wildlife Coordination Act 16 U.S.C. Sections 661-666.** Requires Federal agencies involved in actions that will result in the control or structural modification of any natural stream or body of water, for any purpose, to take action to protect fish and wildlife resources which may be affected by the action. Requires consultation with the U.S. Fish and Wildlife Service prior to taking any action.
- **Clean Water Act Section 404, 40 CFR part 230, 33 CFR part 320-330, 40 CFR part 6, Appendix J.** Regulations to protect waters of the U.S. and wetlands, as defined by EPA and the U.S. Army Corps of Engineers regulations, by prohibiting the discharge of dredged or fill material without a permit, and taking actions to avoid

adverse effects, minimize potential harm and preserve and enhance wetlands to the extent practicable.

- **Porter Cologne Water Quality Act, Water Code 13000 et. seq.** The RWQCB is required to develop Basin Management Plans to set enforceable water quality standards for the protection of the beneficial uses of State waters. Additionally, under WC Sections 13050 and 13172, the RWQCB is authorized to develop standards and regulations for the discharge of mining wastes.
- **Great Basin Unified Air Pollution Control District Regulations (nuisance and fugitive dust control)**

**Rule 402 - Nuisance**

**Rule 403 – Fugitive Dust**

**Chemical-Specific ARARs for this response action are:**

- **Water Quality Control Plan for the Lahontan Regional, North and South Basins, Water Quality Control Board Lahontan Region, September 2015 Revision.** Establishes water quality objectives and designates the beneficial uses for waters in this watershed basin. It also includes requirements for mining wastes.
- **State Water Resources Control Board Resolution No. 92-49 (“Anti-Degradation Policy”).** Requires that quality surface and groundwater be maintained to the maximum extent possible.

**Location-Specific ARARs for this response action are:**

- **National Historic Preservation Act, 16 U.S.C. 470 et seq.** Requires federal agencies to take into account the effect of any federal undertaking on any site, building, structure, or object that is included or may be eligible for inclusion in the National Register of Historic Places.
- **Archeological and Historic Preservation Act, 16 U.S.C. 469, 40 CFR 6.301.** Establishes procedures to preserve historical and archeological data that might be destroyed through alteration of terrain as a result of a federal undertaking.
- **Endangered Species Act, 16 U.S.C. 1531 et seq.** Defines and provides a means for conserving various species of fish, wildlife, and plants that may be threatened with extinction, and provides for the designation of critical habitats essential to the conservation of a threatened or endangered species. Requires Federal agencies, in consultation with DOI and the National Marine Fisheries Service, to ensure that actions that they authorize, fund or carry out are not likely to jeopardize the continued existence of threatened or endangered species or adversely modify or destroy their critical habitat.

- **Protection of Floodplains, Executive Order 11988 (40 CFR Part 6, Appendix A) -** This Executive Order mandates that response actions taken by federal agencies must be designed to avoid adverse impacts to floodplains. Specifically, if response activities are located within a 100-year floodplain, the activities must be designed to avoid adversely impacting floodplains wherever possible. If response activities take place in a floodplain, these requirements will be applicable.
- **Fish and Wildlife Coordination Act (16 USC 661 et seq.) -** This statute requires federal agencies to consider the effect projects may have on fish and wildlife and to mitigate loss or damage to these resources. This statute is applicable to the selected remedy.
- **Migratory Bird Treaty Act (MBTA) (16 USC 703 - 712) -** The MBTA makes it unlawful to pursue, capture, hunt, or take actions adversely affecting a broad range of migratory birds. The MBTA and its implementing regulations are applicable to remedial activities that could affect any protected migratory birds. The selected remedy will be carried out in a manner that avoids taking or killing of protected migratory bird species, including individual birds or their nests.
- **State Water Resources Control Board Resolution 68-16-** State Water Resources Control Board (SWRCB) Resolution 68-16, Statement of Policy With Respect to Maintaining High Quality Waters in California, establishes the policy that high quality waters of the state “shall be maintained to the maximum extent possible” consistent with the “maximum benefit to the people of the state.”

