A CULTURAL LANDSCAPE STUDY AND HISTORY OF THE SAN FRANCISCO MINING DISTRICT AND FRISCO, SOUTHWEST UTAH, UNITED STATES

by

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ABSTRACT

In the early 1990s, English Heritage conducted a series of pilot studies in Cornwall through the Cornwall Archaeological Unit, examining historic industrial mining complexes as a means to conserve and manage a growing number of individual historic sites and monuments. During these studies, a discrete methodology for conducting Historic Landscape Characterisation (HLC) modelling has been developed. Models such as these have been presented in an assortment of scholarly publications and have been applied in portions of Europe and New Zealand. With few exceptions, the English Heritage HLC model has not been applied in the United States. Rather, the United States' National Park Service has provided guidance on the identification, evaluation, and documentation of historic mining sites and landscapes. The present study incorporates social history, archival evidence, and the physical setting of the San Francisco Mining District (SFMD) and associated boom towns in Beaver County, southwest Utah, into a Geographic Information System (GIS) in an effort to apply HLC modelling. Minor comparisons are drawn between the SFMD and mining districts in the United States, United Kingdom, and New Zealand. Several advantages of the HLC methodology for the SFMD include the creation of population, building and archaeological databases that may be applied to the GIS for better management of the resources on a broader scale.

DEDICATION

Newpapers provide a personal glimpse of history, daily life and death in the the San Francisco Mining District camps that help shape the Historic Landscape Characterisation model:

“In 1875 the opening to the Horn Silver made Beaver County the leading silver-lead producer of the state” (*Davis County Clipper*, 8 October 1937: 1).

“Not San Francisco, but Frisco, Southern Utah, the place made famous as being the location of the great Horn Silver Mines – probably the largest known silver mine in the world” (*The New York Times*, 16 March 1880).

“Had the Horn Silver Mine not been discovered, there would be no town here to-day, and had the Horn Silver mine not been what it undoubtedly is, the largest ore body known, Southern Utah would have been still beyond the pale of cheap transportation” (*Salt Lake Tribune*, 16 February 1879: 2).

“The Company’s fine two story, cut stone edifice is completed externally, and makes a splendid appearance. It is the finest and most substantial building in Frisco and shows an unlimited faith in the permanency and future growth of Frisco” (*Southern Utonian*, 22 October 1881).

“On Tuesday morning, John Gardner started in on his last shift at the Horn Silver Mine...His sudden and unexpected death has cast a gloom over the entire camp” (*Ogden Standard*, 7 February 1882: 3).

“Every saloon-keep in Frisco, eleven in all, were indicted by the grand jury for violating the Territorial Statute prohibiting the selling of liquor upon Sundays” (*Southern Utonian,* 18 March 1882: 3).

“Though its operations have not been heralded from the house tops, it is nevertheless a fact that the Horn Silver Mining Company is making great headway with the system of development work mapped out some time ago” (*Deseret News*, 27 November 1889: 6).

“The Horn Silver Mining Co., have been compelled to ‘lay off’ part of their working force, owing to scarcity of water. We understand it is their intention to sink their large well deeper, and [endeavour] to secure a better supply from that source. And as soon as the necessary supply can be obtained a larger force of men will be put on and everything will be rushing again in Frisco” (*Southern Utonian*, 17 January 1896).

“Frisco is rapidly and surely drifting back to the palmy days of the seventies. The Horn Silver Mine is a better mine today than ever before in its history...” (*Deseret News*, 12 December 1899: 6).

To those who gave their lives in the name of mining in the San Francisco District, Beaver County, Utah – You may be gone, but not forgotten.

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ABBREVIATIONS

AD	Anno Domini
ASARCO	American Smelting and Refining Company
amsl	Average mean sea level
AVIO	Alle Vermark Is Ous
BCE	Before Common Era
BLM	Bureau of Land Management
C	Celsius
CE	Common Era
Єg	Cambrian Grampian limestone
Cel	Carboniferious elephant limestone
CFR	Code of Federal Regulations
cm	centremetres
COST	Cooperation in the field of Scientific and Technical Research
Ctl	Carboniferous Topache limestone
Ctq	Carboniferious Talisman Quartzite
Dms	Devonian Mowitza Shale
DOT	Department of Transportation
Drw	Silurian Red Warrior limestone
DUP	Daughters of Utah Pioneers
E	East
e.g.	Example
EO	Executive Order
EPA	Environmental Protection Agency
ESF	European Science Foundation
ESRI	Environmental Systems Research Institute, Inc.
et al.	And others
F	Fahrenheit
fn	footnote
ft	feet
GIS	Geographic Information Systems
GLO	General [Government] Land Office
GPS	Global Positioning System
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HLC	Historic Landscape Characterisation
HSM	Horn Silver Mines
HSMC	Horn Silver Mining Company
HSMC III	Horn Silver Mines Company III
i.e.	that is
IMACs	Intermountain Antiquities Computer System
in	inches
km	kilometre
km^2	square kilometres
LDS	Church of Jesus Christ of Latter-Day Saints; Mormons
Ltd	Limited
m	metre
ma	Million Years Ago
MS	Mineral Survey
mybp	million years before present
N	north

NACD	Native American Consultation Database
NAD	North American Datum
NAD27	North American Datum 1927
NAD83	North American Datum 1983
NCSS	National Cooperative Soil Survey
n.d.	no date
NHL	National Historic Landmark
NOAA	National Oceanic and Atmospheric Administration
NPI	National Preservation Institute
NPS	National Park Service
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
Om	Ordovician Morehouse Quartzite
Qal	Quaternary Alluvial deposits and lake beds
S	South
SFMD	San Francisco Mining District
SHA	Society for Historical Archaeology
SHARD	Sonoma Historic Artifact Research Database
Smq	Silurian Morehouse quartzite
§	Subsections
sp.	Subspecies
SU	Surface Unit
TAQ	Terminus ante quem
Tgp	Tertiary Granodiorite porphyry
TMR	Tintic Mineral Resources, Inc.
TPQ	Terminus post quem
Trh	Triassic Harrington formation
Tq	Tertiary Quartz monzonite
TU	Test Excavation Unit
Tv	Tertiary lava flows
U & N	Utah & Northern Railway
UK	United Kingdom
US	United States
USFS	United States Forest Service
USGS	United States Geological Survey
USHS	Utah State Historical Society
USMM	United States Mineral Monument
UT AMRP	Utah Abandoned Mine Reclamation Project
UTM	Universal Transverse Mercator
VI	Visual Inventory
W	West
WGS	World Geodetic System
WO	Wash Out
WPA	Works Progress Administration
www	World Wide Web

1.0 INTRODUCTION AND METHODOLOGY

In 1993 and 1994, English Heritage conducted a series of pilot studies in Cornwall through work carried out by the Cornwall Archaeological Unit, examining historic industrial mining complexes as a means to conserve and manage a growing number of individual historic sites and monuments. English Heritage established a discrete methodology for Historic Landscape Characterisation (HLC) using cartography (Ordnance Survey Maps), aerial photographs, morphological analyses (examining field patterns), documentary evidence, comparisons of past and current land use, and the interpretation of archaeological features to record, interpret and understand the historical attributes of the present-day landscape. Information is compiled into a geodatabase for control of the spatial and temporal data via Geographic Information Systems (GIS). As such, landscapes include history, archaeology and cultural change, ecology, geology, topography and character (Aldred and Fairclough 2003; Turner 2006). The goal of HLC is to present a landscape in its entirety, including the concept of time-depth over long periods of time (Aldred and Fairclough 2003).

The present study incorporates an examination of the physical archaeological remains, documentary evidence, and social history with GIS modeling using HLC. The intent of the present study is to not focus on the geology, natural setting, history, legal ownership, or archaeology solely within the San Francisco Mining District (SFMD) in Utah, southwest United States (US) (Figure 1-1), but to conduct an overarching study encompassing the symbiotic and diachronic relationship of these disciplines, aiding in the reconstruction of the industrial landscape. The study involves the development of a glossary (Appendix A), requires assistance of individuals and research at a variety of repositories (Appendix B), an examination of physical remains and artefacts (Appendix C); the compilation of multiple databases or gazetteers (Appendix D); and the application of these subdisciplines through the creation of a project GIS (Appendix E).

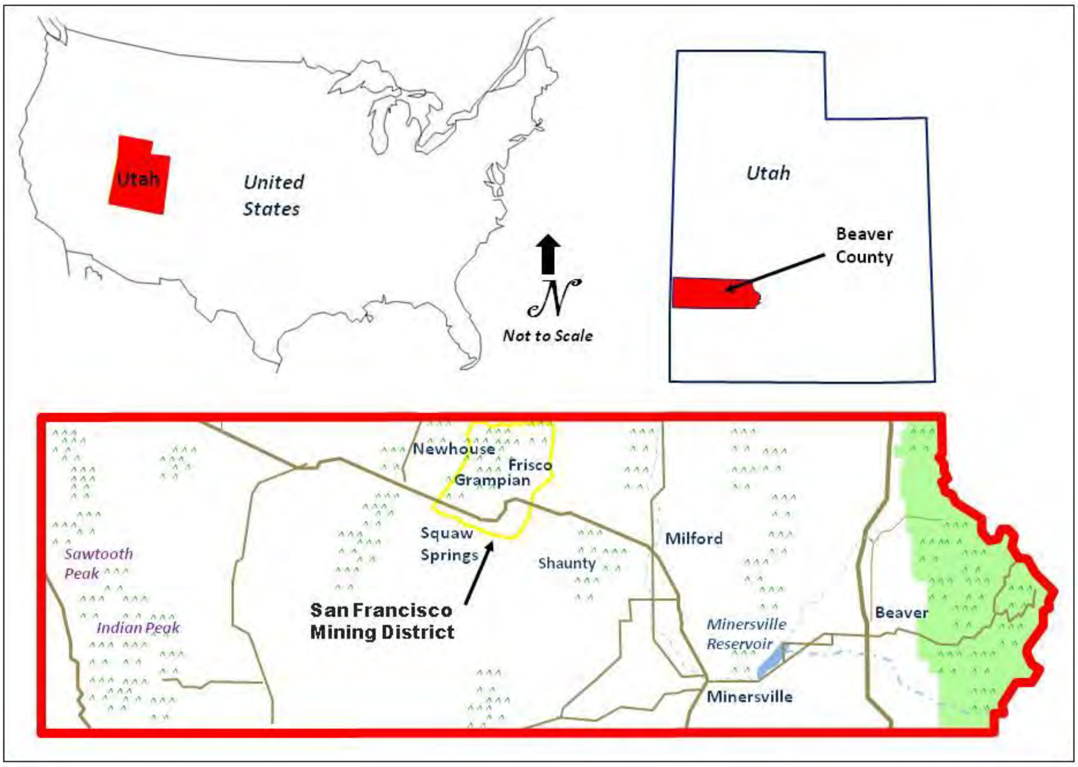

Figure 1-1. Location of the San Francisco Mining District, Utah

1.1 Theoretical Approach

In order to understand HLC, the term *landscape* needs to be defined. Note, there are differences between the definition of landscape in the US and the United Kingdom (UK). In the UK, landscape is a direct result of human interaction with the environment, wherein the environment is adapted to suit the needs of humans and as a result of natural processes; thus, the environment reflects these changes. To illustrate this, Angéle Smith and Amy Gazin-Schwartz (2008:15) state,

> 'Landscape' has become a fashionable concept. While once perceived as the mere backdrop to human action and life, it is now recognized as having a more critical role in how people live and make sense of who they are and what is their identity. More than simply a physical place, landscape is now understood as also having social and ideological or cognitive elements. It has taken on a metaphorical quality in which people talk about the landscape as the general shape and lay of the land, as a body of knowledge, and most significantly as a body of lived experiences of the world. To know the landscape is to know and control the access to that knowledge or to those experiences...Landscapes are imbued with meaning and significance for those who live, work, and die in them...

Rebecca Yamin and Karen Bescherer Metheny's edited volume, *Landscape Archaeology: Reading and Interpreting the American Historical Landscape* (1996: xv), describes the landscape as "the stage for human action...both [reflecting] past activities and [encoding] the cultural landscape in which people's views of the world are formed." J. Edward Hood (1996: 121-146), acknowledges the differences between physical landscape and culture, or natural, formal and planned landscapes, drawing upon examples from Devon (UK) and New England (US) to demonstrate that "culture is not a static thing but dynamic and changing, as are...landscapes..." (Hood 1996: 121). He further offers that "cultural landscape can be extended to include all aspects of culturally defined space...landscape is not only a physical context that helps to constitute social relations, but it is also a meaningful context as well" (Hood 1996: 123). In further examination, landscapes provide spatial organisation that can have both cultural and functional meaning, represent process or material form, or have "multivocal layers of meaning" (Hood 1996: 125).

In the US, the National Preservation Institute (NPI) defines landscape as "an expanse of natural scenery seen by the eye in one view," whereas a cultural landscape "is a geographic area (including both cultural and natural resources and the wildlife or domestic animals therein), associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values" (Brown 2009). Thus, more often than not, landscapes include character-defining features such as spatial organisation, land patterns, topography, circulation, vegetation, water features, structures, site furnishings, and related objects, as well as views and vistas, natural systems and features, cultural traditions, and associated archaeological sites (Brown 2009). In practice, this is complicated by researchers, as approaches or methodology in the US tend to vary from researcher to researcher, despite the guidance provided by US National Park Service (NPS) and NPI.

NPS manages landscapes through the Historic American Landscapes Survey (HALS) with the intent to convey the condition of the original site at the time of survey; a focus on under-appreciated resources; or the historical significance of the features. Under HALS, documentation may be used to prepare National Register of Historic Places (NRHP) nominations, Cultural Landscape Reports, or provide assistance for preservation, treatment, interpretation, or mitigation of the landscape (Jaeger Company 2004).

In terms of mining, Richard V. Francaviglia (1991: 11) defines 'landscape' as "an image of a place based on its visual characteristics." Specific issues must be addressed when describing mining properties as landscapes, such as:

- Natural features contributing to the original decision to mine the area;
- Landscape modifications associated with historic mining activity (tailings or gob piles);
- Deterioration due to vandalism, neglect, lack of use, or severe weather, and effects to the property's historic integrity;
- *In situ* original and other historic machinery;
- Linear systems such as canals, ditches, railroads, railroad beds, roads, and tramways including their approximate length and width and the location of terminal points (McClelland *et al*. 1989/1999).

There are several additional terms that need to be defined for clarity throughout the present study, either for terminology used in association with mining activities, or due to the comparisons between European and North American resources (see Appendix A).

The English Heritage HLC model has been presented in an assortment of scholarly publications and has been applied extensively to the Cornwall and West Devon Mining Landscape World Heritage Site (Aldred and Fairclough 2003; Clark, Darlington and Fairclough 2004; Turner 2006). One of the earliest landscape studies includes the Cornwall Archaeological Unit's examination of the mining district in St. Just, Penwith, Cornwall (Edwards *et al.* 1992), which determined that:

- Management of the landscape is a continuous process since prehistory;
- Technology modifies the appearance of the landscape, changes rapidly, and on large scales; and
- Landscape reflects use or change over time.

Turner and Fairclough (2007:122) identify four implications that serve as the basis for HLC approaches: “diversity, perception, application, and scale.” These implications are described as follows:

> [HLC] represents a research tool that can assist the archaeological interpretation of past landscapes...and... seeks to acknowledge that people in past societies had multiple viewpoints too – seeing things in different ways depending upon where and who they were. HLC can help to reveal processes of long-term change in the landscape, and shows the connections between people at various times in the past...and people in the present and future. When we create an HLC, we make a representation using analogies based on archaeological and historical research into specific sites and monuments or areas. The research informs our perception of the rest of the landscape, and our ideas about what we value inform what we research. In turn, HLC can inform our planning for the future – not just the future for a few enthusiasts or professionals, but the future of everyone who sees, visits, remembers or lives in a landscape. This future-oriented aspect offers a new type of importance and relevance to ‘doing’ archaeology.

Recent studies have applied landscape models to mining sites in New Zealand (González-Tennant 2009: 20-37), Ireland, Sweden (Nord 2002), and Scotland (Macinnes 2002). Between 2004 and 2008, the European Cooperation in the field of Scientific and Technical Research (COST), in partnership with the European Science Foundation (ESF), conducted ESF-COST European Project COST A27: *Understanding Pre-Industrial Structures in Rural and Mining Landscapes* (Landmarks 2007). The study identified that previous examinations of landscapes focused on morphological studies of the land use; palæo-environmental and geo-archaeologial studies; technology; documentary information; or the use of GIS for the treatment, presentation and dissemination of data (Landmarks 2007). The purpose of the study was to develop a regional synthesis of subdisciplines (archaeology, technology, law, rural history, geography, ecology, and agribiology) to produce methods and tools for heritage research and historical valorisation (historical value or merit, demonstrated through public outreach and tourism). It esulted in (1) a concerted research action among the portions of Europe; (2) the development of a European GIS database based on archival research (written and iconographic memories), applied arts and sciences (soil memory), methods and technologies implemented at or by the mines, the legal and administrative documentation, and the perception of the landscape; and (3) scientific results which could be applied toward the identification of issues such as deforestation, pollution, erosion, fire, control of resources, as well as the losses of heritage and the appreciation of valuable sites and spaces (Landmarks 2007). With regard to the application of GIS databases to the treatment of mining sites, the study notes,

> The 'digital phase' of virtual simulation must follow an epistemological creation of a landscape's mental model; landscape reconstruction is not purely an entertainment, but is a channel for communication based on deep research, observation and classification processes. Diachronic visibility from modern landscapes is not evident, but this is possible through the correct treatment of documents (cartography, remote sensing systems, archaeological or paleo-environmental data) (Landmarks 2007).

With few exceptions (Barratt *et al*. 2007), the English Heritage HLC model has not been applied in the US. Rather, the NPS has provided guidance on the identification, evaluation and registering of historic mining sites, and for the documentation of rural historic landscapes (Noble and Spude 1992; McClellan *et al*. 1989/1999). Examples of the application of the American landscape models are presented in additional scholarly publications (Francaviglia 1991; Hardesty and Little 2000; Brown 2009).

Barratt *et al*. (2007) initially applied the English Heritage HLC model to a US Department of Defence installation, Fort Hood, Texas, as an experiment and an applied practical tool for land management practices. Similar to the present study of the SFMD, the Fort Hood study demonstrated that the application of the HLC model to the US requires a refinement of the model in a variety of manners. Following the Fort Hood HLC model, historical maps were compared to aerial photographic transcriptions, physiographic data, geological sequencing, and attributes were entered into a GIS geodatabase. To implement the database, terminology for site and feature types had to be standardised; further considerations took into account the possibilities of adding data from future studies, and linking artefact catalogues, photographs, and other materials (Barratt *et al.* 2007: 68). All attributes were integrated and portrayed visually through the GIS.

Barratt *et al.* (2007: 117) identify the differences of applying the English Heritage HLC model to Fort Hood, acknowledging one of the “most obvious departure[s] from English methodology involves the data sources used, as the project involved the characterisation of a landscape which was not already organised into easily accessible landscape units, and where no detailed mapping was available.” This resulted in a large amount of time being devoted to development of the methodology, experimentation with the datasets, and interpretation of the landscape. Also unlike the English Heritage HLC model, the Fort Hood model allowed for the examination of a landscape encompassing over 300 years of land use and demonstrated a pattern of change over widespread time (Barratt *et al.* 2007: 117-118). Overall, the Fort Hood model proved three successful results regarding HLC models:

1. Allow a glimpse at a wider historic environment;
2. Integrate well with mainstream land use policies, not simply regulatory requirements; and
3. Alow for inter- or trans-disciplinary collaboration (Barratt *et al*. 2007).

1.2 Overview of the SFMD, Beaver County, Utah, US

The SFMD encompasses over 2,428 hectares [6,000 acres], including mine workings, claims and three settlements established between 1871 and 1952. Frisco is situated along the eastern flank of the San Francisco Mountains; whilst a suburb of Frisco, Grampian [Grampian Precinct, Grampion], developed to the south of the boomtown, closer to the mines. Grampian is noted in US Census Bureau records from 1880 onward to 1930, supporting William B. Wray’s (2006: 437, fn. 33) suggestion that Grampian predates Frisco (see also Horton 2002: 136; Butler 1913: Plate I). Newhouse is situated along the western flank of the mountains. The SFMD is situated in the southwest portion of Utah in Beaver County (see Figure 1-1). Additional information regarding the SFMD is presented in Chapters 2 and 3.

Multiple archaeological sites have been documented within the SFMD boundaries including prehistoric lithic scatters; the historic Frisco and Newhouse sites; portions of a railroad grade; wagon roads; and mining-related archaeological sites (Appendix D4). The entire SFMD is comprised of a myriad of feature types associated with the industrial mining landscape (trash dumps; temporary, semi-permanent and company camps; claim markers; prospects; shafts; adits; tailings; assay offices; ore processing sites; a refinery; support facilities such as workshops and offices; railroad and roads; utilities; and other features). Key to note is that the town would not have existed if it were not for the lucrative mines; the mines would not be present if the geology could not support the minerals (Wray 2006: 436, fn. 33):

> The entire Horn Silver ore body mined down to the 1000' [305 m] level, over the first 35 years of production, as shown by mine maps published in Butler (1913), when projected to the surface, occupied less than 2 acres [0.81 hectares], i.e., about one-tenth the area of a single, standard-sized lode mining claim...Had not the tip of the ore body been recognizable in 1875 on the surface, this notable deposit still might not have been discovered and the San Francisco district would be much diminished in historical significance.

Thus, the symbiotic relationships between the geology, archaeology, history, legal ownership (or land use), and the natural setting are lost without being characterised through a systematic approach, such as HLC.

1.3 Development of the SFMD Historic Landscape Characterisation Model

The development of the model follows eight basic stages:

1. Compilation of a historic context based on information gleaned through archival research, documentary evidence, and records of past land use;
2. Examination of the historic maps, aerial photographs, genealogy, and iconography to conduct an assessment of past land use;
3. Delineation of the boundaries of the landscape, based on the research;
4. Identification of subthemes within the overall landscape (mining, settlement, transportation, utilities, and hydrology features);
5. Creation of a comprehensive geodatabase and gazetteers, followed by population of attributes that may be incorporated into the GIS model;
6. Digitisation and georeferencing of historic maps and incorporation of spatial and temporal data into the GIS model;
7. Identification of patterns reflecting the subthemes within the overall landscape and change throughout time; and

8. Identification of tools for future heritage research, valorisation, or areas that need subsequent attention.

Application of the HLC model requires comparison of the physical landscape and cartographic sources through GIS. Employing guidance from the English Heritage HLC model, NPS bulletins, and others (Brown 2009; Francaviglia 1991: 11; Landmarks 20007), allows for the identification of the following physical characteristics at the SFMD:

- The geological setting,hydrology, soil, and other natural terrain contributed to the original decision to conduct mining in the area;
- The presence of features and equipment demonstrating landscape modification associated with historic mining activity and reflecting changes due to technology;
- Deterioration due to vandalism, neglect, lack of use, continued use, and natural erosion;
- Linear systems within the property such railroad beds (ballast), roads, telegraph lines, and water conveyance pipelines;
- The presence of prehistoric era cultural resources sites, features and/or artefacts, as well as the presence of historical land use;
- Change over time represented by both the archival record and corroborated by the physical evidence; and
- The ability to view the landscape in a wider context, through multiple disciplines, and allowing for integration of land use policies.

The following section defines the methods for the application of the HLC model, and how aspects of this process were developed through the course of the study.

1.4 Archival, Cartographic and Iconographic Research

The study does not focus solely on the geology, natural setting, history or archaeology within the SFMD. Rather, the intent is to conduct a study that encompasses the relationship of these subjects for the reconstruction of the HLC model. The proposed study involves archival research to document the historical context and archaeological deposits or features of the site, as a means to identify the historic landscape character of the SFMD (see Appendix D6). Information gleaned from the archival research also allows for comparison to other mining districts of contemporary age and mining practices in the US, UK, and New Zealand (see Appendix D3).

Twenty eight states have sites representing historical mining activities in the US (Bunyak 1998). State Historic Preservation Offices, NPS, NRHP, National Historic Landmarks (NHL), Historic American Building Surveys (HABS), Historic American Engineering Records (HAER) provide excellent sources of information for these sites. Primary sources, such as SFMD records, patented claims and other land acquisition information housed at the Beaver County Court House, newspapers, original photographs, manuscripts and maps, diaries, or personal letters of miners and residents of settlements, provide reliable insight into the workings and layout of the SFMD. Additional information is gleaned from secondary sources: mining and engineering handbooks, textbooks, archaeological reports, popular histories, abandoned mine reclamation reports, and other government documents. Electronic sources and personal interviews supplement the information in order to clarify gaps in the history of the subject property.

For the purposes of this study, vintage maps, aerial photographs, oral histories, historic photographs, regional newspapers and other documentation were considered valuable resources for the documentation of past land use. Topographic maps provide colour-coded line and symbol representations for both natural and artificial features; they may be plotted to scale, shape, and elevation. The US Geological Survey (USGS) has created and revised more than 60,000 topographic maps, providing coverage throughout the entire US at a variety of scales. As such, historical documentation provides a valuable resource for documenting prior property use, and landscape changes for the surrounding areas. Among the earliest cartographic sources for the SFMD are those produced by Butt (1878), Hooker (1879), Tolton (1904), USGS (1906, 1911, 1959), and Butler (1913, 1920). Furthermore, other features (transportation networks, hydrology, and utilities) may be identifed from these various maps and through the use of aerial imagery.

Maps and aerial photographs are compared to ephemeral collections and the US Census to provide a glimpse into the cost of living, the nationality, the occupations, and commercial development of an area (community, neighbourhood). Aerial photographs are extremely useful when other historic resources are not ascertainable; they also may be compared to topographic maps, city directories, fire insurance maps, property tax files, land title records, building department records, and zoning/land-use records. Photographs are compared to modern satellite images or other raster images for further analysis of the data. Raster images may aid in the creation and/or integration of slope data as well.

In addition, oral histories help gather and preserve information about past events or activities. Oral history interviews may be formal or informal, or be gathered from printed compilations of first hand accounts of ordinary people; they may be conducted in person or via telephone (McDonnell 2002). In 1968, Mel Osborn, Dick Callahan, Donn R. Callahan, and Jim Haws – students of Southern Utah University – conducted oral history interviews of Richard Jones and wife, and Samuel F. "Bud" Leigh regarding life in the SFMD. In April 2008, Paige Peyton and Heather Puckett interviewed Gladys Whittaker; she and her husband, Arland Spencer "Bud" Whittaker, a railroad worker, resided in nearby Milford and had general knowledge of both Frisco and Newhouse. Few of the former residents of Frisco, Grampian, and Newhouse remain alive in 2010, and thus, there is little information that can be gleaned from conducting new interviews during the present study.

