

**INTENSIVE CULTURAL RESOURCES SURVEY OF
EMPIRE MINE HISTORIC DISTRICT
NEVADA COUNTY, CALIFORNIA**

Empire Mine State Historic Park
Environmental Restoration Project

*Prepared for the
Department of Parks and Recreation,
Sacramento, California*

August 2009



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Prepared for

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I. INTRODUCTION

The State of California Department of Parks and Recreation (DPR) owns the approximately 856-acre Empire Mine State Historic Park in Grass Valley, Nevada County, California (Figure 1). Prior to DPR's acquisition in 1974, Newmont Exploration Limited owned a majority of the property and still retains certain mineral rights in the Park. Many gold mines operated throughout the Park, from the Gold Rush until Empire Star Mines Company ceased operations in 1956. Recently, historic mining remains were found to contain elevated levels of metals that have contaminated the soil and water, and DPR and Newmont USA Limited are subject to a Consent Order with the State of California Department of Toxic Substances Control (DTSC) and Central Valley Regional Water Quality Control Board (Regional Board) to remediate the property. The Regional Board and DTSC are overseeing the Consent Order, designed to investigate and remediate as necessary any surface contamination caused by past mining activities. Investigations to determine the scope and methods of remediation are being conducted.

The Empire Mine State Historic Park was nominated to the National Register of Historic Places (NRHP) in 1970. The nomination was updated with more historical information and photographs in 1973 (Welts 1976), and the property was listed as Empire Mine Historic District in 1977. Listing was based on 19 standing historic buildings clustered around the center of the Park, between Little Wolf Creek to the south and Highway 174 to the north. No other buildings, structures, objects, sites, or landscapes were identified or evaluated. The 1973 Park area was used to establish the District boundary, although the Park has increased in size since that time. Prior to remediation activities associated with the Consent Order, DPR must determine the impacts on contributors to the District. Accordingly, potential contributing elements—including archaeological and landscape properties as well as buildings—must be identified and evaluated against the NRHP eligibility criteria, and the District updated.

DPR has contracted with the Anthropological Studies Center (ASC) of Sonoma State University to perform cultural resources inventory and evaluation studies for the Park, and to update the NRHP listing for the District, in conjunction with the production of the Consent Order's Environmental Impact Report. Although this is not a federal undertaking, Section 106 of the National Historic Preservation Act, codified at 36 Code of Federal Regulations Part 800, provides guidance on how potential historic properties are to be inventoried and evaluated for eligibility as District contributors. Assessing cultural resources NRHP status with regard to the District will satisfy the California Environmental Quality Act (CEQA).

The ASC first developed a historic context to provide the foundation for decisions (NPS 1997:1). Selverston (2008) presented a broad historic context for gold mining across the state in order to understand the fundamental trends and periods of significance, as well as to provide specific knowledge regarding the

Insert Figure 1

1. Location of the Empire Mine State Historic Park

historical activities that have occurred in the Park, in order to help identify and assign associations to identified cultural resources.

ASC next conducted a cultural resources records search and intensive field survey in order to locate archaeological and historical elements that may contribute to the historical significance of the District. *Guidelines for Local Surveys: A Basis for Preservation Planning*, the topic of National Register Bulletin 24, provided guidance of the effort (NPS 1977). The inventory—the subject of this report—identifies archaeological and historical elements but does not focus on their importance or condition. That assessment will be made after all the elements of each resource are identified during the evaluation phase. This survey report is designed to be a companion to the historic context report (Selverston 2008). It is based on California Office of Historic Preservation (1990a:8) format presented in *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format*, specifically the sections on methods and findings. Given the District's gold-mining emphasis, National Register Bulletin 42, *Guidelines for Identifying, Evaluating, and Registering Historic Mining Properties* (NPS 1992) was also consulted.

II. INVENTORY METHODS

RECORDS SEARCH

A review of existing information on cultural resources within the study area—including data related to as-yet-unidentified resources—prior to conducting fieldwork is necessary prior to conducting fieldwork under 36CFR800.4(a). The records search for this study was done to (1) determine whether known archaeological or historical elements are within the study area; and (2) determine the likelihood of unrecorded resources based on the distribution and environmental settings of known sites. A records search specifically targets data on cultural resources studies and known identified resources. It is different than the archival research and literature review that goes into development of the historic context in that the records search specifically gathers planning and management data. Two repositories of this information for the Empire Mine State Historic Park are the DPR Archives and the North Central Information Center (see below).

Department of Parks and Recreation Archives

Relevant information for studies and resources pertaining to the Empire Mine State Historic Park are on file at the Northern Service Center in Sacramento and at the Sierra District in Tahoma. Jeff W. Brooke, Associate State Archaeologist with the Northern Service Center, gathered and provided a number of studies and site forms from their files between January and April 2008. Additionally, Mike Zabaneh, the Empire Mine Technical Project Manager with the Northern Service Center at the time of this study, supplied the results of a mine and mill survey completed in March 2008 for the remediation project. There is a “white glove” archive room located at the Park with a large number of maps and technical drawings for various state parks that were inspected.

North Central Information Center Archives

Mark D. Selverston conducted a records search on 7 February 2008 at the North Central Information Center (NCIC), a branch of the California Historical Resources Information System, located at California State University, Sacramento (Records Search NEV-08-04). The NCIC, an affiliate of the State of California Office of Historic Preservation, is an official state repository of archaeological and architectural records and reports for a six-county area that includes Nevada County. The search included examination of all site data and studies within and adjacent to the study area on file at the NCIC.

The search included the California Inventory of Historic Resources (California Department of Parks and Recreation 1976), California Historical Landmarks (OHP 1990b), California Points of Historical Interest (OHP 1992), and the Historic Properties Directory (through 4 December 2007). The Historic Properties Directory (HPD) includes updated listings of the National Register of Historic Places, the California Historical Landmarks, the California Register of Historical Resources, and the California Points of Historical Interest.

FIELD SURVEY

The goal of the field survey is to identify tangible cultural elements that may contribute to the significance of the Empire Mine Historic District in order to identify potential impacts to the District from remediation activities. Accordingly, locating all the physical remains of the region's historic mining and ancillary activity in the entire Park is the central objective of this intensive survey. The National Park Service defines an intensive survey—as opposed to a reconnaissance—as one that is “designed to identify precisely and completely all historic resources in the area” (NPS 1977:12). The eligibility of identified resources to either the NRHP or California's Register of Historical Resources (CRHR) is not a concern during this phase of the study.

