HISTORIC CONTEXT FOR
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

ASC
ANTHROPOLOGICAL STUDIES CENTER
SONOMA STATE UNIVERSITY

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Northern Service Center
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I. INTRODUCTION

The State of California, Department of Parks and Recreation (DPR) owns the 856-acre Empire Mine State Historic Park in Grass Valley, Nevada County, California (Figure 1). Newmont Exploration Limited owned a majority of the Park prior to DPR's acquisition and much of the surrounding land, and still retains the mineral rights. Many gold mines operated throughout the Park, from the Gold Rush until Empire Star Mines Company ceased operations in 1956. 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 Department of Toxic Substances Control and Central Valley Regional Water Quality Control Board to remediate the property. The purpose of the Environmental Restoration Project is to investigate and remediate any existing surface contamination caused by past mining activities at the Park. The State of California, Department of Toxic Substances Control, and the Regional Water Quality Control Board are overseeing remediation activities. Investigations have been undertaken to determine the scope and methods of remediation; and other studies are pending.

The Park was nominated to the National Register of Historic Places (NRHP) in 1970. The nomination was updated with more historic 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. No other buildings, structures, objects, sites, or landscapes were identified or evaluated. The 1973 Park area was used to establish the District boundary. The Park has increased in size since that time, and the original District boundary may not have encompassed all of the elements contributing to its historical significance. Prior to any remediation activities associated with the Environmental Restoration Project, DPR must determine the impacts on contributors to the District. Accordingly, potential contributing elements—including archaeological and landscape property types 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 of the Park, and to update the NRHP listing for the District, in conjunction with the production of the Environmental Restoration Project's Environmental Impact Report. Section 106 of the National Historic Preservation Act, codified at 36 Code of Federal Regulations Part 800, specifies how potential historic properties are to be inventoried, evaluated, and treated. Historic contexts provide the foundation for decisions under the Section 106 Process (NPS 1997:1). This report is designed to be a broad historic context for the Empire Mine Historic District. There have been many histories written specifically about the Empire Mine, but they generally focus on the Empire to the exclusion of the numerous other mines in the area's history. In order to consider the full range of cultural

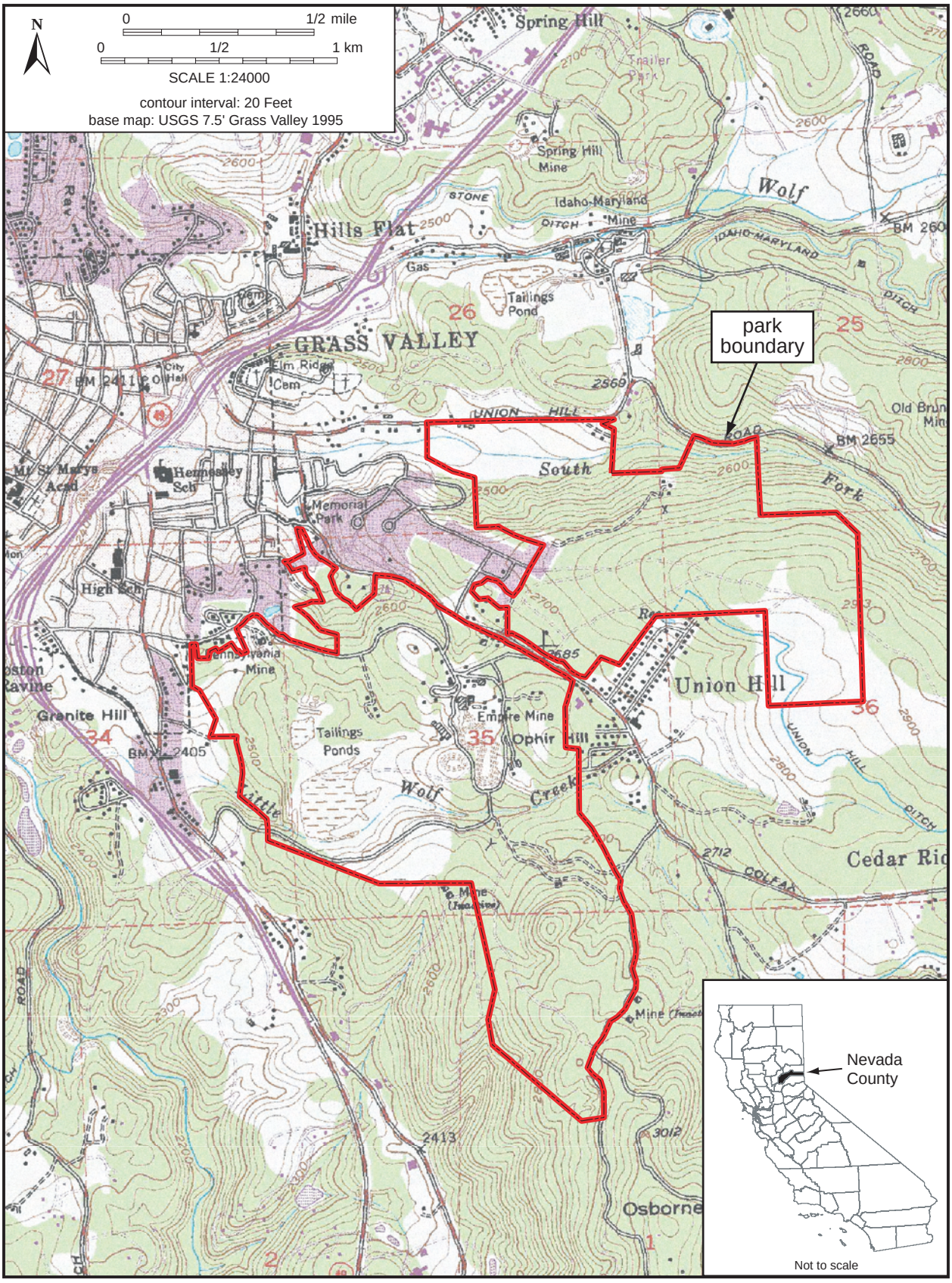

Figure 1. Location of the Empire Mine State Historic Park.

resources throughout the Park, a broader approach is necessary. At one level the information contained here presents the broad historic context for gold mining across the state, in order to understand the fundamental trends and periods of significance. On another level, this context is intended to provide specific knowledge regarding the historical activities that occurred here in order to help identify and assign associations to cultural resources located within the Park boundaries. This context is based on California Office of Historic Preservation (1990:8) format presented in *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format*, specifically the section on setting, and follows the Guidelines for Documenting a Historic Context as presented in National Register Bulletin 16B, *How to Complete the National Register Multiple Property Documentation Form* (NPS 1999). Given the District's gold-mining focus, National Register Bulletin 42, *Guidelines for Identifying, Evaluating, and Registering Historic Mining Properties* (NPS 1992) was also taken into consideration.

II. NATURAL SETTING

ENVIRONMENT

The Empire Mine State Historic Park encompasses approximately 856 acres located in the western foothills of the Sierra Nevada at elevations of about 2,500 to 2,900 feet above mean sea level (amsl). The central portion of the Park includes Ophir Hill (called Houston Hill on the 1896 Folio by Lindgren) and a gradual slope toward the west. The Park also takes in the western and northern portions of Union Hill to the northeast, across Woodpecker Ravine, and the northern portions of Osborne Hill to the south, across Little Wolf Creek (called Ophir Ravine on the 1876 mineral survey plat for the Pennsylvania Mine). There are a series of small hills along the ridgeline between the summit of Osborne Hill and Little Wolf Creek that have acquired various names like Daisy Hill and Prescott Hill. Large flats and valley floors are located within a mile to the north, where the townsite of Grass Valley developed. The peaks and ridges of the Park are entirely drained by Wolf Creek, Little Wolf Creek, South Fork Wolf Creek, and their tributaries. In turn, Wolf Creek drains southerly into Bear River, which heads west across the Central Valley until it joins the Feather River, and on to the Sacramento River and Delta.

Sierra Nevada topography reflects its geologic history. The mountain range initially formed as sedimentary seabed along the continental shelf that became recrystallized by prolonged heat, resulting in long, north/south-trending belts of metamorphic rocks (Alt and Hyndman 1975:89). Molten lava intruded these belts, creating intrusive igneous granitic batholiths that have been uplifting for millions of years. The uplift occurred predominantly along the eastern, north/south axis, where it was crowned by a chain of volcanic activity and resulting extrusive igneous rocks. The result of this activity is a steep eastern face and a gradual western slope. The range tops out at 14,494 feet amsl at Mount Whitney, far to the southeast, while the summits directly east of Empire Mine SHP do not exceed 11,000 feet amsl. Donner Pass, the gap through the summit to the east, is just over 7,000 feet amsl. Periods of glaciation in the higher elevations occurred over the past one million years, terminating at the end of the Pleistocene Ice Age about 10,000 years ago. Perpetual erosion across this dramatic topography has exposed sedimentary, metamorphic, and both intrusive and extrusive igneous rocks.

Warm, dry summers and cool, wet winters dominate the climatic pattern. Summers are generally dry, with average maximum temperatures in the Grass Valley area between 80 and 93 degrees Fahrenheit (Storer and Usinger 1963:27). The Sierra Nevada catches moisture during the winter from the prevailing eastbound winds as rain and snow. This annual pattern has resulted in a lush environment over the broad western slope, which is dissected by many deep stream valleys and numerous springs. The primary river systems flow westerly from the summit. The western foothills in the Empire Mine area that lie between 2,500 and 3,000 feet amsl receive between 25 and 80 inches of rain

annually, with average minimum winter temperatures between 29 and 42 degrees Fahrenheit (Storer and Usinger 1963:27). The Grass Valley area is below the snowline and, although some snow falls at this elevation, it typically melts within days or weeks. The steep eastern slope, in contrast, is dry and arid, with predominantly desert-like conditions.

Empire Mine SHP is within the lower reaches of the Yellow Pine Belt (Storer and Usinger 1963:6). This floral community extends from about 1,200 to about 5,500 feet amsl along this latitude, and is considered the primary timber zone of the Sierra Nevada. Dominate tree species of this zone include yellow and sugar pine (*Pinus ponderosa* and *Pinus lambertiana*), Douglas and white fir (*Pseudotsuga menziesii* and *Abies concolor*), incense cedar (*Libocedrus decurrens*), black cottonwood (*Populus trichocarpa*), black oak (*Quercus kelloggii*), broadleaf maple (*Acer macrophyllum*), and California dogwood (*Cornus nuttallii*). Common shrubs are kit-kit-dizze—also known as mountain misery (*Chamaebatia foliolosa*), prostrate ceanothus (*Ceanothus prostratus*), and western azalea (*Rhododendron occidentale*). Sugar pine generally dominates at the higher elevations of this belt, while the yellow pine—also known as ponderosa pine—is more common in the Park. In addition to these Denise Jaffke (2006:3), during her Empire Mine SHP survey, noted the presence of Jeffrey pine (*Pinus jeffreyi*), manzanita (*Arctostaphylos* spp.), Scotch broom (*Cytisus scorarius*), poison oak (*Rhus diversiloba*), willow (*Sailx* spp.), blackberry (*Rubus* spp.), wild iris (*Iris* spp.), soaproot (*Chloragalum pomeridianium*), wild rose (*Rosa californica*), and various ferns.

SIERRA NEVADA GOLD

Gold is a widely distributed natural resource appearing on the periodic table of elements as Au—derived from the Latin *aurum*, meaning shining dawn. It is a relatively soft metallic chemical element, initially deposited when extreme heat and pressure from molten rock forces open fissures into existing igneous rock bodies, allowing mineral mixtures to intrude and cool. Gold was deposited in the Sierra Nevada 100 million years ago, when “vast amounts of molten granite were injected, as many small intrusions, into and under the overlying folded strata [belts]”of metamorphic rocks, and subsequently uplifted (Storer and Usinger 1963:17). Gold has a relatively low melting temperature and is easily transported in blends of molten minerals. As the minerals cool they separate and harden within the fractures to form veins. Gold will form in the metallic state as dust, grains, flakes, or nuggets, along with tellurides and other minerals. Gold is typically so finely distributed with more predominant minerals, particularly in quartz veins, that it may not be visible. A lode is the ore formation containing concentrations of gold. Erosion exposes and breaks down lode deposits. Gold that is freed from its parent vein—or mother lode—is found in a variety of sedimentary classifications, such as auriferous placer deposits in streambeds. Placer gold can be traced back to the parent lode deposit in some cases.

The Sierra Nevada has been the source of most of California's gold production and contains the greatest number of gold districts. Much of the gold mineralization is in the metamorphic belt along the western foothills, with some significant deposits within batholithic granitic bodies. Serpentine bodies often parallel or occur within gold belts in the region. The well-known Mother Lode is an extensive series of lode gold veins that has been widely interpreted since the mid-19th century, and popularly misunderstood to encompass all gold-producing regions of the Sierra Nevada (Gudde 1975:413). William Clark provided the prevailing definition as a "120-mile-long system of linked or en echelon gold-quartz veins and mineralized schist or greenstone that extends from the town of Mariposa, north and northwest to northern El Dorado County" (1979:15). As such, the Mother Lode does not encompass Empire Mine Historic District. The other lode deposits throughout the Sierra Nevada, however, have been just as productive as the interconnected Mother Lode. In fact, gold mineralization in the vicinity of Grass Valley has produced, in Clark's estimation, "the richest and most famous gold-mining district in California" (1979:54).

Quartz, often the parent lode matrix, breaks down relatively rapidly by weathering and disintegration and releases gold into a variety of placer types, depending on the distance it travels from its exposed source. All of the past and present watercourses flowing through gold-bearing lode deposits in the western foothills contain placer gold. Naturally free gold originating in the extensive lode belt through the territory, settled in most of the alluvial sediments downstream. The Feather, Yuba, and American rivers and their tributaries, including Wolf Creek, have yielded the most placer gold taken from the Sierra Nevada (Clark 1979:19).

Presented below is a typology of placer deposits developed by John Wells (1969:11–17), mining engineer with the Bureau of Land Management; the classification is predicated largely on the role of water in moving gold through various depositional contexts as it travels farther from its parent lode.

Residual Placers

Residual placers are concentrations of gold at or near the point of release from the parent lode. They may be rich but are not likely to be large and, as a class, they have been a relatively unimportant source for mining.

Eluvial Placers

Eluvial placers are a transitional phase between residual placers and water-born deposits. They form irregular sheets of surface detritus across hillsides below parent lodes that may have slumped or washed downhill a short distance, but that have not been transported by water.

Stream Placers

Stream placers are auriferous sediments in active waterways. They are the most widespread type of non-lode gold deposit and are separated into four types: gulch placers, creek placers, river deposits, and gravel-plain deposits: **Gulch**

placers are poorly sorted auriferous gravel and angular detritus from adjacent hillsides in minor drainages with small steep gradients. Gravel accumulations are generally thin and noncontiguous and contain gold that is typically coarse and well-concentrated on bedrock. Wells points out, that early miners found and depleted most of these sources. **Creek placers** are isolated pockets of auriferous gravel in active, perennial creeks. Early mining or subsequent rushes, such as during the Great Depression, also depleted most creek placers. **River deposits** in the form of bar or bank placers are extensive gravel flats in or adjacent to the beds of existing rivers. These deposits are similar to creek placers, but with finer gold and well-rounded gravel resulting from more abrasion and time in the water. **Gravel-plain deposits** are large, well-sorted auriferous sediment plains where a river canyon flattens and widens or enters a wide, low-gradient valley. This type of deposit contains widely distributed fine gold particles. In California, gravel-plain deposits have been subjected to extensive dredging in the late 19th and early 20 centuries.