In 2001, the J. Willard Marriott Library at the University of Utah began digitisation of newspapers under a Library Services and Technology Grant; subsequent grants from the National Endowment of Humanities and the Library of Congress has allowed more than 57 Utah newspapers to be digitised for viewing through the Internet.[1] Two newspapers printed in Beaver County, Utah – the *Southern Utonian*, and the *Beaver*

1 The Utah Digital Newspapers are available online at http://digitalnewspapers.org. /

City Press – include many daily and weekly accounts of life and mining discoveries in the SFMD. Briefly, Frisco operated its own newspaper, the *Frisco Times*; excerpts of the *Frisco Times* were contained in publications of the *Southern Utonian* and *Salt Lake Tribune*. Together with the legal documents, this information aids in defining the social history and supplements the attributes in the GIS geodatabase.

Of utmost significance in this particular study was the incorporation of genealogical information regarding the settlers and miners of the SFMD (see Appendix D1). Conflicting accounts provided exaggerated population statistics, and photographic and physical comparisons of the cemetery provided an outlet for further research. The Church of Jesus Christ of Latter-Day Saints (LDS or Mormons) provides an online service, http://www.familysearch.org, that contains worldwide genealogical records from 4,500 family history centers in 70 countries. This service provided accountings from the US Census; death, marriage, and military records; and information regarding immigration and family history. Gaps in the data are supplemented through employee rosters in the Horn Silver Mine Records (1880-1917), housed in the L. Tom Perry Special Collections, Harold B. Lee Library, Brigham Young University, Provo, Utah. The assembly of this information into a gazetter (see Appendix D1) allows for better documentation of the population from the inception of the mines through the collapse and subsequent bust cycle of the SFMD, as well as offering a better accounting of the persons interred at the Frisco Cemetery.

1.5 Field Investigations

1.5.1 Reconnaissance

Field reconnaissance efforts have been made in the study area over the past few years. Frisco lies to the east-northeast of the San Francisco Mountains. Utah State Highway 21 serves as the eastern boundary for the site and likely served as an early route of transportation for wagons, horses, and later, automobiles; based on archival research, this route likely traverses the path of an old stage road leading to Squaw Springs. The majority of the mine claims fall along the ridges of the San Francisco Mountains, running 24.14 km [15 miles] north-south by 8.05 km [5 miles] east-west and encompassing over 2,428.113 hectares [6,000 acres]. Incorporation of archival maps and aerial photographs into the GIS database aids in the identification of additional physical remains. Whilst it was assumed that there would be discrepancies in the specific location and that shown in the archival record and GIS database, these locations were verified through surveys and ground-truthing (Chapter 4).

1.5.2 Surveys

Title 9, Chapter 8, Section 302, subsections (21) of the Utah Code (Utah Code §9-8-302(21)) defines a survey as "a surface investigation for archaeological resources that may include: (a) insubstantial surface collection of archaeological resources; and (b) limited subsurface testing that disturbs no more of a site than is necessary to determine the nature and extent of the archaeological resources or whether the site is a historic property." In Utah, three types of archaeological field methods are employed:

- A *Class I inventory* focuses on the cultural resource data and archival research available for a property under investigation. It may be applied to prehistoric, historic, or ethnological features and provide overviews of previous land use, sacred sites, or properties of traditional cultural or religious importance. Information is synthesized into an interpretive or narrative overview, and may be continually updated. In general, Class I information may be used for development of regional research designs for evaluations; thus, linking the Class I inventory to the GIS is critical for management of resources, as well as future planning, compliance, and additional research.

- A *Class II inventory* differs from a Class I inventory in that it includes discrete survey goals or aims, a methodology, and sampling units in the development and testing of an archaeological site location. Such field surveys are used to statistically sample a location; characterise probable artefact or feature densities, diversity and distribution; develop or test a predictive model; or to address specific research questions.

- A *Class III inventory* is an intensive survey used to identify the distribution of properties in an area; recording the number, location and disposition of the properties; determining the types of properties within an area; allows for proper classification of individual properties within a larger area; and allows for the recordation of the physical extent of certain types of properties. From this, one may determine procedures for evaluation, management, monitoring and mitigation of cultural resources. This stage is a compilation of the Class I and Class II inventory methods and utilizes field methodology for site sampling.

The current study involves Class I and II practices. Due to the complexity of the site, a sampling strategy was developed as opposed to complete excavation throughout the SFMD. In coordination with Dr. Roger White, seven survey areas were identified for further investigation: (1) the Newhouse town site; (2) the commercial district or centre of the Frisco town site – including the Frisco Mining and Smelting Company site; (3) the Horn Silver, King David, Lulu Mines and the Grampian settlement; (4) the Frisco town site's railroad depot; (5) the Squaw Springs stage stop; (6) Marble Gulch; and (7) outlying areas within the SFMD. The goal of the sampling strategy was to address research questions regarding mineralogy, mining and settlement practices and technology, demographics and ethnicity, economy, and policy (Paul 1964; Bunyak 1998; Dixon 2002; Schablistsky 2002; HARD Mining Sites 2007). Several research questions were posed for the present study (Table 1-1).

The field methodology varied based on the density of remains, features or artefacts present at the seven survey areas, and in accordance with Utah Code §9-8-302(21). Linear transects were walked along areas suspected of containing cultural remains, features or artefacts. Transect intervals were judgmental, based upon the terrain, amount of vegetation in the survey area, and ground visibility.

Three temporary site datums, consisting of a wooden stake labelled with a temporary number and date, were placed within survey areas at Frisco (two within the commercial district and one at the smelter location). Isolated artefacts were documented using standard archaeological techniques. Among the characteristics recorded were the required Universal Transverse Mercator (UTM) coordinates, descriptions, dimensions, drawings/sketches, photographs, maps, and integrity considerations. Geographic coordinates of features, artefacts, or boundaries were

Table 1-1. Research Questions posed for the SFMD

Question
• What features best explain and illustrate the significance of the landscape? What level of detail is required for documenting the landscape?
• Are the mills at the SFMD representive of the mills in the NPS work (Bunyak 1998)?
• How many population centres are apparent? Do businesses at the population centres (Frisco, Grampian) reflect ownership by diverse ethnicities (Dixon 2002; Schablistsky 2002)?
• Who comprised the labour force and is it reflected by the artefacts? Does the work force/ethnicities change over time? Is this noted in the census records? Are there boundaries for segregation of differing ethnicities, social classes, or political groups?
• What activities, events and/or types of mineral/s were mined? Is the mining methodology a reflection of methods employed by distinct individuals or groups based on temporal period, ethnicity or for type of mineral?
• What time periods are reflected in the mine workings, population centres, or artefacts? Are patterns of occupation and abandonment noted or is temporal variation noted between specific features or loci (Costello *et al*. 2007a-c)?
• What types of services are associated with the population centres?
• What mining processes, technology, operations or functions are evident within the SFMD? Were processes, technology, operations, or functions adapted, reused or replaced to specific conditions within the SFMD? Are mining processes, technology, operations or functions similar to those used at other districts in the US or abroad?
• Was settlement exclusively associated with mining? Are areas established for cooking, sleeping, work, waste disposal? Are structural remains present? Evidence for zoning of activities within the sites?
• Is a type of social order evident within the SFMD? Was the community organized or predominantely comprised of "an ethnically diverse transient male population" (Costello *et al*. 2007b: 95)?
• Were miners organized, independent, or employed by a mining company?
• Was a legal system in place to fight crime?

taken through the use of Garmin eTrex® Legend H Global Positioning System (GPS) receivers.

Field testing methods varied and included the emplacement of Test Units (TUs), Surface Units (SUs), and Visual Inventories (VI).

- TUs were utilised to inspect areas with dense concentrations of artefacts. The square excavations (measuring 1 m by 1 m) explored the nature and extent of subsurface deposits and allowed for controlled collection of data or artefacts required for assessment of significance and integrity of a resource. Depths of TUs varied based on the presence or absence of cultural materials. Soils were screened through 3 mm or 6 mm [1/8-inch or 1/4-inch] hardware cloth. In these cases, vegetation was removed from the soils in order to visually inspect items (glass, metal or other artefacts). Artefacts recovered from the TUs were organized, typed by material, and then otherwise inventoried in field notes. TUs were performed through the use of shovels, trowels, whisk brushes, and other small, manual or hand tools. GPS points were taken at the southwest corner of each TU.

- SUs (measuring 5 m by 5 m) were used to inspect light scatters of artefacts associated with features within a controlled inventory unit. Unlike the TUs, no excavation was made, but the artefacts contained within the SUs were inventoried or otherwise described in the field notes, based on a visual account. GPS points were taken at the southwest corner of each SU.

- Concentrations of artefacts and feature areas of varying dimension were inventoried through judgmental transects and VIs rather than using a controlled inventory unit. GPS points were taken in the centre of each VI area.

In order to verify the location of physical remains depicted on aerial photographs, archival maps and the GIS data, ground-truthing was required. In addition to the seven sampling areas, a representative sample of the mining features was examined in comparison to maps and other historical documents. Photographs and GPS points were taken to further document and ground-truth the site.

1.5.3 Ground-truthing

Ground-truthing exercises are conducted to verify the presence or absence of features identified through the course of the study from the archival record, photography, aerial imagery, and the GIS data. Due to the types of features commonly associated with industrial mining landscapes – prospecting holes or trenches, claim markers (corner markers and location notices at discovery opening, usually indicated by the presence of a rock cairn, blazed juniper or pinyon trees, or wooden posts), mine shafts, adits, chutes, or tunnels, hoist works (headframes, horse whip, windlass), waste dumps (tailings), ore houses, pump houses, ventilation equipment, campsites or cabins, smelters, assay houses, blacksmith shops, drys (bathing or changing houses), or associated refuse – much of the observations can be made through visual inspection of the landscape, coupled with mapping using a GPS. Throughout the SFMD, many of these features are identifiable and ground-truthing can substantiate locations indicated in claim records, mine patents, and Proof of Labor records. The claim documentation often is tied to US Mineral Monuments (USMM) that can be relocated on the terrain and eased the process of georeferencing historic maps in the GIS phase of the HLC model.

1.5.4 Artefact Analysis

In terms of disturbance to the SFMD, much of Frisco has been subject to illicit collector activity, such as looting, vandalism, and unauthorised and unprofessional excavation. This activity has yielded a variety of fragmented artefacts on the ground surface which may be observed with limited or without further excavation; these items provide a glimpse of the settlement patterns and land use distribution associated with the SFMD.

The effects of vandalism and illicit collection on the populated areas of the SFMD are disconcerting; excavation pits and spoil piles contain items that were recovered, but left behind as they were of little value to those vandalising the site. Thus, one means of sampling focused on the damage conducted to the surface of the site, with damage being mapped during the ground-truthing. Of utmost concern were artefacts considered attractive to illicit collection such as mining assay crucibles, whole bottles, sun-altered amethyst (or purple) glass, coins, toys, and embossed cans.

Whilst the site has endured extensive vandalism, there are fragments of glass, ceramics, construction materials, cans, and other items that may aid in identification of features. Material culture is vital in understanding settlement patterns, demonstrating human behavior, and accurately describing life in the boomtown. Comparisons of materials to traditional cultures of certain ethnic groups may reveal a larger picture of these ethnicities in this rural setting. Dr. Donald L. Hardesty and Barbara J. Little (2000: 47) acknowledge that "[artefact] assemblages from heavily disturbed sites of short-duration mining towns in the American West that have been moved from their original sites might not tell us much about specific families or individuals living in the towns but can be an important source of information about other questions."

Portions of the mining features are being reworked for economic purposes; as a result, access to certain portions of the property is limited for long term excavation. Minor surface collection of artefacts was performed only as a means to analyze more closely items that have the ability to address research questions (see Table 1-1 and Chapter 5). Following the project, collected artefacts were packaged following curation standards (in accordance with US 36 Code of Federal Regulations [CFR] 79) and were retained for a teaching collection for the Milford Archaeological Research Institute, which operates in Milford, Utah; upon request, the artefacts may be submitted to the HSMC, which is the present land owner.

1.5.5 Delineation of Landscape Boundaries

Hardesty (2010: 8-10) notes the multiplicity of boundaries for mining landscapes:

> Sometimes the boundaries overlie those of mining districts, which are legal or quasi-legal organizations that regulate mining claims. The boundaries of mining districts reflect perceptions of the geological distribution of the metals or minerals being mined or social networks that regulate access to land. But mining landscapes are not necessarily the same as mining districts. In some ways, the 'real' boundaries are easy to identify; the cultural landforms created by mining activities such as mine waste-rock dumps, mill tailings, and open pits are often highly visible and mark where the lines should be drawn. Visual images or viewsheds drawn from paintings, photographs, or narrative descriptions are also useful in drawing culturally meaningful boundaries around mining landscapes.
>
> The boundaries of mining landscapes typically reflect the geological distribution of metal or mineral deposits...
>
> The boundaries of mining landscapes often contain more than just the place where the ore is mined. Mining landscapes must also include 'outliers' – geographically separated places where mines, mills, settlements, and supply operations took place.

The boundaries defined for the SFMD HLC model are based on physical remains of the settlements and mining support infrastructure, artefacts and features, boundaries of mining claims, transportation routes, and the geology and topography of the San Francisco Mountains.

Evidence of mining activity is centred on rock formations in the San Francisco Mountains dating from the Cambrian to the Quaternary; the mineralogy lies along a portion of the Wah Wah-Tushar mineral belt and an ignimbrite field, attributed to Oligocene and Early Miocene age volcanoes (East 1966, as cited by Whelan and Hintze 1973: 88; Hintze 2005; Stokes 1986). Mine workings, waste-rock dumps and tailings in the SFMD indicate minerals were recovered from ore associated with intrusive quartz monzonite (Butler 1913). Whilst there were isolated areas of settlement associated with a few outlying mines, the majority of the settlement was located at Frisco between the commercial district and the railroad depot; at Grampian closer to the Horn Silver Mine; and to the west at Newhouse. Physical indicators, such as extreme breaks in the landform and roads were used to help define the boundaries of the SFMD in the GIS.

Hardesty (2010: 20-21) also notes that “mining sites are geographical clusters of building ruins, trash dumps, privies, roads, milling structures, and mines [organised] into feature systems.” They represent cycles of occupation, abandonment and reoccupation from the same or differing time periods. They may or may not have vertical stratigraphy, with repetitive cycles of the occupation, abandonment and reoccupation, which Hardesty (2010: 20-21) refers to as the “mutilation effect.” This may be true for features contained within the mine shafts themselves, as much as for features on the surrounding physical landscape.

On a much broader scale, these boundaries are amorphous. Means used to discern the historical associations to the HLC included town site plat maps,[2] cartographic sources, company records, diaries and personal accounts, professional and technical journals, government accounts, newspaper accounts, US Census

2 In the US, a plat or cadastral is a map drawn to scale, showing subdivisions of land such as a block, streets, alleys, and corresponding numbering, usually prepared prior to a town or city incorporating under the US legal system.

records, city directories, store invoices, and secondary accounts. Hardesty (2010) refers to the global network of mining districts in terms of population networks, material networks, and information networks.

Analysis of archival records demonstrated that the SFMD falls within a population network tied to other mining ventures in Utah, Nevada, and related mining support in Illinois and New York. The genealogical records show not only a tie to nearly every state in the US, but also on the grander, international scale (see Appendix D1).

The material network also extends to the artefacts; as Hardesty (2010: 175) notes, however, "the archaeological image of global marketing networks is more oriented toward the 'production' networks created by the locations of commodities manufacturing." In other words, examination of bottles, cans or ceramics often provides information regarding the manufacturer or country of origin. Store invoices and company records may indicate the locations where commodities were purchased, known shipping and/or distribution points, and suppliers to the stores. These items reveal ties to Silver Reef and Beaver, Utah, as well as Pioche, Nevada, and locations elsewhere.

Hardesty (2010: 176) attributes the influence of the transcontinental telegraph and Victorian ideology on mass marketing, settlement patterns, consumption and commercialism in mining settlements, as part of the information network. Maps demonstrate the 'universal grid' utilised in the layout of the road network (or portions thereof) and commercial district of the SFMD. The cumulative amounts of glass fragments from bottles versus tin cans in the refuse may relate to the temperance movement or mass marketing (Hardesty 2010:176). Other examples of the information network include the presence of the telegraph in Frisco, as well as the short-lived local newspaper, *The Frisco Times*, and *The Southern Utonian*.

In addition to artefact distribution, legal records also aid in delineating the SFMD HLC boundaries. The Beaver County Probate Office maintains records of the SFMD (mining claims, annual reports, and proofs of labour), which provide a legal description for the extent of the district boundaries that depict patented mining claims and the physical remains of the settlements. Ancillary features, such as the remains of the Utah Southern Railroad, Utah State Highway 21, Squaw Springs, and the former telegraph line are included within the district boundaries, although these features may be associated with activities outside of the district boundaries as well. An additional example of features associated with the SFMD, but not within the boundaries, are unrecorded charcoal pits in the nearby Wah Wah Mountains. The locations of these features have not been determined through the course of the present study, but their presence is noted within the archival record.

1.5.6 Identification of Subthemes

Several subthemes are identified within the SFMD, including the natural setting, the mining features, settlement types, transportation, hydrology, and communications. With regard to the natural setting, of utmost consideration to the HLC model is the underlying geology of the San Francisco Mountains; without the geological composition, the mining would have never occurred and the associated town sites never would have developed. Likewise, the mines served as the impetus for further development, including the smelters, support infrastructure, residential areas, business district, transportation networks and utility corridors. Had the Horn Silver and King David mines not been so lucrative, perhaps the railroad would not have been extended to this region of Utah from Salt Lake City.

Settlement is most prevalent at the Frisco, Grampian and Newhouse town sites. Reflections of settlement patterns are visible in terms of the cemetery, commercial properties, and industrial features that are not necessarily associated with the mining industry. For instance, sheep and cattle ranching activities have taken place in the immediate area, concurrent with and continuous since the mineral exploration.

Transportation features range from stage routes, to wagon trails, the railroad, and subsequently the paving of Utah State Highway 21. Whilst many of these features now overlap, cartographic and other documentation aids in the extrapolation of these features over time. These features, especially the railroad, demonstrate the link of the SFMD to the outer world – it introduced trade networks and other business opportunities that may have otherwise led to the demise of the SFMD. For instance, the addition of the railroad allowed for transport of ore to smelters near Salt Lake City, Utah, and onward to the refinery in Chicago, Illinois. Without the railroad, the SFMD would not have been capable of sustaining its smelting capacity due to capital costs.

Water resources were somewhat limited within the SFMD, with the settlements drawing heavily upon transports from nearby Milford, Utah, and the Wah Wah Valley. Hydrology features, such as springs, within the SFMD are important to note due to the lack of this resource. Furthermore, the introduction of a pipeline from Morehouse Spring to Frisco and the King David Mine by the 1920s coincides with a small boom cycle for the district.

Like the railroad, the addition of the telegraph opened the SFMD to the outside world. As such, the communications or utilities subtheme is important to note. The LDS, or Mormons, instrumented the 'Deseret Telegraph,' which connected each of the stakes[3], throughout rural Utah. In later years, Western Union acquired the Deseret Telegraph and extended the service throughout the western US.

1.6 Comprehensive Geodatabase

The geodatabase has been developed in Microsoft Office Access, 2007. The geodatabase involves a spatial data repository for storage and management capabilities. Attribute data was contained in an Access database that could be joined

3 A Church of Jesus Christ of Latter-Day Saints 'stake' is an administrative unit of multiple congregations of the church, comparable to a Catholic diocese; it takes its name from Isaiah 54:2.

to the GIS as needed using an unique identifier for easier manipulation. The database contains attributes for prehistoric and historical site and feature classifications, event data, HLC type data, natural infrastructure data, Utah Abandoned Mine Reclamation Project (UT AMRP) data, comparison/comparative site data, and abstracts/claim data.

1.7 GIS Model

Compared to archival research, incorporation of the data into the GIS is perhaps the most important aspect of this study. The ability to visually demonstrate the themes aids in the interpretation of the SFMD landscape. Following methodology established by English Heritage, NPS, NPI, etc., the current study relies upon cartographic sources, aerial photographs, and pre-existing GIS data available from reputable online sources. Hard copy maps are geo-referenced and digitized for incorporation into the study, as warranted, and a series of databases are created to examine event, monument, and archive records for additional analysis. The results of the archival research, ground-truthing, artefact analysis, and GIS information are drawn into this thesis, providing an analysis of the entire environment of the SFMD, in accordance with the methodology utilised in the UK (Aldred and Fairclough 2003).

As noted in Chapter 4, the project utilizes ArcGIS software produced by Environmental Systems Research Institute, Inc. (ESRI). In terms of the HLC model, the application of ArcGIS allows for asset/data management, planning, analysis, treatment, presentation, and dissemination of the data; in other words, GIS allows for better control of the data through the geodatabase, imagery, and interoperability.

Ground-truthing is used to compare the physical setting with the documentary evidence. Through the use of a GIS model, a base map can be prepared using satellite images, slope data, and georeferenced historical maps in order to more accurately ground-truth the data. Other applications of GIS include the ability to restore or enhance images, in order to detect change or make comparisons between differing imagery. For example, vegetation and features may be compared between aerial photographs, USGS maps, or other documentation.

GIS also allows for data extrapolation, such as determining hectares (acreage); using differing symbology to represent varying types of data (polygons, points or line features); and the development of a geodatabase for use with the HLC model. Sites and features on the landscape were assigned GIS feature class types (line, point, polygon) that corresponded with the geodatabase. Certain types of information (acreage, soils, geological data) are displayed as polygons; telegraph lines may be depicted as line features, but individual poles may be displayed as points. Within the SFMD boundaries, there may be additional subthemes represented in the landscape, such as sheep ranching, transportation, hydrology, etc.; the creation of shapefiles aid in portraying these types of data in the GIS.

For GIS, some data must be extracted from old maps. In these instances, the historical maps have to be geo-referenced.[4] The technique for recreating the data varies based on the scale and/or accuracy of the historical map(s) in question. Georeferencing involves alignment of spatial data (points, polygons, lines contained in the shape file layers) with historical maps, satellite imagery or aerial photography. In cases where information was pre-existing in a GIS format, the information could be joined spatially between the polygons or points. Knowing which geographic coordinate system coorelates to the UTM was considered vital for ensuring the GIS data to be displayed correctly.[5]

4 For georeferencing, a minimum of 10 points [landmarks, such as US Mineral Monuments, Public Land Survey markers, benchmarks, railroad, that appear on existing maps within the study area] were selected on the ground at a 2 m resolution.

5 UTM is a grid-based system for locations; the UTM system for Beaver County, Utah, falls within US Zone 12, using the Salt Lake Meridian. Two primary datums are used for cartography, the North American Datum 1927 (NAD27) and the North American Datum 1983 (NAD83). Also used is the World Geodetic System (WGS84), which is the current reference system utilized by GPS (usually within a +1 m accuracy). In US archaeology, sites are recorded using NAD27, with most modern GIS data provided in NAD83 or WGS84. This difference in mapping systems provides discrepancies in projection of data. Hence, it is important to note which coordinate system is used before applying varying data layers to the base map.

1.8 Change over Time

Landscapes demonstrate patterns of change over time that can be ascertained from mining claims and other legal records, newspapers, oral histories, lithographs and photographs, cartography, and scientific (archaeological and biological) studies. Change also is reflected in historic mining landscapes as developments are made in terms of technological advancements, population increases or declines, and the availability of minerals. Epistemological characteristics – geology, mineralogy, topography, soils, vegetation, hydrology, and historical land use – may be traced through a series of GIS data layers organised in chronological patterns (see Chapter 6).

1.9 Tools

HLC models serve as tools for identifying, developing and managing land use. Whilst the development of the SFMD HLC model may result in the identification of themes and subthemes that demonstrate the significance of the property, it also presents opportunities for further heritage research and historic valorisation. Through an examination of the SFMD using a broader picture (the site as a whole, rather than through individual disciplines), the HLC model offers an opportunity to integrate current land use policies, whilst not interfering with future mining opportunities. The SFMD HLC model may aid the present property owner, as well as state and federal agencies, in establishing safety measures (for historical features such as abandoned mine shafts that might present a hazard).

The SFMD is visible from Utah State Highway 21, and as such, attracts interest and unwarranted behaviour (trespass, bottle collecting, recreational vehicle use, etc) from tourists. The DUP have erected a plaque commemorating the site, however, more public outreach could be performed in terms of signage. Access from the plaque into the SFMD extends west to the Cemetery. Additional signage could be erected by the cemetery, directing visitors away from more dangerous portions of the property (mine shafts, unstable structures, potential explosives, etc.). For instance, the SFMD HLC model may aid the present property owner, or the state, in establishing safety measures in conjunction with the UT ARMP closure program.

1.10 Previous Studies of Industrial Archaeology

Although attributed to Donald Dudley, Professor of Latin at the University of Birmingham (Hudson 2010), Michael Rix first coined the term "industrial archaeology" in a publication of *The Amateur Historian* in Birmingham, UK, in the 1950s (Nevell 2006). By 1959, the Council for British Archaeology established an industrial archaeology research committee. In 1963, Kenneth Hudson published *Industrial Archaeology: An Introduction*, which served as a foundation for the field of research. By 1973, the Association for Industrial Archaeology (AIA) was created (Nevell 2006). In the US, Robert M. Vogel and Michigan Technological University spearheaded the Society for Industrial Archeology in 1971.

By the 1980s, it was evident that the discipline of industrial archaeology differed between the US and UK and there was a lack of synthesis between the two methodologies. In the US, 'social archaeology' encompassed nearly all aspects of historical archaeology, including industrial archaeology, whilst in the UK, industrial archaeology was viewed as a separate entity. In the 1990s, historical archaeologists in both countries began reexamining industrial archaeology and in 1998, Marilyn Palmer and Peter Neaverson provided a publication, *Industrial Archaeology: Principles and Practice*, which defined industrial archaeology as "the systematic study of structures and artefacts as a means of enlarging our understanding of the industrial past." In 2003, elements of industrial archaeology were addressed in *The Environmental Archaeology of Industry*, edited by Peter Murphy and Patricia E. J. Wiltshire, which contributes to the knowledge of environmental effects caused by mining, metallurgical activities, smelting, and resource procurement (Murphy and Wiltshire [eds] 2003). Further, in 2005, a methodological approach was issued by the AIA, titled *Understanding the Workplace: A Research Framework for Industrial Archaeology in Britain*. In April 2008, a conference entitled "Crossing Paths or Sharing Tracks?" held at the University of Leicester prompted the edited volume by Audrey Horning and Marilyn Palmer, *Crossing Paths or Sharing Tracks? Future directions in the archaeological study of post-1550 Britain and Ireland* (2009). Through this conference and subsequent edition, differing theories of "post-medieval" versus "historical" and "industrial" archaeology were examined. As Matthew Johnson notes in the forward of the edition (Horning and Palmer 2009), "the implication for archaeologists of industry, and for all post-1500 archaeologists is clear: we cannot study social life without a deep understanding of technical processes, and we cannot understand technical processes without a deep understanding of social context." This concept takes into account many of the principles for examining the historic landscape. Throughout the compliation, the reoccuring theme is that industrial archaeology inherently examines the landscape by virtue of tying together the oral, social, labour, urban and family histories, geography, ethnography and archaeology (Horning and Palmer 2009).