Building Assessment

The NRHP nomination listed 19 buildings related to the District, with the Rowe shaft headframe and ore bin counted as a single building (Welts 1976). Robert Canby, Jr. (1982) of DPR described 46 individual buildings in the Park, including those documented in the original nomination. Jeanette Schulz (1990) inventoried the ruins of the Empire Mine Cyanide Plant. As part of the current inventory, Judith Marvin and Mark Selverston conducted a pedestrian survey of the known buildings, structures, and objects associated with the Empire Mine and Mill, Bourn Cottage, and other structures, residences, outbuildings, and support structures on the Empire Mine property on 4 and 5 June 2008. Resources associated with the built environment and buildings not previously documented were taken into account as well. Each building was assigned a unique designation, photographed, and updated descriptions were developed; buildings that had been inspected by Canby but are no longer extant were noted.

Archaeological Survey

The first step of any survey is to develop predictions about the types and locations of resources. Generally cultural resource predictions are based on archival research and a cultural resources records search (NPS 1985:36). The historic context prepared for this project (Selverston 2008), combined with the results of the cultural resources records search as described in the findings chapter, indicated that the majority of the project area would contain dense remains from substantial and enduring gold mining combined with the remains from sparser settlement endeavors. Research provided the names, locations, dates and duration of activity and occupation, and data on the evolution of numerous mines and settlements throughout the Park.

It was further anticipated that various resource types would constitute a rural historic landscape. NPS (1989:2) defines a *rural historic landscape* as “a geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings, and structures, roads and waterways, and natural features.” For mining landscapes specifically, NPS (1992:9) predicts “standing buildings, structures,

and other architectural remains; machinery; archaeological remains; and landscape features such as mine waste rock dumps, mill tailings, water delivery systems, open pits, and roads.” NPS also concludes that archaeological remains may be the most abundant property category.

Given these expectations, a feature-driven survey approach was chosen as the most efficient method for the field survey, involving detailed documentation of every feature encountered. The strategy recognizes complete systems, in which individual features are viewed as potential components of a larger and/or more complex process, or feature system. Donald Hardesty (1988:9) defined the *feature system* “as a group of archaeologically visible features and objects that is the product of specific human activity.” Past activity typically leaves a suite of surviving interrelated components, so when one component is identified, survey for associated elements ensues (e.g., a mine portal is typically upslope from a waste dump, and tailings are associated with a mill).

Fieldwork was carried out in May, June, and July 2008, with a crew of two to five people. The survey team traversed the entire Empire Mine State Historic Park (see Figure 1) on transects averaging 75 feet apart, and varying between 45 and 150 feet depending on the density of resources, vegetation, natural landscape (such as slope), and the Park boundary. The only substantial area omitted from the survey is the approximately 35-acre mill tailings pond impounded by the so-called Sand Dam. The dam, made from waste rock, was constructed in order to prevent Empire Mine’s mill tailings from the entering the waterways, as was required in 1917 by the California Debris Commission. The resulting tailings field was mapped but avoided as a safety precaution, and it is assumed that evidence of earlier activities would be buried. Greatest attention was paid to areas particularly dense with resources—a substantial portion of the study area—in order to sort out feature systems and determine their relative order so that the evolution of events could be recreated. In contrast, large areas of redundant, overlapping features—such as prospected hillsides or sluiced creek beds—were generally documented by a single boundary as a particular landscape type.

Field crews assigned a unique context number to every resource discovered, typically at the feature level. Detailed information was collected, the location recorded, and photographs taken for every context. The data collected included functional type (such as foundation or waste dump), dimensions, material, form, and descriptive detail when appropriate. Artifact lists, based on what could be seen on the surface, were developed to characterize deposits. Features or assemblages perceived to be a hazard were noted, such as a deep shaft. The location of every feature was taken using a Trimble GeoXT or GeoXH global positioning system (GPS) unit, points using a Trimble GeoExplorer III unit, or by determining distance and bearing to a known point. Digital and 35-mm photography were employed to visually document most features and landscapes, with the exception of redundant feature types or poor field conditions, such as bad lighting or thick vegetation.

Precise definitions were used in the field when assigning feature type. For example, the term “prospect” was applied to any exploratory excavation with all the removed soil and/or rock deposited adjacently. When back-dirt represented more material than the visible excavation, the term “waste dump” was assigned. Feature-system-based principles allowed a better understanding in the field of observed remains. For example, depressions similar to prospects associated with waste dumps were understood to be collapsed shafts, and what appeared to be short ditches or races running downslope were recognized as collapsed adits. The term “hole” is any opening without a definable waste dump, and these were perceived to serve as air vents or other such supporting functions, as well as unintended caving. Complete definitions of all property types that were identified are provided in Chapter III, with descriptions of common feature systems for each.

Safety Precautions

The Empire Mine State Historic Park Consent Order is predicated on evidence that the study area contains hazardous levels of certain elements. For this reason, and at the discretion of DPR, Michael Meyer of the ASC developed a Site Specific Safety Plan (SSSP) summarizing the potential health threats and delineating specific precautions for the pedestrian survey, including a monitoring program. The SSSP was made available to all field crew, reviewed prior to the survey, and kept on-site for the duration of fieldwork. Mark Selverston served as both the project coordinator and the health and safety officer during the survey.

Lead, aluminum, arsenic, cadmium, mercury, thallium, and manganese have been found in concentrations that pose a health risk in areas of historic tailings, waste rock, and within water draining from the Park. A document entitled, *A Preliminary Endangerment Assessment for the Empire Mine State Historic Park, Grass Valley, California* (Harding Lawson Associates 1992) identified a 7-acre area within the Park boundary that posed a health risk to the public due to elevated concentrations of arsenic, cadmium, lead, and mercury associated with historic tailings. This area includes the historic cyanide plant and extends to the Sand Dam. The DTSC 2006 Fact Sheet for Actions Addressing Mining Waste to Begin at Empire Mine State Historic Park lists additional hazards. Specifically, the outlet of the Magenta Drain Tunnel that discharges water into an unnamed creek within Woodpecker Ravine contains arsenic, thallium, iron, and manganese in excess of Federal and State primary and secondary drinking water standards. Other areas may potentially contain concentrations of metals such as arsenic, lead, and mercury that present a health risk based on type, amount, and length of exposure.

The greatest risk of potential chemical exposure during surveying is inhalation of dust. Dust may be generated from walking or windy conditions, and from clearing discovered features. Crews were instructed to minimize generating dust, especially in areas of potentially hazardous soil conditions. Fine sands and silt that are potentially mill tailings were not to be disturbed. Placing gear such as backpacks on bare soils and coming into contact with water draining from the

mine were avoided. Measures were taken to remove dust from boots and clothing prior to leaving the project area or entering indoor workspaces. Overalls were worn during the survey, and drop cloths were placed over vehicle seats to and from the staging area to minimize the spread of dust. Overall bibs and car seat drop cloths were removed and boots brushed following fieldwork. Soiled overalls remained outdoors in the project area and were laundered after each field rotation, or as necessary.