**B. Project Schedule**

The proposed actions are anticipated to begin in July 2017 and be completed by November 1, 2017

**C. Estimated Costs**

Project Preparation, Support, and Mobilization	\$1,245,577
Construction Activities	\$2,036,161
Cultural Resource Monitoring	\$ 24,210
Forest Service Oversight	\$ <u>40,320</u>
 Total	 \$3,261,700

\*\*\*\*\*

**VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN**

Should action be delayed or not taken, the Site will continue to present an imminent and substantial endangerment to human health, welfare or the environment due to the release of

hazardous substances into the adjacent Mill City Tract recreational cabin area and into the Mammoth Creek watershed. Cabin residents, the recreating public and the environment will continue to be threatened as described above. The concentrations and magnitudes of antimony, arsenic, lead, and mercury released during water eroding events from the Site will continue to be affected by the magnitude and severity of storm events, human disturbance and spring snowmelt run-off.

**VII. OUTSTANDING POLICY ISSUES**

None have been identified at this time.

**VIII. ENFORCEMENT**

The Forest Service's PRP search and follow-up research by the Office of the General Counsel (OGC) resulted in the determination of a viable PRP. An Administrative Settlement Agreement and Order on Consent will be sent to the viable PRP.

**IX. DECISION**

The Forest Service has CERCLA authority and is the "lead agency" for National Forest System (NFS) land at non-National Priorities List sites. No other appropriate response mechanisms or authorities are currently available to address this Site.

In compliance with the Forest Service's role in protecting the public health and welfare and the environment, and because the release or threatened releases are on NFS lands under the administration of the Inyo National Forest, and pursuant to the authority found at 42 U.S.C. 5604 (a), Executive Order 12580, and 7 CFR 2.60, the Forest Service undertakes this response action. The response action will be not inconsistent with the NCP.

Approval is hereby given by the Forest Service to conduct a time-critical removal action to remove mill-waste contaminated soils from the Mammoth Stamp Mill Site including the impacted areas within the adjacent Mill City Tract recreational cabin area on the Inyo National Forest.

The removal action for the Site was developed in accordance with CERCLA, as amended, and not inconsistent with the NCP. Conditions at the site meet the NCP 40 C.F.R. § 300.415(b) criteria for a removal action. This decision is based upon information contained within the Site's administrative record.

Signature: Tyrone Kelly Date: 4/14/17  
Tyrone Kelly  
Director of Engineering  
Pacific Southwest Region