Bench Placers

Bench placers comprise remnants of stream placers left behind, often on hillsides, as the bed cuts downward. Early miners referred to these placers as “hill diggings,” or as “high” or “low” benches when multiple phases of stream development left vestiges at different elevations on the canyon walls. These are not bank deposits alongside active streams, but long-abandoned segments exposed high up on canyon walls, midslope terraces, or ridgelines.

Tertiary Placers

Tertiary placers are remnants of ancient stream placers deposited during the Tertiary age, some 50 to 2 million years ago. They are abundant in the Sierra Nevada and typically located deep under lava-capped, flat-topped mountains, below as much as 1,500 feet of younger gravel and volcanic flows. Geological uplifting characteristic of the Sierra Nevada has raised these capped channels to well above active streams. Tertiary gravel has been found to contain rich placer deposits that were extensively worked by large-scale hydraulic mines, and, to a lesser degree, by drift mines.

William Clark (1979:57) summarized the specific gold geology of the Grass Valley Mining District. The region is characterized by a 5-mile-long (north/south) by 1/2-mile-wide granodiorite body which intruded into preexisting metamorphic rocks, and which is itself dissected by numerous dikes. The western portion of the Empire Mine SHP overlies this large batholithic body. Dark greenstone deposits rich in serpentine are to the east and west of the intrusive body below much of the Park, stretching from the Visitors Center in the north to the Osborne Hill area in the south. The Union Hill area consists of Tertiary gravel capped by andesite, tuff, and breccia—an extrusive igneous composition. Gold ore veins are present in both the granodiorite and dark greenstone. Placer deposits are present in the slopes and drainages associated with the lode deposits, and in the capped Tertiary gravel of Union Hill.

III. CULTURAL SETTING

PREHISTORY

The prehistory of the Grass Valley area is appropriately viewed within the framework of the cultural sequence of the greater northern Sierra Nevada. Kathleen Hull (2007) recently summarized the archaeology of these rugged mountains, describing 10,000 years of occupation, drawing from culture histories of both the Great Basin and California's Central Valley and coast. Denise Jaffke (2006) has presented this northern Sierra prehistoric cultural chronology specifically for the Empire Mine State Historic Park as follows: Pre-Martis (more than 5,000 years ago); Martis complex (5,000 to 1,300 years ago); and Kings Beach complex (1,300 to 150 years ago). Both Martis and Kings Beach represent seasonal use of the uplands, with movement to the lower elevations below the snowline in the fall and winter (Markley and Henton 1985:13). Archaeological work in the immediate Grass Valley area has been too limited to fully appreciate how local prehistory articulates with the overall pattern of the western slope.

Small mobile groups likely crossed the Sierra Nevada foothills between about 5,000 and 10,000 years ago (3000 to 8000 B.C.), reflected in predominantly hunting-based—and sparse—assemblages. Pre-Martis people from about 8,000 to 10,000 years ago are distinguished by their Paleoindian or Early Holocene tradition of large stemmed and, occasionally, fluted points (Hull 2007:185; Meals 1994:5). The people from about 5,000 to 8,000 years ago left behind Humboldt concave-base, Borax Lake wide-stemmed, and various Pinto projectile points, as well as handstones and millingslabs, characteristic of the Early Archaic tradition, or Spooner phase (Meals 1994:5; Selverston et al. 2005:46). Although these artifacts are rare in the western Sierra Nevada, it is inferred that small hunting bands carrying little in the way of durable material culture sporadically traversed the region (Meals 1994:5).

More sedentary, low- to mid-elevation settlements relying on a diversified subsistence base developed after 5,000 years ago (3000 B.C.; Hull 2007:189). Named for its type site located in the Martis Valley (CA-PLA-5), the Martis complex is distinguished by basalt flaked-stone scrapers, drills, large dart points, and handstones and millingstones. Contracting and split-stem points mark the Early phase, between 5,000 and 3,000 years ago, while corner-notched and eared points reflect the Late phase, dating to between 3,000 and 1,300 years ago (Jaffke 2006:5). Martis sites uncover a culture who hunted large game like deer, antelope, and mountain sheep, and who collected the seeds of conifers and grasses and ground them into a meal (Meals 1997:7).

Ric Windmiller (1995:4), among others, attributes Martis to Hokan-speaking ancestors, although this hypothesis has generated considerable debate (Baumhoff and Olmstead 1963; Eshleman and Smith 2007; Markley and Henton 1985). Moratto (1984:551) has postulated that "California probably was largely a Hokan province" between 6,000 to 4,000 years ago. The ethnographically known Hokan-speaking groups are isolated from one another, scattered across

northern, mountain, and coastal California—including Washoe, Shasta, Pomo, and Chumash, to name a few (Golla 2007:78; Hull 2007:180; Kroeber 1925:569; Shipley 1978:81). The conventional wisdom is that Washoe—and other Hokan speakers—represent "the eroded remnants of formerly widespread language groups," presumably including the people who lived in the Grass Valley area between about 3000 B.C. and A.D. 700 (Golla 2007:78).

Hull (2007:182) points out significant archaeological differences between the Martis complex and the subsequent Kings Beach complex that was deposited between 1,300 years ago and the Gold Rush (A.D. 700 to 1850). Jaffke (2006:6) cited important technological changes apparent in the archaeological record, including the emergence of bedrock milling and its popularity during the past 500 years, and the replacement of basalt spear and dart points with small chert and obsidian side-notched or contracting- stem arrowheads between 1,500 and 750 years ago (A.D. 500 to 1250). Rosegate and Gunther series points mark the Early Kings Beach phase from 1,300 to 800 years ago (A.D. 700 to 1200), while Desert Side-notched and Cottonwood series are typical of the Late phase from 800 to 150 years ago (Meals 1994:5).

The Late Kings Beach Phase is generally attributed to the ethnographic, Hokan-speaking Washoe population (Jaffke 2006:5). However, recent DNA studies reported by Eshleman and Smith (2007) do not support that the change in assemblages between Martis and Kings Beach is due to the arrival of Penutian-speaking groups like the local Maidu within the past 2,000 years. They argue, while conceding limited data, that "the Penutian Spread into California seems to have been a more recent Late Period phenomenon" (Eshleman and Smith 2007:298). This attribution of the Kings Beach complex to supposedly older Hokan-speaking Washoe instead of Penutian-speaking Maidu further unhinges the linkage between material culture and population movements. The nexus between various language groups and the prevailing view of "gradual elaboration of the technological and subsistence bases with a progressive refinement of social, political and ceremonial aspects of culture" (Jaffke 2006:6) remains elusive.

ETHNOGRAPHIC HISTORY

Native informants interviewed by Hugh Littlejohn in 1928 said that Hill Nisenan lived in the settlement of *Sipony,* located a few miles east of Grass Valley (Carlson 1986:10). Another village or camp located near Grass Valley, in the vicinity of Gold Hill, was occasionally occupied in the early 1850s by an "Indian chief" named Wemah and his "tribe" (Poingdestre 1895:9). In all, five major villages have been noted within a 6-mile radius of town, including on Osborne Hill, in the southern reaches of Empire Mine SHP (Chalmers 2006:10).

Carlson (1986) and Wilson and Towne (1978) have compiled substantial ethnographic data regarding the Nisenan. This group, also known as the Southern Maidu, claimed the Yuba, Bear, and American river watersheds,

extending from the Sierra Nevada summit to the Sacramento River (Wilson and Towne 1978:388). Their word *nisenan* (nee-ce-non) means 'from among us' (Chalmers 2006:9). The Northern Hill Nisenan spoke a dialect of the Nisenan language. Nisenan is a member of the Maiduan language family (attributed to the Penutian language stock), which also includes Konkow Maidu, Chico Maidu, and Mountain Maidu. The Maiduan languages were spoken throughout an area extending northward to the Feather River, Lassen Peak, and Honey Lake (Riddell 1978:371). Linguist Victor Golla (2007:77) proposes that Maiduan speakers migrated from the northwestern Great Basin into the Sierra Nevada, where they were cut off about 1,000 years ago, and that these Penutian speakers integrated elements of the preceding Hokan language similar to Washoe. Other Penutian speaking people form a contiguous block across the Central Valley and into the San Francisco and Monterey bay areas, with cousins in Oregon and as far north as southeastern Alaska, but these groups evidently migrated at different times. The Nisenan spoke three distinct dialects: the Northern Hill in the Yuba and Bear drainages; Southern Hill on the American River; and the Valley congregated by the Sacramento River, with further dialectical division evident. The Northern Hill Nisenan living in the Grass Valley area belonged to the Northeastern Central Hill group based around Nevada City. Their descendants call themselves Tsi-Akim Maidu, and they still consider Nevada City central to their organization (Tsi-Akim Maidu 2008).

The Hill Nisenan based themselves in the foothills. Groups moved into the mountains during the spring and summer, and returned to below the snowline to collect acorns and hear the stories of their ancestors over the fall and winter (Carlson 1986:5, 28). They were very transitory, with villages being relocated within a decade, and individual lodges perpetually being moved, especially on the death of one of the inhabitants. Chief Wemah primarily resided in the vicinity of modern-day Weimar, which was named for him, though he traveled to "temporary villages" throughout his territory, which stretched from the South Fork Yuba River to Bear River, and from the High Sierra to the Central Valley (Chalmers 2006:13). A dwelling typically housed an extended family, with grandparents and unmarried relatives included. Six or so conical dwellings with one or more acorn granaries formed a village, along with a large assembly or dance house in the major villages. They selected open, flat ground on knolls, ridgetops, or crests, and on gentle slopes or mid-slope benches with southerly exposure (Carlson 1986:8, 9, 11). Boundaries of the village community based around Nevada City—as with the other such groups—are not exact, and various factions shared resource areas. Groups from Auburn, Colfax, and Foresthill were apparently related to the tribelet around the Empire Mine, evidenced by all of these groups using burial grounds between Grass Valley and Nevada City (Carlson 1986:16). The Maidu and Washoe reportedly shared the headwaters of the Yuba and Bear drainages above the snowline for hunting, although some informants reported that Hill Nisenan would attack small hunting parties of Washoe (Carlson 1986:7, 24).

The Hill Nisenan territory experienced intermittent intrusions by non-native people prior to the Gold Rush. Although events between 1770 to about 1830 would have had some impact on the Nisenan living along Wolf Creek and Bear River, any such effects have, in general, not been recognized in the archaeological record. Spanish, as well as Russian, exploration parties from the settlements along the coast had explored the interior as early as 1808. Mexico's independence from Spain occurred in 1821, although the distant outposts of Alta California were somewhat detached from that event. That same year a major expedition reportedly reached Valley Nisenan territory at the confluence of the Feather and Sacramento rivers. Armed with a cannon, Captain Luis Arguello's expedition of 75 men and 235 animals visited a string of settlements west of the Sacramento River (Arguello 1992). Interactions varied, with some turning violent. One particularly destructive battle resulted in death and injury of several neighboring River Patwin. The River Patwin shares an ethnographic border with the Nisenan, and the Hill Nisenan living in the Grass Valley area probably received accounts of these initial encounters.

This phase of sporadic incursions into the interior ended with Jedediah Smith's traversing the Central Valley and foothills in 1827. His route crossed ethnographic Nisenan territory. His descriptions of his travels opened the door to French- and English-speaking fur trappers entering the valley from the northeast, ushering in an exploration and settlement period. In 1832 and 1833 John Work led a trapping party typical of the era from Fort Vancouver into the region. His 100-person party engaged in trapping for extended periods on the lower Feather and Yuba rivers. Their camps could be likened to a nomadic pluralistic village, with men, women, and children of diverse backgrounds and specialized tasks. Work's detailed journal includes numerous entries about giving food and trifles to the local people, probably beads, and in some cases trading them for food such as salmon. Although interactions were generally peaceful, Work's party responded aggressively when traps or horses went missing. Foreign disease entered the valley with these trapping parties. An estimated 75 percent of the indigenous population had died from epidemic diseases by 1833 (Cook 1955:311).

Around the time of Work's fur-trapping expedition, the coastal Franciscan missions were undergoing a process of secularization, sparking an increase in land grants. Spanish-speaking California under Mexican authority—beginning in 1822—increasingly participated in global trade and began to allow foreign settlement in order to populate the frontier (Nunis 1998). Rancho expansion reached into the interior beginning with John Sutter in 1839, and more non-Hispanic immigration and settlement soon followed during the 1840s. Overland trails were beaten across the Sierra Nevada, with many taking the California Trail by way of the Truckee Pass (Hoover et al. 1990:239). The early snow in 1846 resulting in the well-known Donner Party tragedy illustrates the hazards of the overland trek.

Tensions between the United States and Mexico mounted, with President James K. Polk announcing by proclamation in May 1846 that a state of war

existed between the two republics. Emboldened California immigrants raised the Bear Flag in Sonoma that June, but the swift entry of the U.S. military prevented further formation of a California Republic. By December, Polk announced his intentions to exert authority over the region. California was essentially under a U.S. military governor from July 1846 until December 1849 (Wells and Chambers 1882:88). Two important and well-known events occurred virtually simultaneously in the early months of 1848, affecting developments in the Sierra Nevada: first, Mexico and the United States signed a peace treaty that ceded California; and second, James W. Marshall discovered gold on the American River.

GOLD MINING IN THE GRASS VALLEY MINING DISTRICT, 1848–1961

Prospectors from California and Oregon explored the region soon after Marshall's discovery was announced, and mining camps began to grow around the rich strikes by late 1849. Miners from all over the globe spread out across the Sierra Nevada in their continued quest for deeper and more dispersed deposits, adapting in many ways as time passed. Gold quartz eroding out of lode deposits was discovered locally in 1850, and Grass Valley began taking on the qualities of one of California's premier hard-rock mining districts. The industry in the Grass Valley area followed the booms and busts typical of gold mining in the West, but the workings of the Empire Mine Historic District consistently set the production standard for over a century. Empire Mine State Historic Park epitomizes the transition from Gold Rush-era mining to highly capitalized lode mining lasting to the mid-20th century. Eight distinct eras define the dominant patterns across 11 decades of gold mining in the Sierra Nevada. General trends are described for each era, with specific examples provided to demonstrate how operations in the District articulated with important historical events. The substantial discussion associated with the four periods spanning 1850–1916 is further structured to organize the information clearly using the sub-headings political and legal trends, technological advances, Grass Valley Mining District activity, and Empire Mine Historic District activity.