1.10.1 Comparisons to Other US Mining

New Western Historian Rodman Wilson Paul (1964: 27-28) establishes a pattern for US mining frontiers that begins with the discovery of gold or silver, followed by a stampede of crowds, establishment of a mining camp or town, roads, stores, saloons, or other amenities. As the minerals diminished, the settlements declined. Over the life-cycle of the mines, populations surged and decreased, with Americans being the predominate or initial group, followed by a mixture of Chinese, German, Canadian, Irish or Cornish immigrants. This change in personnel, along with the influx of investment, machinery, and mining knowledge, Paul (1964: 28) argues, "characterised the transition from the frontier phase to the more mature era...the patterns established during the earlier period continued to influence the later one."

Paul (1964: 30) adds, “in mining techniques, the West was not so much originator as adapter and accelerator.” He notes that many of the technological processes were borrowed from Europe and Spanish America, and then altered to fit the purpose or condition of the location. In addition to the technology, the US adapted from European mining law; “the process was one of selecting portions of long-established precedents, adapting them, and experimenting in unsystematic fashion” (Paul 1964: 31). In terms of civil and criminal law, Paul (1964: 32) notes that few people showed interest in civil affairs until the criminal element became unruly in mining towns. As a result, “the majority of the atomistic society of the camps and citiies found itself forced momentarily to drop individual concerns in order to think and function as a group. This same cycle of neglect followed by extralegal action was to be repeated on all subsequent mining frontiers” (Paul 1954: 32).

In politics, mining towns followed those who represented mining interests, or were investors in mining.[6] Richard H. Peterson (1975: 52-67) compares the social and economic backgrounds of 50 mining magnates, representing productive mining districts in the western US between 1870 and 1900. Of these, ten of the mining leaders represented enterprises in Utah[7] (Peterson 1975: 57). By comparing the ethnic background (paternal family’s origin), the region of birthplace for American-born western mining leaders, father’s occupations, family status or class, highest educational level attained, and age on going to work, Peterson (1975: 67) surmises that his study corroborates “[Frederick Jackson] Turner’s claim that the frontier promoted vertical social mobility, or the freedom to rise.”

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6 Politicians include Nathaniel P. Hill (Colorado), John Percival Jones (Nevada), William M. Stewart (Nevada), George Hearst (California, Montana investor), Marcus Daly (Montana), Samuel T. Hauser (Montana), William Andrews Clark (Montana), Arthur Lloyd Thomas (Utah) and John Henry Smith (Utah).

7 In Utah, these included Henry Newell (1844-1928), Thomas Kearns (1862-1918), Jesse Knight (1845-1921), Joseph R. Walker (1836-1901), Matthew H. Walker (1845-1916), Enos Wall (1839-1920), David Keith (1847-1918), John Q. Packard (1822-1908), Joseph R. DeLamar (1843-1918), and Samuel Newhouse (1853-1930) (Peterson 1975: 57).

In reflecting patterns of gender, ethnicity, age, and social status, the artefact assemblages, archaeological features, and the landscape itself, may assist in the interpretation of behavioral change over time. In characterising the physical evidence of mining landscapes six groupings can be suggested that help to interpret the process:

- *Prospecting and Extraction: claim markers, prospects, shafts, adits, tailings;*
- *Processing*: assay offices, ore processing sites, refineries, other support facilities;
- *Community development:* temporary mining camps, semi-permanent mining camps, company mining camps, or town sites and associated trash;
- *Transportation corridors*: roads/trails and railroads;
- *Water management* : domestic or industrial/mining use, including natural and man-made features; and
- *Utilities*: telegraph lines, telephone lines, water lines, sewage lines.

Dawn Bunyak (1998) conducted a study of flotation milling sites on behalf of the NPS, Intermountain Support Office, Denver, Colorado, identifying five states with developed historic contexts that focus on mining activities in the US: Minnesota, South Dakota, Arizona, Colorado, and Montana. Bunyak (1998) incorporated the earlier contexts into her examination of the floation milling sites and identified eight large mills (500 to 2,000 tons/day) in Utah, Idaho, Alaska, Colorado and Nevada; six small mills (50 to 200 tons/day) in Montana, Idaho and Colorado; and one mill of unknown size in Nevada. She also identified mills in seven districts in Utah: the Utah-Apex Mining District (Bingham); Magna and Arthur Plants (Garfield); Midvale Plant (Midvale); Utah Leasing Plant (Newhouse); Silver King Coalition Mine and Mill and the Utah Consolidated Mill (Park City); the Chief Consolidated Mill and the Tintic Standard Reduction Mill (Tintic District); and the Tooele Mill (Tooele).

Bunyak (1998) identified general characteristics for the placement of milling properties and other associated equipment. Generally, mills are located in or near remote mining districts with close proximity to water sources for both the mill and mine; easy access to transportation; labour supply; locations for disposal of tailings; and appropriate terrain (Bunyak 1998: 35). Historically, mills were based on wood or steel and concrete designs, but were built around the machinery and varied in size. Multi-level buildings were utilized frequently on mountains or slopes whilst taller and compact buildings were constructed on flat-grounded areas. Multi-level buildings used gravity to move the ores, thus saving power costs and requiring fewer pumps and elevators. Flat-ground mills used more electricity or steam power. Some facilities incoporated a partly inclined and flat-ground building to take advantage of gravity and flotation (Bunyak 1998: 35-38). Mills also utilized equipment such as aerial tramways, railroads, trucks, or other conveyance apparatus (to mill/equipment/ smelter); an arrival terminal; ore bins; crushing/grinding plants; mill buildings; water and power sources; machine shops; workshops; laboratory/assay offices; administrative offices; warehouses and storage for chemicals; a changing house or dry; and tailings ponds (Bunyak 1998: 35-38).

The success of the Horn Silver Mine at the SFMD has been likened to that of the Comstock Lode in Virginia City, Nevada. As such, it is fitting to compare the two districts and associated settlements in the present study. The impetus for mining in Utah spread after the discovery of gold at Sutter's Mill, California, and the Comstock Lode. The Comstock Lode was identified in 1859 with the discovery of gold, and later silver, at Mt. Davidson. Early attempts at discovering silver had begun as early as 1853 by Hosea Ballou Grosh and Ethan Allen Grosh. The 'mother lode' itself was discovered by Peter O'Reiley and Patrick McLaughlin; it was soon attributed as the greatest silver strike north of Mexico. Shortly thereafter, three camps – Silver City, Gold Hill and Virginia City – were established along the ore vein, and over time, there was little separation between Gold Hill and Virginia City. By 1861, Virginia City included brick buildings, paved roads, gas and sewer lines, and a business district. News of the discovery attracted international attention and a large population increase as Cornish, Irish, and other European immigrants flocked to the area;

Virginia City boasted of a Chinatown by 1863, east of G Street and a smaller concentration of Chinese to the east of H Street. Between 1863 and 1866, the area felt a slight depression. The Union Mill and Mining Company stabilized the community between 1866 and 1868, followed by additional discoveries in the early 1870s. In 1875, a fire swept through the city, and although the city rebuilt the following year, the bonanza was over by 1880. Today, Virginia City is considered a tourist destination, incorporating many of the archaeological features, such as the Boston Saloon, into the attractions for visitors.

Virginia City has been the subject of several archaeological studies (Dixon 2002, 2005; Schablistsky 2002; Hardesty 1988, 1990). Kelly J. Dixon (2002, 2005) has examined the historical archaeology of the Boston Saloon, an African American-owned establishment operating in Virginia City between 1864 and 1875; established shortly after the founding of the Comstock Mining District (1859), the saloon was owned by William A.G. Brown. Dixon (2005) provides a wealth of background information for saloons in the West and associated material culture, which may serve as a comparison to drinking establishments in Frisco. As Dixon (2002: 219) notes,

> The archaeological and historical records associated with the Boston Saloon serve as reminders of an African American presence in the mining West that is not openly visible on the modern landscape... Nevertheless, there is still a history and reality at the physical place that held the site.

Whilst only one African American was identified in US Census records for Frisco, the SFMD does contain a wide array of other ethnic backgrounds that are identifiable only through the archival record. Like the African Americans at Virginia City, little is known about the contributions of these various ethnic groups to the cultural landscape of the West (see Appendix D1 and Chapter 6).

Julie M. Schablistsky (2002) also examines Virginia City, but looks at the development of urban western neighbourhood composition and development during the 19th century. She draws upon earlier archaeological investigations performed by Hardesty (1996) and others (Dixon 2002, Thompson 1992), to compare and contrast ethnic neighborhoods in the mining town; the focus is on the Chinatown (C Street near Blocks 88 and 89) and the Cooper Family residence (18 North G Street). Schablistsky (2002) compares the physical remains (features and artefacts) to City Directories, Census records, newspapers, photographs and maps to provide a class and ethnic profile of western residential neighborhoods. The study also allows for a comparison of real estate growth and decline during the boom and bust cycles of the Comstock Lode. The testing methods employed at one residential property (small 1 m by 1 m units) allowed for better control and recovery of artefacts in a setting where the primary dwelling had been consumed by fire; Schablistsky (2002) was able to better control the discoveries horizontally and vertically through these means of excavation and identified intact subsurface stratigraphic deposits. Unlike Virginia City, information regarding Frisco's ethnic background was limited. No analysis of Census records had been compiled previously, nor was information available regarding neighbourhood composition or development. One referenced noted a Chinatown east of Grasshopper Street in Frisco (location unknown). Ceramics associated with Chinese suggest occupation closer to Grampian. No other ethnic indicators or segregated dwellings were noted in the SFMD.

Hardesty provides a wealth of information regarding mining sites in the American West, including Virginia City. His works, *The Archaeology of Mining and Miners: A View from the Silver State* (1988), and *Evaluating Site Significance in Historical Mining Districts* (1990) serve as foundations for comparative research. Hardesty (1988) provides researchers with various avenues for research for mining topics, including maps, census, newspapers, government records, company records, diaries, and other vital information. Further, he provides information on the various techniques of mining, discusses the layouts of sites, and identifies land use themes (Hardesty 1988). These themes and information presented in the 1988 document focus on mining throughout Nevada, and are continued through his analysis in 1990. Hardesty offers a methodology for evaluating mining sites for inclusion in the NRHP

(Hardesty 1990). Hardesty (1988) also has examined mining in Nevada. In 1959, the NPS prepared a theme study, "A Mining Frontier Context," which by today's standards, is considered outdated. Hardesty's (1988, 1990) guidance later served as the foundation for the NPS's updated publication, National Register Bulletin, *Guidelines for Identifying, Evaluating, and Registering Historic Mining Properties* (Noble and Spude 1992).[8] As a result, Bunyak (1998), Hardesty (1988, 1990), Dixon (2002, 2005), Schablistsky (2002), and Noble and Spude (1992) provide preliminary guidance for the types of features that may be identified at the SFMD.

1.10.2 Previous Studies of the SFMD

The SFMD has been the subject of many studies, ranging from popular ghost town stories, to personal vignettes and geological studies. None of these previous studies, however, have incorporated the social histories, archival research, archaeological or physical remains, geological setting, and natural setting into a cohesive study (Gilbert 1890; Butt 1878; Hooker 1879; Emmons & Becker 1885; Tolton 1904; Butler 1913, 1920; Merkley 1948/1988; Whelan & Hintze 1973; Notarianni 1982, 1994; Brown 1996; Bradley 1999; Wray 2006; Bassett 2008). Based on these studies, it is estimated that the period of significance for the SFMD spans approximately 82 years, from 1870 to 1952. Wray (2006: 286-457) breaks this period of significance into subthemes, based on the types of mining performed within the District, to reflect a series of booms and busts; however, the use of these subthemes, results in portions of the historical landscape being lost. Thus, in an attempt to clarify the periods of significance, the following table was developed (Table 1-2).

8 The NPS's National Register Bulletin is available online at http://www.nps.gov/history/nR/publications/bulletins/nrb42.

Table 1-2. Timeline for the SFMD

Date of Significance	Theme / Event	Additional Comments
1870-1952	Organisation of SFMD	Prospecting and initial organisation of the SFMD and adjacent Preuss District
1871	Grove Karl Gilbert geological study	Focus on Lake Bonneville shorelines and western flanks of San Francisco Mountains (1890)
1875-1876	James Ryan and Samuel Hawkes locate New York Ledge and Horn Silver claim	Claim subsequently sold to Allen G. Campbell, Matthew Cullen, Dennis Ryan and August D. Byram. Large scale mining operations continued until 1952.
1875-1900	Silver-Lead Mining	Development of silver-lead properties
1870s-1884	Charcoal Production and Smelting	Charcoal production, smelting, water, railroads and settlements
1875-1908	Water	Springs present, but not for domestic use. 1875-1880: Wagon from Milford and the Wah Wah Springs. 1885-1904: via train (Brown 1996: 63). 1904-1908: pipeline from Morehouse Spring to Frisco, and then onward to the King David Mine (Butler 1913: 20).
Ca. 1870s-present	Transportation: Stage Coach, Railroad, Highway 21	1870s-1880s: stage service. 1880-1943: railroad service; 1952-present: Highway 21
1875-1943	Telegraph	LDZ established Deseret Telegraph throughout the state, 1865-1900. 1900, Western Union Telegraph. SFMD lines operated between 1880-1922
1875-1937	Settlements: Frisco, Squaw Springs, Grampian, Newhouse	Frisco established 1875, decline by 1928. Squaw Springs established by 1879. Grampian developed between 1890 and 1930, possibly earlier. Newhouse established as company town between 1900-1937.
1878-1959	Mapping of the District: Newell Butt, Bert Sylvenus Butler, J. Frank Tolton, Various, USGS	1876: Butt, U.S. Surveyor General's Township Plat Map. Butler 1913-1920 geology maps. Tolton 1904. Fred McLaughlin and W.M. Beaman (USGS) Frisco Special Map, 1906, revised 1911. Updated quadrangles (USGS), 1959.
1900-1920	Copper Development and Mining	Development of copper properties, such as Cactus Mine
1900-1923	Silver, Lead, Zinc and Gold Mining	Development of silver, lead, zinc and gold properties
1923-1938	Continued Decline	period of dwindling population, business closure and "somnolence."
1938-1952	Wartime Revival	Slight economic boom between 1930s and 1950s.
1952-present	Exploration Efforts	Continued mining ventures

1.11 Evaluation of the Work

Evaluation of the work requires testing of the thesis. The study incorporates examination of the physical archaeological remains, documentary evidence and social history of the SFMD HLC with GIS modelling. It does not involve humans or animals as subjects of the research; will not expose any person to physical or psychological harm; will not provide for the identification of individuals; will not pose a significant risk to the environment or society; nor will it raise any ethical issue that will require further ethical review. It includes limited excavation, as only representative sampling is required to characterise the landscape. Much of the SFMD has been subject to vandalism, yielding a variety of fragmented artefacts and providing a glimpse of the settlement associated with the mining district. Portions of the mining features subsequently have been reworked for economic purposes. As a result, access to certain portions of the property is limited for long-term excavation.

As noted in Section 1.1, the study involves the application of an HLC to a North American mining district as a means to reconstruct the past landscape. This study is supplemented by a historic context (Chapters 2 and 3), GIS integration of the data (Chapter 4), artefactual analysis (Chapter 5), and ground-truthing (Chapters 4 and 6). Further, the study examines site distribution and draws comparisons to other mining sites in Arizona, California, Colorado, Montana, Nevada, and Utah. Additional comparisons can be made to sites in the UK such as the World Heritage Sites (Cornish Mining Sites in Cornwall and Devon) and Snailbeach, Shropshire. Outside the US and UK, the Otago Goldfields, including Macetown, provide an opportunity for comparison to mining districts in New Zealand (Appendix D3). Of utmost consideration is the underlying geology of the San Francisco Mountains; without the geological composition, the mining would have never occurred and Frisco never would have developed. Likewise, the mines served as the impetus for further development to include the smelters, support infrastructure, residential areas, business district, and utility corridors. Had the Horn Silver and King David mines not been so lucrative, transportation networks, such as the railroad, would not have been extended from Salt Lake City to this region of Utah.

2.0 CONTEXT AND HISTORY

The methods and theories identified in Chapter 1 may be applied to the SFMD in tandem with a historical context to aid in reconstructing the industrial landscape. In order to apply the HLC model adequately, one must understand the topography, natural resources and history of the SFMD. This chapter provides information regarding these themes, as well as the climate, hydrology, geology, and prehistoric and historic context of the region, including discussion of the population of the area by the LDS (Mormons) and immigrants. Within the SFMD, the context includes a description of associated mining activities: claims filed; timbering and smelting operations; development of transportation corridors (railroad, stage, and later highway); and development of the settlements. This chapter also addresses activities that are unrelated to mining within SFMD, but which contribute to the understanding of the HLC model.

2.1 Geological Context and Natural Setting

The SFMD lies within southwest Utah, with the San Francisco Mountains being situated in the central portion of Beaver County. The County comprises 670,807 hectares of land, with the majority being held publicly by the US Forest Service (USFS), Bureau of Land Management (BLM), or state lands under the auspices of the School and Institutional Trust Lands Administration, and Utah Division of Wildlife Resources (Utah Natural Resources Conservation Service 2005). Land within the SFMD itself is held privately by several different land owners, including the HSMC and Western Utah Copper, and publicly by the BLM (Figure 2-1).

2.1.1 Topography

Utah has three distinct geological regions: the Great Basin, the Colorado Plateau, and the Rocky Mountains (Figure 2-2). The SFMD falls within the eastern half of the Great Basin, a distinct arid environment with unique hydrographical, physiographic, floristic and cultural

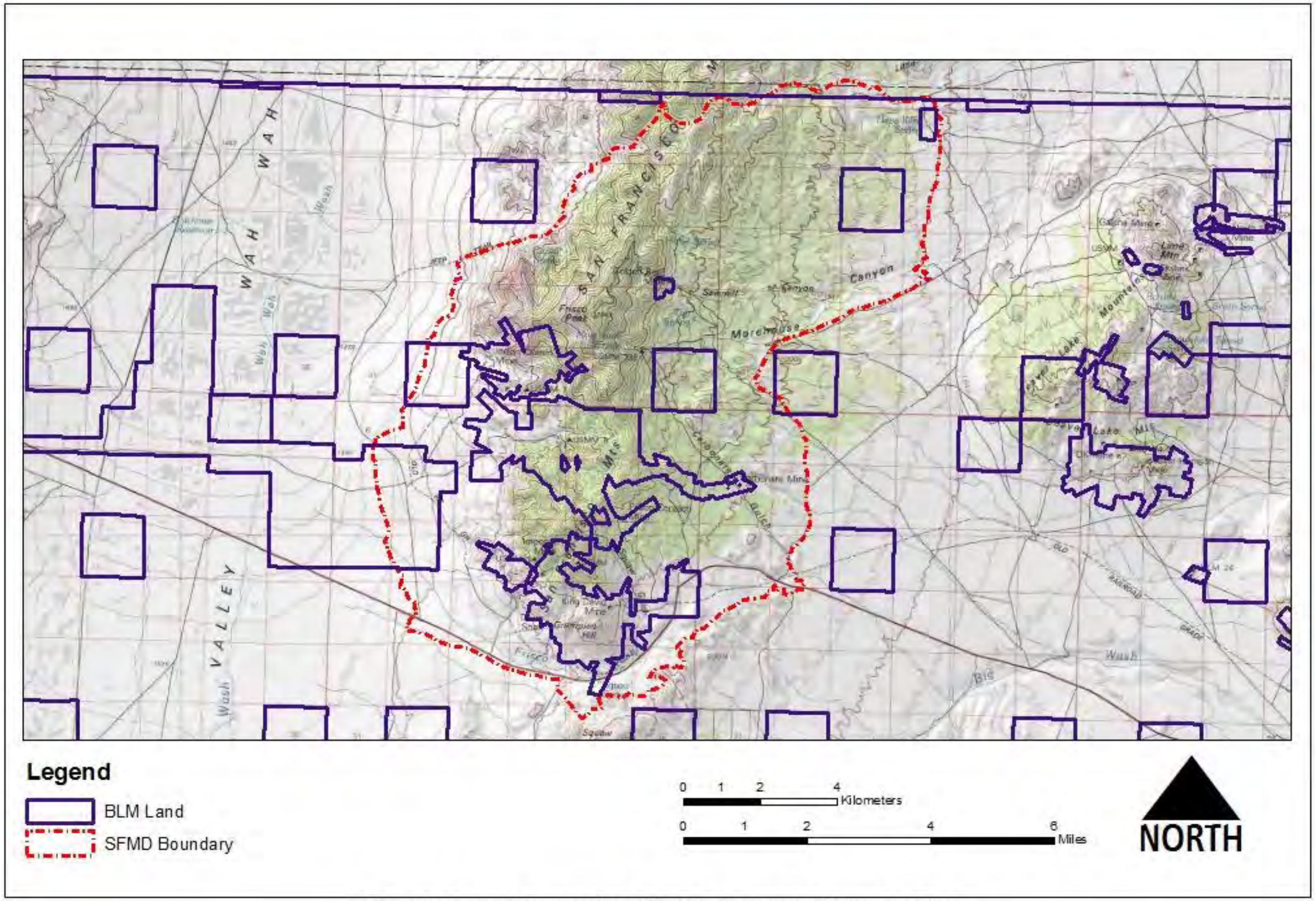

Figure 2-1. Land Ownership of the San Francisco Mining District

provinces, encompassing 1,036,000 square kilometres (km^2) [400,000 square miles] of Nevada and Utah, as well as portions of Colorado, Wyoming, Idaho, Arizona, New Mexico, and California (D'Azevedo 1985: 1-14). Overall, the Great Basin encompasses approximately one-tenth of the continental US and was one of the last frontiers in North America to be explored and settled by Euro-Americans (D'Azevedo 1985: 1).

Western Utah is dominated by topography that ranges from small mountains and rugged terrain that give way to arid desert land. Elevations range from 4,123 m [13,528 ft] at Kings Peak in the Uinta Mountains, to the lowest point near Beaverdam Wash, at 1,646 m [2,350 ft] (Figure 2-3). Elevations of the SFMD range from 716 m [5400 ft] upwards to 2,743 m [9,000 ft], with evidence of former shorelines of ancient freshwater Lake Bonneville visible on the western flanks of the San Francisco Mountains. This prehistoric pluvial lake extended west and north of the SFMD; its receding waters created the Great Salt, Utah, Rush, and Sevier lakes, as well as the Bonneville Salt Flats (see Figure 2-3). Scenic terrain to the south, notably at the Zion, Bryce Canyon, Arches, Capitol Reef, and Canyonlands National Parks, is comprised of Kayenta and Navajo sandstones (see Figure 2-3).

2.1.2 Climate and Hydrology

Utah is one of the more arid locations in the US, with its desert areas receiving less than 13 cm of rain annually (Andersen 1996). Average precipitation ranges from 25 to 38 cm [10 to 15 inches] per year. A review of the *Monthly Weather Review* from 1872 to 1974 revealed relatively cold temperatures, increased precipitation, hail, frost, and snow in the late 1800s (US Signal Service 1890, 1896, 1899). Butler (1913: 19) offers a table showing precipitation at Frisco between 1897 and 1906, which confirms increased rainfall, especially in 1901, 1903 and 1905.

Weather conditions for 1885 were of particular interest due to the collapse of the Horn Silver Mine on 12 February 1885, partially attributed to snow and weak timbers in the shafts (US Signal Service 1885; *Southern Utonian*, 1 February 1889; *Southern Utonian*, 17 January 1896; Butler *et al.* 1920: 503). Just six days later, on 17 February 1885, the *Salt Lake Herald*

Figure 2-2. Geological Regions of the Western United States

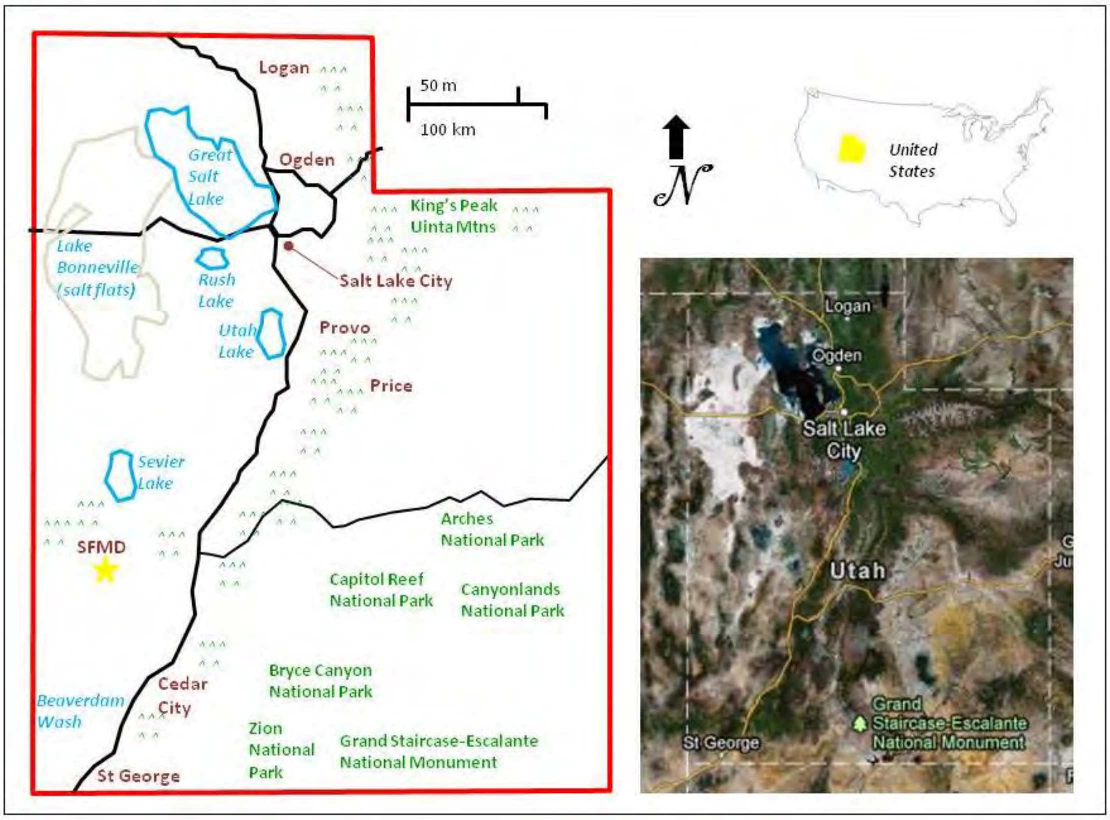

Figure 2-3. Topographical Areas of Utah

announced an avalanche that nearly buried the town of Alta, east-southeast of Salt Lake City. Reports of the incident cite a snow storm that lasted more than eight days (US Signal Service 1885: 43; *New York Times*, 23 February 1885; *Salt Lake Herald*, 17 February 1885).