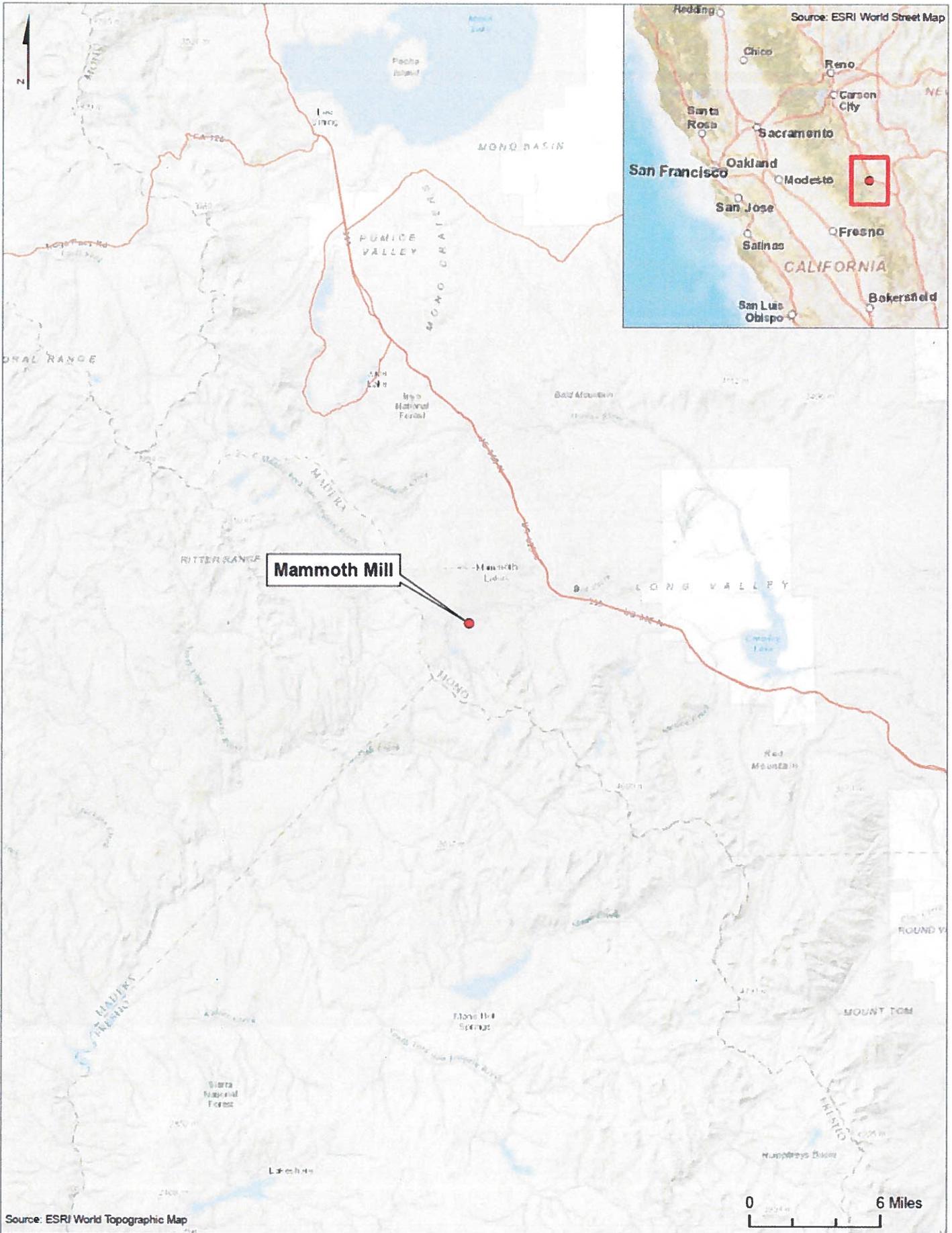
## References

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- Caldwell, G., 1990. *Mammoth Gold—The Ghost Towns of Lake District*. Genny Smith Books. Mammoth Lakes, California. 174 Pages.
- California Trout, Inc., 2014. “Upper Owens River Water Quality Project, Final Technical Report.” April 22.
- ERRG, 2017. “Technical Memorandum for Refinement of Streamlined Human Risk Assessment, Mammoth Mining Company Stamp Mill Site, Inyo National Forest, Mono County, California.” January 23.
- Meyerriecks, W., 2003. *Drills and Mills—Precious Metal Mining and Milling Methods of the Frontier West*. Second Edition. ISBN 0-9714383-1-5. 264 Pages.
- U.S. Department of Agriculture Forest Service (Forest Service), 2014. “Removal Preliminary Assessment for the Mammoth Mining Stamp Mill Site, Mammoth RD, Inyo National Forest.” January 6.
- U.S. Geological Survey (USGS), 1994. “Bloody Mountain Quadrangle. California – Mono Co. 7.5-Minute Series (topographic).”