The Gold Rush, 1848–1850

The news of abundant gold spread across the globe in a well-documented order: beginning locally in California; then to shipping ports across the Pacific; from Oregon to the Sandwich (Hawaiian) Islands and throughout Central and South America. Migrations of people from each place headed in turn to the poorly known, often uncharted mountains of California. James Marshall, who is credited with discovering gold at Sutter's Mill, is also given credit for being the first to pan along Deer Creek in the Nevada City area in 1848 (Hoover et al. 1990:244). By October 1848 David Stump, a Mr. Berry, and another man came from the Willamette Valley in Oregon to the Grass Valley region, where they took a large amount of gold from Wolf Creek, about a mile east of town (Wells 1880:64). The company soon left, being unprepared to deal with the coming winter.

President James K. Polk received word of the large gold deposits in California as early as September 1848. By the time gold discovery was confirmed in late November, he had been able to ponder the significance of the find for over two months. In 1785 the United States had replaced its Colonial currency with a silver standard modeled on Spain's silver dollar, and eventually fixed a gold ratio to it—that is, a dollar would equal fixed weights of the precious metals regardless of the changing value of those metals. The U.S. Treasury minted both silver and gold coins, although foreign coins continued to play an important role at the federal level, all the way down to individual exchanges. Fixed silver and gold values caused an overvaluing of silver trade with England, who had switched to a gold standard from silver in 1821. As Britain stockpiled gold, U.S. Treasury holdings declined during the first half of the 19th century.

In the mid-1840s, the independent treasury movement succeeded in separating the nation's wealth from speculative private banking systems; a system was created that could take in silver and gold, largely as foreign currency, and convert it into U.S. coin. Polk's final message to Congress in early December 1848 described the vastness of gold in California, suggesting that, "a branch mint of the United States at the great commercial depot on the west coast would convert into our own coin not only the gold derived from our own rich mines, but also the bullion and specie which our commerce may bring from the whole west coast of Central and South America" (Polk 1848). He optimistically pronounced that economic opportunity in California would allow the U.S. to compete with Great Britain, the dominant global power.

President Polk's message spread fast, encouraging an unparalleled number of would-be gold miners to make the journey to California in 1849. At the onset of the year, the non-native population was about 26,000; by the end of the year, it had reached 115,000 (Jelinek 1999:233). The entire Sierra Nevada foothills were heavily colonized, "and California soon became home to the nation's most ethnically diverse population" (Rawls 1999:5). Multiple camps hosting hundreds of miners from all over the world sprang up every 5 to 10 miles along every major waterway. Experienced mining men from the United States and Europe began to arrive toward the end of the year, although they remained a minority. Ultimately, the Gold Rush period represents the opening up of the region to global processes, and a scramble for its land, mineral wealth, and other natural resources. Many of the mostly young male immigrants during this short and frenzied era arrived intent on making their riches and returning home (Jung 1999).

Less than a year since Stump and his friends had successfully mined there, a party of forty-niners tracking lost cattle along Wolf Creek rediscovered the area, naming it Grass Valley. Cabins began to be erected by late summer (Hoover et al. 1990:242). A company from Boston began mining in a ravine down Wolf Creek in September (Bean 1867). Boston Ravine, as it became known, and the creeks and gullies throughout the Grass Valley area were worked on a small scale in late 1849, and from then on placer diggings provided excellent returns until the era of quartz mining a decade later (Prisk 1895:19). A sawmill was

erected that fall in the young town of Grass Valley, and about 20 men braved the winter of 1849-1850 (Gudde 1975:140). “Most of that first winter’s gold seekers gravitated to the collection of log huts and canvas shanties that grew up in Boston Ravine” (Mann 1982:10).

In the absence of federal or state government, or any other social order, local mining districts began to form when the population of miners reached a level requiring some structure to avoid, or, at least to settle disputes (Umbeck 1981:93). Throughout California companies of placer miners developed mining districts and codes of governance predicated on Lockean ideals of individual rights, public property, and fairness favoring first-come first-use (Zerbe and Anderson 2001:122). The sheer numbers of miners in 1848 led U.S. Army Colonel Richard Mason to “permit all to work freely,” though he would have preferred to levy some sort of fee-based system benefiting the federal government had he not been so outnumbered (Pisani 1999:127).

Gold Rush placer miners—mostly inexperienced—used simple, traditional methods during this brief and chaotic period. Although Limbaugh (1999:29) reported miners employing pans, rockers, and sluice boxes in the rush of 1849, Rohe’s (1986) in-depth study on the origins and diffusion of placer methods confirms common use of only pans and rockers prior to 1850. Sonorans from Mexico were the first group in California with any practical mining experience. Trained miners from Europe and the United States did not begin to arrive until late 1849, in tandem with the arrival of various new mining methods (Rohe 1986:128). Miners quickly adapted to the region, experimenting with new methods as they pursued different types of gold deposits.

Picks and shovels, and pans made from metal, wood, and even woven baskets, were the most common tools during the Gold Rush. “A good day’s work for a placer miner under medium conditions is 100 pans of dirt in 10 hours” (Wilson 1907:63). Water’s ability to separate less-dense material from free gold made it virtually essential for placer mining. Rockers were popular and highly portable placer devices during the Gold Rush. They used a punched metal plate to screen out large rocks, and an apron and cleats or riffles along a trough to capture gold when water was ladled in and the device rocked. Gold had to be cleaned out from behind the cleats and all of the waste material had to be dumped frequently.

Early Statehood, 1850–1863

Political and Legal Trends

General Bennett Riley took over governorship of California in April 1849 and, at the behest of President Polk, set into motion the formation of a territorial legislature (Wells and Chambers 1882:88). A state constitution was developed, and the Euroamerican segment of society extended civic authority over California in 1850. Twenty-seven individual counties were formed that year. Nevada County was not created out of eastern Yuba County until spring of 1851, taking its name from the dominant placer-mining town of Nevada City. Admission into the Union

was delayed at the federal level. California's constitutional declaration that it was a non-slave state caused substantial concern for the half of Congress that represented slave states. When President Fillmore signed the bill into law admitting California as a state on 9 September 1850, the balance between slave and non-slave states tilted, thereby exacerbating the already deteriorating relations between the North and South.

The all-time record of gold production in California occurred in 1852, weighing in at over 3.9 million fine ounces (Clark 1979:4). This entire period, however, is characterized by annual production nearly as large. Daniel Cornford (1999:82) noticed the "importance in absolute and relative economic terms" of mining up until 1860. The state appointed John B. Trask to head up the first California Geological Survey in 1853, recognizing the preeminence of the mineral industry. Trask visited the Empire Mine in 1855 and 1856 (Welts 1976). The Office of State Geologist was created by the legislature in 1860, and Josiah D. Whitney was appointed to begin the ambitious task of an accurate and complete geological survey of the state. As Polk predicted in 1848, the San Francisco Mint eventually opened in 1854. Until then, prospectors relied on any of the more than 20 private mints that refined and stamped their own coins and ingots. It was also common practice during this era for specie, or pinches of gold dust, to be used in local transactions. Many of the miners preferred to send some of their wealth home. For this they turned to gold dealers who purchased gold at $8 to $16 an ounce and sold it back east for $18, allowing incipient banks to thrive (Schweikart and Doti 1999:214).

A minor nationwide economic depression from 1856 until 1860 encouraged many to continue placer mining, even though the work was becoming far more complicated than panning or rocking. Increases in gold mining consistently occur during slow economic cycles. Mining slowed during the Civil War, dropping below 2 million fine ounces for the first time since production was accurately measured, and under 1 million by 1865 (Clark 1979:4). The decline resulted as much from depleted placers as from miners leaving the goldfields to join in the conflict. Census population schedules illustrate the numerical dominance of miners in California during early statehood: miners comprised 75 and 38 percent of the workingmen in the population totals for 1850 and 1860, respectively (Cornford 1999:78). The declining numbers of miners in the population illustrates the draw to other strikes, other occupations, or simply giving up and returning home. In Grass Valley, however, the influence of gold mining in the community was moving in the other direction, from 71 percent of the population engaged in mining in 1850 to 76 percent in 1860 (Mann 1982:226). The town was becoming a hard-rock mining town. All of this industrial, commercial, and settlement activity occurred on what was legally public federal land.

In *Land in California*, W. W. Robinson observed, "The squatter movement that began in the eastern states continued steadily west and farther west, greatly influencing the land policies of the government" (1948:111). Accepting California into the Union committed all of its land to the public domain of the United States, subjecting it to federal law. Expectation was that settlement would be protected

under the prevailing Preemption Act of 1841 (Kens 2003). This law permitted sizeable settlement claims and the preemptive right to purchase them inexpensively from the government before public offering after only a short period of residence. In this manner, the United States earned revenue and disposed of surveyed public domain by selling small plots to settlers who had demonstrated their willingness to develop and maintain self-sufficient farms.

Congress extended these preemption rights to California settlers in 1851 (Trussell 1970:71). Shortly after, in June of 1852, the U.S. Senate rejected various treaties that would have granted California Indians reservations amounting to about one-seventh of the state. In the absence of formal reservations and preemption rights asserted pioneers had every reason to believe they could settle on what was to them unclaimed land in accordance with Manifest Destiny, and that they would eventually be given the opportunity to purchase their claim. Likewise, prospectors had every reason to believe they could work their own diggings freely, and that their claims would be legally recognized. Technically, however, everyone was squatting on either land grants or federal public domain until the region was surveyed and claims certified, despite any county taxes they may have paid. On 3 March 1853, Congress provided for the survey of the public lands in California, further defined applicable preemption rights, and granted certain lands to the State to finance education and public buildings.

The Master Title Plats (MT Plats) of the United States General Land Office (US-GLO; later the Bureau of Land Management) document the first transfer of each parcel out of the public domain, including transfers to the State, and provides details regarding each transaction. The 1853 Act specifically granted title to Sections 16 and 36 of each Township and Range to the "State to vest on approval of survey, subject to prior rights." As the text of the law implies, however, formal title could not be determined until after the region was mapped in the Federal Township and Range system and any valid preemption addressed. The coast, the Central Valley, and the first set of foothills were the first to be surveyed in the mid-1850s. The General Land Office did not survey remote places in the mining territories with any detail for another decade, although preemption rights were extended to unsurveyed land in 1862 (White 1994:27). The young rural community settled in anticipating federal confirmation of their claims and better opportunities with their incorporation into the United States. Early during the Civil War, the federal congress passed the Homestead Act in 1862. This act permitted any citizen or person in the process of becoming a citizen to acquire 160 acres of unclaimed public land free of charge. One purpose of the act was to give the landless a chance to acquire Union land, while encouraging citizens to settle the West. As with other land policy, homesteads could not be confirmed until the land was surveyed.

Technological Advances

While other techniques were gaining importance, simple placer mining endured throughout this period. As with the initial couple of years during the Gold Rush, the bulk of wealth was produced by sustained numbers of placer miners. Surface placers lasted until about 1855, after which river mining accounted for much of the state's production until the early 1860s (Clark 1979:7). Miners quickly turned to long toms for processing stream banks once the active bars were exhausted. A long tom operated essentially the same way as a rocker, although a constant stream of water had to be conveyed to one end of the long wooden trough. Dirt and gravel was added and reduced as it was carried down the trough by flowing water to a punched metal plate where only the finer material entered a sluice box below. Edwin F. Morse used this type of device to work his claim in Woodpecker Ravine during the winter of 1850-1851, describing living alone in a cabin there as a "lonesome existence on wild winter nights" (Morse 1927:224).

The idea of enlarging the sluice box quickly gained popularity, and the troughs themselves were fitted with riffles of various types so they would collect gold instead of just reduce and screen soil. Sluice boxes could be strung together and material dumped in, or they could be positioned at the end of a channel so the ground could be caved into a stream of water flowing into a board sluice. Miners released gushes of water from a pond or reservoir to dislodge big chunks of ground, a technique called booming. A trough was carved into the ground or bedrock and lined with stones to act as riffles in some ground-sluice operations. Miners were using long toms by 1850 and impressive chains of sluice boxes containing mercury by 1851 (Lindström, Wells, and Wilson 2000:60; Rohe 1986:132).

Expedient digging into stream banks, or "coyoting," occurred in 1849, but true drift mining into substantial gravel beds and into deeply buried Tertiary deposits was not widespread until 1850 (Rohe 1986:146). Drifting took the form of haphazard coyoting or the more careful excavation of structured complexes of shafts and adits. The method required more planning, cooperation, knowledge, technology, and money than the vernacular name "coyoting" implies. Miners had to map Tertiary geology, excavate safe shafts that would not collapse, and move people, tools, and air in while hoisting out placer deposits (Mann 1982:12). The pay dirt taken out was wheel-barrowed to a sluice and processed. An area of extensive drifting near Nevada City came to be known as Coyoteville by the summer of 1850 (Gudde 1975:86). Tertiary deposits in the Union Hill portion of Empire Mine SHP were probably explored during this period.

To expedite the removal and processing of large placer deposits, "a technology distinctly Californian in design and application" was developed (Limbaugh 1999:32). Hydraulicking—using a barrel, canvas hose, and nozzle—was introduced in 1853 (Pisani 1999:132). Edward Matteson from Connecticut was mining near Nevada City when he came up with the idea of forcing water under pressure through a nozzle to wash down stream banks into his sluice (Paul

1947:152). The concept was refined and improved over the next 30 years, at the end of which its use was regulated to control debris from clogging river systems. Remains and landscapes from large sluicing, coyoting, or small hydraulic operations are anticipated throughout the Grass Valley Mining District. Historic maps (Lindgren 1896) depict “placer diggings” within the Park along South Fork Wolf Creek, Woodpecker Ravine, and Little Wolf Creek that probably represent these types of mining processes.

Gold still embedded in exposed lode formations was discovered at the onset of this period. Great quantities of money were expended in the initial quartz rush to build tunnels, shafts, arrastras, and quartz mills, but generally investments did not pay off (Wells and Chambers 1882:214). The inexperience and the crudeness of early technology led to many disastrous failures, and quartz came into disfavor. Only a few had the energy and resources to continue developing lode mines (Wells 1880:187). Hand methods reigned, using hand-drills and black powder for extraction (Hardesty 1988:21). Men experienced at driving hand-held rods of steel into solid rock with a hammer—either alone, called single jacking, or in pairs, called double jacking—were highly valued. California mining historian Charles Bohakel (1980:4) described the division of labor by nationality: foreign immigrants filled most of the manual and underground work at quartz mines, while U.S. citizens typically operated the machinery.

The arrastra—which dragged a heavy object in a circular trough to crush and grind the ore—“was the only successful milling tool for quartz miners in the early days,” although the Chili mill, which employed the crushing edge of a heavy wheel in a circular trough, was also used (Limbaugh 1999:39). There is evidence that although this technology was a better method than stamping, it was considered less efficient by investors because of its Hispanic origins (Van Bueren 2004). The first stamp mills were impractical, made from tree trunks capped in iron or using square stems and shoes that could not rotate to ensure even wear (McQuiston 1986:27). The first ore-crushing stamp mills in the district were of Cornish design, illustrating the early influence in the region by these experienced miners (Limbaugh 1999:38). The Cornish-influenced Grass Valley System used blankets to collect gold after stamping, and became widely used in many mining districts. The cost of crushing was disastrously high, and the technology for saving gold was imperfect. Widespread difficulty in processing lode deposits is attributed to the general slump in the industry that lasted through 1853. Stamp mill designs reached a productive level of efficiency by 1857 (McQuiston 1986:27).