As noted above, Lake Bonneville extended along the western edges of the San Francisco Mountains during the Pleistocene. Fed by the Bear River, the massive lake spanned 523 km [325 miles] long by 217 km [135 miles] wide, and was over 304.8 m [1,000 ft] deep. Approximately 15,000 years ago, the lake flooded Red Rock Pass, Idaho. It continued to recede, leaving four distinct shorelines (Stansbury, Bonneville, Provo and Gilbert) that are evident near the Cactus Mine and Newhouse.

Three large washes are noted on either side of the San Francisco Mountains, including Wah Wah and Frisco Washes along the west side, and Hickory Wash along the east; additional smaller washes – or 'gulches' – are present throughout the boundaries of the SFMD. Rainfall runoff from the SFMD provides limited amounts of water. Reservoirs have been constructed to store water in small quantities for livestock, such as those noted at Wah Wah Ranch, and the Dutchman and Newhouse Reservoirs. A few springs are present in the vicinity, such as the Morehouse Spring (five miles north of Frisco), Squaw Springs (one mile south of Frisco), Coyote Springs (1200 m [3/4 mile] north of the Carbonate Mine), and the Horn Silver Spring (at Frisco, Figure 2-4). The Horn Silver Spring was developed for the smelter and concentrating ores but did not produce a large flow and was insufficient for drinking or household purposes. Most of the wells in the Frisco vicinity encountered water at depths 5 m to 8 m [15-25 ft] below the ground surface but were non-potable. The location of a well in the Frisco commercial district, associated with underground piping, extends beneath the cement sidewalks to provide small quantities of water in cement cisterns (or watering troughs) adjacent to a few structures. At the Horn Silver Mine, however, no water was encountered until the 366 m [1200 ft] level (Butler 1913: 20).

Newspaper articles from 1902 and 1904 describe the lack of potable water at Frisco (*Salt Lake Herald* 1902, *Salt Lake Mining Review* 1904). As late as 1902, all water was transported to Frisco via wagon from Milford; at that time, water cost £0.63 [$1.00] per barrel (*Salt Lake Herald* 1902). In 1904, an agreement was made with Newhouse Mines & Smelters Corporation to construct a pipeline from the Newhouse Reservoir, across the San Francisco Mountains, to Frisco – a distance of approximately 6.44 km [4 miles] (*Salt Lake Mining Review* 30 June 1904: 19). In coordination with the pipeline, a pumping plant was proposed at the mountain summit for use at the Horn Silver zinc ore mill. By 1908, a pipeline connected the Morehouse Spring to the King David Mine and Frisco.

Figure 2-4. Horn Silver Spring, 2011

2.1.3 Wildlife

Table 2-1 lists the State- and Federally-listed threatened, endangered, and candidate species within Beaver County. Within the SFMD, historically and today, are common species such as mule deer, elk, antelope, jackrabbits, coyotes, fox, bobcats, mountain lions, rattlesnakes, lizards, quail and grouse.

Table 2-1. State- and Federally-Listed Species and Species of Concern, Beaver County (Utah Comprehensive Wildlife Conservation Strategy 2005: 14)

State-Listed Species	Federally-Listed Species	Species of Concern
Northern Goshawk (*Accipiter gentilis*)	Utah Prairie-dog (*Cynomys parvidens*)	Big Free-tailed Bat (*Nyctinomops macrotis*)
Bonneville Cutthroat Trout (*Oncorhynchus clarki utah*)	Bald Eagle (*Haliaeetus leucocephalus*)	Burrowing Owl (*Athene cunicularia*)

Table 2-1. State- and Federally-Listed Species and Species of Concern (Continued)

State-Listed Species	Federally-Listed Species	Species of Concern
Least Chub (fish) (*Lotichthys phlegethontis*)	California Condor (experimental) (*Gymnogyps californianus*)	Dark Kangaroo Mouse (*Microdipodops megacephalus*)
	Yellow billed Cuckoo (*Coccyzus americanus*)	Ferruginous Hawk (*Buteo regalis*)
		Fringed Myotis (*Myotis thysanodes*)
		Greater Sage-grouse (*Centrocercus urophasianus*)
		Hamlin Valley Pyrg (*Pyrgulopsis hamlinensis*)
		Kit Fox (*Vulpes macrotis*)
		Long-billed Curlew (*Numenius americanus*)
		Pygmy Rabbit (*Brachylagus idahoensis*)
		Short-eared Owl (*Asio flammeus*)
		Three-toed Woodpecker (*Picoides dorsalis*)
		Townsend's Big-eared Bat (*Corynorhinus townsendii*)

2.1.4 Vegetation

Vegetation in Utah varies from forests in the mountains, to sagebrush and Sonoran desert scrub, gradually giving way to meadow grass, mosses and shrubs in lower lying areas. Forests include Engelmann spruce (*Picea engelmannii*), Subalpine fir (*Abies lasiocarpa Nutt.*), Piñon pine (*Pinus edulis*), Juniper (*Juniperus sp.*), White fir (*Abies concolor*), Quaking aspen (*Populus tremuloides*), Ponderosa pine (*Pinus ponderosa*), Douglas fir (*Pseudotsuga menziesii*), Bristle Cone pine (*Pinaceae aristata*), Blue spruce (*Picea pungens*), and Gambel oak (*Quercus gambelii*), whilst xeric shrubs are noted in the lower areas (Graham *et al*. 1999; Widtsoe and Peterson 1908: 17). Reports from the General Land Office (GLO) on 30 November 1861 indicate a wealth of natural resources such as pine and other timber to entice settlers, but by 1913 there was little timber within the SFMD (Butler 1913: 19-20):

> On these high slopes pines (*Pinus monophylla*) grow to considerable size, trees 2 feet [60.96 cm] or more in diameter not being uncommon. Cedar trees of good size are also numerous. Most of the timber has been removed, a part being used as timbers for the Horn Silver mine and a considerable quantity converted into charcoal for the smelting of the local ores. The lower slopes bear a scanty covering of scrub pines and cedar (Butler 1913: 19-20).

In 2001, the USGS produced a poster showing the Ecoregions of Utah (Woods *et al*. 2001). The SFMD falls within three identified ecoregions: Shadscale-Dominated Saline Basins (coded as 13b); Sagebrush Basins and Slopes (13c); and Woodland- and Shrub-

Covered Low Mountains (13d) (Woods *et al*. 2001). Dominant vegetation for the SFMD includes Utah Juniper/conifer (*Juniperus osteosperma,* A1); sagebrush/wormwood (*Artemisia* sp., C1); greasewood (*Sarcobatus vermiculatus,*C2); shadscale (*Atriplex confertifolia,* C3); and rabbitbrush (*Chrysothamrus* sp., C6). These types of vegetation include xeric shrubs such as sagebrush (*Artemisia* sp.), Mormon tea (*Ephedra* sp.), Russian thistle (*Salsola tragus L.*), Rabbitbrush (*Ericameria* sp.), and Shadscale saltbrush (*Atriplex* sp.), and forests of Piñon and Juniper. Also present are Indian rice grass (*Oryzopsis hymenoides*), Indian paintbrush (*Castilleja* sp.), Yucca (*Yucca* sp.), and Beavertail cactus (*Opuntia basilaris* sp.). Much of the lesser vegetation that had been denuded by settlement and mining activities has returned to its native state over the past 120 or so years on the lower elevations; however, as Butler (1913) noted, forests removed for charcoal production and timber have not regenerated. Figure 2-5 provides a photographic overview of the vegetation present within the landscape today.

Figure 2-5. Overview of Vegetation within the San Francisco Mountains, 2010

2.1.5 Soils

A survey of the western portion of Beaver County performed by the National Resources Conservation Service (NRCS) in 2008 identified soils on the western and eastern flanks of the San Francisco Mountains as being comprised of soils from the Hiko Peak series (NRCS

2008, see http://soils.usda.gov). The Hiko Peak series includes very deep, well-drained soils on hills, alluvial fans, and fan remnants with slopes of 0 to 60 percent (NCSS 1977, 2003, 2009). The soils are formed in alluvium and colluviums derived from igneous rocks, quartzite and limestone and are associated with Annabella, Dixie, Red Butte, and Taylorsflat soils. Generally, the Hiko Peak soils are used for rangeland and wildlife habit, supporting vegetation such as sagebrush (*Artemisia* sp.) and Indian rice grass (*Oryzopsis hymenoides*) (NCSS 1977, 2003, 2009).

2.1.6 Geology

Numerous geological studies have been performed within the SFMD (Gilbert 1890; Hooker 1879; Cummins 1879, American Institute of Mining Engineers 1879; Butler 1913, 1920; East 1956, 1966; Arrington and Hinton 1966; Stringham 1967; Hintze and Whelan [eds.] 1973; McKelvey 1973; Whelan and Hintze 1973; Best *et al*. 1989; Wray 2006: 286-457). Grove Karl [G.K.] Gilbert made one of the earliest reports of the area, documenting the Lake Bonneville shorelines in 1871 (Gilbert 1890; Butler 1913: 16). His report predates the discovery of silver ore in 1875 and organisation of the SFMD but included two maps of the western flanks of the San Francisco Mountains (Gilbert 1890, Plates VIII and XLI).

In 1879, W.A. Hooker and Henry Cummins published two similar reports of the Horn Silver Mining Company, which described and contained lithographs of the mineralogy and geological setting of the SFMD, in the *Engineering and Mining Journal* (Hooker 1879, Cummins 1879). Samuel Franklin Emmons visited the SFMD in 1901 and again in August 1904, primarily focusing attention on the Cactus copper mine (Butler 1913: 15, 172). Between 1904 and 1905, Fred McLaughlin prepared a topographic map encompassing the SFMD, Preuss, and portions of the Star, Rocky, and Beaver Lake districts (Butler 1913: 15). Several additional geologists conducted a general study of the SFMD in 1908 (Ernest S. Bowman, H.E. Havenor, V.B. Herbert, Joseph Jensen, R.C. Tower, and Ralph R. Wooley) (Butler 1913: 16). That same year, Waldemar Lindgren visited the SFMD and subsequently tasked Bert Sylvenus Butler with preparing a geological map of the surface; the following year, W.M. Beaman extended the map to include portions of the surrounding districts, encompassing an area of 518 km^2 [200 square miles]. Between 1909 and 1910, Butler returned to the area and conducted a study of the ore deposits in the SFMD. Together, these studies produced a series of maps of the mineral deposits and geological descriptions for the SFMD. William B. Wray (2006: 286-457) produced a definitive study of the geology of the SFMD in 2006, summarizing the literature and maps of the previous geologists.

The geology of San Francisco Mountains is comprised of Quaternary alluvium, fine-grained intrusive Tertiary igneous and volcanic rocks, Ordovician limestone, dolomite, shale, sandstone and quartzite, as well as Cambrian quartzite and other undifferentiated rocks (Butler 1913, 1920; East 1956, 1966; Whelan and Hintze 1973: 88; Wray 2006: 400-411; Hintze 2005:74-77; Stokes 1986:167, 179-180). Table 2-2 provides a brief overview of the geological timeline represented at the SFMD.

The mineralogy of the SFMD is characterised by the Wah Wah-Tushar mineral belt that “coincides with the northern edge of the ignimbrite field” made up of rhyolitic and dacitic volcanic ash or tuff, andesite, and basalt (Stokes 1986: 179; see also Hintze 2005: 75, Best 1986: 77). Volcanic activity during the middle Tertiary associated with numerous calderas situated between central Mexico and Utah, resulted in an ignimbrite flow of “tens of thousands of cubic miles of ash-flow tuff [which] accumulated to thicknesses of hundreds of feet;” the flow extended 2,000 cubic miles, sweeping northward more than 322 km [200 miles] from the caldera (Hintze 2005: 75). The Wah Wah-Tushar mineral belt extends from Iron County (south) to Piute County (east), through the centre of the western boundary of Beaver County (west of the SFMD), ending near Marysvale, Utah. According to Best (1986: 82-84), the volcanic zone includes three calderas: White Rock, Indian Peak, and Pine Valley calderas (Hintze 2005: 74-75, Best 1986: 82-84). Volcanic rock in the SFMD likely formed as the result of a large “Frisco” *stratovolcano* that produced a series of flows, autobreccias, andesitic, and latitic dikes before collapsing approximately 29 million years before present (mybp) and again in the Miocene (Hintze 2005, Wray 2006: 403) (Figure 2-6). Wray (2006:

403-404) suggests the centre of the collapse as lying “several miles or more southeast of the Frisco Contact mine.”[1] Likely, the Frisco stratovolcano, Indian Peak-Caliente calderas, and/or Marysvale area calderas, provided the base for the mineral deposition common to the SFMD; each contributed to the Miocene volcanic rocks and high angle faults. The largest eruptive event is identified as the Indian Peak caldera, “a 40-mile diameter depression over a mile deep” [64 km deep by 1.6 km wide] that is no longer visible physically due to faulting, erosion and sediment deposition common to the Great Basin. Hintze (2005) attributes the ignimbrite flow as extending 2,000 cubic miles, sweeping northward more than 322 km [200 miles] from the caldera.

Table 2-2. Geological Timeline Represented at the SFMD (Butler 1913, Wray 2006)

EON	ERA	PERIOD	EPOCH	Sedimentary Rocks
Phanerozoic	Cenozoic	Quaternary	Pleistocene (and recent)	(Qal) Alluvial deposits and lake beds
		Tertiary	Pliocene Miocene Oligocene Eocene Paleocene Neogene Paleogene	(Tq) Quartz monzonite (intrusive) (Tgp) Granodiorite porphyry (intrusive) (Tv) Lava flows (chiefly latites)
	Mesozoic	Triassic		(Trh) Harrington formation (thin-bedded shales with interbedded limestones and lenses of quartzite)
	Paleozoic	Carboniferous	Pennsylvanian	(Cel) Elephant limestone (heavy-bedded dolomitic and siliceous limestones) (Ctq) Talisman Quartzite (fine-grained pink quartzite) (Ctl) Topache limestone (heavy-bedded blue limestone with beds of shale and chert)
		Devonian		(Dms) Mowitza Shale (calcareous shale interstratified with thin beds of limestone)

1 Stratovolcanoes dating between 32 and 22 mybp are noted in the Tushar Mountains (Mt. Belknap), approximately 183.43 km [114 miles] east of the SFMD. Volcanoes dating from 1 mybp are noted to the north in Juab County, such as Fumarole Butte. Volcanoes as recent as 600 years old, are present in Millard, Iron, Kane, Garfield, and Washington counties. Among the more recently active volcanoes in the vicinity is at Pahvant Butte (erupted last, 15,500 years ago), in the Black Rock Desert, 127 km [79 miles] to the northeast of the SFMD.

Table 2-2. Geological Timeline Represented at the SFMD (Continued)

EON	ERA	PERIOD	EPOCH	Sedimentary Rocks
Phanerozoic	Paleozoic	Silurian		(Drw) Red Warrior limestone (heavy-bedded blue and gray limestone in part dolomitic; lenses of quartzite near base) (Smq) Morehouse (?) quartzite (fine-grained pink quartzite, containing some fine siliceous shale)
		Ordovician		(Om) Morehouse Quartzite (fine-grained pink and white quartzite, with some shale beds)
		Cambrian		(Ꞓg) Grampian limestone (heavy-bedded blue and gray limestone, in part dolomitic with limy shale at top)

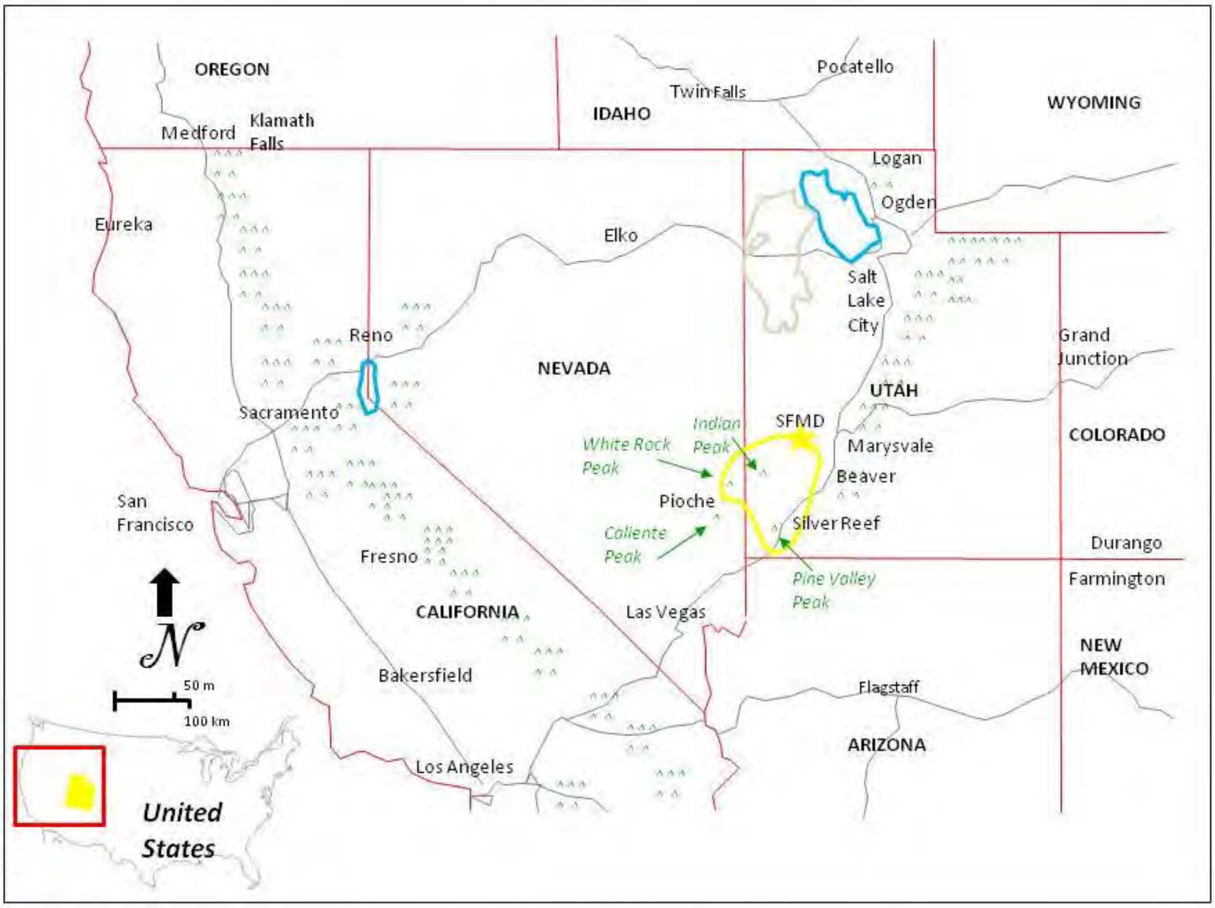

Figure 2-6. Approximate Location of Frisco Stratovolcano

Butler's (1913) description of the district corresponds with that offered by other geologists (Hintze 2005, Best 1986, Wray 2006):

> The San Francisco Range... is composite. The portion south of Squaw Springs Pass consists principally of lava flow; the portion north of the pass is made up of limestone and quartzite, with intruded monzonite; and the eastern flank of the northern portion is composed of lava and tuff (Butler 1913: 25).
>
> In the San Francisco Range, the east as well as the west side of the northern portion of the range is bounded by a fault, as is well shown in the Horn Silver mine... and it does not extend south of the Squaw Springs Pass... The volcanic rock in the southern part of the San Francisco Range has been faulted down against the sediments. The fault has determined the position of the Squaw Springs Pass (Butler 1913: 27).

Ores containing metallic content are the result of intrusive quartz monzonite, with little variation in the types of rock in which the deposits formed, were deposited, or altered due to chemical composition or character during the time of the deposition (Butler 1913: 118, 119, 133). Deposits in the sedimentary rocks contain deposits of silver, lead, and varying amounts of copper and zinc. Mineralization in volcanic rock is noted in the Horn Silver and Beaver Carbonate mines, along the eastern flank of the SFMD (Butler 1913: 131). "The deposits are of the type known as replacement fissure veins, in which the ore and gangue minerals in part filled open fissures and in part replaced the rock adjacent to the fissures" (Butler 1913: 131).

According to Butler (1913: 91-92), minerals present in the SFMD include naturally occurring sulphur, gold, silver, and copper.[2] Wray (2006: 286, 399, 415-418) provides information for 109 minerals that have been documented within the SFMD; he notes that "lead was the dominant metal produced in the district, although the silver content of the ores from several of the larger mines was of comparable economic importance" (Wray 2006: 286). Wray (2006) also acknowledges that the SFMD produced commercial grade lead, zinc,

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2 Butler (1913: 92-110) provides information for additional minerals identified in the SFMD: sulphides, sulpharsenides, sulphantimonides, chlorides and fluorides, oxides, hydrous oxides, carbonates, hydrous carbonates, silicates, phosphates, arsenates, vanadates and antimonites, sulphates, and molybdates. Wray's (2006: 415-418) listing includes silicates, silica, elements, sulfides, sulfosalts, oxides, hydroxides, halides, carbonates, sulfates, phosphates, aresnates/antimonates, and molybdates/tungstates, based on Butler (1913) and Page Blakemore (ca. 1966: 6-7).

silver, gold, copper and tungsten, with lead and silver being the more dominant minerals recovered collectively from the mines within the district.

Comparing the geology to the terrain, Wray (2006: 418-419) provides a physical description for the SFMD in terms of mineral composition and mining claims, which may be used for projecting the geological setting of the HLC.

> The San Francisco district may be thought of as the west-northwesterly, tapering end of...the Milford Mineral Belt (Wray 2006). The copper-rich "core" of this elongated Belt is at least 15 miles [24.14 km] long, and extends from west of the Cactus mine in the San Francisco district, within the Cactus stock, east-southeasterly through the San Francisco range, and across the broad intervening alluvial-covered Big Wash valley to and including most of the Beaver Lake Mountains and all of the Rocky Range. The surrounding, elliptical lead-zinc-silver mines and occurrences in and adjacent to the north side of the Cactus stock, including the Quadmetals, Carbonate and Rattler mines, the Indian Queen group, and others. The peripheral gold-rich zone is exposed in the central San Francisco Mountains near the north edge of the district, in and near the Golden Reef mine. The corresponding gold-rich zone (if present) to the south is concealed by post-mineral, Miocene volcanic rocks south of [Utah] State Highway 21.

2.2 Prehistoric Context

Whilst it is unclear if prehistoric people exploited mineral resources in the San Francisco Mountains, or to what extent, it is known that much prospecting was performed throughout the historical and modern era. The prehistoric era in Utah encompasses more than 11,000 years. At least seven prehistoric archaeological sites – all lithic scatters – and three multi-component sites have been recorded within the SFMD boundaries (see Appendix D4). An isolated metate was noted within the commercial district of Frisco as well. Additional unrecorded prehistoric archaeological sites may be identified within the SFMD. In order to better understand the prehistoric use of the landscape, the following section is presented to address the cultural context recognised in this portion of the Great Basin, sites identified within the context, and current Federally-recognised Native American tribes who have ancestral ties to this portion of Utah.

Much of the prehistoric archaeological record for the eastern Great Basin is derived from studies conducted at lake-margin cave sites and rock shelters. Prehistoric occupation of Utah did not occur until the end of the Pleistocene, following the receding of Late Wisconsin pluvial lakes along the basin floors and mountain glaciers in upland areas (Aikens and Madsen 1985: 150). Several renowned archaeological sites have been identified along the ancient shorelines of Lake Gilbert, such as Danger Cave and Hogup Cave (Aikens and Madsen 1985: 150). Danger Cave, near Wendover, Utah, provides a record of occupation dating from 8300 BCE to post 1400 CE[3], based on the presence of woven artefacts (nets, textiles, basketry), wooden effigies (duck decoys and other animals), and wooden artefacts (arrows, hafting, sickles) (Aikens and Madsen 1985: 150-151, Tuohy 1985: 228-230). Hogup Cave, near Salt Lake City, represents occupations dating from circa 6350 BCE to 1470 CE and includes evidence of hunting and seed processing (Aikens and Madsen 1985: 151). These cave sites provide the basis for the cultural sequences typically accepted for the eastern Great Basin. Aikens and Madsen (1985: 152, 154-160) divides the chronology into three periods: the Bonneville Period (9000-7500 BCE); the Wendover Period (7500-4000 BCE); and the Black Rock Period (4000 BCE-500 CE).

The Bonneville Period (9000-7500 BCE) summarizes the Paleo-Indian stage and is named for Pleistocene Lake Bonneville (Aikens and Madsen 1985: 154). “Typologically diagnostic surface finds of Clovis and Folsom fluted points in the eastern Basin province and northern Colorado Plateau may belong to the Bonneville period or may immediately precede it” (Tripp 1966; Gunnerson 1956; Hunt and Tanner 1960; Wormington and Lister 1956, as cited by Aikens and Madsen 1985: 154). Examples of Bonneville Period artefacts are noted at Danger and Smith Creek Cave, and “open surface sites along pluvial lakeshores” throughout the Great Basin (Aikens and Madsen 1985: 154). Fluted points also have been identified in the south-western part of Utah, in the Mineral Mountains, east of the SFMD (Pritchard Parker, personal communication 2009).

The Wendover Period (7500-4000 BCE) relates to the Archaic phase and is named for the town of Wendover. More archaeological sites representative of the Wendover Period are

3 BCE refers to Before the Common Era and CE refers to Common Era.

identified in a wider array of environmental settings than those associated with the Bonneville Period (Aikens and Madsen 1985: 154-155). The period reflects a shift between hunting and plant collection at varying times of the year; a wider range of vegetal foods; tools for obtaining and exploiting resources such as twined basketry; milling tools; nets and snares; and medium- to large-sized projectile points. In Utah, Danger and Hogup caves, plus Sudden Shelter, Cowboy Cave, and Weston Canyon Rockshelter, have artefact assemblages that reflect the Wendover Period (Aikens and Madsen 1985: 155).

The Black Rock Period (4000 BCE to 500 AD) is named for Black Rock Cave near Salt Lake City. Representative archaeological sites of the period are situated in "upland regions away from the lake basins, in areas occupied previously only at low intensities, if at all" (Aikens and Madsen 1985: 158). Example sites include Deadman, Danger, Hogup, Sudden Shelter, and Cowboy caves, and other sites located in piñon-juniper zones with an abundance of grasses (Indian ricegrass [*Oryzopsis hymenoides*]) and mountain sheep. The shift away from lake basins is attributed to changes in marshland habitats and temperature changes (Aikens and Madsen 1985: 158).