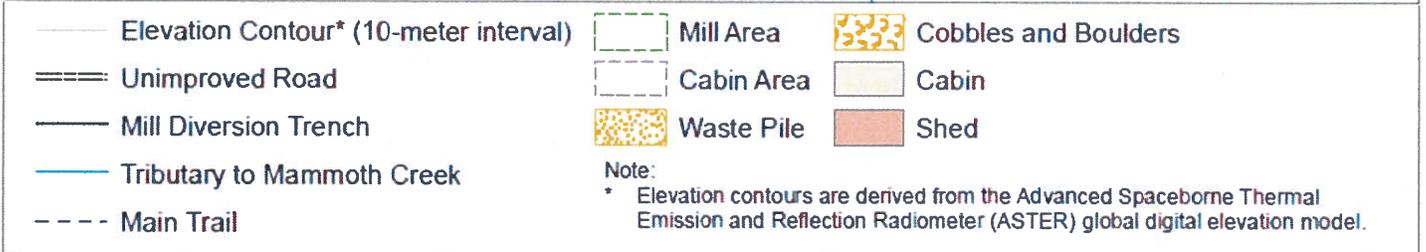
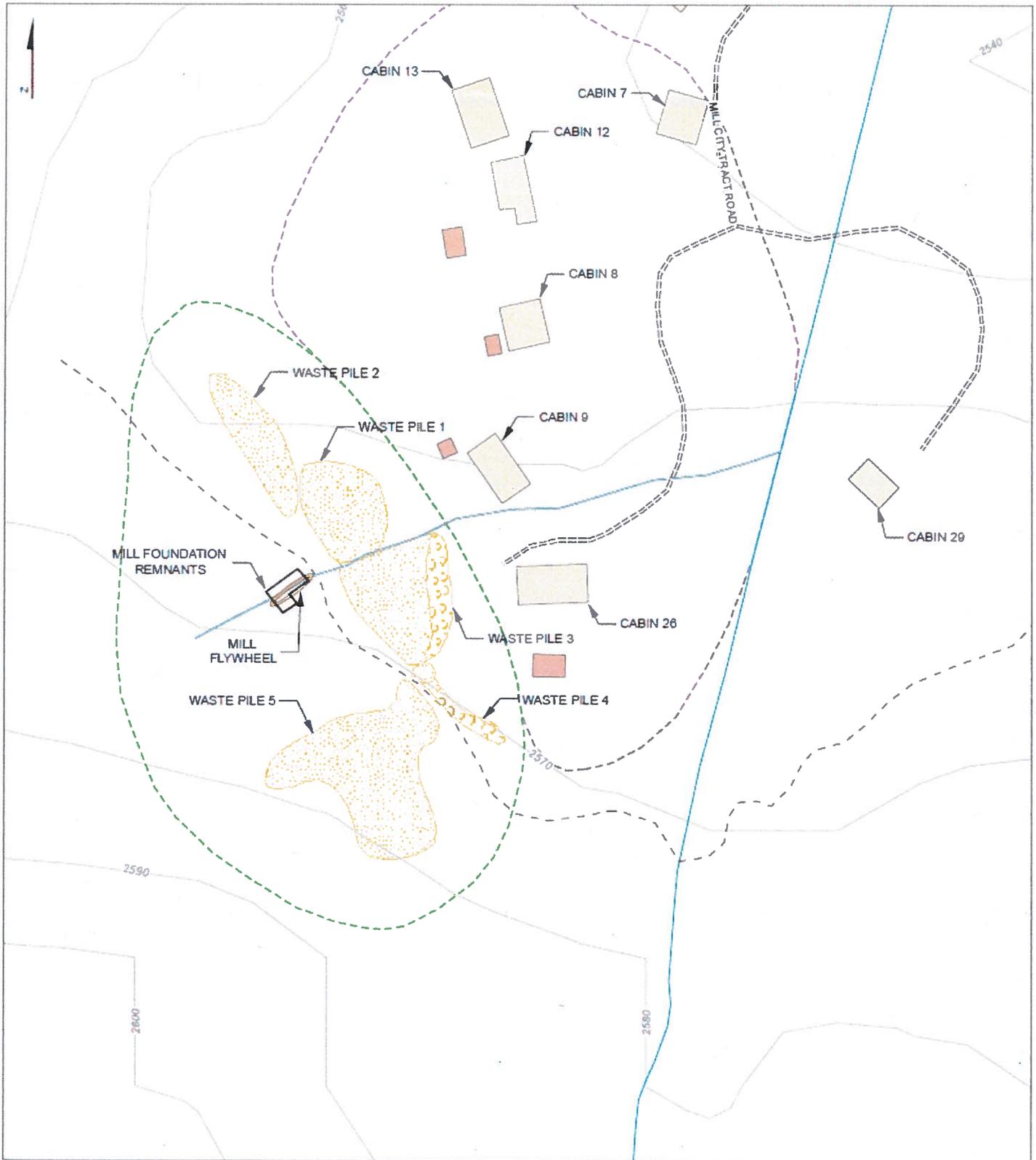
## Figures