Grass Valley Mining District Activity

The 20 forty-niners who camped out in Grass Valley emerged through the winter in early 1850 to a fresh wave of would-be placer miners. About 15 cabins, the first store, a hotel, and family were in town by the end of summer (Poingdestre 1895:5; Wells 1880:64). A transportation network quickly developed to service the gold-mining communities, with the Nevada City Road branching off the Truckee Trail in use by 1850 (Byrd 1992:7). Grass Valley and Nevada City

served as the trading centers at this time, catering to “a mercurial aggregate of young, single miners, centers populated largely by small merchants almost indistinguishable in age and attitude from their customers” (Mann 1982:2). As many gold seekers settled and developed families during this period, the population of California continued to burgeon from 225,000 in 1852 to 380,000 by 1860 (Jelinek 1999:233).

In June of 1850, a German prospector stumbled upon outcroppings of gold-bearing quartz while collecting firewood on Gold Hill (Gudde 1975:134), above Boston Ravine. By October, George McKnight had located the Gold Hill ledge about 1 mile west of the Empire Mine, sparking statewide excitement (Bohakel 1980:1). A miner present that year recalled that Tom Cracklin was the first to discover the quartz ledge on Gold Hill in December (Morse 1927:228). Regardless, the flurry of quartz prospecting that followed led to many new discoveries, including Ophir Hill that same month (McQuiston 1986:15). By March of 1851, Grass Valley had quickly grown to 150 buildings, several stores, inns, and saloons; and three separate stamp mills were operating by May (Bohakel 1980:1; Gudde 1975:140; Poingdestre 1895:6).

The rapid rise of lode mining throughout California between 1850 and 1852 collapsed, due in part to lack of experience and technology. These obstacles were eventually overcome in the 1860s, in large part by the continuous efforts in the Grass Valley Mining District (Limbaugh 1999:36). Cornish immigrants, bringing hard-rock mining experience and technology from the tin and copper mines of Cornwall, began to form a distinct community in Grass Valley. Groundwater in the mines was a constant problem that experienced Cornish miners helped overcome, with the first Cornish pump installed at the nearby Gold Hill Mine in 1855 (Limbaugh 1999:38). A local newspaper, *The Grass Valley National*, confirmed on 5 November 1861 that most of the lode mining was carried out by the Cornish.

Empire Mine Historic District Activity

George D. Roberts is credited with discovering gold on Ophir Hill in October 1850, while cutting timber he was planning on selling to placer miners working Boston Ravine (Welts 1976:1). What was to become the heart of the Empire Mine was first claimed by a single 30 by 40 foot location, as was the custom in placer-mining districts. Woodbury, Park, and others purchased the claim in 1851 for $350, consolidated it with the surrounding claims into the Ophir Hill Mine, and processed the ore with their mill located where the Sebastopol Mill was later erected (Wells 1880:191). Ophir Hill yielded liberally, but, owing to mismanagement, its owners failed in 1852, and their assets were auctioned (Bohakel 1980:3). The Empire Quartz Hill Company purchased half of Woodbury’s Ophir Hill Mine at auction. The other half of the mine went to John R. Rush, but he eventually sold it to the Empire Quartz Hill Company in 1854 (Prisk 1895:23). In the same year, the Empire Mining Company incorporated, with the board consisting of lode-mining pioneers C. K. Hotaling, James O’Neil, B. B. Laton, Fred Jones, Silas Lent, James H. Wilcox, Thomas Barnstead, W. W.

Wright, James Beauchamp, Richard Groat, and John E. Southwick (Bohakel 1980:3; Mac Boyle 1919:154).

The Empire Quartz Hill Company had recently built their first mill on Wolf Creek in the winter of 1851 and 1852, a short time before purchasing half of Woodbury's Ophir Hill Mine at auction. They built their mill at a time when processing ore was experimental. The so-called Grass Valley Process used at the Ophir Mine in 1853 included roasting the ore in heaps before running it through a 16-stamp mill. Stamped ore pulp then passed over blankets, which captured three-quarters of the gold, then through a revolving cylinder containing mercury, and finally into a Blaisdell pan containing iron balls and more mercury (McQuiston 1986:27).

In 1854 the Empire Quartz Hill Company purchased back the south half of the Ophir Mine obtained by Rush, and incorporated as the Empire Mining Company (Bohakel 1980:4). The new company, employing 34 miners and 6 surface workers in 1855, paid close attention to local advances in milling technology. Experimentation led to cylindrical iron stems fitted with tappets permitting each to rotate for even wear. The Empire Mining Company upgraded to a new steam-powered, six-stamp mill in 1856. The mine produced well for the remainder of the period.

Roberts's discovery on Ophir Hill was not the only lode mine at Empire Mine SHP that was located and developed during the Early Statehood Period. To the south of the Park, across Little Wolf Creek, Charles H. Osborn and others located multiple claims on Osborne Hill in 1851 (Wells 1880:193). The Grass Valley Mining Company purchased the claims and opened a mine in 1852, developing it profitably until 1857. At that time large investments outpaced returns and the mine was held by mortgage until 1864.

The Heuston Hill Mine, extending down the south slope of Ophir Hill and across Little Wolf Creek, was located in 1853 by the three Heuston brothers, G. H. G. Stackhouse, George A. Montgomery, and others (Wells 1880:193). The location was worked successfully until 1855, after which it exchanged hands a number of times until John Trenberth and others gained control in 1861 and began making improvements.

On the ridge between Osborne and Ophir (Houston) hills was the Sebastopol Mine, which was worked in 1858 by William and Robert Watt, John Judd, and Benjamin Macauley. The group sank a 150-foot shaft and a drain tunnel. They suspended operations that year, however, while the owners focused on their more productive Massachusetts Hill Mine closer to town (Wells 1880:194).

Above the Sebastopol on Osborn Hill was the "Wheal Betsy" (Bean 1867). The Betsy claim was purchased in about 1860; and there were hoisting and pumping machinery on the mine by 1867. Captain Stephen W. Lee and A. H. Houston owned the Betsy along with John Byers. "The Orleans claims, owned by

the Smith Brothers, Edward Northey and others, lie north of the Betsy, and are in good repute, although not extensively worked at present" (Bean 1867).

"In the vicinity of Osborn and Ophir Hills are a number of other quartz veins, including the Lawrence Hill, Prescott Hill, Franklin Hill, Daisy Hill, and countless others" (Bean 1867). Many of the other mining claims made in the Park were superficially developed, but it can be inferred that the lack of lode-mining experience and resources led many to sell or abandon their rights. The mines that were consolidated and developed past the initial lode-mining crash in the early 1850s slowed in their production during the Civil War. California also lost a large number of its miners to the Comstock Lode from 1859 until 1864 (Clark 1979:7; Paul 1947:285). The Empire Mine closed in the fall of 1863, in part due to limited water from a drought causing increased production costs, as well as a shortage of workers due to conscription for the Union Army and miners heading to Nevada (Empire Mine SHP 1994).

Gold-mining Slump, 1864–1872

Political and Legal Trends

The first, most significant slump in California's mineral industry came in the wake of the Civil War, between 1864 and 1872. By 1864 the Gold Rush was over, attributable to the exhaustion of stream and bench placers easily processed with little experience or investment (Clark 1979:7). Beginning in the 1850s, and continuing after all the stream placers were depleted, miners increasingly worked for wages, as there were fewer opportunities to work independently or in small, joint stock companies (Cornford 1999:93). Wages steadily decreased: from exorbitant highs above $10 a day during the Gold Rush, to $3 or less by 1860 (Paul 1947:350). Although mining companies continued to experiment with popular hydraulic and lode-mining techniques, this entire period was dominated by a relative statewide slump in the industry. In 1870 the ambitious geological survey of California carried out its last fieldwork, and it officially ended in 1874, emphasizing the declining relevance of the mineral industry.

California was diversifying beyond the Gold Rush and Early Statehood periods, both of which were dominated by gold-mining culture. As many gold seekers settled and developed families, the population continued to burgeon—to 380,000 in 1860, and 560,000 by 1870—with decreasing proportions engaged in mining (Jelinek 1999:233). The mining town of Grass Valley was no exception. There the percent of employed men working in the mining industry fell from its high of 76 percent in 1860 down to 54 a decade later, while simultaneously experiencing a big increase in farmers, artisans, and unskilled laborers (Mann 1982:Table 5).

Bean summed up the development of Grass Valley during this period with the optimism of a true booster:

> At the present day the place is a town of substantial, steady-growing advance. Its future is bright, the quartz ledges, horticultural and agricultural resources giving assurance of permanent prosperity.

> The town is situated in and on the hills bounding what in early days was a small grass-covered valley, whence was derived the name. On the uncultivated hills about is a thick growth of fine trees, chiefly pine, giving a peculiar and pleasing aspect to the vicinity. Orchards, vineyards and gardens abound, and the place is the market town of a large and thickly-settled region. At Grass Valley are the shops of the railroad. The town has gas works, electric lights and a most excellent water system. There are seven churches, the Roman Catholic having formerly been a cathedral, Grass Valley being the see of the bishop, now removed to Sacramento. The school system is perfect, and in addition there is a Roman Catholic convent. Here are situated some of the largest and richest mines in the country, the celebrated Idaho mine being the most noteworthy. The business center is well built up and presents a scene of activity [1867].

The Central Pacific Railroad Company began construction of the transcontinental rail line across the Sierra Nevada in 1866, but wage jobs on construction teams were not lucrative enough to lure workers from the mines. In fact, in one incident, 95 percent of a 2,000-man construction crew "fled for the Nevada mines almost as soon as they arrived at the end of track and had been fed a warm meal" (Ambrose 2000:119). Various immigrant pools were relied on to pick up the slack, with Chinese laborers employed with particular success. The transcontinental railroad was completed in 1869. One effect was to transform the cultural and economic landscape of the Sierra Nevada from an isolated frontier dominated by independent placer miners to agrarian communities of families whose more diversified economies now had access to outside markets. The drop in proportion of miners in the population in 1870 across the state, as well as in the mining regions, is evidence of this demographic shift.

This period was marked by monetary instability. To battle it, President Andrew Johnson argued for debt and interest rate reduction noting: "Our commerce, which at one time successfully rivaled that of the great maritime powers, has rapidly diminished, and our industrial interests are in a depressed and languishing condition" (Johnson 1868). Gold production in California, for example, was sputtering along at 75 percent or worse than what it had achieved prior the Civil War (Clark 1979:4). National mining law was defined during this era in order to spark industrial growth (Pisani 1999:131). Congress passed the first act affecting mining, the 1866 Stewart Bill, that established three principles: (1) that mineral land in the public domain should be open to exploration and occupation; (2) that claims established under local customs developed by each mining district shall be recognized; and (3) that title to land with certain minerals may be obtained (Peele 1941:24–06). The act established free-access doctrine to lode mines, and was expanded in 1870 to placer mines, ultimately culminating in the 1872 General Mining Act (Delony 1990:8). In part, the act provided that all valuable mineral deposits in the public domain should be open to exploration, purchase, and patent by U.S. citizens. The new law also codified regional mining district codes, and created the Bureau of Mines within the U.S. Department of Commerce. These sweeping regulations culminated at the end of this slump

period, and played a defining factor in the minor boom in gold production during the last quarter of the 19th century.

The General Mining Act allowed the dominant industry in the West to finally patent mineral rights, just as farmers could claim settlements under the Homestead Act of 1862. Both acts intended to benefit the nation by facilitating development. No public land could be conveyed to the state or its citizens, however, until the federal survey was completed. Surveys of the public land encompassing Grass Valley and the mining district finally occurred in 1867. The first title of land patented in the Park occurred that same year, for the entire eastern portion of Union Hill within Section 36, vested to the State under authority of the California Enabling Act of 1853.

Technological Advances

Gold mining continued to be a significant economic force during the 1860s and early 1870s, though its character had changed considerably. The rich surface and river placers were largely exhausted, and hydraulic mines emerged as the primary producers for the next 20 years, keeping production relatively stable between 726,554 and 883,591 ounces (Clark 1979:7). Lode mining took a back seat to the hydraulic efforts of the period. Improvements were made to water-delivery systems, canvas was replaced by iron pipe or penstock, and nozzles were attached to iron monitors called giants that increased pressure and direction. Additional improvements to high-pressure waterwheels, like the California-made Pelton and Knight models, were made by the early 1870s (Limbaugh 1999:34). *The Century Magazine* reported that “the hydraulic monitor was first used, according to good authority, in 1865. But it was not until a much later date—in 1869 or 1870—that it came into anything like general use” (Evans 1883:325).

Technological advances in lode mining during the period included the invention of dynamite in 1867 and the Burleigh mechanical drill in 1869, both of which “created a technological revolution in the mining industry” (Hardesty 1988:21). Due to the hazardous rock dust they created, however, the drills—also called widow-makers—did not come into widespread use until the 1890s (Clark 1979:7). Miners unions successfully resisted the widow-makers until about 1890, when the devices were finally designed to be less dangerous. It also took much of this period before dynamite replaced the black powder to which miners had been accustomed. Cornish miners in Grass Valley resisted the change with a nine-week strike and held conversion off for three years before capitulating in 1869 (Cornford 1999:97). The California-improved stamp mill, originally invented for road construction, had become standard design by the 1860s. Smith and Northey erected a quartz mill on Little Wolf Creek in 1864 that ran eight square-stem stamps, driven by a 30-horse-power horizontal engine, and used the blanket process; instead of pans, it used arrastras for grinding sulphurets and amalgamating rusty gold. The owners, Robert Smith, John Smith, Edward Northey, and Henry Morgan, provided custom milling (Bean 1867). The better milling technology failed to spur lode development until advances in the collection

process were achieved in the 1890s (Limbaugh 1999:41). Regardless of these advances, statewide production of gold continued, until 1873, at a fraction of what it had been during the Gold Rush and Early Statehood periods.

Grass Valley Mining District Activity

There was quite a revival of energy in placer mining around Grass Valley in 1870, owing to the increase in hydraulic-mining technology (Wells 1880:187). Two of the first formal mineral patents in the Park, conveyed under the authority of the 1866 mining act, were large placer claims. Michael Senior Byrne and Thomas R. Walker received 140 acres in 1872. Byrne and Walker's Town Talk Placer (not to be confused with the community of Town Talk closer to Nevada City) is located within the Union Hill area, which has also been called Buena Vista Hill. The Shea, Independent, and Town Talk were mined hydraulically and had "cement mills erected on them" (Prisk 1895:19). The Town Talk specifically encompassed what was depicted on a 1890s map (Lindgren 1896) as "placer diggings" along the slope on the north side of the range. Whereas other placer diggings are depicted within the Park, those in the northern part of this claim are not located within pronounced drainages, indicting they are related to the exploitation of Tertiary deposits locked below Union Hill instead of active stream placers. William Biggs, Michael McGuire, and Phil W. Roberts received a mineral patent to about 215 acres in 1873. Their Biggs and Sims Group mineral patent encompassed the upper Little Wolf Creek watershed east of the Sebastopol claim, below agricultural surface land owned by Ducotey and Gill (Mac Boyle 1919:92). Described later as a drift mine in the state mineralogist's report, the deposit was reportedly a Tertiary channel 50 feet wide and 4 to 15 feet deep, capped by 20 to 80 feet of andesite, and filled with gravel and quartz with free gold.