Smaller projectile points (arrow tips and atlatl darts) and limited amounts of pottery were used by 400 to 500 CE, as indicated by late Archaic sites in the eastern Great Basin. By 800 CE, the "Fremont cultural horticultural village sites characterized by pit houses, above- and below-ground storage features, and corn-beans-squash horticulture had begun to occur" (Aikens and Madsen 1985: 160). In Utah, this shift to settled farming villages represents the end of the Archaic phase and is best represented by the artefact assemblages at Hogup Cave (Marwitt 1985: 163). It is unclear where the Fremont culture originated, although it is postulated that:

> ...the early Fremont people were bison hunters of Athapaskan origin who entered the Utah region about A.D. 500, and who adopted and modified Pueblo ceramics, horticulture, and architecture. Fremont would thus be a synthesis of Plains and Southwest elements, with the Plains elements being more obtrusive on the northern frontier of Southwest influence (Marwitt 1985: 163, see also Aikens 1966).

Thus, the Fremont culture represents a period from 400 to 1300 CE and is associated with sedentary villages and horticultural farming, although hunting and gathering activities remained a part of the subsistence strategies exploited by this cultural group (Marwitt 1985: 161). Maize, pottery and characteristic Fremont-type metates (a well-defined grinding trough with a flat shelf at the narrow proximal end) are common at Fremont sites and suggest a wide trade network (Marwitt 1985: 161). Other artefacts associated with the Fremont culture include anthropomorphic fired-clay figurines, flaked bone scrapers, bone finger rings, bone awls, bone whistles, and basalt-tempered and/or calcite-tempered grayware ceramics (Sevier Gray and Uinta Gray) (Marwitt 1985: 161-170). Fremont archaeological sites are located throughout Utah, including sites in nearby Milford, Parowan, and Beaver (Marwitt 1985: 162; Pritchard Parker, personal communication 2009).

Between 1250 and 1350 CE, the majority of the Fremont had vacated the Great Basin, although there is little information on where the culture relocated. It is possible that Fremont groups moved to the Snake River Plain (Idaho) or assimilated into Numic-speaking Shoshone, Ute or Southern Paiute (Marwitt 1985: 171). By 1350 CE, the Fremont was replaced in the Great Basin, both culturally and ethnically, by Numic-speaking populations (Marwitt 1985: 172). Evidence of the likely assimilation with the Numic speakers is noted at archaeological sites in Utah such as Hogup Cave, Pine Park Shelter and various cave sites near Salt Lake City (Marwitt 1985: 172).

Federally-recognized Native American Tribes with ancestral ties to Utah include the Bannock, Goshute, Southern Paiute, Navajo, Ute, and Shoshone (NPS/NACD n.d.). Euro-Americans first encountered these groups in the late 18th century and early 19th century (Thomas, Pendleton and Cappannari 1985: 262-263; Murphy and Murphy 1985: 286; Shimkin 1985: 308-309; Callaway, Janetski and Stewart 1985: 338; Kelly and Fowler 1985: 386). European exploration in the area included the Rivera expedition (Uncompahgre River, Colorado, 1765), the Dominguez-Escalante expedition (1776), the Arze-Garcia expedition (1813), and various expeditions by Maestas (an interpreter and legal officer for Spain and

Mexico). Euro-American travels into Utah continued with the opening of the Santa Fe Trail from Missouri to Mexico (fur trappers and explorers, Jedediah Smith, William Henry Ashley, 1820s). These expeditions were followed by Mormon settlers (Brigham Young, 1856). As Euro-American settlement increased, natural game, wild berries and other foods were depleted or removed for field cultivation, threatening the Native American way of life. Skirmishes between settlers and Utes erupted, generally after provocation (O'Neil n.d.). Federal intervention (1850s) allowed for the planting of 'Indian farms,' which provided food to starving Utes, as offered by Brigham Young:

> When we came here, they could catch fish in great abundance in the lake in the season thereof, and live upon them pretty much through the summer. But now their game has gone and they are left to starve. It is our duty to feed… these poor ignorant Indians; we are living on their possessions and in their homeland (O'Neil n.d.).

As the settler population continued to rise and federal response to Indian agents proved inadequate, many Utes resorted to stealing, raiding cattle and other livestock, vice starvation. Thus, most settlers considered the Native Americans to be thieves. In response, President Abraham Lincoln agreed to a reservation in the Uinta River Valley (ratified, May 1864); however, many Utes refused to leave areas of Sanpete, Provo, and Spanish Fork for the colder Uinta Basin. Resistance culminated with the Black Hawk War, which resulted in Mormon settlers being forced to leave areas, establish forts, and maintain a militia (Nauvoo Legion). Upon Black Hawk's defeat and replacement by Tabby-to-Kwana [Child of the Sun], the Utes relocated to the Uinta Basin. In return, Brigham Young provided seventy-five head of cattle to the reservation and the government provided an allotment of coffee, lard, bacon, flour, sugar, salt, beef, navy beans and bulk soap to each family. Within a short time, the land the Utes abandoned was occupied by settlers (O'Neil n.d.).

The Pahutes (Southern Paiutes) have been nomadic, with ancestral lands encompassed portions of southeastern California, southern Nevada, northern Arizona, and southern Utah. Following the Escalante expedition (1776), the Spanish actively captured Paiutes and sold them as slaves (O'Neil n.d.). Like the Utes, the Paiutes faced displacement from traditional hunting and gathering lands following the arrival of the European explorers and Mormon settlers. By 1954, the LDS quickly established the Southern Indian Mission at Fort Harmony (south of Cedar City), allowing for the conversion of many Paiutes; missionaries quickly learned native languages. In 1865, Paiutes began signing treaties relinquishing lands in Southern Utah, ultimately leading to removal to reservations: Moapa (1869/1873), Indian Peaks (western Utah, 1915), Koosharem (central Utah, 1928), and Kaibab (Arizona, 1907). A small colony of Paiutes has remained in Cedar City since 1851. The 1900, 1930 and 1940 Censuses for Grampian Hill and Frisco Precincts include a roster of individuals living at the Paiute colony near Cedar City; none of the censuses include information regarding the Goshutes or Utes in the SFMD (Figures 2-7 and 2-8).

The Gosiutes (Goshutes) occupied land in the Great Basin to the southwest of Great Salt Lake and were nomadic like the Southern Paiutes, residing temporarily in juniper and sage bound structures (wickiups). Goshutes encountered Euro-Americans following Captain Howard Stansbury's arrival in Tooele Valley on behalf of the Corps of Topographic Engineers; Stansbury erected an adobe house and shortly thereafter, a mill was constructed with additional houses and farms being built (O'Neil n.d.). The settlers and soldiers quickly uprooted the land, allowed grazing for sheep, cattle and horses, which decimated the traditional hunting and gathering lands of the Goshutes. Frequent Indian raids occurred as food became scarce. Whilst Indian Agents attempted to teach farming practices to the nomadic tribes, the Goshutes were unwilling to abandon their traditional customs of hunting and gathering; some attempts to farm failed due to grasshopper infestations. As the Utes and Paiutes were relocated, the Goshutes refused to leave their traditional lands. Two reservations were created for the Goshutes, including land in Skull Valley (1912 and 1919) and Deep Creek Reservation in western Tooele County (1914) (O'Neil n.d.).

There is little to no evidence for prehistoric exploitation of mineral resources within the boundaries of the SFMD.

Figure 2-7. Paiute Indians from Cedar City, Utah, Photographed by Timothy O'Sullivan and Wheeler Survey in 1871 (Cooper 2012)

Figure 2-8. Paiute Wickiup at the Newhouse Town Site, 1905 (*Salt Lake Mining Review*, 15 December 1905: 9)

2.3 Historic Context

As indicated in Chapter 1, the development and settlement of the SFMD was contingent upon the mineral resources. Without mining, settlement of the area most likely would have been limited to livestock raising activities (sheep or cattle ranching) or sporadic settlement associated with the LDS Church. Thus, mining activity associated with the SFMD served as the impetus for the development of Frisco, Grampian and Newhouse, the establishment of rail service, and utilities throughout the area. As such, the historic context is vital to the understanding the landscape of the SFMD.

2.3.1 Early Exploration

The first explorers to Utah, the Dominguez-Escalante Expedition, were Spanish. Mexican Americans lived in the area since Spanish colonial days. By 1848, the US acquired much of the western US from Mexico through the Treaty of Guadalupe Hidalgo[4] and Euro-American settlers shortly thereafter. The US Census (1850) documented a small number of Spanish-speaking, or surnamed, settlers residing in the Utah Territory. As Vicente Mayer (n.d.) notes, "In Utah, the religious and social exclusiveness of Mormon society discouraged any significant influx of Spanish-speaking settlers, or any non-Mormon settler." Like other ethnicities, Spanish-speaking/surnamed labourers were attracted to the railroad and mining industries and competed for work against the Irish, Cornish, Swedes, Finns, and Italians; others sought employment as sheepherders or ranch hands. Spanish immigration to Utah was limited primarily to Basques (Bitton and Irving n.d., Notarianni 1979). According to Mayer (n.d.), only 40 Mexican Americans were living in Utah in 1900; at least one Mexican male (Beland S. Bridges) is listed in the census for the SFMD (see Appendix D1). Bridges

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4 The Treaty of Guadalupe-Hidalgo ended the Mexican-American War (1846-1848), also known as the War of North American Invasion (*La Intervención Norteamericana*). Signed by Nicholas Trist on behalf of the US in February 1848, the treaty provided for Mexican cession of approximately 1.36 million km^2 to the US in exchange for £9,967,230 [$15 million]; and ensured the safety and pre-existing property rights of Mexican citizens living in the transferred lands, but these property rights were not always upheld. Within one year of residing in the ceded lands, the Mexican citizens were to automatically become full-fledged American citizens. In terms of today's excahnge rate and inflation, the cost would have been £548,497,650 [$283.05 million].

was single, 23 years old, having arrived in Utah in 1898, and employed as a miner of ores (US Census 1900). The population increased between 1910 and 1930 due to World War I; the hiring of Mexicans and Mexican Americans as strikebreakers in labour strikes (e.g., Utah Copper Company, 1912); and by the introduction of railroads through the interior of Mexico, allowing for mass transportation to the American southwest (Mayer n.d.). This increase also is reflected in the census for the SFMD (US Census 1910, 1920, and 1930; see also Appendix D1). A mass exodus of Mexican immigrants took place during the 1930s; with the onset of the Great Depression, the government began deportation of these immigrants to ease the economic strain, although many left voluntarily. In the 1940s, another wave of Mexican immigration occurred, with many seeking employment as migrant labourers (Mayer n.d.).

2.3.2 The Church of Jesus Christ of Latter-Day Saints / Mormons

The LDS (Mormons) were instrumental in the establishment of the Utah Territory and later the State of Utah. The Church provides a wealth of historical information ranging from genealogical sources to Church history (LDS 2010; Allen n.d.).

Joseph Smith, Jr., founded the Church in April 1830. Shortly thereafter, he published the *Book of Mormon* and missionaries began proselytizing in New York and Ohio. Due to religious persecution, Smith and his followers left New York, settling in northern Ohio by late 1831. There, he published *The Doctrine and Covenants*, a translation of the Book of Abraham, and what later became the Joseph Smith Translation of the *Bible*. Within months, the Mormons had constructed a temple in Kirtland, Ohio, and began a settlement in Missouri. Again, due to persecution, they relocated to Illinois, under the leadership of Brigham Young. There, they established the city of Nauvoo and a second temple. In June 1844, Smith was murdered and the Mormons were driven forcibly from Nauvoo. Again, under Young's leadership, the pioneers established a settlement at Winter Quarters, Nebraska.

In 1846, a group of volunteers formed the Mormon Battalion to fight in the Mexican War, exploring parts of California, New Mexico and Arizona. In 1847, Young led the Mormon pioneers to the Salt Lake Valley; the population dramatically increased with converts from the eastern US and abroad. The next year, the missionary force increased; new temples were constructed; the church-owned *Deseret News* began publication; and several Mormon-sponsored social societies and cooperative enterprises (e.g., Zion's Cooperative Mercantile Institution) formed. Attempts were made as between 1849 and 1850 to establish the State of *Deseret*, but all failed approval by Congress until January 1896 (Rood and Thatcher n.d.). In September 1850, the government established the Utah Territory, encompassing the new Mormon settlements. New communities were established and within the year, extended settlement south to Cedar City. The population in the fledgling Utah Territory grew from 11,380 people, predominately Mormon (1850) to 210,779 (1890), and as many as 550,310 (1940) (US Census 1850, 1890, 1940).

In terms of mining, Mormons actively participated in the Gold Rush in California (1848-1851). Newly appointed Governor, Brigham Young, recognized the need for iron and called for exploration in southwest Utah through the "iron mission" (Union Pacific 1901: 14). As a result, a substantial iron works was erected near Cedar City. Although the mission ended in 1854, additional mining for lead and silver was carried out in Minersville, Beaver County.

Prior to his death in 1877, Young oversaw the Mormon settlement of 400 communities in Utah, Arizona, Nevada, California, and Idaho. By 1861, Salt Lake City served as a link for the first transcontinental telegraph and in 1869, Promontory Point marked the junction for the transcontinental railroad. With the addition of this infrastructure, Utah gave way to additional settlement, as witnessed by pamphlets by the Union Pacific Railroad:

> The year 1869 was the year of the completion of the Union Pacific Railroad. A great influx of Eastern people now began. Mines were opened at the same time, and the industrial development of Utah may be said to have started (Union Pacific 1901: 14).

One prominent mining entrepreneur and merchant, William Samuel Godbe, is of note (Figure 2-9). A British convert to the LDS, born in Middlesex, England, in 1833, Godbe immigrated to Utah in 1851. In 1868, he, along with Thomas and Fanny Steinhouse, Elias Lacy Thomas Harrison, and Edward Tullidge, began criticising the economic policies of the

Young (Russell 1999: 525). In 1869, both Godbe and Harrison were named dissenters of the Church in a heresy trial, and as a result, Godbe was excommunicated. In 1870, he formed the "Godbeite Church, the Church of Zion" in opposition to Young, calling for reform of the Mormon doctrine (Russell 1999: 525). Other "intellectual Mormons," such as Amasa Mason Lyman openly criticised the LDS (Walker 2009: 333-335). Lyman helped establish the *Salt Lake Tribune* and proselytized in nearby Minersville. In 1870, he was excommunicated for actively teaching doctrines that were considered unorthodox and for his association with the Godbeites. Although somewhat aggressive, the Godbeite Church died out by the 1880s.

Figure 2-9. William Samuel Godbe in 1923 (Utah State Historical Society, Photograph 15188, USHS Classified Photo Collection)

Godbe then became active in mining ventures in Pioche, Nevada, the SFMD, and Salt Lake City, and founded the Liberal Party of Utah. In 1899, Godbe served as the Populist Party candidate for the Mayoral election in Salt Lake City (Walker 2009: 333-335). Although seen as a social outcast by many Mormons, Godbe returned to Salt Lake City shortly after Young's death (1877), where he continued to reside and practice polygamy until his own death (1902) (Russell 1999: 525).

Mormons founded the city of Beaver as early as 1856. By 1869, a local stake led by John Murdock, a dairy industry, a tannery and a woollen mill were active in the community. In 1873, the US Army established Fort Cameron in the area, and by 1880, the Utah Southern Railroad had reached Beaver. Mining spurred the local economy and increased the population. By 1908, Beaver became the first town in Utah to be electrified and using a hydroelectric generation plant along the Upper Beaver River, was capable of providing electricity as far west as Newhouse in the SFMD (Fiege and Ore 1988).

2.3.3 Immigrants

The Census indicates that a wide mixture of people resided in the SFMD originating from the US and Territories, as well as England, Wales, Scotland, France, Germany, Austria, Denmark, Holland, Finland, Sweden, Canada, Prussia, South Africa, Norway, Australia, Mexico, Japan, China, Greece, Italy, Bohemia,[5] and Ireland (US Census 1880, 1900, 1910, 1920, 1940; see Appendix D1). Few ethnographic studies have been devoted to the mining, although the State of Utah (USHS n.d.) provides a wealth of information relating to African Americans, Hispanics, Greek, Scandinavian, South Slavic, Japanese, German, and Chinese immigrants. Davis Bitton and Gordon Irving (n.d.) attribute some of the immigrants as converts of LDS. From 1837 to 1889, Mormon missionaries traveled to the British Isles, Scandinavia, and Germany to proselytize, leading many new converts to relocate to Utah. Additional immigration from Europe came with enticement from mining opportunities and railroad; often these labourers found support in social and labour organizations such as United Mine Workers, American Federation of [Labour], Cambrian Association of Utah, Dutch

5 At the time, Bohemia was the Kingdom of Bohemia in the Austro-Hungarian empire, now the Czech Republic.

Club AVIO [*Alle Vermark Is Ous*], and *Chemnitzer Vereinigung* [German-American Federal Credit Union] (Bitton and Irving n.d.; Notarianni n.d.).

2.3.3.1 Eastern European, Slavic and Jewish Immigrants

Not all immigrants to Utah practiced Mormonism. As Jack Goodman (n.d.) explains, there were a number of Jewish settlers to the area, including those immigrating from Germany, Russia, Poland, and Rumania [Romania], and few converted to Mormonism; in Utah, those attending church often did so in Catholic or Greek Orthodox churches. Whilst no Jewish members were listed in Salt Lake City in 1847, Jewish Hungarian miners were present in the city in 1851 and at least one millinery store and bakery owned by German Jews operated in there by 1854 (Goodman n.d.). Solomon Nunes Carvalho, who accompanied John C. Fremont's 1853-1854 mapping expedition of the Rocky Mountains, and detailed their experiences in *Incidents of Travel and Adventure in the Far West* (1857), was Jewish. Additional Jewish merchants and freighters arrived to the Utah Territory, including several businesses near Camp Floyd (1858). Samuel H. Auerbach, F. Auerbach & Bro., began supporting the mining industry in Salt Lake City. Also in 1858, Salt Lake City established a Jewish cemetery. Relevant to the SFMD is Samuel Newhouse; namesake and Jewish businessman, he was a speculator and promoter of mining, moving to Utah in 1896 and developing portions of Salt Lake City.

As estimation of 4,000 Slavs (including Serbians, Croatians, Slovenes, Macedonians, Bulgarians, Austrians, and Bohemians) arrived in Utah between the late 1800s and 1924, seeking employment in mining or the railroads (Stipanovich n.d.). Initially, immigration to the US compared to seasonal migrant labour in Central Europe; many planned to emigrate from their homes for short-term periods and to return home for retirement, although illness and accidents prevented this from happening in several instances (Stipanovich n.d.). "The death of the head of household placed greater strains upon other male members of the family to emigrate and to replace the relative who had been sending cash to help support the family"

(Stipanovich n.d.). Attitudes toward immigration slowly changed, with multiple males immigrating together, sending for additional family members as they were financially capable. Between 1904 and 1914, Slavic immigration was dominated by males between ages 14 and 30 years. For family members remaining at home, traditions of appointing godfathers for the interim were common. Males commonly resided in boardinghouses rather than privately owned homes, with few exceptions. At Frisco, Anton Svalina[6] resided as the head of the household he rented and worked in the mines (US Census 1930; see Appendix D1). Additional Eastern european immigrants were noted in the Census, although it is unknown whether or not these individuals were Jewish (Figure 2-10).

In the US, fraternal organizations such as the United Mine Workers of America, provided stability and a social network for many Slavic immigrants in Utah. These institutions served to provide entertainment and literature, although most Slavic families continued customs through oral traditions; partially, due to the fact that the majority of these Slavic immigrants could not read or write (Stipanovich n.d.).

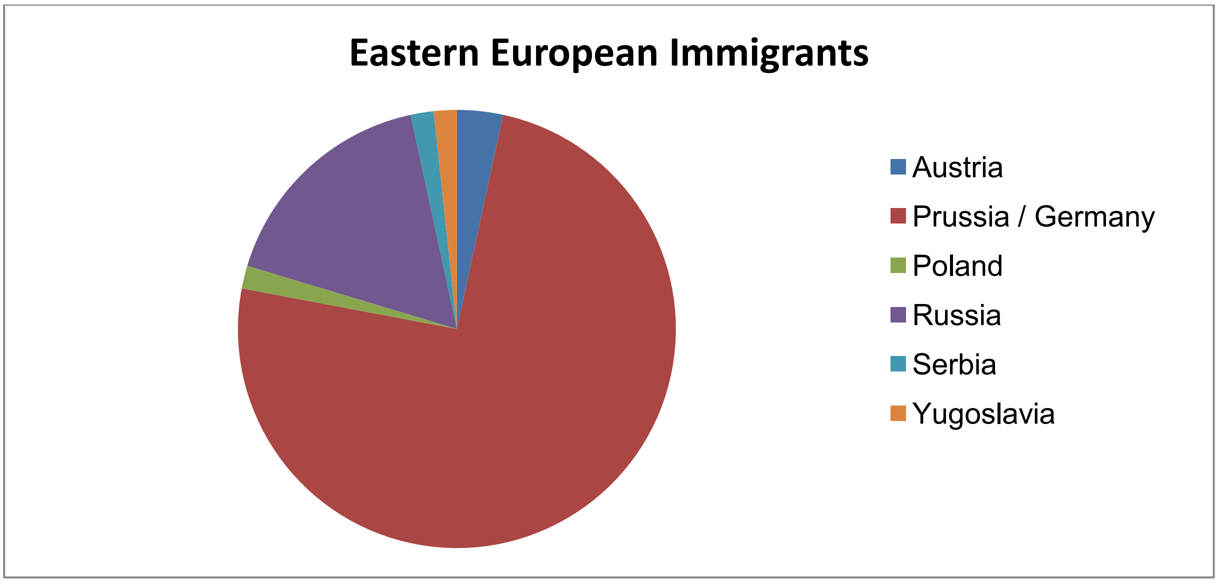

Figure 2-10. Eastern European Immigrants in the San Francisco Mining District

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6 The Census indicates Svalina was born in Yugoslavia in 1888; however, there was no Yugoslavia at that time; it came into existence after World War I. The 1930 Census identifies Anton Svalina as being born in Yugoslavia; he immigated to the US in 1905.

2.3.3.2 Greek Immigrants

The Utah State Historical Society (USHS) provides an overview of immigrants from Greece (Papanikolas 1970). Many immigrated to the US due to: the bankruptcy of Greece (1893), continued Turkish control (1897). and failure of currant crops (1907). Among the earliest to Utah was Nicholas Kastro, a friend of Brigham Young. Also in Utah, L.G. Skliris provided Greek labourers for the Union Pacific and Oregon Short Line Railroads, and mines, smelters and steel mills. Typically, Greeks lived in tents or boardinghouses and often were associated with Japanese immigrants. In 1910, the Greek population in Utah was dominated by 30 to 38 year old males, all employed as gold mine labourers. After 1915, nearly every mine, smelter or mill town in Utah had a Greek population, although immigration decreased due to immigration and labour laws of the 1920s (Papanikolas 1970). Between 1880 and 1940, the Census only accounts for eight Greek immigrants in the SFMD; all held jobs as labourers and railroad employees (see Appendix D1). Papanikolas (1970) concedes that "census taking was haphazard and Greeks known to have been in Utah working on railroad gangs are not found in Polk's city directory." This may account for the scant amount of information available for the Greek immigrants to the Frisco area.

2.3.3.3 British, Irish, Scottish and Canadian Immigrants

British and Canadian fur trappers arrived in present-day Utah under the Hudson's Bay Company and the Charles McKay and Captain Welles exploration parties, seeking to claim a portion of the wilderness; as such, Utah has always held a British presence. According to Frederick S. Buchanan (n.d.), the period between 1850 and 1870 was the heaviest of British immigration to Utah; he attributes much of the settlement at that time to Mormon missionary activity and converts. Many Utah towns, villages and areas bear British, Cornish, and Scottish names: Sanpete County boasted of an entirely British-born population, including one town named Wales. Grampian is named for the Grampian Hills in the Scottish Highlands of north-eastern Scotland (Hickman 2006: 4, Van Cott 1991); the namesake was given by a Scottish miner, Robert McGreager [McGregor] (Van Cott 1991).[7]

Missionaries to the British Isles sought out 'blowers, moulders and all kinds of furnace operators to immediately immigrate to the valley without delay' (*The Latter-Day Saints' Millennial Star* 11 [1849]: 248-49, as cited by Buchanan n.d.: 28). Non-Mormons also immigrated to the area, including an influx of Irish and Cornish miners in the 1880s and 1890s. Many followed Patrick Edward O'Connor, attributed as the father of the Utah mining industry[8]. As previously noted, W. S.Godbe, who constructed the Frisco Smelting Company at the SFMD, immigrated to Utah in 1851 (see Appendix D1). Others followed the railroad, including John Sharp, and William Jennings, a coal miner from Scotland who maintained a house in Birmingham (UK) and immigrated to Utah with his Cornish wife (Priscilla Paul). Jennings later became the superintendent of Utah's Central Railway (1871) and director of the Union Pacific Railroad. The Census shows English, Irish, Welsh, Scottish, Australian, South African, and Nova Scotian[9] immigrants residing in the SFMD from 1880 to the 1920s (Figure 2-11; see also Appendix D1).

John Rowe (1974: 211) produced a study examining Cornish Immigrants in the US, with a focus on those seeking employment in the mining industry. He acknowledges:

> ...Cornishmen contributed more to the development of mining in Utah than they did in New Mexico. Latter-Day Saints missionary activity in the Old World brought many convert immigrants to Deseret, although comparatively few Cornish people joined the Mormon Church. There was in Cornwall as in other parts of Britain a scabrous interest in Mormon polygamy, while the Mountain Meadows Massacre became ten times bloodier in anti-Mormon propagandist telling and re-telling. Nevertheless, a few

7 No record of Robert McGreager could be identified from genealogical records for the SFMD. One Robert McGregor of Perth, Scotland, arriving in New York in 1808; but there is no mention of this McGregor relocating to Utah or being involved in mining activities (see Appendix D1).

8 Born in Ireland in 1820, Civil War solider and Major General Patrick O'Connor later dropped the "O" from his name. He is attributed as establishing the first silver mine and first daily newspaper in Stockton, Utah, and authored Utah's mining laws (Balance n.d., Nichols 1995). He died in 1891.

9 Australia, South Africa and Nova Scotia were included in this list of immigrants due to the close ties of these countries to that of the UK. One individual, born in India, is noted in the Census data for the SFMD; her father was a native of India, while her mother was from Wales (see Appendix D1).

Cornish people joined the Latter-Day Saints, notably the hymn-writer, Penrose, and members of the Moyle family (Rowe 1974: 211). ...For them [Cousin Jacks] the Mormons could keep their Salt Lake City and Bingham Canyon – Pioche, Tombstone, and Butte City were far more in their line, more like warmed-up versions of St. Just, Redruth, and St. Blazey on Saturday nights (Rowe 1974: 214).