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**Figure 1. Site Location and Vicinity Map**  
 Mammoth Mill, Inyo National Forest





**Figure 2. Site Features**  
Mammoth Mill, Inyo National Forest

Lake District, Mono County.

From an interview with Judge J. D. Thompson, who is interested in Lake district, we gain the following information concerning that part of Mono county, in this State. The diagram accompanying this will show the location of the principal mines of the district:

The Lake district is situated in Mono county, some 50 miles southeast of Bodie and 25 miles north of the southern portion of Lake Mono, on the east side of the Sierra Nevada mountains, and but a few miles from the head waters of the north fork of the San Joaquin river, and about 80 miles north from Borden, on the Southern Pacific railroad, easy of access by wagon from Bodie or Benton, and by wagon road and trail from Borden.

This district is now attracting a large amount of attention from mining men and capitalists, and bids fair to become one of the most pro-

ducted by the Mammoth G. & S. M. Co. of this city. It is 25 feet in width, and has been prospected at different points for 6,000 feet along the ledge. From 600 to 800 feet east of this, and nearly parallel with it, is the Silveropolis, or Don Quixote ledge, which shows equally as rich as the Mammoth ledge, though only about half as wide. Still to the east, and below the summit, is the Monumental ledge. On the west side of the mountain, and partly down the side, is the Crescent ledge; and to the north, and still lower down the mountain side, is the Alpha ledge.

These ledges all bear a uniform quality of quartz and ore, and in every instance have improved in richness as they have been worked. Assays from different mines show the ore to be free milling ore one-third gold and two-thirds silver, and give a general average of from \$40 to \$50 per ton.

The Mammoth mine is now being worked at the end of the ledge on the north end of the mountain some 200 feet below the cropping; the ore without selecting milling over \$40 per ton, the last run of 200 tons yielding \$11,000 at an expense for mining and milling of less

than \$5 per ton. Adjacent to the Head-Light and on the same ledge, is the Monte Cristo, a mine that bids fair to be a rival of the Mammoth in richness. It has two shafts down 40 feet on side of the ledge, but no crosscutting done.

On the Alpha ledge the mine most developed is the Alpha. It has a tunnel in nearly 300 feet and is now within 20 feet of the main ledge, whose croppings 15 feet in width, give great promise of rich ore at the depth the tunnel will cut the ledge. It has already passed through three ledges of low grade ore of from two and one-half to six feet in width, with streaks of very rich quality, assaying up in the hundreds. Adjacent to this on the north is the Jordan, and on the south the North Star, both mines of great promise.