Most of the major lode mines in the region had been located by 1867, though none had been patented. In that year there were 30 stamp mills operating and 1,600 men working in the industry in the Grass Valley area alone (McQuiston 1986:31). The number of operations and miners employed began to contract for the reminder of the period, however. Gold Rush historian Rodman Paul concluded that the gold-mining industry reached maturity during this period. He found the contraction in the number of districts, miners, and technologies enabled fewer operations to harness more of the capital—a distillation process whereby "a small number of mines pay richly under the application of established processes" (Paul 1947:284). That many mines were being consolidated after this time confirms Paul's assertion that a smaller number of companies were focusing on larger and larger mines. As will be seen in the next two periods, however, much more mining activity in the Park, both by large and small companies, was to come.

A general panic in Comstock dividends in the second half of the 1860s had investors redirecting their interest from Nevada back to California, particularly toward the few heavily developed operations with proven records. Returning miners from the Comstock Lode also contributed to the advances made in

California during this period. One of their major contributions was taking California mine shafts to greater depths (Paul 1947:289). A handful of consolidated mines in the Grass Valley District, including the Idaho, North Star, and Empire mines, were responsible for substantial production during this period. Mac Boyle (1919) declared the Grass Valley Mining District out of the general mining slump in the years following the Comstock bust in the mid-1860s.

Empire Mine Historic District Activity

Captain Stephen W. Lee of Grass Valley and Alex H. Houston of San Francisco purchased the Empire stock in July 1864 and commenced development of new machinery and a drain tunnel. Lee and Houston were actively acquiring a number of adjacent mines during this period, including the Betsy by 1861, the Heuston Hill by 1863, and the Osborn Hill Company by 1867 (Bean 1867). The partnership between these two men was part of a pattern of consolidation and increased financial connection between the mines and San Francisco (Mann 1982:134). J. P. Pierce and A. L. Morrison followed fellow San Franciscan A. H. Houston, along with the investors Cronise, Lake, Homer, and Associates, by investing in the Empire Mining Company in 1867 (Bean 1867; Wells 1880:191).

Captain Lee, the principal owner and manager of the Empire Mining Company during most of this period, from 1864 until early 1870, completed the 30-stamp Steamboat Mill on Ophir Hill in 1865 (Bohakel 1980:3). The mill was one of the major renovations under the new owners' $200,000 expansion project (Mac Boyle 1919:156). Bean described the mill after its completion as a "magnificent mill, which is unquestionably the finest quartz mill in Northern California" (1867). It could process 60 tons of ore per day, and employed 130 men in two daily shifts. The main building was 100 by 90 feet, with a boiler house 30 by 18 feet. The Steamboat Mill had all the improvements of the period, such as the newest styles of pans and settlers, including the Frue vanner that had been developed in 1867 (McQuiston 1986:29).

Another San Franciscan who invested in the Empire Mining Company during this period was William Bowers Bourn. Massachusetts-born William Bowers Bourn left a successful banking business in New York to come to San Francisco in 1850 at the behest of associate and maritime shipping Captain George Chase (Steinfeld 1996:9). He established himself in the city and his wife joined him in 1854. One of his many business pursuits during the Early Statehood period was engaging in mining ventures. Bourn invested heavily in the Empire Mine throughout the 1860s, and obtained a controlling share in 1869. He began to take a "keen interest in operations" immediately (McQuistion 1986:33). It was right around the time Bourn gained control that the dispute with the miners over dynamite occurred. Bourn also had the Gold Quartz Claim of the Empire Mining Company surveyed on 19 January 1870 in order to patent it under the 1866 mining law. It was the first lode mine patented in the Park. Though the Sebastopol had been surveyed the month before, it was not patented until the next era. The mineral plat depicts "the old road from Grass Valley to Buena

Vista," the ledge location, and some fence lines around "Pat Mulligan's garden," located along the southwest side, just north of "Marys Ravine." Pat Mulligan appears in the 1860 population census for Grass Valley as a 29-year-old white male gold miner from England who shared a dwelling with two other miners. They lived in a neighborhood where every household was occupied by two or three miners. The Steamboat Mill and other mine infrastructure were not depicted on the plat.

Bourn also replaced Captain Lee in April 1870 with a new superintendent, Mr. Jenks Frank Nesmith (Bohakel 1980:5). A fire destroyed the Steamboat Mill and hoisting works in September 1870, several months after Nesmith was appointed. Bourn and Nesmith quickly erected a new 20-stamp, steam-powered mill that had the same capacity as the 30-stamp Steamboat, and rebuilt the hoisting and pumping works. The mine continued to be profitable for a number of years (Wells 1880:191). At the close of the period, in 1873, the mine employed 80 miners at $3 a day, and 11 men worked at the mill (Bohakel 1980:5).

William Watt, one of the original claimants of the Sebastopol Mine, was the first to have his claim surveyed in support of a mineral patent, which he did in December 1869. The patent for the Sebastopol Gold Quartz Claim, which had been worked briefly in 1858, was not issued to the Sebastopol Consolidated Gold Mining Company until June 1890, during a rash of such patents at that time. The claim was located in the drainage below the Osborne Hill Mine, south of Ophir Hill and Little Wolf Creek, and other than a notation of "sluiced ground" in the ravine, nothing is shown on the mineral plat. The claim had been largely idle as the original owners developed the Massachusetts Hill Mine and, based on Wells (1880:194), remained idle after they received the patent. There was other mine development in the Park during this period, though no other patents were made.

George M. Norton and Thomas Hardy were the principal owners of the Ophir Hill Mining Company north of the Empire during this period (Bean 1867). They heavily developed the claim by sinking a vertical shaft 200 feet, striking the Ophir Hill ledge, and running multiple drifts 300 feet on the lode. Bean reported that the ore had not been processed, but "the mine is in an excellent locality, and we expect before 1867 closes that the energetic and enterprising owners will be well paid for their investment of money and time" (1967). The Thomas Donahue Company owned the claims to the north, but they had been only superficially worked to a depth of 36 feet.

The new owners of the Heuston Hill Mine, consisting of Robert and John Smith, S. D. Bosworth, the Coleman Brothers, Captain Stephen W. Lee, and Alex H. Houston, also erected machinery for deep working. The relationship between the San Francisco investor, Alex H. Houston, and the three Heuston brothers who located the Heuston Hill claim in 1853 is unclear. Although 19th-century references to the mine typically used the Heuston spelling, the Houston version seeps into 20th-century documents referencing the same operation (Clark 1979:59; Mac Boyle 1919:250; Prisk 1895:25; Wells 1880:193). Erwin Gudde (1975:161) notes the two mines are perhaps the same in his well-researched

California Gold Camps. The new owners financed a 300-foot incline shaft from 1861 to 1870 on the south bank of Little Wolf Creek, and employed 60 men in 1867 (Bean 1867; Mac Boyle 1919:251). The Hueston Hill Company was involved in several suits, but won every case. The mine was considered by Bean to be "justly included among the first-class mines of this district" (1867). The mine was profitable into the 1870s, but was reported as idle in 1880 by Wells (1880:193).

Gudde (1975:256) reported that there were about a dozen operating mines on Osborne Hill during this period, with each knoll on the ridge extending through the Park south of Little Wolf Creek taking a separate name (e.g., Prescott Hill, Daisy Hill, King Hill). The Osborne Hill Mine was itself under new ownership in 1864, after being held in mortgage since 1857. The new owner, Joseph Woodworth, erected a "splendid" 15-stamp mill costing $22,000, "and work was pushed ahead with vigor" (Wells 1880:193). Several investors purchased the mine in 1866, including one of the owners of the rapidly expanding Empire Mining Company, Captain S. W. Lee. The other new owners were Grass Valley residents A. Delano, Alexander Stoddard, Robert Smith, John Smith, William Campbell, along with W. H. Hooper and Thomas Jones, who seem to have been outside investors. They incorporated as the Osborne Hill Mining Company in 1868 and began extensive development for the remainder of the period.

Gold-mining Resurgence, 1873–1892

Political and Legal Trends

This period began with a mining boom sparked by the worldwide economic depression of 1873–1877. During economic downturns the stable value of gold increases in relation to other stagnating prices, drawing the attention of investors and the unemployed. Gold mining regained importance across California between 1873 and 1892, with production climbing to a peak of nearly 1.76 million ounces in 1883—an amount not seen since 1862 (Clark 1979:4). President Ulysses S. Grant pledged his commitment to the "restoration of our currency to a fixed value as compared with the world's standard of values—gold" (Grant 1873). All of Europe adopted strict gold standards during this period. Congress suspended coining silver in 1873, effectively adopting a gold standard as well, and passed the Specie Restoration Act in 1875. In part, the Act of 1875 was intended to restore confidence in the federal monetary system, which had introduced greenbacks during the Civil War but failed to pin them to a gold standard. By 1874 gold production was up about 15 percent from the year before (Clark 1979:4).

California policy makers were responsive to the escalation of gold production with the establishment of the State Mining Bureau in 1880. Although the number of new mineral patents and production trends demonstrate a steady return to gold mining, the numbers of miners in the state did not regain their former dominance. This was due in part to new technologies that required fewer workers, particularly in large hydraulic operations that peaked just before the 1884 Sawyer decision (Evans 1883). Broadly speaking, California mining

declined after the Sawyer decision, but it had little impact on lode mining—the dominant industry in the Park. The State Mining Bureau also continued systematically mapping after 1884, and produced its first geological map in 1891.

With the transcontinental railroad completed, some Chinese miners headed to the mines, where they found jobs or purchased claims originally located by Euroamericans (Rohe 1996). Many Chinese who worked on the railroads also became laborers for large capitalized lode mines, where they were considered "less quarrelsome" than many "turbulent and riotous" Euroamericans (Hardesty 1988:87). Discrimination, however, made finding gainful employment difficult. In hydraulic mines, for example, Chinese were "employed in the least important work, in drudgery which it would be difficult to get competent white labor to perform" (Evans 1883:335). They worked some placer claims in the Grass Valley area during this period, but were barred from working in the lode mines; the local Chinese community turned to farm and domestic labor, kept orchards and gardens, and operated laundries along Wolf Creek (Chalmers 2006:46).

Technological Advances

Hydraulic mines, relying on water pressure delivered by vast networks of water systems to tap into deeply buried Tertiary deposits, were the primary source of gold initially. This was the era of large-scale hydraulic operations, and it was centered, according to *The Century Magazine* in 1883, in Nevada County on what was (and continues to be) popularly called the Yuba Ridge, or just the Ridge (Evans 1883:326). Though a profitable technique, debris from the process choked rivers downstream, causing flooding that ruined agricultural land and threatened heavily populated centers (Smith 1999:168). Nonetheless, hydraulicking dominated northern California mining until the federal courts decided in favor of emerging agricultural interests. The 1884 Sawyer Decision required mines to impound all debris. Few operations could adhere to the judgment and maintain dividends, and gold production immediately dropped about 35 percent. Illicit small-scale hydraulic operations continued in the mountains during the remainder of this period, which was characterized by low fluctuating production, with lode mining eclipsing hydraulic operations (Rohe 1994:89). Refinement of lode-mining technology continued, preparing the way for major strides during the next period.

Grass Valley Mining District Activity

Harry Wells offers first-hand accounts of the town during this period. Grass Valley, "with its brick business blocks, its long rows of stores, its hotels, its handsome residences and neat cottages, its large and imposing school house and church edifices, bears but slight resemblance to the crude and hastily constructed shanties" of prior eras (Wells 1880:67). Indeed the list of businesses is long and impressive given that many other Gold Rush settlements had become ghost towns long before. "On the hills and in the ravines about the city are many busy, reverberating quartz mills, whose ceaseless clatter make sweet music to the ear of a resident, knowing, as he does, that a liveliness in mining interests is always followed by a revival of business and general prosperity" (Wells 1880:67).

The idyllic view presented in this county history contrasts with Mac Boyle's dour assessment presented in the 1919 *Mines and Mineral Resources of Nevada County* for the Mining Bureau: he states that the general slump in mining continued to take its toll in Grass Valley, noting that by 1880 the Empire and Idaho mines were the only enterprises in operation (Mac Boyle 1919:157). The activity represented by mineral patents during this period contradicts Mac Boyles gloomy appraisal.

Empire Mine Historic District Activity

Much of the land in the Park was patented between 1873 and 1892, reflecting the major trends of the period. Both settlers and mining interests were vying for the same land. In all, 14 lode mines, 1 placer mine, 3 cash entries, 1 homestead, and 1 scrip (a federal payment in land rather than currency), encompassing over 600 acres in and around the Park, were removed from the public domain into private hands during this period. This activity is recounted below in order to demonstrate the extent of the gold-mining resurgence, and its relationship to settlement of the region. The mineral plats described below also depict some the physical remains that are expected within the Park, and clues as to what and who produced them.

William Bowers Bourn, Sr., and Jenks Frank Nesmith continued to develop the nearby Empire Mine, with the Ophir Shaft extending down 1,250 feet in 1874 (Bohakel 1980:6). W. B. Bourn, Sr., died at his estate in San Francisco by a self-inflicted gunshot wound as he was preparing to bring the Empire Mine payroll up to Grass Valley; it was determined an accident (Steinfeld 1996:22). Sarah Bourn took over management on behalf of the estate, relying heavily on Nesmith to keep the mine productive, which he did successfully until 1878. In that year it was decided that all of the pay ore of the Ophir vein had been extracted and the pumps were turned off, allowing the shaft to fill with water (McQuiston 1986:34). Nesmith began on a new shaft in the Park to penetrate the Rich Hill ledge.

William Bowers Bourn, Jr., returned from England in 1878 at the age of 21 to help his mother with family business decisions, particularly the disposition of the Empire. All of the experts agreed that the mine should be abandoned, being unprofitable to work at such depths (Bohakel 1980:6). Wells (1880:191) declared that the Empire Mine was practically worked out in 1880. The young Bourn was having none of it, and formed a new company, the Original Empire Mill and Mining Company. Work resumed in 1879 with dewatering the shaft and a broad exploration program, and the mine was again productive by 1883, when a new vein was discovered (Steinfeld 1996:28). John Hayes Hammond served as consulting engineer, and eventually manager. With production up Bourn took on substantial expansion with the vision of switching the whole operation over from steam to water power, which he accomplished by 1886 (McQuiston 1986:36). The Ophir shaft reached a depth of 1,600 feet, and 150 men were employed underground, with 8 at the mill (Welts 1976:7). The system piped water through the Empire, using a Pelton wheel to power the new 20-stamp mill, the old 20-stamp mill, and other infrastructure, and then the flow continued down to the

North Star, which Bourn had purchased in 1884 with Alexander Stoddard, and then on to the Allison Ranch Mine, where it was used a third time.