A variety of physical hazards are present in the study area that could be encountered by archaeological workers. These included open adits or mine shafts; confined spaces; uneven terrain from holes, ditches, and steep grades; slippery surfaces; and building materials that pose slip, trip, and fall hazards; other concerns included extreme weather, biological hazards—particularly poison oak, and dusty conditions. Specific precautions were implemented to minimize risk to the survey team from these threats. Closed spaces, including underground mine workings, were not to be entered. The minimum personal protection equipment consisted of hard-soled work boots and suitable work clothes, including bib overalls. Crews were instructed to use caution near cut banks, and to be wary of unstable edges.

Additionally, all field personnel completed training in accordance with California Code of Regulations Title 8, Section 5192(e). Training requirements for work that may potentially expose workers to hazardous substances include a minimum of 40 hours of instruction off site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor. Crew was given a spirometry lung function test prior to fieldwork. Lastly, a monitoring program was initiated for all field crew scheduled to be on-site 20 days or more. This program consists of blood screening for aluminum, anganese, arsenic, cadmium, lead, mercury, and Zinc protoporphyrin before the survey, and post-field screening for blood lead level and Zinc protoporphyrin.

POST-FIELD PROCESSING AND ANALYSIS

Geographic Information Systems (GIS) technology and a cultural resources database were used to identify property types and determine their boundaries. Defining possible contributing elements was based on the multivariate nature of feature systems as discussed above, the proximity of features and feature systems—whether they were isolated or clustered, and their historical associations. Densely packed, multi-context feature systems located close together typically represent mining and milling operations or settlement sites. As a general rule, 75-foot gaps between clustered features were analyzed as potential property boundaries. Prospect pits and trenches are ubiquitous in the Park, and were excluded from this analysis. The scores of isolated prospects, instead, are considered to comprise a single landscape with numerous elements.

Linear features, such as roads and ditches, were also not used as a factor in establishing site boundaries, as they are considered discrete resources that can

pass through activity areas. Disarticulated segments of the same road or continuous segments were considered a single site, while short road segments linking an activity to a broader road network were subsumed under the site boundary encompassing that activity.

There are a number of property types represented by isolated features other than prospects and linear resources, with artifact deposits being the most abundant (e.g., can dumps). GIS technology and the context database were designed to simplify the creation of site records.

Geographic Information Systems

GPS data files collected in the field for identified contexts and other features of the Park were downloaded and post-processed with GPS Pathfinder Office 2.80 software. In Pathfinder Office, raw data files were differentially corrected to the California Survey and Drafting Supply base station in Sacramento. Corrected data files were edited for irregular positions resulting from multi-pathing. The edited files were exported as ArcView shape files in Universal Transverse Mercator (UTM) North American Datum (NAD) 83, zone 10 coordinates, and imported into an ArcMap 9.2 GIS project. Features and boundaries for which no field GPS data were gathered were created in GIS.

A variety of historic maps and Master Title Plats were digitized and georeferenced in GIS. These included 52 individual mineral survey plats filed with the federal government in support of mining claims. This large number of historic maps—dating to between 1867 and 1942—are particularly relevant to this project. Each map depicts specific mining improvements made during the period in support of the claim, and many extant mining and non-mining features are also often shown, such as old diggings or an identified individual's home. A detailed presentation of the data gleaned from the set can be found in the historic context for the District (Selverston 2008). Other maps integrated into GIS include the U.S. Special Folio for Grass Valley published in 1890 (a particularly useful early topographic map), and county maps for 1880, 1884, and 1913 (all depicting mine names and land owners). Locations of identified features were displayed with relevant historic maps, assisting in attributing specific associations. This information was used, in part, to define site boundaries around isolated and clustered contexts based on historical associations.

Cultural Resources Context Database

Field data for each context was entered into a Microsoft Access database. Database fields include the following: context number, resource designation, property type, resource present, feature type, resource attribute, maximum and minimum length, width, height, and depth, material, form and size of constituent rocks, orientation, previous designation(s), hazard assessment, and comments. The full range of feature types noted in the field were standardized into 78 categories (e.g., waste dump, foundation, artifact deposit). For each feature, the resource present (i.e., building, structure, object, site, or landscape) and the resource attribute code as defined by the California Office of Historic

Preservation (e.g., AH2. Foundations/structure pads; AH9. Mine/quarry/tailings) were entered into the appropriate fields. Each feature was assigned to a distinct property (based on proximity, historical associations, and/or other factors discussed below), and assigned a cultural resource designation; thus each property or cultural resource is composed of one or more features. Every property represents a property type that is defined in Chapter III.

III. INVENTORY FINDINGS

RECORDS SEARCH RESULTS

Cultural Resources Registers

The Directory of Properties in the Historic Property Data File for Nevada County (OHP 2007) indicates that the Empire Mine is listed in the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR).

The Empire Mine Historic District was listed on the NRHP as an individual property in 1977 (Welts 1976), and is also designated as National Historic Landmark No. 77000169 (OHP 1990b), as well as a California Historic Landmark (see below). The NRHP nomination form describes 19 contributing buildings/structures that add to the District's significance under historic archaeology, architecture, and industry for the periods 1800–1899 and post-1900. The Rowe Shaft headframe and ore bin are counted as a single structure, though detached and separated by nearly 200 feet. No other elements were listed, including the awkward exclusion of all archaeological resources. The District boundary was established to “encompass the entire Empire Mine property” (Welts 1976:36), though it actually encompassed only the Empire Mine State Historic Park as it was configured in 1976. The Empire Mine property is greater than listed, and the Park boundary has changed since that time.

The Empire Mine is California Historical Landmark 298, registered in 1939, and is therefore listed in the CRHR (OHP 1990b). At the time, the mine was recognized as being the oldest lode mine in continuous operation in the United States. Manzanita Parlor No. 29, the local branch of the Native Daughters of the Golden West, dedicated a plaque on 17 March 1963 that reads, “Empire Mine, This plaque marks the site of the Empire Mine noted for its continuous operation 1850–1957 producing over \$120,000,000 in gold.”

Previously Conducted Studies

Nine cultural resources studies had been carried out within the current Park boundary prior to this study, and 19 studies were conducted adjacent to or nearby (see Appendix A). DPR's findings provide the most comprehensive information on historic context and the type and number of previously identified cultural resources. Relevant studies carried out within the Park are briefly mentioned here.

Lortie and Docken (1980) conducted the first archaeological survey of the Park, documenting 30 sites: 12 in the Union Hill area (UH-1 to UH-12); 11 in the Osborne Hill area (OH-1 to OH-11); and 7 west of the Empire Mine proper, or in the Pennsylvania Mine area (PN-1 to PN-7). Their report presents a site-by-site narrative with good preliminary histories for each resource and some field maps. The report does not plot on a map the exact survey coverage, nor are the site boundaries depicted on a topographic map or other reliable location reference.