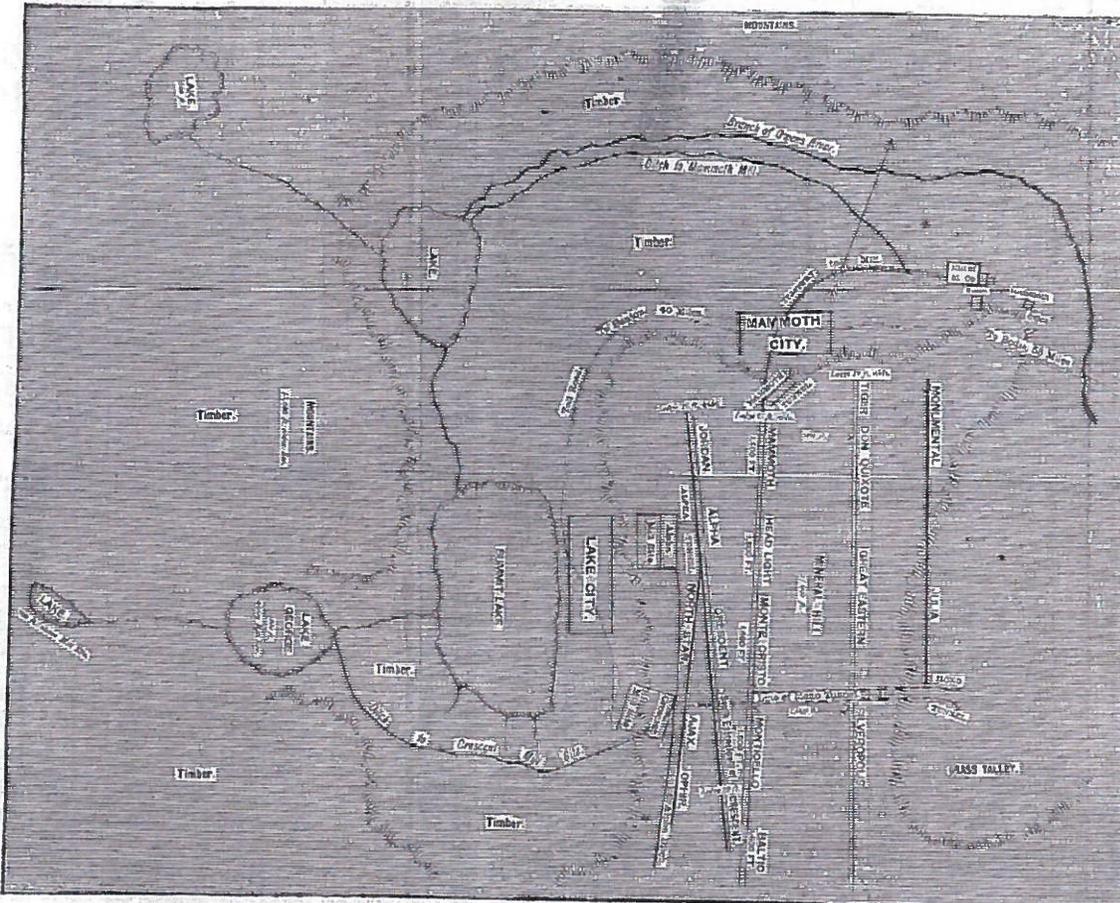
The Crescent is being worked from the side of the mountain, and though not yet into the main ledge, has cut many wide stringers of fine ore, and gives promise of being a valuable mine. Assays from the croppings, which are from eight to ten feet wide, and from the feeders out, range from \$40 to \$300 per ton.

Recent developments in the Don Quixote prove that to be entitled to rank with the leading mines of the district, while the Silveropolis on the south end is equally as promising. The Julia, on the extreme east side of the mountain, has also fair prospects. The shape of the mountain and the position of the ledges in it, will enable them to be worked advantageously. The tunnel now being run by the Mammoth Co. will strike that ledge at a distance of less than 600 feet, 1,000 feet below the surface; while the Mono tunnel on the east side of the mountain, will, when extended from that side 300 feet, cut the Silveropolis ledge 1,200 feet below, and worked from the west, will, at a distance of 400 feet, cut the Crescent ledge, and when extended 400 more, will cut the Monte Cristo 1,000 feet below the surface.

The Mammoth has a fine mill of 20 stamps run by water-power supplied by water from the lakes hundreds of feet above it. The Alpha has a mill site at the mouth of the tunnel, and an abundance of water already brought to it sufficient to run a mill of the same size, and the Crescent has water-power of equal capacity; other mines also have water-rights. These are inexhaustible, supplied as they are by large springs, and from the numerous lakes, 12 in number, surrounding the mines, situated among the mountains many hundred feet above the mill sites and conveniently located to be

Coltan Marble.