Bourn also began to look beyond the Ophir Shaft workings, spending an extended effort this period trying to patent a second Nevada Quartz Mine, this one located in 1881 on the north side of their Empire Mine. The claim was originally surveyed in 1885, but an amended survey took place in 1888 to deal with a conflict with other claims, including that of the Magenta Quartz Mine and Mill site, before it could be patented. The surveys depict the Magenta Hoisting works particularly clearly, as well as explorations near the Empire. A number of cabins and houses are depicted on the earlier map, and fewer in 1888. Bourn appointed his cousin, George W. Starr, who had been working in various roles at the mine since 1881, as the new superintendent in 1887, replacing Hammond (Bohakel 1980:8). Completing his expansion project and having installed Starr, Bourn decided to tend to other affairs; he sold his controlling interest in the North Star in 1887 and in the Original Empire Mill and Mining Company in 1888 to James D. Hague, a recently arrived engineer representing eastern investors (Steinfeld 1996:31). The same year Hague acquired the Empire, two men were killed in an accident that destroyed much of the surface infrastructure (Empire Mine SHP 1994). Tensions between labor and management were strained. In 1890, the same year in which Cornish immigration reached its peak, Starr had the brand-new compressed-air-powered drills installed that allowed rapid development without creating the hazardous dust of earlier models. While the advance allowed for cheaper, safer mine development, it required fewer miners. Starr served out the remainder of the period, before moving on to the rich mines of South Africa in 1893.

Non-mining interests claimed land in the Park during this period. George Wilson received his scrip patent in 1876 for more than 162 acres of level valley floor along the South Fork Wolf Creek, within a mile east of Grass Valley and just north of the Town Talk Placer Mine. There are two George Wilsons listed in the population census for Nevada County, one in 1870 and one in 1880, but neither of them lived in Grass Valley. The “old Wilson place” was called the Manion place by the mid-1890s, in reference to the Town Talk Placer Mine just south. Michael Manion owned the property after Wilson (Prisk 1895:19).

In 1876 Francois Sauvee purchased over 90 acres straddling Little Wolf Creek (encompassing the Sand Dam area of the Park). He is listed on the 1870 census as a 50-year-old French gardener, living with his family, who were also all from France, except for a 7-year-old daughter born in California; another French man, also gardening, lived with them. The 1880 census lists Sauvee as a farmer with some of the family still at home, and a Canadian (French?) laborer. During this period he conducted some mining along what was then a “dry reservoir,” as the 50-foot deep “Sauvee’s Shaft” is labeled on the 1888 survey plat for the neighboring W. Y. O. D. mine to the north. His workings would later become the Golden Treasure Mine.

Henry Tremain purchased the 40 acres directly west of Sauvee's property in 1879, mostly outside of the Park. In 1870 Tremain was a 31-year-old white English miner, living in the crowded boardinghouse of Peter and Isabella Miller in Grass Valley. There were 22 quartz miners from England or Ireland in the house, along with two domestic servants and a Chinese cook. Pascal Joseph Bonivert obtained the first Homestead patent within the Park in 1890, located on both sides (north and west) of Tremain's cash entry and lying only partially inside the Park boundaries. Bonivert entered the property in 30 August 1879, the same year Tremain bought the land wedged between the homestead. Bonivert had to relinquish portions of his claim because of the prior mineral rights of the Dakota, Liberty Hill (Noon Summer), and Pennsylvania mines, but maps of the area show that he quickly obtained Tremain's cash entry (Englebright 1884; Hartwell 1880). In 1870 Peter J. Bonivert, a 30-year-old Belgian boilermaker, was a married man living without family in the crowded house of James Van Bibber (spelling uncertain), a 46-year-old white "iron molder" from Kentucky, along with Van Bibber's wife, four children, a 33-year-old white "pattern maker" from New York named John A. Peer, and a 37-year-old quartz miner from Scotland named William Patterson. In 1880 J. P. Bonivert was still a boilermaker, but then living with wife, 3 sons, and 2 daughters, presumably on the homestead.

In 1891 John L. Smith made the third and last cash entry of this period, for about 6.5 acres in Woodpecker Ravine, in the vicinity of the Magenta Drain Tunnel. The county history provides details: "Smith resides on the Crandall road to Colfax (later Highway 174), three-fourths of a mile from the center of Grass Valley, his post office. He was born in Scotland in 1827, and in 1848 came to the United States, and to California in 1853, and settled on the place he is now occupying" (Wells 1880:230). Though his house was just outside the Park, Smith was heavily involved with mine development in the District, namely as superintendent of the Orleans Mines, consisting of Heuston Hill, Madison Hill, Fillmore, Prescott Hill, and Betsy locations, which were "worked for many years under the superintendence of the late John L. Smith and produced a large amount of bullion" (Prisk 1895:24). He also received the only placer mineral patent during the period, and the last for a long while. His Mother Neal Placer was surveyed in 1888 and patented in 1891. The mineral plat, created after the Sawyer decision of 1884, depicts large "hydraulic excavations," tunnels, and shafts, demonstrating that hydraulic mining continued in the District into the second half of the period.

The Orleans Mining Company, under Smith, was very active during this period, patenting several claims: the Betsy, Heuston Hill, Madison Hill, and Prescott Hill quartz claims were all surveyed in 1885 and patented in 1889; the Fillmore was also surveyed in 1885, and again in 1891, the year it was patented. The Fillmore was depicted on an 1884 map as the Bonanza, with a mill present (Englebright 1884). Consolidated, these mines formed a contiguous block spanning Little Wolf Creek between the Empire, Sebastopol, and Osborne Hill mines. The survey plats depict pre-1885 activities consisting of numerous roads and mining excavations on both sides of the creek; some large waste dumps on

the south side (Betsy and Heuston Hill); a stone powder house by the Betsy; hoisting works over the Prescott Hill incline shaft; the caved-in Heuston Hill incline shaft south of the creek and its drain tunnel on the north; the Orleans Quartz Mill in the Fillmore claim near the creek (and shown on Englebright 1884); two houses on either side of the mill; and the Empire Ditch depicted in the Heuston and Madison claims.

The Fillmore mineral plat surveyed in 1885 and in 1891 confirms that the Daisy Hill and New Ophir claims to the south were under development during this period, though not patented until later, in 1895 and 1905, respectively. The New Ophir, where the Daisy Hill Mine was located in 1886, was surveyed in 1889. A 300-foot shaft was excavated at the mine in the "early days" (Mac Boyle 1919). The Daisy Hill belonged to C. Cuminsky (or Cominsky) and Edwin F. Morse, while the New Ophir was patented to Morse exclusively. The mineral plat for the New Ophir, which was surveyed in 1889, depicts Cuminsky's cabin alongside the claim, along with numerous workings, including active and old shafts, the 800-foot-long Albany Tunnel, and a reservoir in Daisy Ravine. The Fillmore (or Bonanza) was surveyed twice, apparently because it was in conflict with the contemporaneous New Ophir. Edwin F. Morse, who lived in Boston Ravine from 1850 to 1896, is listed on the 1870 census as a 36-year-old quartz miner from Massachusetts living with family. His reminiscences, dictated to his daughter, were published as "The Story of a Gold Miner" in the California Historical Society's quarterly journal (Morse 1927).

Far to the south the Jefferson claim was originally located in 1866, and the adjacent Winding Ledge claim in 1876, but the Conlon Gold Mining Company did not consolidate them until 1892. Extensive mine development had taken place by the 1890s, as shown on the mineral survey: depicted are several contemporaneous and caved shafts; Conlon's 300-foot tunnel with tramway and dump; the Norton incline; and another incline with excavations for a hoist, blacksmith, office, and boardinghouse for the miners. Conlon's cabin is on the other side of the workings, in view of his tunnel. John B. Conlin (sic) is listed in the 1880 census as a 52-year-old Irish miner living alone, apparently at the mine.

The Osborn Hill Mining Company patented their Osborn Hill Quartz Mine off the south side of the Park in June 1875, based on survey carried out in March 1874 to document their improvements. The mineral plat depicts only a single shaft in the center of the claim. Once the patent was in hand, however, they stopped development for at least four years (Wells 1880:194). A second shaft was added by 1884 (Englebright 1884). The Sebastopol Mine north of the Osborn Hill Mine, on the other hand, reopened during this period after a 20-year hiatus. James Bennallack and others purchased the claim, and the new owners brought machinery from their Bullion Mine over to the Sebastopol. It was under development in 1880, and finally patented to the Sebastopol Consolidated Gold Mine in May 1890, based on the survey carried out way back in 1869 (Wells 1880:194).

Felix F. Cassidy lived west of the Empire Mine, where he claimed the Cassidy Consolidated Quartz Mine composed of the O'Connor and Gilroy locations. He commissioned Samuel Bethell to survey the nearly 24-acre lode mine located between the Empire Mine and Sauvee's farm in 1877. The mineral patent depicts his home on the north slope of Mary's Ravine. The Michigan-born 41-year-old miner was living there with wife and five children in 1880, and is listed in Grass Valley with his wife in 1870 as well. The mineral plat depicts the family garden on the west side of the house, and the shaft and steam hoisting works farther downslope toward the ravine are plotted as evidence of mining development. His hoisting works were still in place in 1884 (Englebright 1884).

Edward Nuttall located and recorded the Nevada Quartz Mine in 1884 south of the Cassidy claim, between Sauvee's agricultural land and the Fillmore Claim of the Orleans Mining Company. Edward Nuttall is listed on the 1880 census, a couple of dwellings away from Sauvee, as a 42-year-old English miner, indicating he lived on or near his claim. He developed the 500-foot-deep "Nevada or Boston Tunnel" on the south bank of Little Wolf Creek, as well as several exploratory shafts along the lode line in the center of the claim. The road to Boston Ravine is also shown on the 1887 mineral survey plat, crossing the ridgeline above the workings. A decade later, Nuttall was living north on Crandall Road, near where the late John L. Smith bought land, and close to the gold claim he located in Woodpecker Ravine, as depicted on a mineral plat of 1898 for the Sims Consolidated.

To the west of Felix Cassidy's home and mine, on the other side of Sauvee's farmland, was the Dakota Quartz Mine, located in 1880 and patented by Samuel T. Jones in 1891. The relatively small claim straddles Little Wolf Creek just below what is now the Sand Dam. The 1889 survey depicts "old workings in creek," a flume crossing the creek, and two ditches on the south bank, as well as "Jones Tunnel" and two shallow shafts about where the Sand Dam is now located. Jones, born in England in 1857, was a machinist living on nearby Auburn Street in 1900. His house is depicted in the Park on the plat for the nearby Oliver Placer Claim surveyed in 1887.

Just downstream from the Dakota, alongside Bonivert's farmland, and extending north far into the Park, was the Noon Summer location, which was consolidated with the Liberty Hill and patented at the end of the period, in 1892. The claims were discovered much earlier, however, the Liberty Hill in 1876, and the Noon Summer in 1877. The 1888 plat for a neighboring mine shows the Liberty Hill location also had been called the Jersey Quartz Claim. A group of men consolidated the two locations and had the area surveyed in 1889—in the same year as the neighboring Dakota. A number of contemporaneous as well as older workings and water-conveyance features were depicted on the mineral plat. The group—all English immigrants—consisted of local Grass Valley residents Thomas H. Berriman, James H. Oliver, John P. Oliver, Richard Oliver, and Thomas Plummer. Richard Oliver was born in Cornwall, England, while his two sons, James and John, were born in Michigan and Pennsylvania, respectively. All three were listed as miners living together in 1880 along with the rest of the

immediate family, near the Park on Auburn Street. Richard Oliver also patented the Oliver Placer down Little Wolf Creek, between the Park and Auburn Street, in 1890. Richard was not listed on the 1900 census, but the rest of the family was still on the road to Auburn; James and John were still mining. Thomas Plummer was also an Englishman, born in 1850. He is listed as a quartz miner in Grass Valley in 1870, 1880, and 1900, although it appears he moved around somewhat. Thomas Berriman is listed on the 1870 census as a 26-year-old English quartz miner living in the household of an older family member, Nicholas Berriman, an engineer, and Nicholas's wife and children, along with younger Robert Berriman, who was also an engineer. They were likely brothers. Robert came to California in 1864, after working as a mining engineer in Michigan from 1860 (Wells 1880:212). Probably from Cornwall, he mined in Nevada County in 1871, after which all the brothers turned to farming. Their farm was south of Bonivert and Sauvee agricultural lands, along Auburn Road (Englebright 1884).

The Noon Summer and Liberty Hill claims were sandwiched between two important mines that, although not patented until later, began to be developed during this resurgence. East of the Liberty Hill claim was the W. Y. O. D. claim, or Work Your Own Diggings, that was located in 1875, but not surveyed until 1888, and again in 1892 due to conflicts. It was worked only superficially prior to 1888 (Mac Boyle 1919:232). The W. Y. O. D. Gold and Silver Mining Company sponsored the surveys. The 1888 plat shows the mine was extensively developed between 1875 and 1888, with an office, multiple shafts, a main 200-foot-deep incline shaft, the "site of old hoisting works," two adjacent dumps, and a 5-stamp mill. A company of local miners developed the mine after 1888, and discovered rich ore at 400 feet down (Mac Boyle 1919:232). By the close of the period four years later, based on the 1892 plat, the main shaft had reached a depth of 800 feet. The mine was "highly productive" (Clark 1979:53). Charles Brockington, a Michigan native born in 1857, has been credited for the mine's success (Prisk 1895:82). He came to Grass Valley in 1867 with his parents, and began to work for the Empire at the age of 13, having been there just three years. He went on to mine throughout the West, but returned to Grass Valley in 1884 to work for the Empire once more. He left the Empire after two years to oversee development of the W. Y. O. D. Mine, where he served as the superintendent from 1886 to 1892.

The Pennsylvania Consolidated Quartz Mine—to the west of the W.Y.O.D. and Liberty Hill locations—was surveyed early in the period, in 1876, for the Pennsylvania Consolidated Mining Company. The survey plat does not depict any workings, but does list shafts as improvements. Hoisting works were present by 1884 in the center of the claim, within the drainage running south along the west side (Englebright 1884). The mine closed down in 1888, having driven an incline shaft 345 feet in length and a 500-foot-long drain tunnel (Mac Boyle 1919:231). Mining resumed in 1890 to the north of the original hoisting plant, producing considerable gold early during the next period (Lindgren 1896). The 1876 plat also depicts the orchard of J. James along the west boundary of the claim, alluding to another early inhabitant of the Park. Richard Alexander Carbine

Harry settled on the 20-acre parcel encompassing James' orchard in 1882, and eventually received a Homestead proof for it in 1894. According to his testimony, Harry moved into an existing house that he purchased from Thomas Grase; he had been an amalgamator before homesteading. Harry was, according to the 1880 census, a single 20-year-old English butcher boarding at Loraine Pam's boardinghouse. He paid taxes in Grass Valley from 1871 to 1888, and described himself as an invalid in his 1890 testimony. According to his neighbors who provided witness testimonials—Benjamin Dunstan, a 45-year old self-employed miner, and James H. Oliver, a 40-year old miner and patentee of Liberty Hill and the Oliver Placer—the house Harry purchased from Grase was built by Gregory Phillip(s?) between 1865 and 1870. Harry possibly moved into the house in the north side of the homestead, adjacent to Empire Road, as depicted on Lindgren's 1896 Folio. The ditch leading to a pond adjacent to that dwelling is labeled R. Harry's ditch on the mineral plat for the W. Y. O. D. claim surveyed in 1888. Another dwelling in the south side of Harry's homestead, and the Park, was occupied by S. Jones based on the mineral plat of the Oliver placer claim surveyed in 1887. Samuel T. Jones was the claimant to the nearby Dakota claim in the vicinity of the Sand Dam. J. James was living in the homestead in 1878 as indicated by his orchard between Harry and Jones.