Tordoff (1987) conducted a small survey in the Union Hill area in advance of a fire-suppression project. She included the survey coverage on a base map that also depicts Lortie and Docken's sites. Although this indicates a base map for the Park once existed, it was not available for the current study.

Robert Canby, Jr. (1982) provided the most comprehensive study of standing buildings and structures in the Park. His study provides a three-page Historic Resources Inventory form for each of the 46 buildings and structures identified. All of the buildings Canby recorded are located in the central portion of the Park, between State Route 174 and Little Wolf Creek. Some of the buildings are no longer standing, and new buildings that Canby did not record were identified during the current study. Although Canby provided a comprehensive inventory of the extant buildings and structures in the Park at that time, his assessment of construction dates was not always accurate.

Jensen and Associates (1991a) conducted a survey of about 40 acres along South Fork Little Wolf Creek. The study was carried out for a private development project, but the property has since been acquired by DPR and added to the Park holdings. The only previously known Native American site within the Park was identified on this 1991 survey, consisting of bedrock milling features on a low outcrop north of the creek.

Scott Green (2006) surveyed the Osborne Hill area south of Little Wolf Creek, and portions of the Park around the Orleans Mine, in association with another fire-suppression project. The incomplete draft report includes historic context and summary of several sites—some quite large—within a part of the Park that is very dense with historic-era mining remains (sites designated "EMSHP-1 thru 12-2006"). The project could not be completed, resulting in a document that is missing important elements, such as a table of contents, references, maps, and figures. Very thorough draft site records, however, were made available by DPR that provide much of the missing material, including sketch maps, extensive site histories, and references.

Denise Jaffke (2006) reported on a survey for a trail connector project through Woodpecker Ravine. Her study included archaeological sampling of an extensive domestic artifact deposit adjacent to the Empire Mine visitor center overflow parking lot. The linear survey was restricted to the trail alignment itself. The excavation is the only controlled archaeological study in the Park other than surface inventory. Par Environmental Services, Inc. (1991) and Levy (1992) both covered the lower portion of Woodpecker Ravine, with portions of their survey areas now within the Park boundary.

Lastly, MFG, Inc. (2008) prepared a survey report for mine and mill sites within the Park, specifically to assist the Restoration Project. Their methods involved compiling likely locations of mine and mill sites based on archival records, and then field-checking each location. Though findings were not documented on DPR historic resource or archaeological site forms, their long list and maps of anticipated mines and mills, as well as those identified in the field, is a very useful reference for cultural resources management.

Previously Documented Cultural Resources

There are 55 distinct, previously recorded sites/structures of an archaeological nature within the current Park boundary, and 46 documented standing buildings/structures. Additionally, there are another 15 sites located nearby (see Appendix B).

In some cases the same resource was addressed by multiple studies. Conlon mine and mill (ASC-21-08-2000), for example, was investigated by Lortie and Docken (1980), who designated the mine as OH-1 and the mill as OH-4, and by Scott Green (2006), who designated both the mine and the mill, as well as numerous other features, as EMSHP-01-2006. For the purpose of this summary the Conlon mine and mill is considered a single resource. Similarly, Canby (1988) documented the two standing transformer houses of the Pennsylvania mine and mill (ASC-21-08-2034), while Lortie and Docken (1980) designated the entire complex as PN-1. Appendix B provides a concordance linking all previously assigned temporary designations, state primary and trinomial designations, and the prevailing cultural resource designation assigned during the current survey. The common name or historic association and the OHP resource attribute code for each previously recorded resource is also provided, and the study responsible for identification referenced.

Although much of the land surrounding the Park has been surveyed with a far lower site density reported, close reading of the survey reports reveals numerous mining features that were not formally recorded. For example, on Jensen's (2004) survey of 250 acres on Osborne Hill—a project area surrounding the southern portion of the Park—10 features related to historic mining were documented only on a table within the report, with no Historic Resources Inventory forms completed. The author concluded, “there is simply insufficient integrity among the features representing the historic mining operations to justify preservation, exhibition, or recordation” (Jensen 2004:7). He further states that, “Intact and exhibition-quality components of the original historic mining features have been preserved within the adjacent Empire Mine State Park, and in fact elements of the Conlan [sic] Mine, located partially within the present project area, are preserved within the adjacent State park property” (Jensen 2004:8). The criteria used to define historic-era mining features as exhibition-quality in contrast to those not worthy of recordation is not clearly presented, but the consequence is an absence of comparative data on neighboring property.

The density and distribution of known resources, combined with the rich historical activity documented in the historic context (Selverston 2008), indicated that the survey would encounter substantial numbers of features throughout the Park, and provided insights into the likely distribution of various feature types. Information on previously documented cultural resources was reviewed prior to the survey and taken into the field during the survey for reference. Scott Green's (2006) site sketch maps were particularly useful for the Osborne Hill area.

SURVEY FINDINGS

Feature types identified throughout the Park as a result of the field survey, and the quantity of each, are presented in Table 1. Each feature type represents a distinct element of a site, or a single building, structure, object, or landscape. This tally includes both specific elements with known functions, such as the built environment of the mineyard and historic cottage grounds, as well as components of the Park's historic fabric, such as foundations of ruined mine, mill, and residential buildings and structures. All of these features are above ground. A single prehistoric resource exists within the Park: a bedrock milling feature on a small knoll on the north side, or navigational right bank, of South Fork Wolf Creek.

Table 1. Identified Feature Types in the Empire Mine Historic District

Feature Type	Count	Feature Type	Count	Feature Type	Count
Adit	42	Flume	2	Privy	5
Artifact	2	Foundation	168	Prospect	445
Artifact deposit	103	Garage/carriage house	7	Pumphouse	1
Automobile	1	Garden shed	1	Ramp	8
Bedrock milling feature	1	Gate	2	Reservoir	3
Berm	6	Guest cottage	3	Road	124
Blacksmith's shop	1	Headframe	1	Shaft	69
Canal	1	Hoist	1	Shed	3
Cellar	5	Hoist house	1	Single family dwelling	10
Channel	8	Hole	35	Single family dwelling/ conservatory	1
Chicken house/coop	2	Landscaping	2	Sluice box	1
Chimney	2	Lime shed	1	Tailings	5
Cistern	3	Machine shop	1	Tool shop	1
Clubhouse	1	Machinery	2	Trail	9
Compressor building	1	Mill structure	1	Tramway	2
Corral/stable	2	Mine manager's office/ refinery	1	Transformer house	4
Culvert	1	Mining landscape	23	Utility line	14
Cut	21	Monitor	8	Vegetation	3
Cut bank	29	Monument	23	Wall	60
Dairy	1	Mound	8	Waste dump	138
Dam	15	Orchard	4	Water box	1
Depression	6	Ore bins	1	Water tank	1
Ditch	125	Penstock	14	Well	2
Drain outlet	2	Pipe	8	Wood shed	2
Engineer's office	1	Placer tailings	2		
Fence line	37	Pond	1		
Flat	31	Pool	1		
Total Features/contexts					1,684

Historic Architecture

Nine buildings and structures associated with the Empire Mine and Mill Complex (ASC-21-08-2047) were inventoried: the machine shop, hoist house, transformer house, stamp mill ruins, lime shed, cyanide plant ruins, mine manager's office/refinery, and engineer's office/model room/core shed. Other structures associated with mining include two transformer houses at the Pennsylvania Mine (ASC-21-08-2034) and a headframe and ore bins at the Rowe Shaft (ASC-21-08-2067). The former transformer house on the Cassidy Mine has been utilized as a shed for the adjoining residence for many years and is included with that complex.