The Los Angeles Express speaking of this marble says: Henry G. Hanks, President of the State Geological Society, has made a study of the Coltan marble. He concludes that it compares in every way with the best Carrara marble. The total consumption per year of Carrara marble is on an average of 30,000 tons. Mr. Hanks asks why California should not be able to take some of this to market. He closes his letter to the Express as follows: "The flimsy buildings we are now constructing will surely be replaced by those built of better and more durable materials. The wood which has been so abundant, so easy to get, and so easy to work, will be exhausted, or will have to be brought from greater distances, and as the State grows older the people will see the folly of building red-wood palaces which cannot by any possibility last more than 25 to 30 years. As this will come about in time, it will be well for us to encourage the prospectors who are ransacking over the hills to look for these materi-



MAP OF LAKE DISTRICT, MONO COUNTY, CALIFORNIA.

able sections for investment in mining at present known. The work that has been done in the district since the spring opened has been exceedingly satisfactory to those who have engaged in developing it. Veins of ore already uncovered prove not only its richness, but go far to prove its permanency.

The ledges are wide and bear ore of uniform quality, though thus far not of high grade, yet sufficiently rich to pay well.

The extensive bodies of fine timber and numerous water powers reduce the cost of mining and milling the ore, so that there can be no doubt of its being highly remunerative.

The principal mines shown by the accompanying sketch are located on Mineral hill, a table mountain situated in the midst of, and nearly surrounded by volcanic mountains and extinct craters. Mineral Hill is some 7,500 feet in length, and about 2,000 feet in width at the top, the north end and the sides being very abrupt and precipitous; the height at the north end and on the west side is about 1,000 feet, while on the east the valley extends close to the base, and has nearly or quite 1,600 feet below the summit. Running lengthwise, and nearly through the center of this mountain, 35° east of south and almost parallel with its sides, is the ledge known as the Mammoth ledge, on which are the Mammoth and Head-Light mines, owned

than \$5 per ton. Adjacent to the Head-Light and on the same ledge, is the Monte Cristo, a mine that bids fair to be a rival of the Mammoth in richness. It has two shafts down 40 feet on side of the ledge, but no crosscutting done.

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utilized without great expense.

With these advantages over other districts, there can be little doubt but that in the near future those who have invested in Lake district, will be richly remunerated for their time, labor, and capital.

ANOTHER LONG TUNNEL.—We learn from the Nevada county papers that the Derbec Gravel M. Co. contemplates running a tunnel into their claim, at a point above the town of North Bloomfield, and working it upon the plan of the Bald Mountain claim, in Sierra county, drawing the gravel to the mouth of the tunnel by locomotive power. The tunnel will be between 3,000 and 4,000 feet in length. If this plan is adopted, both the ground of the Derbec and Watt gravel companies can be worked through the same tunnel.

KNEEDALL'S one-stamp mill is said to be more than a success with those who understand how to work it. It was promised that the mill would crush five tons per day. It has been found capable of crushing seven.

A GOVERNMENT financial clerk drew about \$10,000 the other day, for salaries. He lost the amount. It has since been returned on "no questions" conditions.

ials, and to publish the results of their discoveries for the benefit of our citizens. In this connection I desire to mention again the importance of a State Museum at San Francisco, where specimens from such discoveries may be kept for all time—for the benefit not only of ourselves, but for the advantage of foreign visitors who wish to know the resources of the State. On this latter point we beg to suggest that the University is the place for such museum. Berkeley is very accessible from San Francisco, and we have there the men capable of exhibiting the collection to its best advantage; and there, at the same time, our young men may profit from it, as well as the State at large through information given visitors.