In 1888 the Magenta Consolidated Gold Mining Company patented the Magenta Quartz Mine and Mill Site in Woodpecker Ravine along Crandall Road, north of the Empire Mine. Two shafts and hoisting works are depicted on the 1876 mineral survey plat, as are a ditch and flume, all in the eastern portion of the claim. The Company also located and patented the adjacent Tunnel Discovery Quartz Mine in 1886. The survey of the same year depicts diggings, an incline shaft, another shaft, the "Causeway Ditch," probably Carville Conaway's ditch, and "Giddehay's" fence. The latter name probably refers to Thomas Cuddehey, who later patented the Chesapeake location in the late 1890s.

James McCann settled in the vicinity farther up Crandall Road, above the Magenta at the head of Woodpecker Ravine, and just east of the Empire Mine. In 1882 he located and recorded the OK Quartz Mine on the north side of Heuston (also Ophir) Hill, where park residences are presently located. His mineral patent, surveyed in 1886, shows several shallow shafts with drifts along the lode line. The shafts were located in the eastern third of the claim, while his home and a long fence line encompassed the remaining two thirds. His residence was in the District south of the intersection of Crandall Road (now Highway 174) and East Empire Street. Though he developed these shallow workings during this period, he did not receive the patent until 1896. His neighbor's lot belonging to Pat Coughlan was also in the Park. McCann and Coughlin, both Irish miners, were listed in 1880 on the census as neighbors. McCann lived with his wife, Rosie, four sons, two of whom were also mining, a 15-year-old servant named Mary Jones, and a boarder from Ohio, Ben Bradfish. His eldest son was born in California in 1857, indicating the family had arrived to the area early on. With Coughlin were his wife, Annie, and two daughters.

Gold-mining Boom, 1893–1916

Political and Legal Trends

This period experienced an even stronger boom in tandem with another worldwide economic depression that lasted from 1893 until 1896. Increased gold production during this depression filled the U.S. Treasury. By the end of the century, the Treasury's gold significantly outweighed its silver. President William McKinley argued for preservation of the 1873 de facto gold standard in his 1899 message to Congress, urging members "to make adequate provision to insure the continuance of the gold standard and of public confidence in the ability and purpose of the Government to meet all its obligations in the money which the civilized world recognizes as the best. The financial transactions of the Government are conducted upon a gold basis. We receive gold when we sell United States bonds and use gold for their payment" (McKinley 1899).

Production of gold steadily lifted from about 600,000 ounces in 1893 to well over 1,000,000 at the close of the period (Clark 1979:4). The four-year drop in production in the late 1890s could be related to the rush of miners to the Yukon Territory. California policy makers continued to respond to growth in the gold-mining industry. In 1893 the Caminetti Act was passed, creating the California Debris Commission, which licensed hydraulic mines in the Sierra Nevada and was empowered to assess such mines to build debris dams. Finally, marking the end of this period, the State Mining Bureau that was established in 1880 produced their second geologic map of the state in 1916, providing much more detail than the map produced during the previous era.

There were no placer-mineral patents made in or near the Park during this period. Throughout the state, placer mining had finally lost its preeminent position to heavily capitalized lode mining (Rohe 1986:127). Traditional small-scale placer mining also took a back seat to dredge mining. After 1898, heavily capitalized dredge mining wrested huge quantities of gold from gravel fields at the mouth of each major river system along the edge of the Central Valley. Substantial investment in the District's lode mining is also apparent during this boom. A record 21 individual lode mineral patents were made during this period, ranging in size from about 3 to 30 acres, each one requiring some level of development. Improvements to both mining facilities and the residential elements of the Empire Mine also occurred following a brief slump.

Technological Advances

Advances in technology allowed for an increase in claims and gold production without significantly increasing the proportion of miners in the county. The water-cooled Leyner pneumatic drills suppressed dust, finally ushering in the percussion drill in the 1890s (Limbaugh 1999:38). It was a suite of factors, however, that culminated in lode-mining growth during this period. Great improvements were made for several decades beginning this period, enabling many more deposits, especially "large but low-grade accumulations, to be profitably worked. The improvements of air drills, explosives, and pumps, and the

introduction of electric power lowered mining costs greatly. The introduction of rock crushers, increases in size of stamp mills, and new concentrating devices, such as vanners, lowered milling costs. Cyanidation was introduced in 1896 and soon replaced the chlorination processes" (Clark 1979:7). Stamp mills also reached peak size and efficiency during the 1880s and 1890s, and were typically powered by electricity instead of water after 1890 (Hardesty 1988:39; Limbaugh 1999:41).

Grass Valley Mining District Activity

Grass Valley benefited greatly from this gold-mining boom. The town was boasting of its growth in the third year of the economic depression, with the publication in 1895 of a local souvenir brochure largely based on the Nevada County Mining Review (Poingdestre 1895; Prisk 1895). "Here is a galaxy of mines without a counterpart in the history of the State," the city booklet said, continuing that, "Mining is yet in its infancy here, and with the introduction of cheaper motor power our resources will be illimitable. Our mines increase in wealth as depth is attained. Our deepest mines are our richest ones" (Poingdestre 1895:9). In highlighting the Grass Valley Mining District, the county-wide booster piece acknowledged that, "with improved machinery for both mining and milling, and with the knowledge gained by experience, Grass Valley soon advanced to where she is today, *The Quartz-Crowned Empress of the Sierra*" (Prisk 1895:20). Many have argued that gold mining "came of age," as Mann (1982) put it, or reached "maturity," according to Paul (1947), around 1870. Lode mining around the Empire Mine Historic District, however, appears to have reached its peak during the Gold-mining Boom period, 1893–1916.

Empire Mine Historic District Activity

The Empire Mine initially missed the substantial boom of the period. They encountered a "barren zone" and George Starr headed off to the rich mines of South Africa in 1893 (McQuiston 1986:38). Robert Walker, who took over as superintendent after Starr departed, had difficulty convincing the owners to invest in the mine during his tenure (Welts 1976:8). Facilities deteriorated considerably, and by 1895 Walker could only employ a few men, with about 100 "working on shares in the mine" (Prisk 1895:23). Instead of allowing the mine to decline, William Bourn, Jr., regained the controlling interest the following year (Bohakel 1980:10).

Among the first things Bourn, Jr., did was commission San Francisco architect, Willis Polk, to design better residential facilities at the mine. Polk had recently completed Bourn's mansion in the city, and designed the new summer cottage at the mine as an English manor, complete with reflection pools and gardens (Steinfeld 1996:102). The "cottage" was built in 1897–1898 on the prominent hill near the mine, upon the Tunnel Discovery Quartz Mine location. Its completion was cause for a grand celebration by Grass Valley's social elite, as it brought a certain degree of class to the mines.

At the same time Bourn increased the company's territory with the acquisition of the Daisy Hill Mine in 1896, and he began to lay the groundwork for a new patent as well. Bourn located the Tilden and Judd and O'Keefe claims in 1897, and had them surveyed in 1898 as the Tilden Consolidated Quartz Mine. Bourn received the patent—the only one in the District issued directly to him—in 1905, extending the Empire's holdings northeast to encompass the head of Woodpecker Ravine, in the vicinity of the Rowe Shaft. Though the improvements made to obtain the patent were limited, consisting only of four shafts, the mineral plat illustrates how populated it was just across the road from the mine. Three residences are shown in 1898: McCann's house, which is discussed above in relation to the O. K. Quartz Mine, F. Coleman's house, and Duncan's cabin.

Bourn's expansion and building efforts were not sufficient to lift the mine. Exploration efforts failed and the downward trend continued (Welts1974:9). The company operated at a loss from 1893 to 1898 (Bohakel 1980:10). It was not until George Starr returned as manager in 1898, lured back to the position by his cousin, Bourn, that the barren zone was penetrated and the vein relocated (Steinfeld 1996:65). Starr placed conditions on his return that gave him free reign and the resources to accomplish three goals: attend to the deteriorating facilities, locate more gold, and reduce production costs, all of which he accomplished in short order (Welts 1976:9). By January 1899 ore was found that was so rich it paid for all of Starr's improvements and yielded dividends (McQuiston 1986:40).

Bourn supported Starr's efforts by continuing to build support structures, including an office designed by Polk that was completed in 1899, a map room, and other offices and facilities for the manager and supervisors (Steinfeld 1996:102; Welts 1976). Bourn even had a smaller version of the cottage, dubbed the Ophir cottage, constructed for Starr (this building burned down in 1935). The Empire Mines and Investment Company was organized by Bourn in 1899, replacing the Original Empire Mill and Mining Company that he created when he first arrived back in the late 1870s. Starr, meanwhile, oversaw the mine renovation, modernization, and exploration program. In 1900, with the shaft exceeding 3,000 feet on the incline, the property was described as a "showplace" in the *Mining and Scientific Press* (Bohakel 1980:12).

The Empire entered the 20th-century productively. Starr had continued massive reconstruction to all aspects of the facilities, constantly updating various systems, including a state-of-the-art cyanide plant in 1910. They had been benefiting from a privately owned plant built in 1905 below the stamp mill (Empire Mine SHP 1994). Some of the proceeds of the mine were used for expansion, including incorporating other mines, such as the Omaha Group to the southwest, along Wolf Creek, south of the North Star holdings (Welts 1976:9). They also acquired the Pennsylvania Mine in 1912, which had been struggling financially for 10 years (Bohakel 1980:13). After the Pennsylvania acquired all of the W. Y. O. D. locations in 1902 (see below), it had limped along without the financial resources to expand. Having faith it would pay, George Starr and Bourn acquired all of the assets, including a 20-stamp mill and a cyanide plant (McQuiston 1986:45). Compared to the Empire, the Pennsylvania was practically

unexplored. Instead of deepening its workings beyond 2,600 feet, the Empire crosscut over at the 3,400- and 4,600-foot depths (Welts 1976:10).

Toward the close of the period—between 1913 and 1914—the Empire Mine again refurbished their workings. The adjacent North Star Mines contested the Empire's deep expansion in 1914, alleging they had trespassed and extracted ore illegally (McQuiston 1986:48). The complaint was settled out of court, but it was around this time that Bourn and Starr began to hold the entire operation under a veil of secrecy, consistently refusing to supply data to the state mineralogist (Mac Boyle 1919:160). Welts concluded that, "given Bourn's demand for secrecy, his refusal to give data to state commissions, the Empire's policy of storing wash underground and the prohibition of visitors below the 3000 foot level, one wonders how many other wandering winzes were dug" (1975:10).

Various mining interests, both large and small, rushed to patent the remaining locations in the Park. The Magenta Consolidated Gold Mining Company expanded to the north by having the MacKay Quartz Mine surveyed in 1893. The claim was located in 1886 just north of the Empire's 1888 Nevada Quartz Mine, crossing Woodpecker Ravine. Development was minimal, consisting of shafts and prospect cuts, but sufficient to obtain the patent in 1894, and the lateral mineral rights below ground. The rapidly expanding North Star Mining Company under Hague added the Magenta holdings in the same year to their already extensive workings (Bock 1990).

James Glasson patented the General Grant Mine along the road between the Empire and Boston Ravine, on the ridgeline south of Woodpecker Ravine, in 1895. The claim was located in 1879, and little development had occurred by the time of the survey in 1894, consisting of shafts and cuts. The deepest shaft was only 85 feet, and it still had a "whinz [sic]" at its collar in 1894; a whim is a simple hoisting apparatus. An impressive Telegraph Incline Shaft is shown just to the north, within the Woodpecker Gravel and Mining Company's Placer Mine. The 1870 census shows James Glasson as a 40-year-old English quartz miner, living in Grass Valley Township with his wife and three sons. The eldest son, 15-year-old Richard, born in Michigan, was employed in a quartz mill. The 1880 census lists Glasson as a laborer and miner then living with his wife and a stepson, who was apprenticing with a blacksmith.

William George patented the neighboring Parr Quartz Mine in 1893, located between the W. Y. O. D. and the Cassidy mines in 1889. Development shown on the 1891 mineral plat includes shafts east of the W. Y. O. D. mine's surface workings, and on the north end by the General Grant, on the slopes of Woodpecker Ravine. The north end, in fact, seems to pinch out to encompass a quartz lode apex within the Woodpecker Gravel Mining Company's placer claim.

Thomas Cuddehey recorded, surveyed, and patented the 4.5 acres that remained between the Parr, Cassidy, Magenta, and Woodpecker Gravel Mining Company claims between May 1897 and July 1898. His only improvements were a series of shafts, though old shafts and hydraulic cuts from bygone eras are depicted on the mineral plat surveyed in June 1897. Cuddehey was an Irish

immigrant miner who lived, in 1880, next door to John Smith (a Scottish miner), on Crandall Road. His fence line is depicted on the neighboring mineral plat of the Tunnel Discovery Quartz Mine surveyed by the Magenta Consolidated in 1886 (mentioned above). He was living with his wife, three daughters, all in school, and a nephew, Richard Rogers, who was mining as well.

The W. Y. O. D. patented their productive mine alongside the Parr and General Grant in 1893. The claim was vigorously worked beginning in the 1880s, and in 1894 more development occurred there than in any other mine in the Grass Valley Mining District (Prisk 1895:23). The shaft had been pushed to 1,400 feet by 1895, and a state-of-the-art 20-stamp mill had replaced the original 5-stamp. The mine employed a large number of men, and had a "magnificent hoisting and pumping plant" (Prisk 1895:23). The superintendent in 1895, Mr. T. H. Simmonds, was born in 1858 in Cornwall. He came to California in 1877 and worked at several mines across the state and in Oregon before taking charge of the underground operations at the W. Y. O. D. (Prisk 1895:83). Simmonds lived with his family near the mine. German immigrant and local Grass Valley banker, Joseph Weissbein, was one of the largest owners of the W. Y. O. D. Mine, as well as its general manager. Development had reached 1,400 feet by 1896, with drifts extending both north and south for hundreds of feet (Mac Boyle 1919:232).