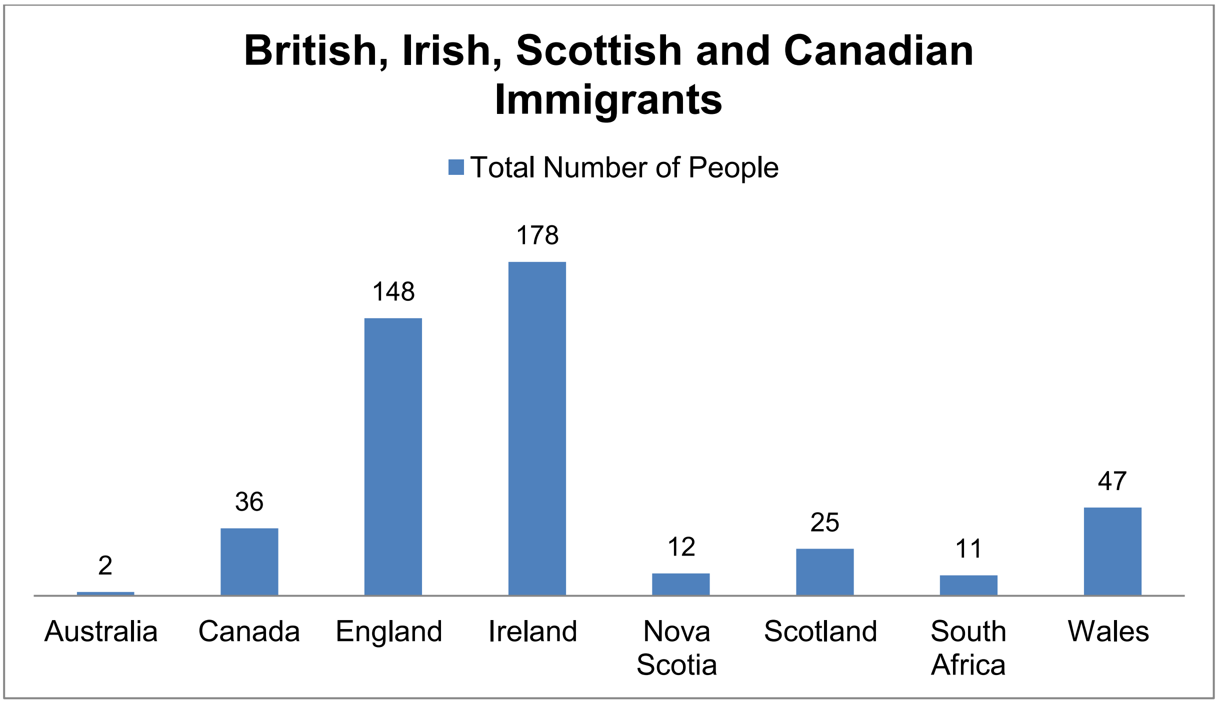

Figure 2-11. British, Irish, Scottish and Canadian Immigrants to the San Francisco Mining District

In comparison, at the town of Silver Reef, Utah, Cornish miners were subject to both preferential treatment and discrimination (Smith 1979). In 1880, the town peaked in population (1,047 residents) and dwindled to virtually no residents by 1903. At its height, the town boasted of a variety of ethnicities(Smith 1979).

> The men who ran the big mining companies that took over Silver Reef shortly after silver was discovered in 1876 considered the Cornish to be the most desirable workers. The Irish, who came West working on the railroad as unskilled [labourers] and then moved into mining, were viewed as rowdy and undisciplined. The Cornish, on the other hand, had the reputation of being some of the finest miners in the world. They had gained considerable experience in hard-rock mining while working the tin and copper deposits of Britain. They were also considered more docile... It became the practice, then to dismiss Irish in [favour] of Cornish miners.

Canadians entered Utah for fur trapping and trading opportunities, such as Peter Skene Ogden, for whom Ogden is named. Whilst additional Canadians converted to Mormonism, a wave of non-Mormon Canadians ventured to Utah with the discovery of silver in Bingham

Canyon (1840s) and the arrival of the railroad (1869). The Census shows Canadian immigrants residing in the SFMD from 1880 to the 1920s (Figure 2-11; Appendix D1).

2.3.3.4 Scandinavian Immigrants

Scandinavians flocked to Utah due to the efforts of 1,361 LDS missionaries proselytizing in Norway, Denmark, and Sweden. Early doctrine dictated that "for anyone to be content in Zion, conversion…had to precede emigration" (Mulder n.d.). In addition to converting to Mormonism, the English language was taught, as were principles in cleanliness, bathing, abstinence from tobacco and strong drinking, ceasing card playing, legalizing common-law marriages, and payment of all debts (Mulder n.d.). In a sense, the New World – or Utah – would serve as a utopian community. That is not to say that traditional customs were put by the wayside; whilst being urged to learn English[10], many Scandinavians continued to use their mother tongue, held community outings, and celebrated Old World holidays. Further, the continual arrival of fresh immigrants allowed the Scandinavian mother tongue to be passed on between generations.

The journey to Utah was not an easy one: from home, they had to arrive at the main assembly point in Copenhagen; then traveling on to Hamburg to Grimsby or Hull to Liverpool; and from Liverpool, they crossed the Atlantic. Prior to 1855, LDS converts traveled from New Orleans, along waterways to Missouri, then along wagon trains or rail to Ogden (Mulder n.d.). Among the first to arrive to Utah were "several weavers and blacksmiths, a tailor, wagonmaker, seaman, miller, wheelwright, carpenter, cabinetmaker, cooper, a government clerk, a former Baptist lay preacher, a village choirmaster, a school trustee, and a good many farmers [primarily freeholders, tenants or journeyman hands]" (Mulder n.d.). By the late 1800s, more artisans immigrated, including tailors, seamstresses, weavers, blacksmiths,

10 Between 1854 and the 1870s, the LDS promoted a phonetic system, known as the Deseret Alphabet with 38-40 characters, to help foreign converts to Mormonism learn the English language more rapidly. "The ugly new alphabet was short-lived. The mother tongue itself proved a better instrument of adjustment than the artificial spelling reform" (Mulder n.d.).

coopers, tinsmiths, shoemakers, and tanners; these craftsmen greatly outnumbered the bricklayers, stone masons and stone cutters, butchers, bakers, brewers and millers.

Unlike other ethnicities, Scandinavians assimilated better into communities; as such, there were no exclusively Scandinavian colonies in Utah. Whilst Salt Lake City had a "Swede Town" by 1885, this area was prompted by business interests primarily rather than socially outcasting. Since 1852, Little Denmark included a mixture of 58 households included English, Scottish, and American neighbours, although 29 of the households were Scandinavian. Mulder (n.d.) notes that this is reflected by the Census:

> In every Census in the hundred years from 1850 to 1950, Utah residents born in Scandinavia as well as those of Scandinavian stock…appear consistently as the second largest group of foreign-born or foreign stock in the state, second only to British-born and those of British Stock.

Interestingly, Mulder (n.d.) claims that "Scandinavians, as Mormons and farmers, shunned Gentile establishments like Corinne, a railroad boom town, and Silver Reef, a briefly prosperous mining community, but they did not hesitate to sell their produce to the unbelievers at a profit." Despite this, numerous Scandinavians were employed in mining communities such as Bingham (1890), the SFMD, and smelters in Salt Lake City and Grantsville. SFMD Census information indicates that there were numerous first-generation Scandinavians employed in mining and other labour categories between 1880 and 1940 (Figures 2-12 and 2-13). Second-generation Scandinavians were noted in 1900 and included a Postmaster, miner and labourer, as well as several small children (Census 1900, see Appendix D1).

2.3.3.5 Chinese and Cantonese Immigrants

Chinese immigrants are noted in the SFMD by 1900 (US Census 1900; Appendix D1). By that time, Chinese communities had been established in Utah in Box Elder County, Carbon County (Pleasant Valley), Terrace, the Uinta Bain, Corinne, Ogden, Salt Lake City (Plum Alley), and Park City. Conley (n.d.) explains the Chinese experience in the West:

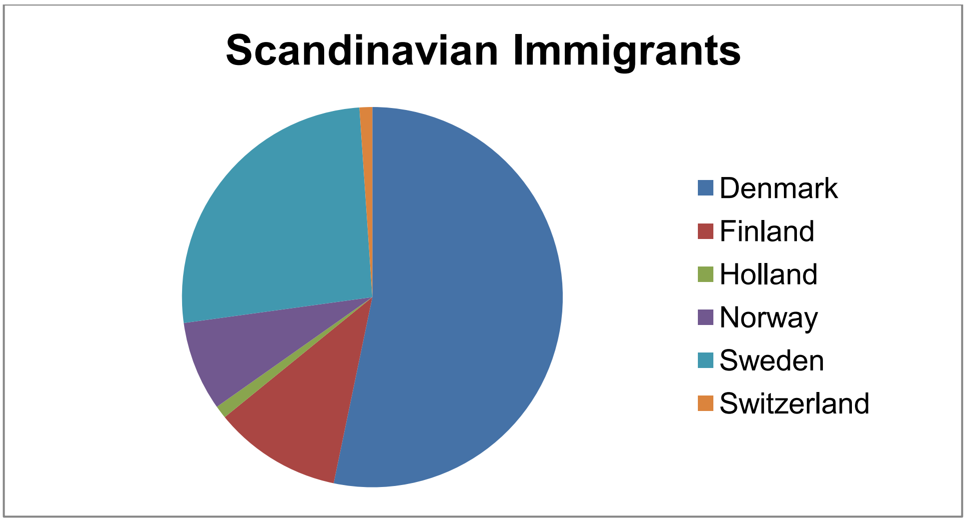

Figure 2-12. Scandinavian Immigrants to the San Francisco Mining District, 1880-1940

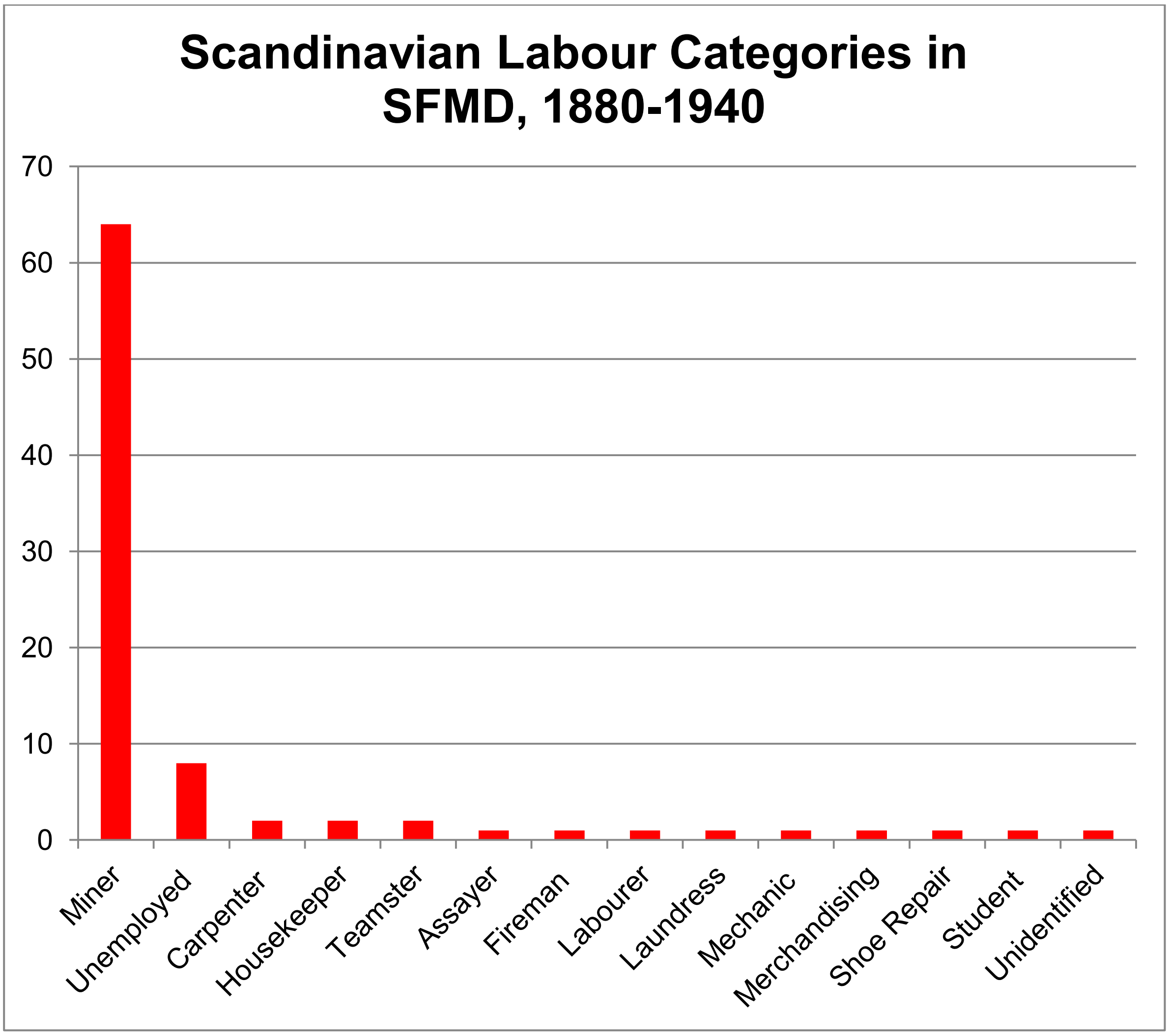

Figure 2-13. First Generation Scandinavian Labour Categories in the San Francisco Mining District, 1880-1940

> Regarding the history of the pioneer Chinese in the West, census records are perhaps more informative than the few other records available. Such simple statistics as names, ages, occupations, and literacy, in the dearth of written history about the Chinese in the state, help clarify certain misconceptions: many of these first Chinese could read and write, which puts to rest the faulty notion that they were all *coolies*. Far from being unskilled, a number of the Chinese took advantage of the economic potential of the new towns to leave the ranks of [labour] and open their own businesses.

Liping Zhu (1997) examines the experience of Cantonese participating in mining endeavors in the Pacific Northwest, California, Idaho, and the Rocky Mountain frontier. Whilst many Chinese immigrated to the US following the discovery of gold at Sutter's Mill (California, 1849), approximately 10,000 Chinese worked under the auspices of the Central Pacific Railroad Company in the construction of the transcontinental railroad (Zhu 1997: 54). Following completion of the line in Promontory Point (Utah, 1869), several thousand Chinese became unemployed. Many remained in Utah, Nevada, and Idaho and staked independent mining claims as opposed to lode mining, which required capital and investment in heavy equipment.

Those who sought settlement in boomtowns often felt isolated from the rest of the community, hence the creation of Chinatowns within larger communities. Conley (n.d.) attributes this to the retention of their cultural customs. Few Chinese women and children journeyed to the US, thus activities such as Chinese weddings, holiday customs, religious and burial practices were considered unusual to non-Chinese. Even fewer converted to Mormonism. In Terrace, Utah, "when the men died they were taken to a cemetery west of [town]...Later some of the remains were shipped back to China" (Conley n.d., Tinker 1964). It is possible that whilst some Chinese desired to be buried in their native soil, local society called for the repatriation of the remains outside of the community.Unsubstantiated claims suggest this was true in the SFMD as well.

"In 1882... Congress passed the Chinese Exclusion Act [Chinese Immigration Act of 1882], prohibiting further Chinese [labourers] from entering the country" (Zhu 1997: 59). The law served as a 10-year moratorium for Chinese labour immigration and was the first significant restriction of free immigration into the US. The Act expired in 1892, but was extended under the Geary Act, which continued to regulate immigration until the 1920s. In 1943, all exclusion acts were repealed under the Magnuson Act, the Immigration Act of 1965, and the Immigation Act of 1990. Between 1902 and 1930, unionized miners in Park City campaigned and actively boycotted Chinese restaurants and laundries, calling for the prohibition of the selling and buying of Chinese goods, further ending employment of Chinese (Conley n.d.). Around this time, Utah passed legislation which banned Chinese from working in the mines. Census information for the SFMD identified 18 male Chinese immigrants in four labour categories (Figure 2-14).

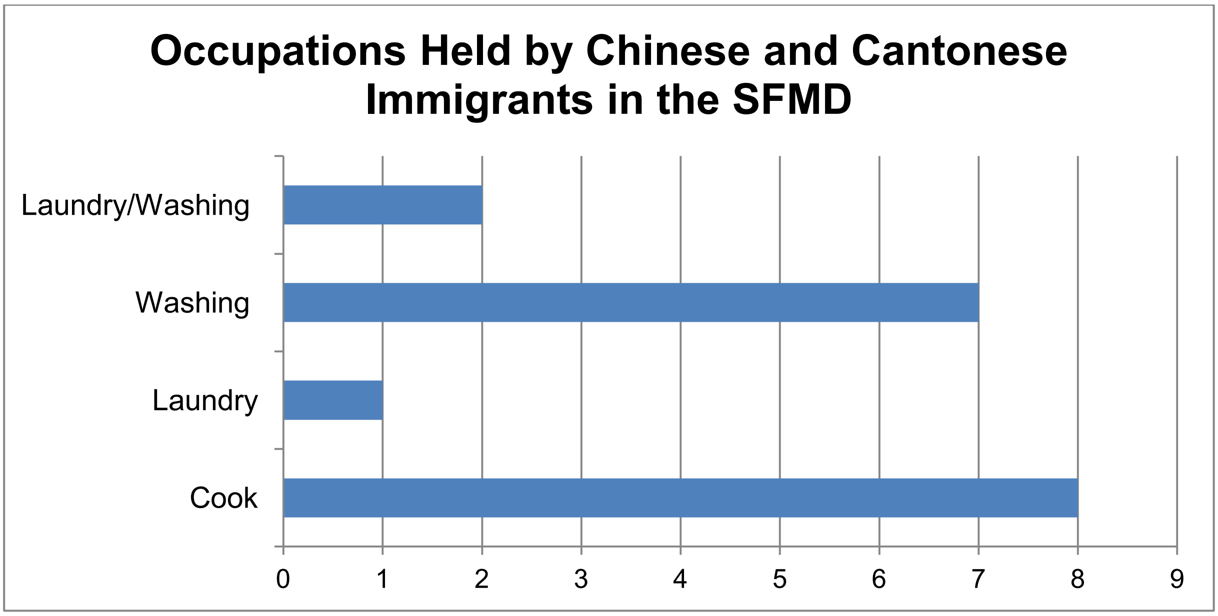

Figure 2-14. Occupations Held By Chinese and Cantonese Immigrants in the San Francisco Mining District

2.3.3.6 Japanese Immigrants

Following passage of the Chinese Exclusion Act and a liberalization of Japanese emigration laws in 1885, thousands of Japanese migrated to Hawaii, Seattle, San Francisco, and neighbouring western states. The first Japanese to Utah arrived in February 1872 as part of a delegation for Iwakura Mission (Figure 2-15).[11] Subsequent Japanese immigrants arrived in 1882, including a group of women prostitutes for railroad workers (Papanikolas and Kasai n.d.). "Unlike the Balkan and Mediterranean immigrants who were almost totally from the poorly educated classes, Japanese aliens included artisans, merchants, students, professionals, and bankers" (Papanikolas and Kasai n.d.). Most, however, found work in fields or railroad section gangs; meager conditions included sleeping in crowded bunkhouses, poor sanitation, and little pay.

Figure 2-15. Iwakura Tomomi Surrounded by Mission Delegates, London, 1871 (Wikimedia n.d.)

Japanese labour agents, Yozo Hashimoto or the Edward Daigoro (E.D.) Hashimoto Company, provided workers to industries in Carbon County, Salt Lake City, Box Elder County, and Weber County. Daigoro Hashimoto also served as a labour agent to Greek, Korean, and Mexican labourers in Utah (Papanikolas and Kasai n.d., Mayer n.d.).

11 Extraordinary and plenipotentiary ambassador Iwakura Tomomi led the Iwakura Mission. He servved as a Statesman and Minister of the Right under Emperors Bakumatsu and Meiji. In 1871, he led the two-year long mission tour of the world.

> Daigoro's [labour] agency assured Utah industry of Asians and Mexicans to meet every need and emergency. All mill, smelter, and mining towns had Japanese boarding-houses that camp bosses ran themselves and later, when the Picture Bride Provision of 1910 allowed men to emigrate, with their wives. Daishiro and Kyoichi Sako housed their men in Little Tokyos located in Magna and Garfield.

Following the bombing of Pearl Harbor (1941), Japanese in the US faced discrimination and ultimately were forced into wartime relocation centres.[12] At least eight Japanese (seven male, one female, six being first generation immigrants) were identified in genealogical records in the SFMD (see Appendix D1).

2.3.3.7 Italian Immigrants

Italian immigration between 1880 and 1920 focused on "overpopulation, agricultural depressions, and discontent among the *contadini*, the 'peasants'" and a cholera epidemic (1884-1887) in southern Italy (Notarianni n.d.). With a need for unskilled labour in support of railroad construction, mining, and smelting industries, the US offered great opportunity. Many sought positions as section gangs on the Union Pacific, Oregon Short line, and other routes of the Southern Pacific. Soon, Italians were residing throughout Utah in towns such as Murray, Garfield, Stockton, Ophir, Mercur, and Magna. Fourteen Italian immigrantss holding various occupations are noted in the SFMD from 1880 to 1940 (Figure 2-16). Of these, only one was female.

Like other immigrants, Italians were forced to adopt "American" customs and the English language, but in the sanctity of their homes, they continued to focus on the teachings of their

12 Executive Order (EO) 9066 permitted military commanders to declare areas in the US as those "from which any or all persons may be excluded." Not specific to any nationality or ethnic group, this EO was applied to those of "Foreign Enemy Ancestry" including Japanese, Germans and Italians. In May 1942, Civilian Exclusion Order No. 34 called for Japanese in California to move to permanent "relocation centers." The War Relocation Authority, under the auspices of President Franklin D. Roosevelt, established 10 wartime communities in rural areas between the Mississippi River and the Sierra Nevada Mountains. In coordination with the Department of Justice and the Wartime Civilian Control Agency, Japanese/Americans of Japanese ancestry (*Nikkei*) were forced into these communities.In Utah, Japanese were sent to a small camp at Dalton Wells (near Moab) and the Topaz War Relocation Center. Topaz originated as the Central Utah Relocation Center, housed 11,212 people, opened on 11 September 1942 and closed on 31 October 1945. EO 9066 was rescinded in February 1976 and Public Law 100-383 passed in 1988 with a Congressional apology to the Japanese Americans.

parents (or other family), customs, religious practices, and ate traditional foods. In Magna, the “Little Italy” was situated west of “Greek Town” and “Jap Town” (Notarianni n.d.). Descriptions of the housing available to Italians in these communities reference self-constructed, single-boarded shacks with sheet iron roofs, covered with tarpaper, but no plumbing or restrooms, not unlike other dwellings in the SFMD. By the 1900s, many Italians left mining due to labour violence and abuses (safety, health, pay, etc.), to start their own businesses or practice farming. Like other ethnicities, Italian immigration decreased n the 1920s due to the Immigration Restriction Acts of 1921 and 1924.

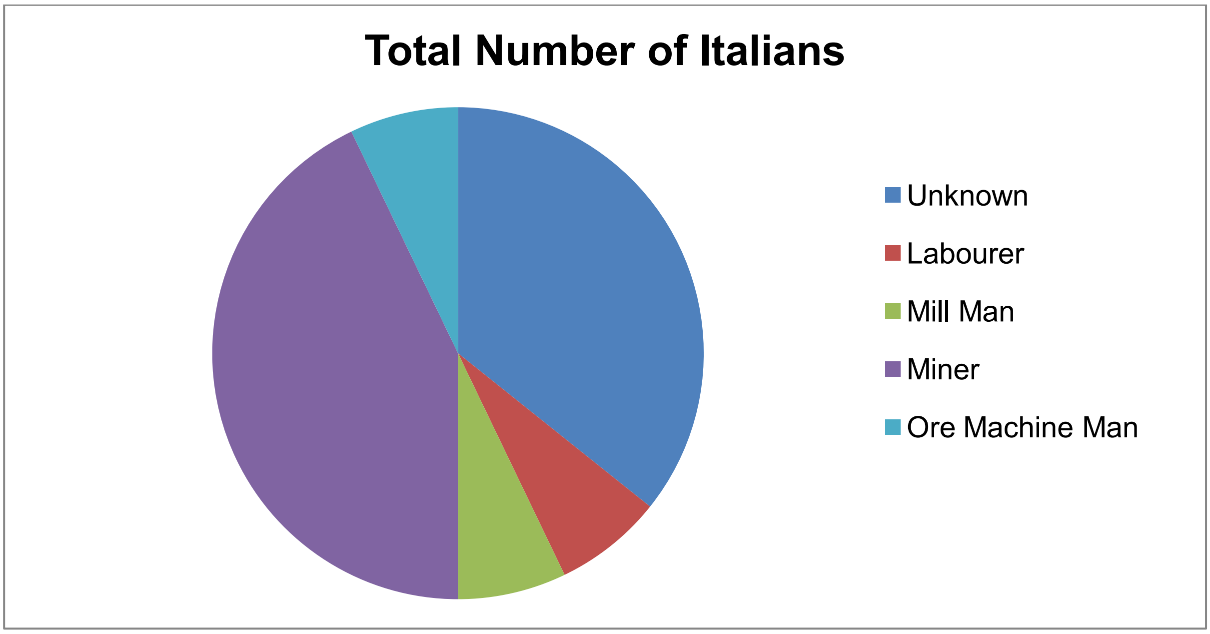

Figure 2-16. Occupations of Italians in the San Francisco Mining District, 1880 to 1940

2.3.3.8 Other Immigrants and Emigrants

Few French immigrants to Utah are noted in the historical record, with the majority being found in association with the sheep industyr or in mining, particularly in Carbon County, Utah (Bitton and Irving n.d., Notarianni 1979). Census accounts indicate a total of 110 French immigrants in Utah by 1920 (Notarianni 1979). In the SFMD, a French company worked the Cactus Mine between 1870 and 1900. The Census indicates nine French immigrants in the SFMD at that time, including a labourer, servant/hotel clerk, restaurant keeper, and baker.

A review of the Census information identified settlers from nearly all of the Continental US emigrating to the SFMD. These settlers were predominantely Caucasian or white, although African American and Native Americans also were represented. Little information is available for the Native American populations in the SFMD area. Coleman (n.d.) notes that African American arrived to Utah as early as the Rocky Mountain Fur Company and Fremont Expeditions, and with the initial Mormon pioneers. Census information for the Utah Territory identifies both free African Americans and slaves in 1850. Additional African Americans arrived after the slave laws were abolished (1862), with railroad and military-related activities, including Forts Duchesne and Douglas. Only one African American was noted in the SFMD (Appendix D1). Figures 2-17 and 2-18 provide an overview of the states represented and the occupations held by women.