Seven buildings and ancillary structures associated with the Bourn Cottage grounds were inventoried: Bourn Cottage, Clubhouse, Stable Block/Visitor's Center, Conservatory, Bourn Garage, Starr Garage, and a pumphouse.

Another structure erected at the edge of the Empire Mill ruins appears to be a rudimentary and low-funded ore-processing facility. It was also not recorded by Canby but was inventoried in the current study.

The other inventoried architectural resources consist of nine single-family dwellings and their ancillary structures:

1. George Sing O'Yung residence, woodshed, garage, and two chicken houses;
2. "Pine Porches," the former mine manager's residence, relocated from inside the grounds near the mill ca. 1916 to its present site, and its guest cottage;
3. Engineer's residence, garage, woodshed, and guest cottage;
4. Mine worker's residence, former garage demolished;
5. Master Machinist's residence, garage and utility shed;
6. Craftsman residence, shed, shed/transformer house;
7. Cassidy residence, guest cottage, carriage shed/garage, garden shed;
8. Mine worker's residence, shed; and
9. Mine worker's residence, now Environmental Office; also not recorded by Canby.

Identified Property Types of the Empire Mine Historic District

The nearly 1,700 individual contexts recorded during the survey have been assembled into 499 discrete properties, as described in the Chapter II, representing 30 unique property types. The function of 5 of these resources has not been identified, comprising the unknown property type category. About 25 percent of the total—numbering 125 properties—are composed of multiple features relating to gold mining, habitation, or both. Table 2 lists the variety of property types present and the number of each. Appendix C presents all of the

properties identified in the District, and the location of each is depicted in Appendix D. Detailed records for every cultural resource discovered in the Park are provided electronically in Appendix E. These properties represent distinct feature systems that share a common historical or physical association. In some cases the association is well known, as is the case of the Empire Mine and several other gold mines that have been interpreted in the Park. For other properties the historic association has yet to be identified. Table 2 is organized by complexity, with the most diverse property types at the top of each column. “Complex” sites, such as a lode mine complex, contain elements related to both a specific economic activity, such as mining or agriculture, and domestic use. These property types have rich research potential because of the complementary nature of their components that allows technology to be understood in light of the social and demographic dynamics. At the other end of the spectrum are simple prospects, amounting to 45 percent of the total identified properties. Full definitions for each property type, focusing on the necessary constituents and examples drawn from the District, are presented below alphabetically for ease of cross-referencing. The function of five properties is currently unknown. Any of the identified properties may be reclassified in light of new findings.

Table 2. Identified Property Types in the Empire Mine Historic District

Property Type	Count	Property Type	Count	Property Type	Count
Lode mine and mill complex	4	Ranch complex	2	Dam/reservoir	4
Lode mine complex	6	Homestead complex	1	Ditch	40
Placer mine complex	5	Dwelling	17	Penstock	2
Mining landscape complex	2	Artifact deposit	28	Drain outlet	3
Ancillary mining complex	1	Ranch element	2	Wagon road	30
Lode mine and mill	5	Corral	1	Rural road	36
Lode mine	24	Orchard	1	Tramway	1
Placer mine	7	Fence line	6	Hole	10
Mining landscape	14	Utility line	9	Prospect	222
Tailings impoundment	3	Monument	8	Unknown	5
Total Identified Properties					499

Ancillary Mining Complex

The District contains a single ancillary mining complex. This property type consists of systems commonly found in association with ore extraction and processing, such as assays, offices, and workshops, as well as remains of domestic use. It is a distinct property when separated from mining and milling facilities by a reasonable distance. The single property in the District of this type also lacks a historical association to a specific operation, emphasizing its distinctness. ASC-21-08-2060 contains evidence of multiple buildings and structures related to assaying and storage—possibly of blasting powder—and domestic use. The dominant feature of the site is a substantial building with thick earthen-berm walls. Its unique reinforced architecture suggests a storage

function for the feature, possibly for explosives. A nearby road (ASC-21-08-1688) extends from the vicinity of the Empire Mine toward the site, terminating near the narrow doorway of the ruin. At least one more building was located north of the possible powder house, evidenced by structural remains and mid-late 19th-century domestic material. The presence of crushed quartz, crucibles, and cupules indicate assay activity. A rectangular depression behind the powder house, on the same side as the domestic material, is possibly the remains of a privy. A second artifact deposit, consisting mostly of sanitary cans from the 1930s-1960s, is located about 40 feet southeast of the powder house.

The archaeological features and artifact deposits of the site are located on Ophir Hill, near the Empire Mineyard, but within a small spur of the 1898 Tilden consolidated claim patented by W. B. Bourn. Bourn combined the Judd & O'Keefe and Tilden locations. The Tilden is pinched from the east by the ca. 1882 OK Quartz Mine claim of James McCann. Most of the mine development occurred within the northern portion of the claim, which was likely originally prospected well before Bourn claimed it. Joseph O'Keefe and John Judd were members of the Massachusetts Hill Company, but prospected on Ophir Hill and in Sebastopol Ravine in the 1850s. None of the maps of the area, going back to 1884, depict buildings or mining features here, indicating the activity in the north half of the site occurred before that time, probably ancillary to gold mining on the other side of the claim, or at the Empire.

Artifact Deposit

Survey identified 28 artifact deposits. This property type consists of sparse-to-dense concentrations of historic-era artifacts without evidence of temporary or permanent shelter or other structural features. The deposits can be sheet concentrations on the surface or accumulations filling natural or cultural hollow features, such as a gully or a privy. Though the survey did not seek out exclusively buried deposits, there may be a subsurface component to some of the surface artifact deposits identified; likewise, exclusively buried deposits may also be present. Artifactual evidence of dwellings or other shelters—such as large counts of fasteners, hardware, brick, and/or window glass—must also be absent from the assemblage for it to be considered in this category.

Artifact deposits devoid of habitation debris may be the result of remote roadside disposal, casual accumulation, or intentional discarding of waste near the site of a discrete activity. This site type can represent isolated or multiple dumping episodes, or mark the location of an activity set apart from habitation. Artifact deposits can accumulate in or near other property types, and possible relationships between properties should be taken into consideration at the District level. Additionally, undiscovered ephemeral evidence for temporary occupation may be present, as these sites may reflect temporary work camps. The southwest slope of Union Hill is particularly dense with artifact deposits dating to the early to mid-20th century.