The W. Y. O. D. Gold and Silver Mining Company patented the Sims Consolidated Quartz Mine to the north, on the other side of the General Grant and Parr, in 1899. They began work on the acquisition in 1898 by surveying the Sims, Nuttall, and Telegraph locations, which had all been located in the 1890s. The ground had been variously called the Woodpecker Gravel Mining Company Placer Mine and the Phoenix (Englebright 1884). The mineral plat of 1898 depicts caved shafts and the untouched Telegraph Shaft, and the extensive workings of the Parr Quartz Mine, including the portals and tracked dump in Woodpecker Ravine. A residence is depicted in the claim as simply "Dave's house," and fence lines on either side that belonged to "Fiddick." James Fiddick, an English blacksmith, did indeed live in the vicinity, with his wife and children. None of his family or neighbors were named David. The W. Y. O. D. shaft had been mined down to 1,600 feet by 1899, employing 65 men and a 20-stamp mill (Mac Boyle 1919:232).

The adjacent Pennsylvania Mine reopened at the tail end of the preceding period, and prospected until 1894, when it discovered rich ore (Mac Boyle 1919:231). From a depth of 700 feet in 1898, some 3,000 feet of drifts had been run along the vein. Operations were "highly productive," and a new 20-stamp mill was erected in 1899 (Clark 1979:53). Between 1900 and 1902, the neighboring W. Y. O. D. and the Pennsylvania mines were involved in litigation concerning breeches in each other's mineral rights, which were decided in favor of the latter. Pennsylvania was awarded all of the locations owned by the W. Y. O. D., and they continued development for the next decade at a slow, under-funded pace. It was up for sale in 1912, and appraisals indicated unfavorable conditions (Mac Boyle 1919:232).

Francois Sauvee never patented the mineral rights, but continued mining on his agricultural land in the Sand Dam area, only about 75 feet south of the W. Y. O. D. Mine. He erected a hoisting and pumping plant on the property by 1895, but had only worked his Golden Treasure, or Sauvee Mine, to a superficial depth (Prisk 1895:33).

Felix Cassidy closed the thin gap of space between his claim and the Empire's by locating the Linden Quartz Mine in 1893. His improvements shown on the 1897 mineral plat consisted of seven shafts and a drift. Other than the limited work to secure the patent, there was probably little other development, if any.

Charles H. Taylor organized the Daisy Hill Mining Company at the onset of the period in 1893 specifically to develop the mine of the same name, originally developed by E. F. Morse and C. Cominsky (Prisk 1895:85). The workings were located in the New Ophir claim adjacent to the Daisy Hill Quartz claim, south of Little Wolf Creek. Taylor was a native to Grass Valley, the son of one of the local foundry owners. As superintendent he oversaw mine development. Both the claims were patented during this period, Daisy Hill in 1895 and the New Ophir in 1905. Within a year, according to DPR archaeologist Scott Green (2006a), the incline shaft was 250 feet deep, and a steam hoist and pump were at the collar, but the mine was idle. The owner was C. Kingsley of San Francisco, who sold it to the Empire Mine in 1896.

Mine development continued on the neighboring Conlon Mine, located between the Daisy and Osborn Hill claims, with J. A. O'Connor as superintendent. DPR archaeologist, Scott Green (2006b), compiled useful references on the mine, including a detailed description in the State Mineralogists Report of 1894, which listed a 10-stamp mill and 15 men employed for three dollars a day, along with other details, down to the kind and cost of lumber used for timbering. Bernard McGrath, an Irish quartz miner in 1900 living on Mill Street, Grass Valley, recorded a proof of labor for the purpose of retaining the rights at the close of 1895. That year the operation included a good hoisting and pumping plant, and apparently operated a "fine five-stamp mill" (Prisk 1895: 31). The surface plant was destroyed by fire in 1902 (Mac Boyle 1919:147). Green (2006b) chronicled the rise and decline of the mine as it was printed in a series of articles printed between 1907 and 1917 in *Mining and Scientific Press*, a popular trade journal published in San Francisco. The years 1907 and 1908 were solid production years, allowing the company to retain its work force through a labor strike over an 8-hour workday. The 12 men working the Conlon were the only miners on the job during the protests, with 650 miners in the region on strike. Following that, however, the mine sat idle for seven years until, in 1915, the labor requirements were challenged and the asset lost.

The extensive Orleans property consolidated during the preceding era continued development. A new hoisting and pumping plant was installed on the Madison Hill claim in 1893, and the shaft pushed to a depth of 350 feet (Prisk 1895:24). The Orleans Mill, consisting of a five-stamp mill and an improved

Hendy Concentrator for crushing ore, operated both day and night. George L. Thurston of San Francisco was the superintendent and general manager of the Orleans Company. Charles Brockington became the acting superintendent in 1893. He had just left the W. Y. O. D. Mine, where he oversaw development for six years.

The Sultana Gold Mining Company formed during this period in 1903 and acquired 27 claims in the southern portion of the District, combining large successful operations like the Orleans, Sebastopol, and Osborn Hill mines (Mac Boyle 1919:250–252). The Sultana Group, as it came to be known, also expanded by patenting mineral claims, just as the Orleans Mining Company had done during the previous period. The patents from this era, however, were generally designed to incorporate small isolated vestiges of the public domain. The Brockington Consolidated Quartz Mine, for example, picked up the gap between the Fillmore (Orleans) and the New Ophir (Daisy Hill) locations. The 1907 survey depicts what they did to satisfy the labor requirement, including numerous surface cuts, shallow shafts, and tunnel repair. The repair work was presumably done to the Albany Tunnel, depicted on plat maps surveyed in the late 1880s. The Sultana Gold Mining Company continued to develop the Prescott Hill and Hueston Hill ledges (Mac Boyle 1919:251).

Early 20th-century Bust Years, 1916–1929

Gold production in this period eroded in conjunction with the United States' entry into World War I, a devastating influenza epidemic (1918–1920), and pronounced inflation that was followed by widespread prosperity in the 1920s (Clark 1979:7). This steady decline in gold output did not end until after the stock market crash of 1929. Actual production in California plummeted from over a million ounces in 1916 to 412,479 ounces in 1929 (Clark 1979:4). Toward the end of this long slump the State Mining Bureau became the Division of Mines within the Department of Natural Resources in 1927, and the first State Geologist was hired in 1928.

Grass Valley changed significantly during this period due to the popular adoption of the automobile. Production of motor vehicles outpaced that of animal-powered carriages and wagons in the decade leading up to 1920 (Jakle 1990:294). The rural population lagged far behind urban ownership, however, until Ford's Model T, which was designed to overcome country road conditions, broadened the automobile's appeal. Additionally, the "motor car was generally regarded as a rich man's toy until the 1920s, when Henry Ford's assembly-line methods brought the price of his Model T down to $280" (Rice, Bullough, and Orsi 1996:398). A local illustration of this shift occurred in 1920, when the horse and foot race track in Glenbrook Park was turned over to automobile races (Chalmers 2006:113). Other notable additions in Grass Valley included a new public library that was completed in 1917 with funds from a Carnegie grant, and the impressive glass-dome Nevada County Bank that opened in 1918 (Chalmers 2006:106).

The Empire Mines and Investment Company continued expansion between 1916 and 1918, growing from 430 acres to 600 (Bohakel 1980:15). The California Debris Commission required the Empire to impound its mill tailings in 1917, which previously had been dumped into Little Wolf Creek (McQuiston 1986:49). In response the company built an 835-foot long dam, 63-feet tall, across the ravine south of the W. Y. O. D. and Golden Treasure (or Sauvee) shafts. The Empire, at the close of WWI, purchased property below Woodpecker Ravine and presented it to the City in memory of those who did not make it back; the land became Memorial Park. Inflation after the war inflamed conflicts between labor and the remaining mines, culminating in strikes at both the Empire and North Star in 1919 (Welts 1976:10). The Empire ultimately raised pay, but tensions continued in early 1920. The Empire was preparing to close down the hoisting and mill operations at the Pennsylvania at this time by installing a subterranean electric train to transport the ore directly to the Empire Mill. Mules housed within the labyrinth had been doing much of the underground hauling since 1899. While visiting the mine in 1922, which reportedly had an abundance of high-grade ore, William Bourn, Jr., suffered a stroke that left him paralyzed.

The Sultana Gold Mining Company initially continued unabated during this bust period. The company dewatered their 800-foot-deep Orleans shaft in 1916, intending to drive it down to the 1,000-foot level (Mac Boyle 1919:251). They relocated the equipment from Prescott Hill, including compressor, motor, and a 20-stamp mill built in 1903, and installed it all at the Orleans shaft along with necessary buildings and shops. A hoist was installed by 1918, and 33 men were employed from $3.25 a day and up (Mac Boyle 1919:252). The mill was idle that year, however, and the mine had not actually produced any ore. The Empire Mine acquired the Sultana Group of claims, totaling 188 acres of mineral rights, in 1923 (Welts 1976:11). That year there were 400 miners working for the Empire. They had to confirm some of Sultana's claims that had yet to be patented. As during the preceding period, these patents were generally small, and minimal development was used to secure the patent. Workings on the Teddy Lode, for example, located in the remaining 8 acres between the Betsy, Sebastopol, and Prescott Hill claims, and evidenced by the plat surveyed in 1923, consisted of five cuts, and "an undivided 1/16 interest in an incline shaft, drifts, and crosscuts." The Empire eventually received the patents to three small locations of the Sultana Company in 1926, under the name Provident Securities Company. The profit from gold mining during this era had slipped steadily, from about $1,000,000 in 1918 to just over $100,000 by 1928 (McQuiston 1986:60). Over the same period, production costs had doubled. At the close of the period, in 1928, the Empire hit low-grade ore, and the mine was up for sale.

Mine development continued on the Conlon Mine—one of the few remaining small operations in the area—during this bust period (Mac Boyle 1919:147). At this point the Royal Gold Mining Company of San Francisco owned the mine, and H. G. A. Brunnier of Grass Valley was the acting manager and treasurer. Brunnier was the same man who had lost the mine in 1917 due to lack of development. In 1919 a new tunnel had been driven about 600 feet, and facilities

consisted of “two 75-h.p. boilers, steam-driven hoist and pump, 3-drill air compressor and a new 10-stamp electrically-operated mill, partially dismantled” (Mac Boyle 1919:147).

The Great Depression, 1929–1941

The Great Depression ushered in the final period of historic gold mining in the region. The stock market crash and ensuing run on banks, as well as the hoarding of gold, deprived the U.S. Treasury of solvency. Consequently, federal policy during the early 1930s was designed to encourage the return of gold coin and specie to the ailing bank system. President Roosevelt signed an executive order in 1933 requiring the return of gold to banks in exchange for non-gold currency, “to restore to the country's reserves all the gold held for hoarding and the withholding of which under existing conditions does not promote the public interest” (Roosevelt 1933).

From his wheelchair in 1928, William Bourn, Jr., offered the Empire to local Nevada City mining engineer and head of Newmont Mining Corporation, Fred Searls, Jr., for far less than what it was worth (McQuiston 1986:63). George Starr retired the following year, and F. W. Nobs took over. Shortly after business interests acquired the Empire, they also invested in the North Star Mine, and in 1929 formed the Empire-Star Mines Company, Ltd. (Bohakel 1980:18). Combined, these assets made the company the number one gold producer in the state in 1930. Fred Nobs continued in the same innovative manner as his predecessors, and by the end of the year had located the “Newmont Vein” at the Empire (McQuiston 1986:66). The Empire-Star Mines Company, Ltd., also patented five claims in 1931 and a sixth in 1932. Some of them had been located and surveyed earlier in the century. Gold production in the state began to steadily rise annually from its depressed state in 1929, and the Empire-Star Mines grew in tandem. The prosperity that the mine delivered to the local economy resulted in Grass Valley being described as thriving with business despite the Great Depression (Bohakel 1980:20).

The Gold Reserve Act of 1934 strengthened reliance on U.S. currency notes over gold, allowing the nation to regain a gold standard. The Act was intended to protect the currency system and to provide for the better use of the monetary gold stock. Presidential Proclamation 2072, which fixed the weight of the gold dollar, caused the value of gold to surge by more than 50 percent. An ounce of gold was valued at $20.67 in 1933, when a $20 gold coin was minted with just under an ounce of the metal. President Roosevelt fixed the gold price at $35 an ounce in 1934, thereby overvaluing gold and undervaluing the dollar note, but preventing future market adjustments.

Rising gold value provided a viable alternative for the unemployed, who took up traditional placer-mining techniques, providing a boom of another kind to the local economy. Statewide gold production rose above the million-ounce threshold for the first time since the 1915–1916 depression, and the extended boom years of early statehood (Clark 1979:4). This incredible resurgence lasted six years, from 1936 until 1941, with the second all-time high for U.S. gold production

reached in 1940. The California Division of Mines, responsive to the resurgence in minerals, continued mapping the state in earnest and completed a highly detailed geological map in 1938. Fred Nobs retired that year, and was replaced by Jack Mann. That same year mining engineers at the Empire-Star recommended exploration at 1,730 feet below sea level, or about 4,230 feet below the ground surface, considerably deeper than any of the existing workings (McQuiston 1986:70). The Pennsylvania Shaft was reopened and fitted with new machinery in 1939 and 1940, and the company broke production records in 1941.

Waning Gold Operations, 1942–1961

World War II interrupted the trend of increasing gold production. Concerned that more than 20,000 men were employed at 250 gold mines and 700 placer mines throughout the western United States, the War Production Board issued Limitation Order L-208 on 8 October 1942. The order classified gold mines, specifically lode mines producing more than 1,200 tons in 1941, as nonessential for the war effort and gave mine owners 60 days to cease operations. Mines producing less than 1,200 tons were exempt. Additionally, government-sponsored scrap-metal drives associated with the war effort dismantled abandoned machinery, a process with obvious implications for cultural resources (Milford 1998:62).

Empire-Star Mines Company, Ltd., halted their operations in the Grass Valley Mining District per the order, but they kept the workings open and dewatered expecting to resume, keeping about 175 men on the payroll (McQuiston 1986:74). They even patented the 5-acre Happy Jack Lode claim in 1944, based on work and survey they had completed in 1942, before the War Production Board's announcement. The mines and mills remained closed for three years, however, until June 1945. By that time the wages for a severely diminished labor pool were such that production costs were simply too high (Bohakel 1980:23). Furthermore, the static gold value put in place in 1934 eventually became antiquated, ultimately depressing gold and generally discouraging investment. The Empire-Star mines attempted to revive production in 1947 by leasing blocks to about 125 miners and providing all the support, such as blasting powder, as well as employing about 200 men (McQuiston 1986:75). They also continued to operate their mill, processing ores for neighboring mines and what little came from their own workings, but were operating at a loss (Bohakel 1980:24). In 1956 miners walked out, striking for better wages, but the Mines Company resisted. By January 1957, with the strike still on, Empire-Star Mines Company, Ltd., began to liquidate their assets, allowed the workings to flood, and closed the mine by summer (Welts 1976:12). In 1958 the entire holdings were sold at public auction (Bohakel 1980:26). It took until December 1961 for the last vestiges of the company to be handled, and the final staff to clear out. The headframe to the Empire was determined a safety hazard in 1969, so it was razed by dynamite. DPR acquired 770 acres of the holdings in 1974 for $1.43 million, excluding the mineral rights below 100 feet in some places, 250 feet in others.

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