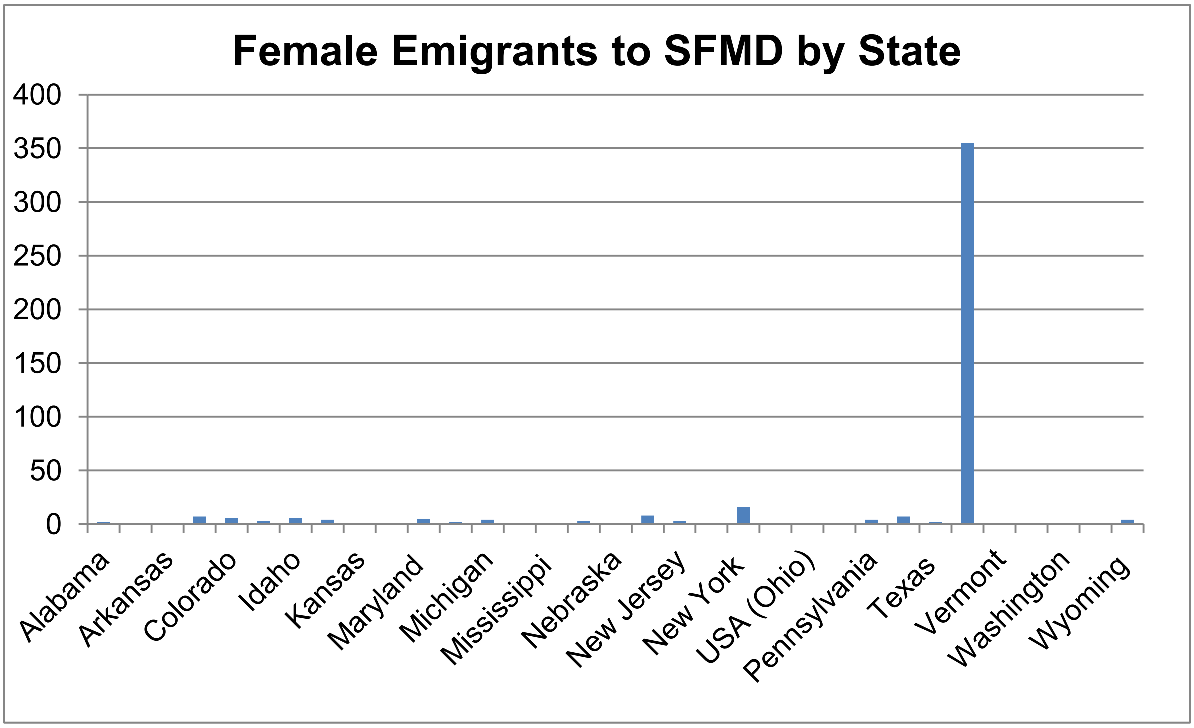

Figure 2-17. Women Emigrants in the San Francisco Mining District, 1880 to 1940

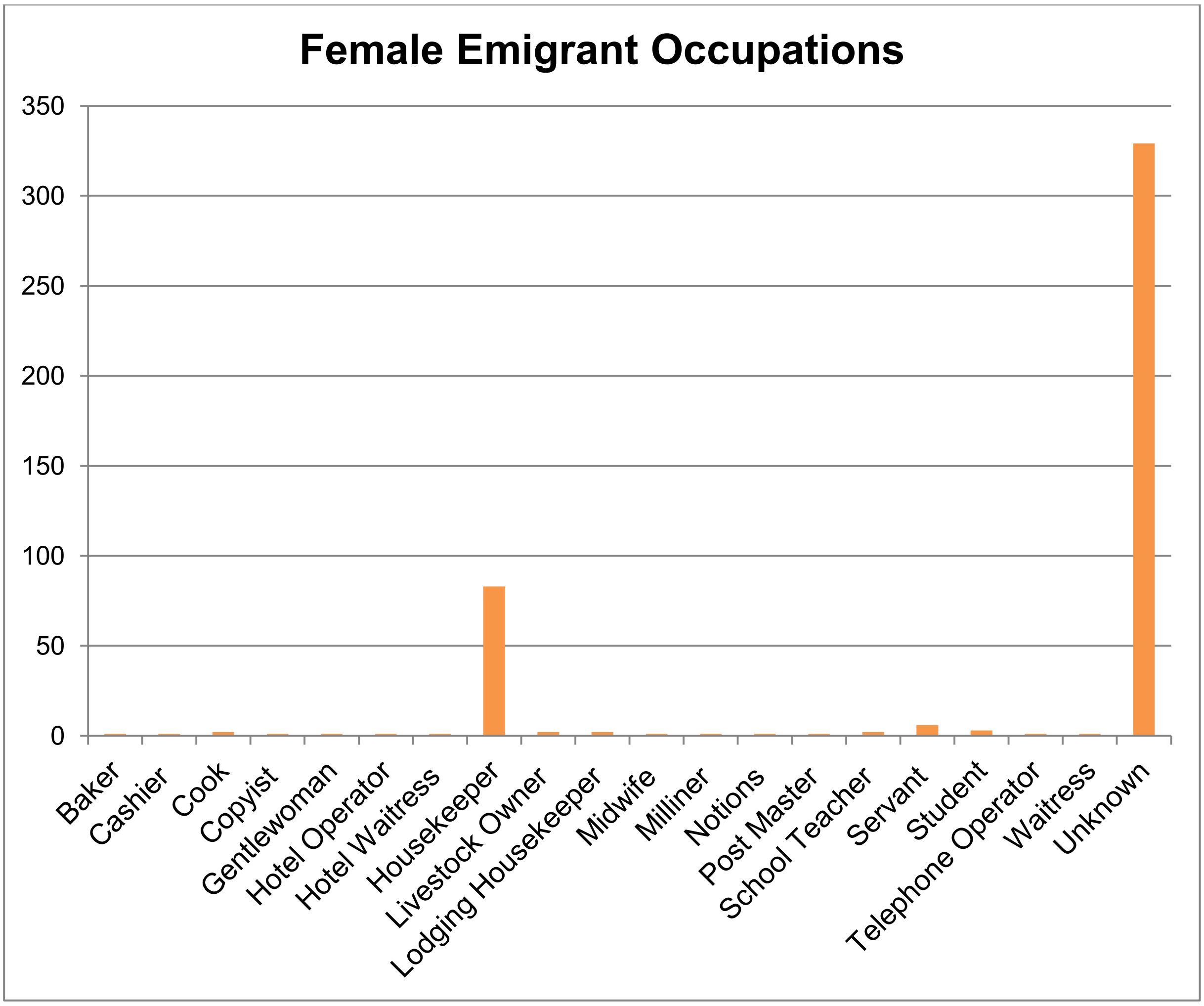

Figure 2-18. Women Emigrant Occupations in the San Francisco Mining District, 1880 to 1940

Census information also identified male emigrants including Caucasian/White, Native Americans, and Japanese-Americans within the SFMD between 1880 and 1940. These individuals were sorted by occupation (Figures 2-19 and 2-20). Additionally, there were numerous individuals in the Census information for which no ethnicity was identified. While males comprised the greatest number within the "unknown" category, women and those of unknown gender also were identified. Figures 2-21 through 2-23 provide overviews of these individuals.

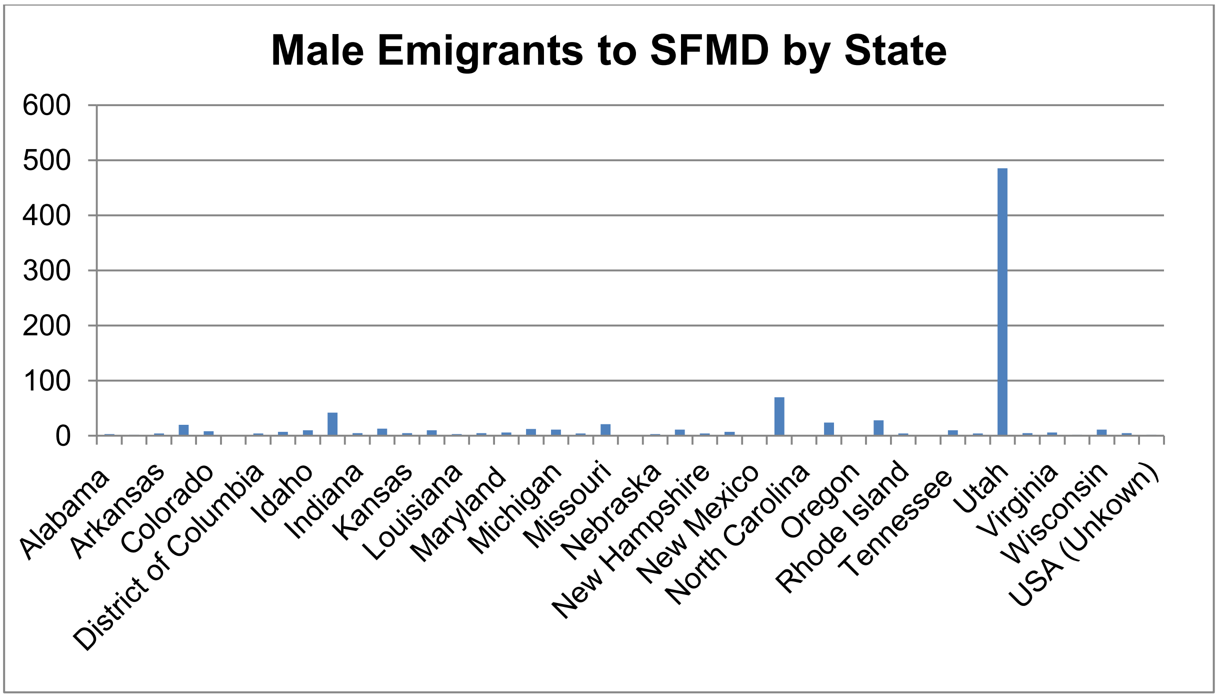

Figure 2-19. Male Emigrants in the San Francisco Mining District, 1880 to 1940

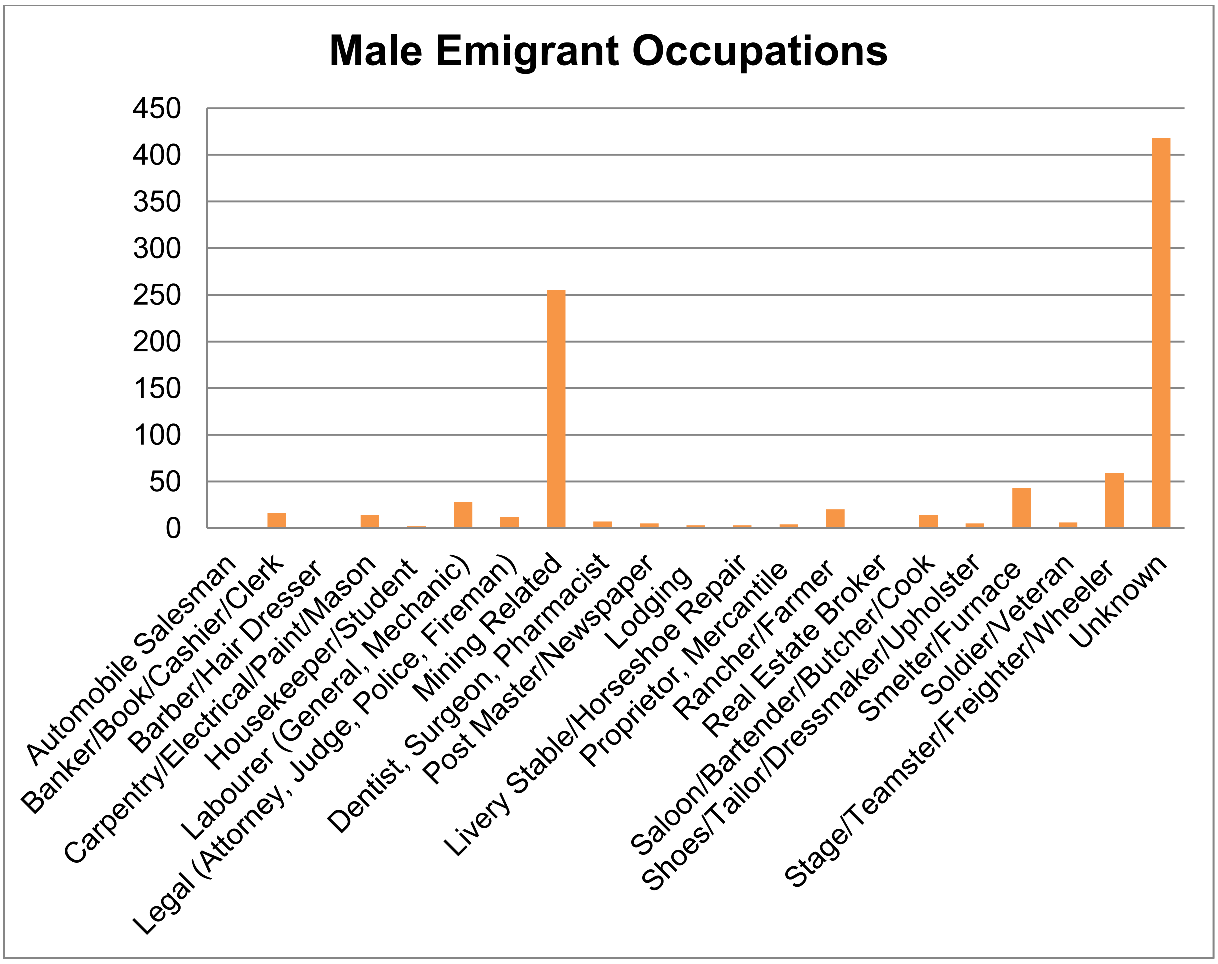

Figure 2-20. Male Emigrant Occupations in the San Francisco Mining District, 1880 to 1940

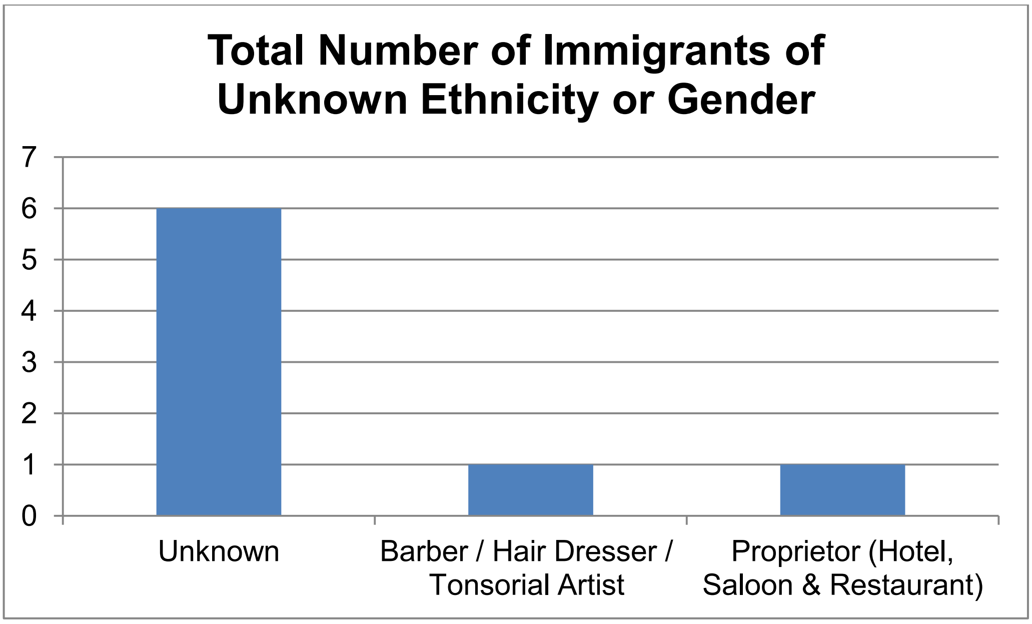

Figure 2-21. Immigrants of Unknown Ethnicity or Gender in the San Francisco Mining District

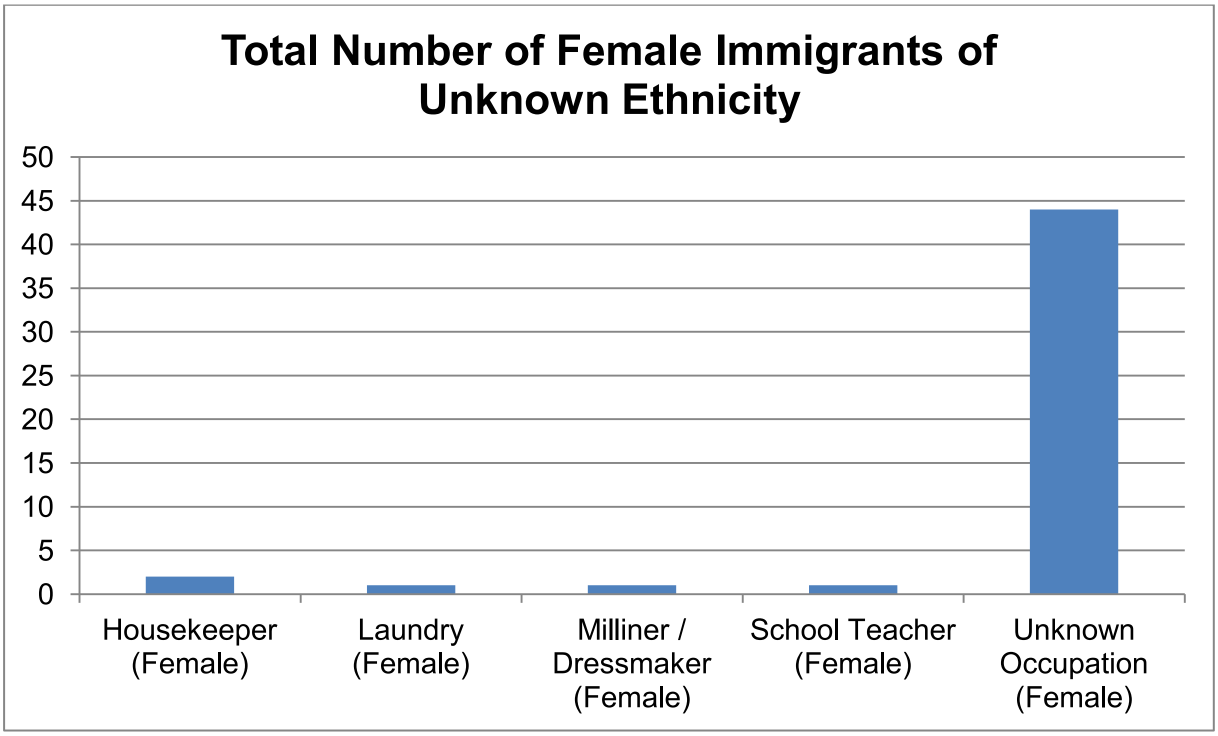

Figure 2-22. Female Immigrants of Unknown Ethnicity in the San Francisco Mining District

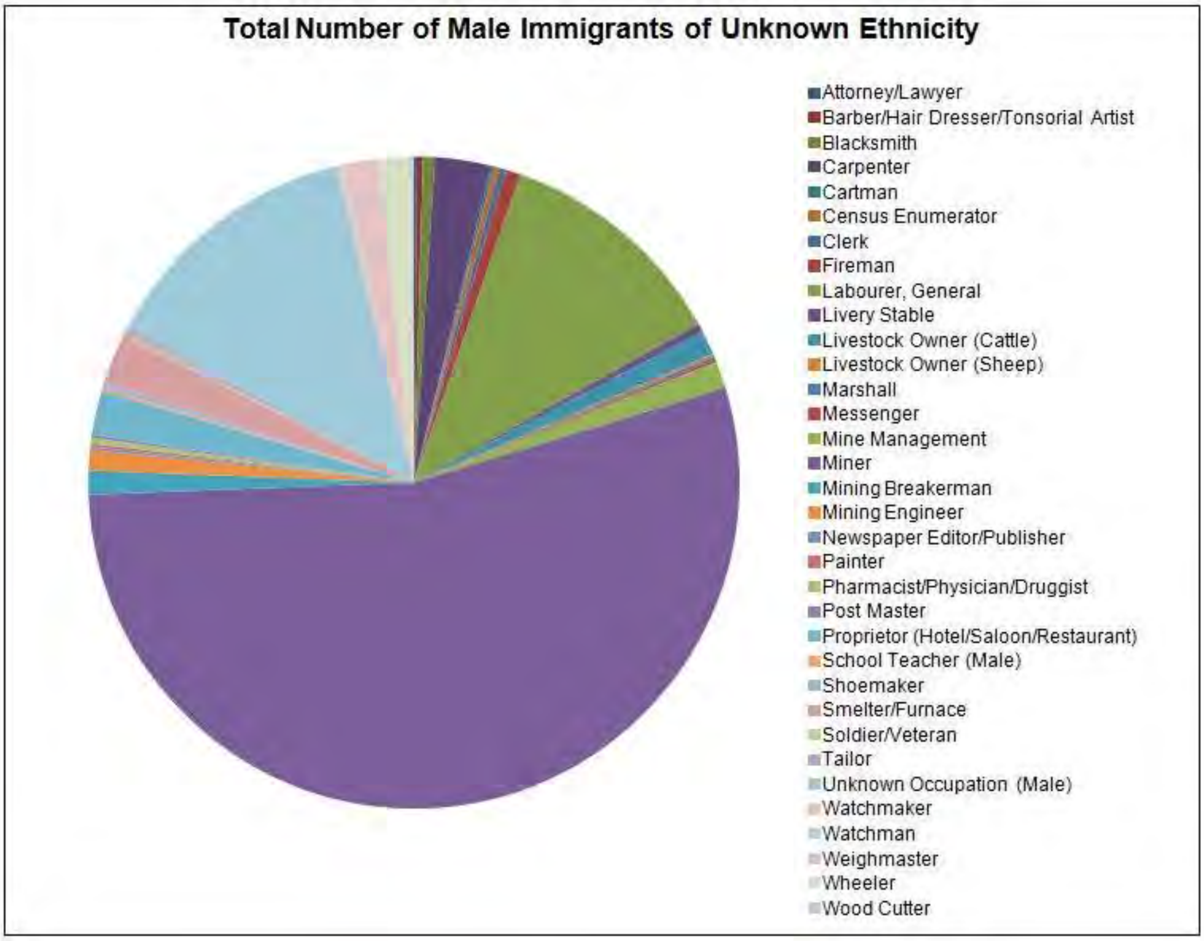

Figure 2-23. Male Immigrants of Unknown Ethnicity in the San Francisco Mining District

2.4 Summary

This chapter establishes the geographic, natural, and topographic setting for the HLC model. By identifying the initial environmental setting of the SFMD, a pattern for land use can be determined. The information aids in identifying features chronologically and physically along the landscape. Not only does this include an examination of the landscape itself, but the people who later settled the area as well.

Frederick Jackson Turner argued in his "Frontier Thesis" that the conquest of the Western US was complete by 1890, and based his theory on the history of white males. Little examination was made to other ethnicities or genders prior to the inception of the New Western History. The SFMD HLC challenges Turner's thesis in that the population included a multicultural background comprised of males, females and children (Figure 2-24; Appendix

D1). Although the composition of the population was dominated by white males, contributions were made by non-whites and females as evidenced by the historical record and artefacts. Further, the archival research indicates that while settlement had taken place from the 1870s within the SFMD boundaries, the year 1890 (and subsequent years) marked continued expansion and development within the area. The following chapters support this information by examining the mining activities, the development of the associated settlements, and the artefact composition of the archaeological sites that remain as footprints on the landscape.

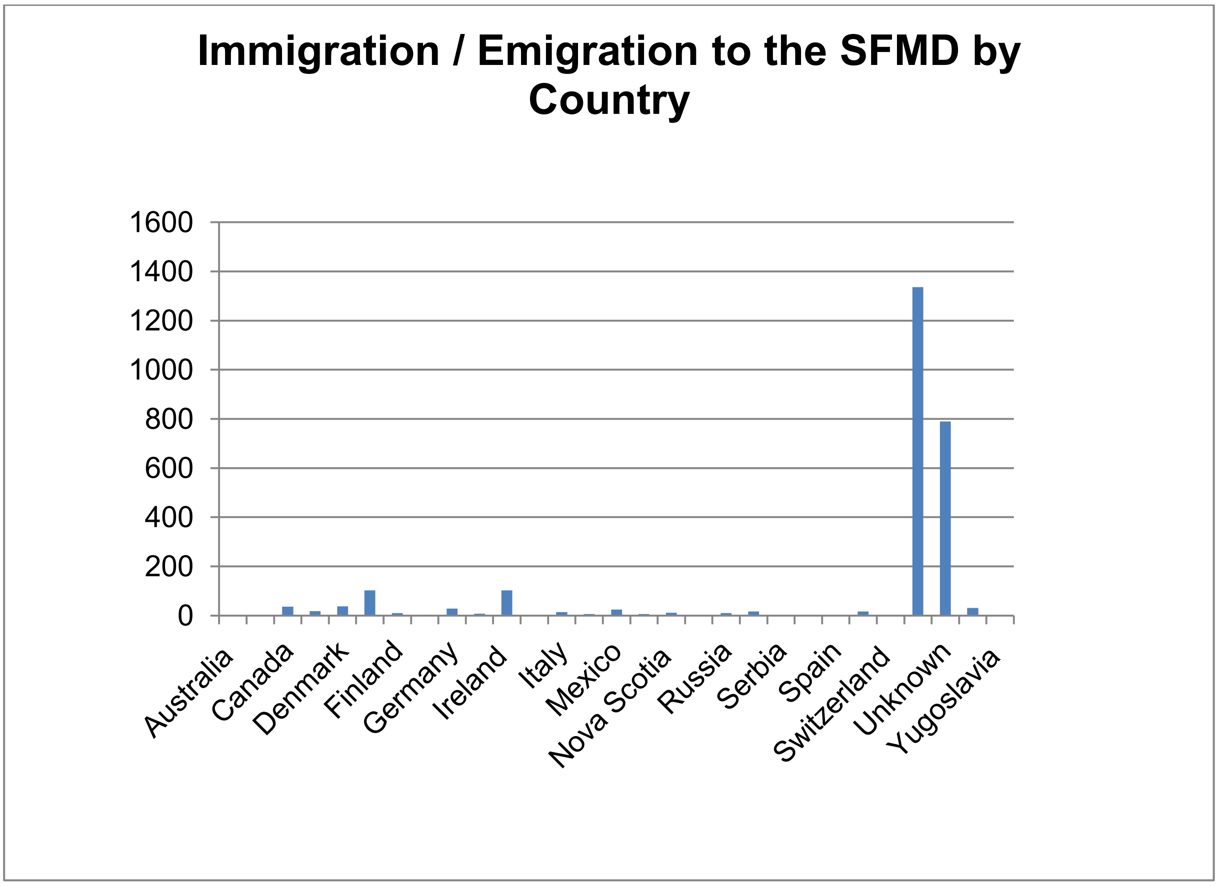

Figure 2-24. Immigrants and Emigrants to the SFMD between 1880 and 1920

3.0 MINING IN THE SAN FRANCISCO MINING DISTRICT

In order to identify areas for further study on the physical landscape, the HLC relied upon the development of a historic context. The archival research allowed for a chronological development of the SFMD that could be replicated through the GIS data (Chapter 4) and supported by the artefact assemblage (Chapter 5). The following chapter summaries the history of the SFMD, with an examination of early mining in the local area, including the claims, smelters, timbering operations, transportation and settlements.