Corral

A single corral property was documented during the survey. This property type is an enclosure for confining animals, typically livestock. The corral in the District, ASC-21-08-2035, was used for mules put to work in the mines, and is located between the Pennsylvania and Work Your Own Diggings operations. The enclosure was made by fastening three strands of wire rope to trees. Associated remains indicate a related structure within the corral, possibly for feeding, and a watering feature.

Dam/reservoir

Survey identified 4 dam/reservoir properties in the District. This property type consists of a barrier and/or impoundment constructed to hold or divert water. The dam component can be of earth or stone construction, and may have originally included wood elements. It can be conceived of as a landscape element. A dam/reservoir system may contain a ditch or evidence of a flume, and may be a component of one of the mine property types. ASC-21-08-1419 serves as an example from the district. This property is composed of an earthen dam across Little Wolf Creek, and a series of ditch segments extending northwest approximately one half mile to the W. Y. O. D. mine.

Ditch

Survey discovered 40 distinct ditches. This property type consists of an engineered water-conveyance channel. These features are typically of earthen construction with some stonework, and vary in top width from 1.5 to 11 feet. In some cases, ditches were lined with wooden boards, or found in association with flume remnants. The most common mining ditch is 3 to 5 feet wide from berm to berm, with a stone-filled berm along the downslope edge. Abandoned ditch cuts are frequently filled with alluvium and are prone to erosion—many survive only as single or multiple, noncontiguous segments. The berm is often reinforced with more stone where the ditch corners. A ditch is part of a larger system that includes a catchment or diversion at the beginning, such as a dam and reservoir, and that feeds an activity (like mining or milling) along its course or at the end. This property type does not include those catchment and end-use components, as that would make it another type, such as a dam/reservoir or placer mine. Many ditches recorded in the District represent only segments of systems that extend beyond the survey coverage. Ditch segments are also frequently elements of other property types, such as mines or dwellings. The need for water in gold processing required the excavation of many miles of ditches. Ditches can be conceived of as landscape elements.

Drain Outlet

There are 3 drain outlets in the District. This property type consists of an opening, typically in the bottom of a ravine, designed to drain underground workings at higher elevations than the outlet. Drain outlets may still be open, or collapsed but identifiable as such. Because they are for draining mines and not portals, substantial waste dumps or surface plant systems are generally absent.

An example in the District is ASC-21-08-2241. This particular resource consists of the remains of the Heuston Hill drain tunnel constructed prior to 1885, as it appears on the mineral survey plat of that year; the mine was originally developed to the east as early as the mid-1850s (Selverston 2008:20). The site now consists of a collapsed opening draining into a substantial ditch that is partially contained by a modest berm of waste rock. The ditch runs parallel to Little Wolf Creek before entering its north bank, where it is associated with a dwelling site from the same era.

Dwelling

There are 17 identified dwellings and dwelling sites in the District. This property type consists of an isolated dwelling—such as an extant house, cabin or tent flat—with no evidence of gold mining, agriculture, or other notable enterprise within the site boundary. Evidence of habitation may include standing residential buildings, or archaeological manifestations of habitation, such as stone or brick foundations, cellars, chimneys, flats, and/or structural artifact assemblages such as large quantities of brick, fasteners, or window glass. Small ancillary buildings or structures, such as a garage, workshop, or pump house, or their remains, may complement dwellings. Later-period homes of wage laborers are typically isolated dwellings, and it is assumed that many of the past occupants of the Park were associated with its gold mining history. This property type is relatively easy to understand chronologically given the types of remains characteristically present, such as artifact deposits.

ASC-21-08-2038 provides an example in the District that contains buildings, structures, and archaeological remains. The central component is the residence of Felix Cassidy, a miner who settled in the District by the 1870s, and whose home is depicted on the 1877 mineral plat for the Cassidy Consolidated Quartz Mine. A standing guest cottage, carriage shed/garage, and garden shed complement the built environment. The barn that was standing when the District was originally listed is now in ruins. Additionally, ruins of other buildings or structures and a substantial artifact deposit are present within the site boundary.

Fence Line

Survey documented 6 fence-line properties in the District. This property type consists of post and wire alignments that may involve stone masonry along the base as well. Less frequent are full stone fence lines of the type encompassing much of the Empire Mine's cottage grounds and mineyard. Post and barbed-wire fence lines were common beginning in the 1870s, and they are frequently an element of more complex site types. Many fence lines align well with property boundaries evident on historic maps. Given their linear nature and potential for identifying associations, fence lines can contribute to relative dating of District elements. They can be considered landscape elements.

Hole

Survey identified 10 hole properties in the District. Holes in the District are simple property types composed of a single opening in the ground surface

without any associated waste dump or back dirt, differentiating it from adits, shafts, and even prospects. They can be of any dimension, with some in the District extending 20 to 30 feet deep. They are common elements of other property types. They may represent ventilation openings for extensive underground workings, or provide a similar function. They may also be the result of caving within near-surface underground workings.

Homestead/Ranch Complex

Survey discovered 1 homestead complex and 2 ranch complex properties in the District. Although these two types are physically similar, the homestead variety possesses more archival material. A ranch/homestead complex reflects the core of a subsistence settlement, and consists of a mosaic of feature systems: artifact deposits, dwellings, and ranch or homestead elements. They typically include corrals, outbuildings, fence lines, and/or orchards as well. This property type represents the ubiquitous subsistence farm or homestead that characterizes rural settlement across the West. Evidence of habitation can be one or more features or artifact deposits indicating a dwelling. Typically, water systems and transportation networks are components of ranch/homestead complexes as well, although not necessarily. These feature systems represent a homestead complex when they are located within a patented Homestead claim.

Lode/Placer Mine

Gold mines are common property types in the District, with 24 lode mines and 7 placer mines identified during the survey. A gold mine contains lode and/or placer extraction feature systems, depending on the type of mineral deposit targeted. A lode or placer gold mine property, for the purposes of this typology, reflects the dominant extraction type reflected in the landscape, contains no habitation evidence, and can be conceived of as a landscape element. Many of the lode mines in the District are well known and included within the Park interpretive program, such as the Betsy (ASC-21-08-2008), Golden Treasure (ASC-21-08-2029), and Rowe operations (ASC-21-08-2067).