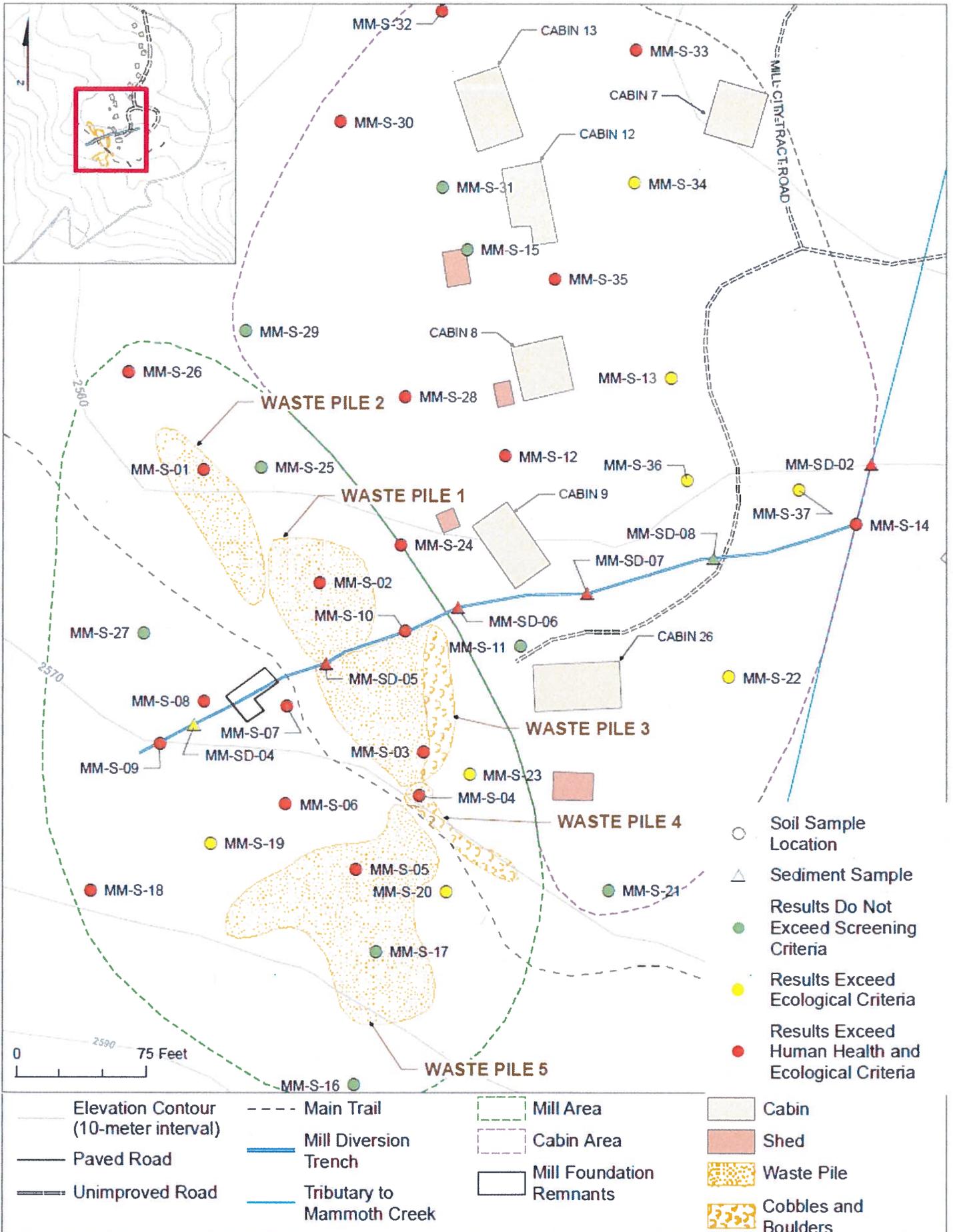
ONE of the school scandal witnesses has gone to Honolulu. A delinquent witness has been bound to appear before the committee.

ONE Mandla, a naturalized American, has been prohibited from lecturing in Bertha on the improved prospects of our Western States.

GOVERNOR STANTFORD is importing 20 thorough bred mares from Lexington, K.T.

REPORTS of dreaded socialistic movements in Germany are followed by rumors of Nihilistic uprisings in Russia.

Figure 3 Map of Lake District circa 1878



**Figure 4. Soil and Sediment Sample Results**  
Mammoth Mill, Inyo National Forest