A lode mine typically consists of multiple feature systems that may include adits, shafts, ore car or tramway systems, cuts, waste rock, surface plants, ventilation systems, hoist works, drainage systems, and/or tangible evidence of any of these. It can be as simple as a single incline shaft portal with an associated dump, or as complicated as a combination of all these features. Artifacts related to assaying ore value, such as bone ash cupels, are not uncommon. A placer mine typically consists of series of mining features, including stacked or piled placer tailings, stacked-stone alignments, channels, sluice or hydraulic cuts, coyote holes, or drifts. It can be as simple as a single placer tailing along a creek or as complicated as a combination of all the typical features. Water systems and transportation networks are common components of placer and lode mines. Substantial mines with multiple features are usually related to nearby habitation sites. The possibility of finding evidence of associated dwellings recorded under a different designation (i.e., within an adjacent or nearby property) should not be precluded.

Lode Mine and Mill

Survey identified 5 lode mine and mill properties in the District. This property type contains the same feature types as the lode mine property type, with the addition of feature systems associated with beneficiation, or ore processing. Once ore is extracted from a mine, valuable minerals must be separated from undesirable ones, an activity that can involve crushing, stamping, screening, flotation, amalgamation, and smelting (Cowie et al. 2005:13–24). Various maps and historic literature describe “Sulphuret Works” in the region. Fay (1920:662) defined sulphuret as “undecomposed metallic ores, usually sulphides,” generally gold-bearing pyrites. Common mill elements include stamp or other types of mills, tailings, and collection facilities such as concentrators or flotation systems. The five sites of this type in the District are the Orleans mine and mill (ASC-21-08-2045), the Pennsylvania mine and mill (ASC-21-08-2034), the Woodworth mine and mill (ASC-21-08-2006), remains of what appears to be a very early operation on the Old Heuston Hill claim, sandwiched between the Sebastopol and Biggs claims (ASC-21-08-2013), and the Tracy quartz mine Sulphuret plant of the 1890s (ASC-21-08-2081).

Lode Mine and Mill Complex

There are 4 lode mine and mill complex properties in the District. This property type is the most diverse resource class in the Park, containing a combination of buildings, structures, objects, features, and artifacts associated with ore extraction, beneficiation, and habitation. This property type reflects intensively developed mine operations, including the Conlon (ASC-21-08-2000), Empire (ASC-21-08-2047), Prescott Hill (ASC-21-08-2010), and Work Your Own Diggings, or W. Y. O. D. Mine (ASC-21-08-2028). See descriptions under Lode Mine and Mill, as well as Dwelling, for information regarding anticipated feature systems.

Lode/Placer Mine Complex

Survey discovered 6 lode and 5 placer mine complex property types in the District. A gold mine complex reflects mining activity and residential occupation. This property type can represent a solitary prospector working a small deposit, a hard-rock mine and work camp, or a company of miners ground sluicing an entire streambed. Typical mining and habitation components are defined under Lode/Placer Mine and Dwelling. Evidence of habitation can be one or more features or artifact deposits indicating occupation. Water systems and transportation networks are common components of mining complexes. Examples include Daisy Hill (ASC-21-08-2003), Sebastopol (ASC-21-08-2011), Fillmore (ASC-21-08-2044), and a series of operations in the Town Talk Placer Mine (ASC-21-08-2082, ASC-21-08-2083, and ASC-21-08-2088).

Mining Landscape

Analysis of survey findings identified 14 mining landscapes. This property type consists of densely organized lode and/or placer prospecting and/or extraction feature systems. Although reflecting intensive mining activity, mining

landscape properties generally lack evidence of developed surface plants (e.g., hoist works, power generators), beneficiation or ancillary facilities, and habitation. Sparse or isolated historic artifacts may be present, such as a shovelhead or a shard of bottle glass, but they are not considered to constitute formal deposits nor do they necessarily represent dwellings or other buildings or structures. Lode mine landscape properties are characterized by uneven and cratered ground surface created by prospecting and extraction activity. The result can appear like animal burrows, leading to the popular period term, coyoteing. Gudde (1975:392) described the term as a mining method “likened to the digging and burrowing of the coyote.” Placer mining landscapes are characterized by a cut bank and placer tailings, and are differentiated from placer mines by less-focused systems. Whereas a placer mine contains clear feature systems, a landscape is undefined and/or obscured by existing conditions. Many of the mining landscapes identified in the District contain both lode and placer feature types that can be difficult to distinguish.

Mining Landscape Complex

Two mining landscape complex properties have been identified in the District. This property type is essentially the same as a mining landscape, with the addition of one or more associated artifact deposits. The result is a class of resource with a heightened research potential, in which mining processes can be understood in light of material culture. The two properties identified consist of coyote-burrow-like craters with artifact deposits on the hills north and south of Little Wolf Creek. One is located on the ridge in the south end of the Cassidy Consolidated claim, and the other on the bank of Sebastopol ravine, just outside of the ca. 1869 mineral claim of the same name. The latter mining landscape complex is associated with a particularly rich artifact deposit pre-dating 1880 on a flat above and within coyoteing features. It reflects a camp of miners dating from the early rush to the region.

Monument

There are 8 monument properties in the District. This property type consists of isolated survey or property markers. This feature type is fairly common in the District, with 15 additional monuments considered elements of other property types. Monuments typically consist of an upright stake or post made from a pipe, tramway rail, or milled lumber, fortified at the base with a stone cairn in some cases. The two isolated monument properties, as well as many of the features, are pipes driven into the ground with engraved or painted designations. These can be considered landscape elements.

Orchard

Survey discovered 1 orchard property. This property type consists of fruit or nut tree plantings, or their remains, that generally retain an organizational layout, usually rows. Fence lines and irrigation elements can be components. While often elements of other property types, namely a homestead/ranch complex, an orchard property type is devoid of dwellings or other substantial facilities.

Orchards can be considered landscape elements. The mixed fruit orchard in the District, ASC-21-08-2229, is located on the open valley south of South Fork Little Wolf Creek, on land originally settled by George Wilson by 1876, and later by Michael Manion (Selverston 2008:30).

Penstock

Survey identified 2 penstock properties in the District. This property type consists of an alignment or segments of an enclosed conduit made of riveted metal for conducting water. Penstock is frequently a component of lode and placer operations, as well as an element of the more ubiquitous water-conveyance system, the ditch. Distinct penstock properties must be composed of primarily penstock, buried or elevated, in an alignment that transcends distinct property boundaries. One of the identified penstock properties in the District, ASC-21-08-1206, consists of the substantially intact remains of the water system put in place under the direction of William Bowers Bourn, Jr. in 1886 to replace steam power. The structure originated on Union Hill, passed through the Empire Mine and Mill Complex, and exited the west side of the District on its way to the North Star, which Bourn had purchased in 1884, and then on to the Allison Ranch Mine, where it was used a third time.

Placer Mine

See Lode Mine.

Placer Mine Complex

See Lode Mine Complex.

Prospect

There are 222 isolated gold mining prospects in the District identified. This property type generally indicates lode exploration that did not lead to a developed mine. A gold mining prospect consists of one or more exploratory excavations, generally shallow in nature, isolated from any developed mining, and devoid of habitation evidence. Excavated material, typically quartz or other parent rock, has been piled around or adjacent to the prospect. A prospect can be conceived of as a landscape element. Densely clustered prospects can be considered mining landscapes. Prospects that are elements of other property types, such as a mine or mining complex, are not counted as this property type.

Ranch Complex

See Homestead Complex.

Ranch Element

Two nearby ranch elements were discovered during the survey, located on the ridge above the Park's hard-rock trail, on the south side of Little Wolf Creek. This property type consists of limited ranch or farm components devoid of substantial habitation features. They can represent a variety of isolated activities scattered throughout large operations. There can be evidence of ancillary buildings or structures in the form of foundations or pads, but associated artifact

deposits should be sparse and task-specific, not representing prolonged or intensive habitation. These properties can be considered landscape elements. The two identified ranch element properties in the District, ASC-21-08-2018 and ASC-21-08-2019, are located within the ca. 1876 agricultural patent of Francois Sauvee, a French immigrant who farmed and mined in the District during the second half of the 19th century. Archival records indicate that W. H. James and John Williams, both English-born miners, resided in the immediate area during the 1880s, possibly leasing from Sauvee (Selverston 2008:30).

Rural Road

Analysis of survey results identified 36 rural road properties in the District. One of the more common property types in the District, they consist of a graded, two-track roadbed ranging in surface width from 10 to 15 feet, and wider in a few cases. Associated features, such as culverts, may be present. Rural roads represent the classic narrow country road that dominates the region's rural landscape. They do not typically incorporate stone masonry. Pavement is rare and not necessary for this classification. They may be considered an integral landscape element.

Tailings Impoundment

The District contains 3 tailings impoundments. These are generally large types of properties designed to contain fine sediment debris disposed at the tail end of a beneficiation process, such as a stamp mill. The two larger properties in the District use substantial dams constructed in 1917 across drainages using mine waste rock, one for the Empire mill (ASC-21-08-2041) and the other for the Pennsylvania mill (ASC-21-08-2242). A smaller tailings impoundment is located at the mouth of Sebastopol Ravine, at its confluence with Little Wolf Creek. A small milled-wood fence-like dam with wire nails contains the tailings sediment. The mill responsible for the tailings is not clear, although the Prescott Hill or Orleans operations are the most likely candidates.

Tramway

A single tramway property was identified in the District. This property type represents narrow-gauge tramway grade alignment and associated features. This type of feature system is common in lode mines, and often found associated with waste dumps. To be a distinct property, a tramway must not be limited to a single mining operation. The solitary tramway property discovered in the District, ASC-21-08-250, is located in the Osborne Hill area, originating at the Prescott Hill Mine and Mill Complex, and extending south, across the Sebastopol claim, where it winds below the Betsy Mine before exiting the east side of the District. The Sultana Gold Mining Company developed the Prescott Hill shaft from 1903 until 1916.

Unknown

Survey discovered 5 relatively isolated elements for which no feature system has been determined, including two walls, one flat, a mound, and a cement

foundation. They do not seem to be elements of larger feature systems. Their association and purpose may be evident given more research.

Utility Line

Survey identified 9 utility line properties in the District. This property type consists of various transmission lines, most commonly for electricity and water, and possibly telegraph or telephone service as well. Electrical and other elevated types consist of wood utility poles—either standing or the stumps of cut-down poles on razed lines—that often occur with glass or ceramic insulators, wire, and/or other hardware; a series of high-voltage tower cement footings extend into the District from the west to the Cyanide Plant area; crossbars and other elements fixed to trees provide further evidence of electricity transmission. Although electricity was generated in Nevada County during the late 19th century, it was not until the 20th century that it achieved widespread use. Rigid 1-inch ferrous pipe and 4-inch terra-cotta lines provide evidence for water delivery and drainage. These properties are considered landscape elements.

Wagon Road

Survey identified 30 wagon road properties in the District. This fairly common property type consists of narrow, two-track alignments and associated features. Wagon roads range in surface width from 6 to 9 feet and may include dry-laid stone-masonry components and/or an earthen berm along the downhill edge. Some wider wagon roads were used into the 20th century because they could accommodate motorcars. The narrow width, stonework, and downhill berm all indicate 19th-century construction for wagons. They may be considered an integral landscape element that may aid in identifying temporal relationships among properties. A wagon road crossing the Daisy Hill claim, ASC-21-08-47, retains substantial stone masonry along the downslope side.

IV. DISCUSSION AND MANAGEMENT CONSIDERATIONS

The intensive cultural resources survey of the Empire Mine State Historic Park identified a total of 499 properties representing 30 distinct property types, as well as 5 properties currently considered as an unknown type of property. Not surprisingly, resources primarily relate to lode prospecting, mining, milling, and associated settlement; placer mining and agricultural settlement are represented to a lesser extent. A single bedrock milling feature along South Fork Wolf Creek within a ranch complex (ASC-21-08-2091) constitutes the only identified evidence of past Native American activity. About 25 percent of the resources in the Park comprise multiple feature systems representing complex operations, such as those associated with the Empire Mine and Mill complex (ASC-21-08-2047), as well as smaller operations. The remaining 75 percent are simpler property types, such as ditches, roads, and prospects. The number and definition of each property type is presented above; all identified properties are listed in Appendix C, and depicted on location maps in Appendix D. Full sets of Department of Parks and Recreation 523 forms for each identified property are provided electronically in Appendix E.

This survey was an intensive surface effort with a high degree of confidence that visible features have been identified. Nevertheless, it is likely that additional resources are present within the limits of the Park, particularly in areas demonstrably dense with resources. Vegetation varied considerably in the Park, with fire-suppression practices creating good conditions for survey in some areas, while other portions were thick with vegetation that may have hidden cultural features. Similarly, there is potential for buried resources, particularly within identified properties. Fire insurance maps dating back to 1898, for example, indicate various buildings and structures unaccounted for in the survey results that may have left deposits below ground; these maps exist for the Empire, Orleans, Pennsylvania, Golden Treasure, and Work Your Own Diggings. Because additional elements will most likely be discovered within identified property boundaries, the total number of multi-feature complex properties should not significantly increase; most if not all mine development, beneficiation, and settlement activity is accounted for. Prospects—currently numbering 222 properties—are ubiquitous, and there is a high chance that more will be discovered. Additional Native American resources, which may be obscured by vegetation, buried below the ground surface, or even below disturbed historic surfaces (e.g., below tailings or dumps), can also be expected.

Most identified properties are likely contributors to the Empire Mine Historic District. Many of the cultural resources would complement the interpretive goals of the State Historic Park system, offering further detail on Empire operations and illuminating the rich mosaic of stories apparent in this Park's historic landscape. The 1973 NRHP nomination is deficient in addressing this high number and variety of potentially contributing elements. Based on these findings, ASC recommends evaluation investigations followed by a NRHP nomination update.

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