The first metal mines in Beaver County were discovered as early as 1854 (Thompson/*Davis County Clipper*, 8 October 1937: 1). Miners arrived in the Star District at Shaunty[1] near Minersville, between 1872 and 1877 (Figure 3-1). Several prospectors set out for surrounding areas searching for rich minerals and soon discovered silver, copper, lead, zinc and gold 22.53 km [14 miles] to the north-northwest of Shaunty, in the San Francisco Mountains. Between 1871 and 1879, the SFMD formed, Horn Silver Mining Company (HSMC) organized, and by 1885, the community of Frisco was well-established along the southeast slope of the mountains (see Figure 3-1). Frisco likely was "the oldest mining town of the region," although a small 'suburb' comprised of miners developed on the southeastern slope of Grampian Hill under the community name of Grampian (Butler 1913: 18; Van Cott 1991) (see Figure 3-1).

Additional settlements were noted on the western slope of the mountains near the Cactus Mine by1870, with a smelter being constructed there by 1892; the Newhouse town site formed adjacent to the Cactus by 1900 (see Figure 3-1). Over the following twenty years, fifteen mining districts would be located in Beaver County (Thompson/*Davis County Clipper*, 8 October 1937: 1). Along with the mining and settlement came transportation networks

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1 Shauntie became a "hub" of the mining activity, including a smelter with running water, more than forty houses, a hotel, post office, saloons, and stores (Beaver County Recorder n.d., Brown 1996). In June 1875, fire burned the smelter to the ground and the following year, 1876, fire destroyed the town of Shaunty. Attempts to rebuild failed, the mineral veins proved shallow, and by 1877, most had played out.

including stage, rail and later, automobile; utilities such as water, telegraph, and electricity; and other activities including livestock (sheep and cattle) rearing. All of these activities contribute to the landscape of the SFMD.

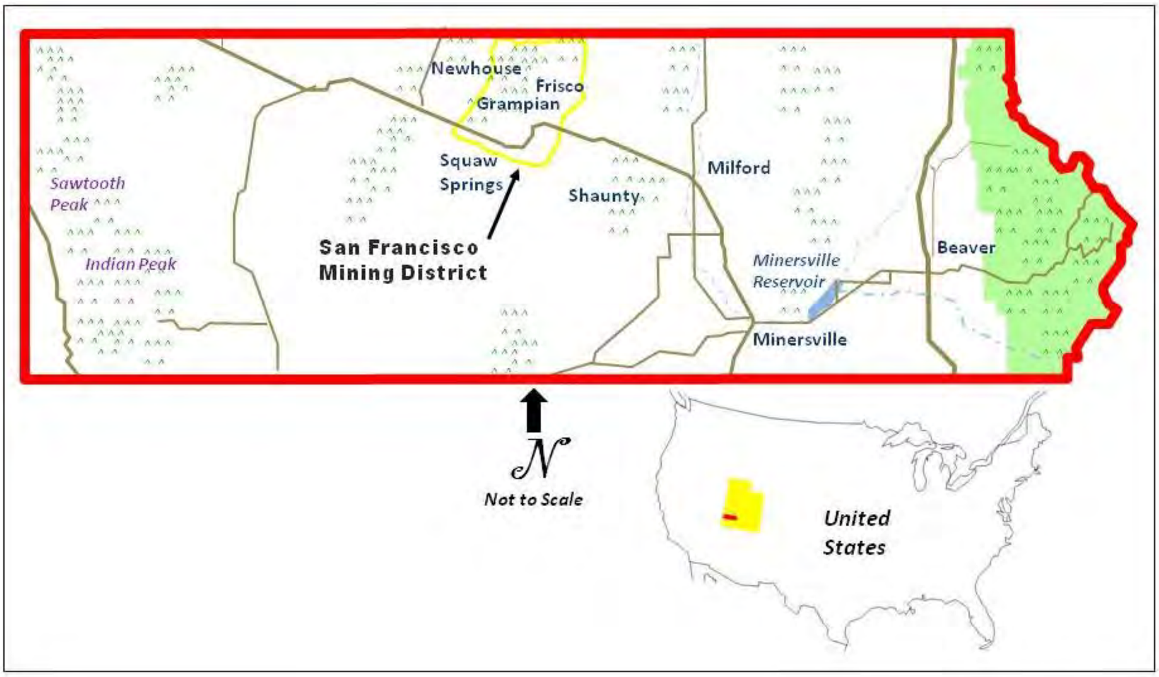

Figure 3-1. Location Map of Local Areas in Beaver County, Utah

3.1 Claim Names

More than 200 claims for mines and mill sites were made within the SFMD (Figure 3-2; Appendix D5). Typical of mining claims, prospectors in the SFMD used names for their discoveries that reflected optimism; ties to their homes, nature and celestial bodies; the politics of the day; or, as indicated by Young (1970: 31-32), “a profusion of imperial, monarchic and plutocratic names.” Helen Carson (1956:53) discusses the naming of claims in the contemporary Comstock Mining District [Comstock Lode] in Nevada.

> Traditional mine names on the Comstock fall into three broad classifications: names that were thought to be auspicious, that had a learned or classical [flavour], or that were of a homely nature. Auspicious names are of two types and denote either opulence or personal fortitude.

Carson (1956: 55, 57) refers to some of the naming strategies as “word magic” and “folk etymology,” which is applicable not only within the Comstock Mining District, but also within the SFMD. Other common names reflect the namesakes of the discoveries, optimism, or popularity with prospectors; Biblical traditions; patriotic places; imagination; or flamboyant humour. A few names described the location of the discovery, such as Crown Point. Examples of Carson's (1956) classifications can be applied to the SFMD (Table 3-1).

Prepared in 1878, a Beaver County cadastral map of Sections 13 and 24, in Township 27 South, Range 13 West (Accession No. 14428, Utah State Tax Commission, Butt 1878), depicts a small 2.59 km^2 [1 sq mile] area for Frisco, the locations of at least two US Mineral Monuments (USMMs), and identified seven claims (Table 3-2; see Appendix D5) within the SFMD. The surveyor name for the locations was illegible, but appears to read "Newel E. (or S.) Butt."

Table 3-1. Classification of Claim Names in the SFMD

Classification	Claim Names
Inspiration	Bonanza, Hope, Relief, Good Luck, Good Fortune, Goodhope, Dandy, Excelsior, Triumphant, Transcendent
Doubt	Humbug, Last Chance
Nature	Sego Lily, Scorpion
Celestial Bodies	Sun Beam, Sun Set, Comet, Neptune, Jupiter, Venus, Mars, Sun, Earth, Saturn
Places	Grampian, Dumbarton, Accrington, Antwerp, Florida
Politics	Uncle Sam, Congress, Independence, Lady Washington, Lady Franklin, Young American, Americus, Jay Hawker, George Dewey
Religion	King David, Absalom, Puritan, St. Stephen
Mythology	Hesperides
Criminals	Bandit, Little Dick, Belle Starr[2]

Table 3-2. Locations Identified in the SFMD

Lot Number	Mining Claim
37	Silveropolis
38	Horn Silver
38B	Horn Silver Mill Site
39A	Cactus Lode
39B	Cactus Mill Site
40	Grampian Smelter Mill Site
41	Frisco Mill Site

Source: Beaver County Surveyor's Map, 1878

2 The name Richard West refers to an individual who committed crime under the psuedoname "Little Dick." Interestingly, Richard West was a member of the Wild Bunch, associated with Butch Cassidy. Belle Star, also known as Myra Belle Shirley Reed Starr, was the claim filed by the Sackett family. Also interesting is one of Butch Cassidy's aliases was James Ryan, which coincidentially was the name of one of the discoverers of the Horn Silver claim.

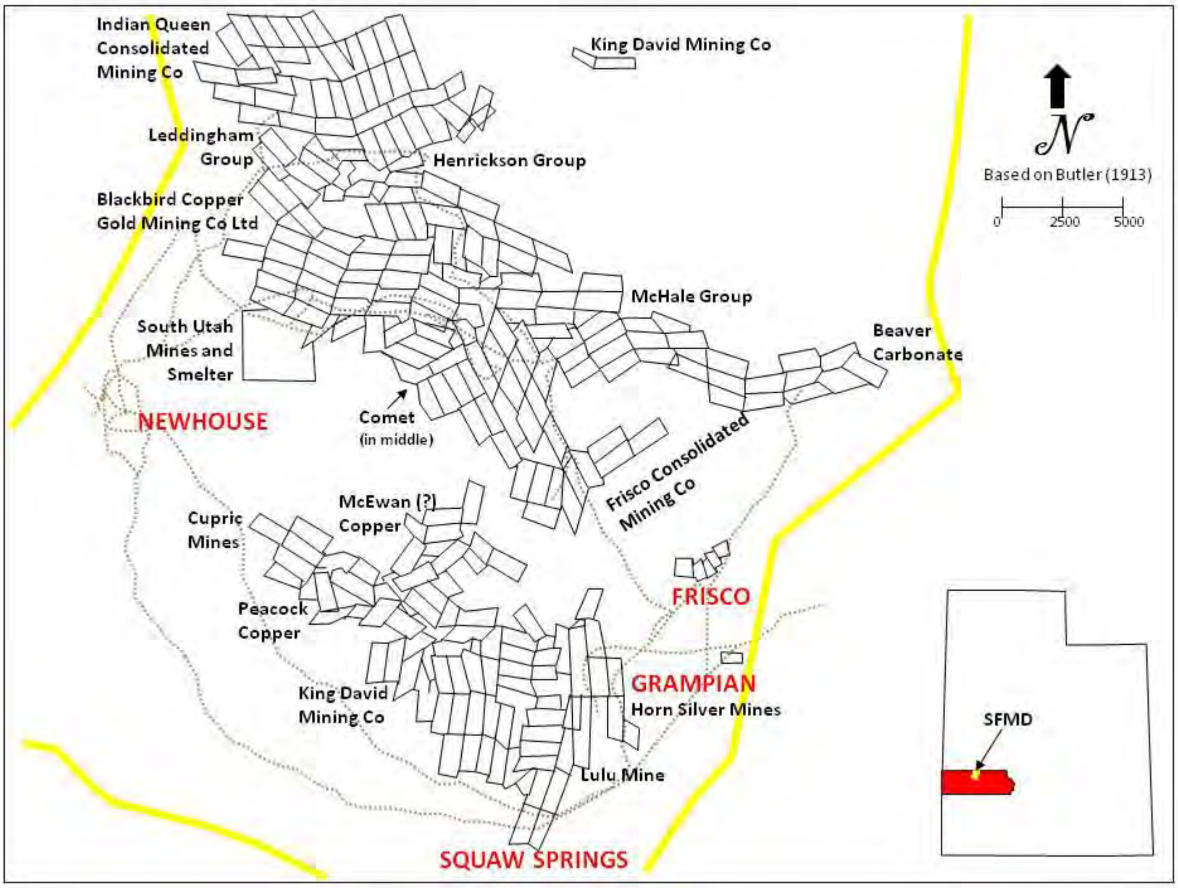

Figure 3-2. Claims of the SFMD (based on Butler 1913)

Several other mines are located within the SFMD boundaries (Hooker 1879; Emmons and Becker 1885: 470-471; Butler 1913: 187):

- *Makalola and Summitt* were worked irregularly and together produced 1,414 tons of ore with openings extending 259 m [850 ft]. A total of 1,814 tons were assayed, producing 75 ounces of silver and 55 percent lead.

- *Cerro Gordo and Minnesota Consolidated Silver Mining Company* claims comprised a small force of prospecting, resulting in ore assays of £25.55 to £31.93 [$40 to $50] [3] per ton, from an opening extending 244 m [800 ft].

- *Frisco Consolidated Silver Mining Company* claims included some prospecting, some openings extending 305 m [1,000 ft], with ore assayed as high as £127.72 [$200] per ton. It consists of a "large group of claims about 1-1/4 miles northwest of Frisco,"

3 All references in this document follow the current exchange rate between the US dollar (USD) and the British pound (GBP or £) is £1.00 = $1.503. The values do not take into account the rise in inflation from the 1870s to the present. Note that in terms of USD, $1.00 in 1871 would be the equivalent to $18.87 in 2012; likewise, £1.00 in 1871 would be the equivalent to £55 or £60 in 2012. These values have been accounted through studies such as that of Nico Colchester (1981) with regard to the value of the Mars Bar (Colchester 1981).

including the Frisco Contact mine and Kruse mine, a shaft sunk to a depth of 213 m [700 ft], a crosscut, and an incline shaft, all performed prior to 1909 (Butler 1913: 187).

- *Chicago and Frisco Consolidated Silver Mining Company* consisted of twelve locations with limited amounts of development.

- *Yellow Jacket* claim's opening extending 76 m [250 ft] to produce 10 tons of high-grade ore.

- *Comet Claim, Cactus, and the Copper Chief* all were copper mines. Additional information is provided in the following sections for both of the Comet and Cactus mines.

- Marble quarries are located at the south end of the SFMD, primarily in Marble and Loeber Gulches. Local stone was referred to as "Tintic white" and displayed at the World's Columbian Exposition (Chicago World's Fair) in Illinois (*The Deseret Weekly*, 17 September 1893). Further, several tombstones in the Milford, Minersville and Frisco cemeteries are produced from the local marble and the flooring in the Horn Silver (Atkin) hotel (Milford) was made from SFMD marble (Wray 2006: 310).

- Fire-stone quarries were located 4.02 km [2.5 miles] from Frisco.[4]

3.1.1 Silveropolis and the Imperial Mining Company

The Imperial Mining Company held the "Silveropolis" claim (Lot 37, see Table 3-1) and the associated Imperial claim. Silveropolis was one of the earliest claims surveyed for patent within the SFMD; USMM No. 1 is situated on the south side of this claim and serves as the initial patent survey reference monument within the SFMD for all mines. Silveropolis was never taken to patent; rather, by 1901, the Imperial Mining Company, successful in obtaining gold, copper and silver ore, consolidated Silveropolis into its holdings (Wray 2006: 309).

The Imperial Mining Company operated at Frisco as early as 1900 (*Deseret News*, 11 August 1900: 6; *Davis County Clipper*, 14 December 1900: 2). Colonel Ralph A. Hawkins filed for 25,000 shares of stock from the Imperial Mining Company (*Deseret News*, 11 August 1900: 6). Hawkins joined a partnership with A.B. Lewis and established the Imperial Copper Mining Company. Later that same year, an English miner residing in Frisco, George Anderson, fell in an incline shaft worked by the Imperial Mining Company, landing on an ore

---

4 Note there are several unrelated and unpatented claims filed with the SFMD under the name "Copperopolis."

bucket, breaking two ribs and receiving several bruises (*Davis County Clipper*, 14 December 1900: 2).

Between 1906 and 1907, the Imperial Mine made a large output of copper, gold and silver (Butler 1913: 182). The mine, situated at Loeber Gulch approximately 2.09 km [1.3 miles] northwest of the Horn Silver, included a tunnel driven along the contact, eastward, for a distance of 335.28 m [1,100 ft]; a winze, two adits, and several short crosscuts with winzes have been used for extraction of the ore. In 1907, another partner joined, Thomas W. Lawson, and the company reorganised as the Nevada-Utah Mines & Smelters Corporation.

In 1909, the Nevada-Utah Company published its financial statements in the *Salt Lake Herald* (20 July 1909: 8). Ernest R. Woolley served as President and General Manager; L.R. Loomis as the Vice-President and Manager, whilst Frederick F. Burgen served as the treasurer, and John W. Griggs and Herman Dowd served as directors (*Salt Lake Mining Review*, 30 June 1909: 18; *Salt Lake Mining Review*, 30 October 1910: 8). The statements listed among the Company's assets, the Imperial Gold and Copper Mining Company; Manhattan Copper and Gold Mining Company; the Manhattan mine and a plant at the Day Mine in Pioche; and offices in New York (*Salt Lake Mining Review*, 30 June 1907: 20; *Salt Lake Herald*, 20 July 1909: 8). The Nevada-Utah Company also held property in the West Mountain District in Utah and multiple properties in the Consolidated Pioche Mines Company and Jack Rabbit District of Nevada; among these included the 213.36 m [700 ft] Leschen aerial tramway, ore bins and 32.19 km [20-mile] private railway (*Salt Lake Mining Review*, 30 October 1910: 8). By 1910, the corporation filed for bankruptcy, reorganising as Consolidated Nevada-Utah (Wray 2006: 331). Additional adits, known as the Massachusetts and the Gulch were added to the property prior to 1913 (Wray 2006: 332). By the 1920s, work at the Imperial property was performed under a lease by the Manhattan Copper & Gold Company (Wray 2006: 359).

3.1.2 Horn Silver Mine

Initial discoveries began with the location of the Horn Silver ledge and ore body along Grampian Hill at a depth of 9.14 m [30 ft] by Samuel Hawks and James Ryan, in September 1875 (Wray 2006: 294).[5] Ryan and Hawkes identified an additional claim, the Horn Silver, along a trachyte ledge resembling a hay-cock atop Grampian Hill (Bancroft 1889: 744; Hickman 2006: 24; Bassett 2008: 12). Here, for the next six months, they worked the "old north shaft" 9.14 m [30 ft] deep into pure silver and lead ore (Hooker 1882; Wray 2006: 295; Hickman 2006: 26). In February 1876, Hawkes and Ryan hired H.W. Donalson as their agent; Donalson sold the claim for £16,589.26 [$25,000.00] to Allen Green Campbell, Matthew Cullen, Dennis Ryan and Augustus D. Byram. They subsequently formed Campbell, Cullen and Company (Wray 2006: 295; Arrington and Hinton 1966: 37-38; Hickman 2006: 32; Goodwin 1913; Bassett 2008: 7). Campbell subsequently organized the Horn Silver Company with partners Dennis Ryan, Philo Farnsworth, Matt Cullen, and Augustus Byram;[6] the Horn Silver Company also was known as Campbell, Cullen & Co.

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5 According to Hall Hickman (2006:23), the initial claim filed by Ryan and Hawkes [Hawke or Hawkes] is noted as the "New York Ledge" and extended 457.2 m [1500 ft] running north and south and 228.6 m [750 ft] running east west from the "New York Ledge," at an elevation of 1996.44 m [6550 ft]. Note, however, the New York Ledge is not listed among patented claims in the records of the Beaver County Recorder's Office. The Horn Silver Ledge included an ore body of chloragyrite or cerargyrite.

6 In 1880, Campbell campaigned for and briefly held the Utah delegate seat in the US House of Representatives. Matthew Cullen, a native of Ireland, first became involved in mining in 1875; he built and owned the Cullen Hotel in Salt Lake, Chicago's Gault House, the Salt Lake Brewing Company, and the Cullen Ice & Beverage Company before he died in 1918. Dennis Ryan, originally of Tipperary Ireland, moved to St. Paul, Minnesota; he later owned mines in Colorado, and constructed a smelter in Tacoma, Washington, in 1889. Augustus Byram was born in Kentucky, served as a member of the Kansas House of Representatives (1868), owned a freighting business with his brother Peter Byram, and invested in several mines; in the 1880s, he relocated to Chicago, Illinois. Philo Taylor [P.T.] Farnsworth (Jr.) at Frisco was the uncle of Philo Taylor Farnsworth of Beaver City, Utah, who is credited with inventing the television. P.T. Farnsworth (Jr.) and several additional family members, including Susan Jane Farnsworth, resided at Frisco. P.T. Farnsworth (Jr.) owned a private railroad car and often traveled between Frisco and Salt Lake City (Docia Lott Woolf 2002). According to Wray (2006: 436, f.19), "the name of 'Philo Taylor Farnsworth' was carried by more than one-half dozen men of the same general family line." Hickman (2006: 32) later notes that a portion of the stock of the Horn Silver Company was sold to Samuel Cooke of the Star Steamship line. No record of Cooke's association with the Horn Silver Company or the steamship industry has been located to date. Rather, Samuel Cunard was associated with the Cunard [steamship] Line (precursor to the Carnival Ship Line). Charles Gilbert Francklyn (i.e., namesake of the Francklyn Smelter) was son of Sarah Jane Cunard and Colonel Gilbert William Francklyn; he was a grandson of Samuel Cunard (*The New York Times*, 22 October 1887 and 15 July 1889; *Deseret News*, 16 April 1879:4).

A claim filed for the Horn Silver Claim (Survey No. 2) was patented 9 July 1877, with a shaft extending 58 m [190 ft] deep, and an additional shaft extending 30 m [100 ft] deep with lesser workings (Beaver County Records, Book 76: 215). The Horn Silver Company expanded the Horn Silver No. 1 Mine, or “New” Shaft to three levels, including a horse [donkey]-drawn whim or winze at the top, with a single cage comprised of a wooden barrel that served for hoisting the ore (Figure 3-3). These workings were covered with “Sloping roof-boards” described by Wray (2006: 296, f. 6) as “the shanty cover[ing] the vertical ‘working shaft.’” Major Harry C. Hill directed the mine operations and served as the Superintendent of the Horn Silver Mine (Hickman 2006: 34). Both the old shaft and ‘main’ [new] shaft are depicted in the transverse sections by Butler (1913, Plate XXX).

Between 1877 and 1879, Campbell, Cullen & Co. listed among their assets the patent for the Horn Silver claim (Lot 38A), “two 5-acre [2.92 hectare] patented smelter sites at Frisco, a three-stack smelter, a 40-mile [64.37 km] telegraph line to Beaver, and other property.”

Figure 3-3. Horn Silver Mine, 1879 (Wray 2006: 296, f.6)

The property included the charcoal kilns, two large stores in Frisco, several iron flux mines near Frisco, refining works in Chicago, Illinois, and some other unidentified property (Wray 2006: 296, see also Butler 1913: 111, 164; Butt 1878, Emmons and Becker 1885: 464). Shortly thereafter, Campbell and others sold the mine to the Horn Silver Mining Company, Inc., in New York[7] for £3,317,851.53 [$5 million] (*Deseret News*, 16 April 1879: 4; Hickman 2006: 32; Goodwin 1913: 289-290). Charles G. Francklyn served as the President, whilst Frank G. Brown was Vice President and William T. Hoyt served as secretary (*Deseret News*, 16 April 1879: 4).

In March 1878, two similar reports were prepared by W.A. Hooker and Henry Cummins for the Horn Silver property (Emmons and Becker 1885: 464). Both described the claim as extending a width of 12 to 18 m [40 to 60 ft], with galena throughout the claim and beyond; and thence from the claim, the ore dipped eastward into a wall of quartzites, dolomites, and what was described as "partially decomposed trachytic material" (Hooker 1879). Hooker (1879) describes the vein as "silver-bearing from wall to wall." The same year, *US Annual Mining Review and Stock Ledger* reported that the Horn Silver was the "richest silver mine being worked" at that time. Hooker (1879) provides one of the earliest topographic and mineralogical descriptions for the interior of the Horn Silver mine to the fifth level, especially before the 1885 collapse:

> The vein is traceable for about 2 miles [3.22 km] from the southeastern end of the Grampian [M]ountain to the point where the dolomites give place to granite... Six locations have been made within these limits, but no extensive or valuable body of ore has as yet been found, except within the lines of the Horn-Silver claim, although comparatively little work has been done upon the others. In addition to these is a claim called the Grampian, adjoining the Horn-Silver on the west, an earlier location upon a vein in the lime rock, from which valuable ore has been taken.
>
> The principal working shaft is near the [centre] of the claim, at the discovery... The old shaft lies 145 feet [44.20 m] to the northward of the working shaft. It was continued down to the line of the second level and connected with it by a drift. The length of the old shaft is 100 feet 7 inches [30.66 m], the surface being higher here than at the working shaft, and if the depth of the fifth level be measured through the former it will

7 The amount of the transaction varies by sources. Hickman (2006: 32) and Goodwin (1913: 289-290) indicate the company sold for £3,317,851.53 [$5 million]. According to the *Deseret News* (16 April 1879: 4), it sold for £6,500,661.16 [$10,000,000.00].

show a gain of 26 feet 11 inches [8.20 m], or a total depth of 282 feet [85.95 m] (Hooker 1879).

The ore thus far removed has been taken from between the first and third levels (the lower levels having been driven merely to explore the vein), and the space thus left vacant has been timbered up securely by 12-inch [30.48 cm] timbers in square sets 5 feet [1.52 m] by 5 feet 8 inches [1.72 m], [centre to centre], and 6 feet 10 inches [2.08 m] high, except the track floors, which are 7 feet 2 inches [2.18 m] in height...(Hooker 1879)...

The second level is 73 feet 8 inches [22.45 m] from the track at surface... This connects with the old shaft, and at the end of the drift a winze connects with the third level...

The third level is 113 feet 6 inches [34.59 m] from the surface at the working shaft... A commodious station is built here, 16 feet [4.87 m] by 20 [feet] [6.10 m] and 12 feet [3.66 m] high...

The fourth level is 204 feet 9 inches [62.41 m] below the surface at the working shaft. Fourteen sets of timbers have been placed in the south end of the level; the rest consists of irregular galleries, all in [sparry] ore... From the fact that a small amount of it – about 100 tons – was treated in the leaching works in Frisco, it has been designated at the mine as leaching ore. It carries a very fair amount of silver...

How extensive this deposit is cannot be determined without further exploration...

According to Emmons and Becker (1885: 468), hoisting works at the Horn Silver,

...consisted of two horizontal engines of about 70-horse power. They were coupled by a clutch, or worked independently. The two boilers were of 60 horse-power, and of the Babcock & Wilcox pattern. Sheaves 40 feet [12.19 m] high, a flat steel-wire cable, 8½ inches [21.59 cm] by ½-inch [1.27 cm] in section, cages, and safeties were used. The machinery was supposed to be capable of sinking 1,200 feet [365.76 m]. A great cave into some of the stopes below has occurred, leaving a crater-like opening on the surface 40 by 70 by 25 feet [12.19 by 21.34 by 7.62 m]. The force employed during the census year was about forty miners (10-hour shifts), at $3.50 [£2.24], and fifteen other workmen (Emmons and Becker 1885: 468).

In addition to his map and report, Hooker (1879) provides one of the earliest colour illustrations of the Horn Silver Mine (Figure 3-4). The illustration depicts the "new shaft," "ore bins," at least one structure, and a horse-drawn wagon of sorts. Several trees dot the landscape in this illustration, indicating that the landscape has been modified – or at least denuded of large trees, presumably for use in the charcoal kilns and shafts (Hooker 1879).

By August 1880, US Census reports described the Horn Silver property as consisting of the refinery at Chicago, iron flux mines at Frisco, the charcoal kilns, and "the Horn-Silver claim, 1,440 by 600 feet [439 by 183 m], patented; two 5-acre [2.02 hectare] smelter sites in the town of Frisco, also patented; a complete three-stack smelting plant;... a 40-mile [64.37 m] telegraph line to Beaver; two large stores in Frisco; and other minor property" (Emmons and Becker 1885: 464). The following year, the Horn Silver shaft had reached a depth of 138 m [453 ft] (*Southern Utonian* 19 November 1881). Campbell, Cullen & Co., dug one shaft of the Horn Silver claim to a depth of 79 m [260 ft] (*Southern Utonian,* 26 November 1881).

Figure 3-4. Lithograph Depicting the Horn Silver Mine (Hooker 1879)

Conflicting newspaper accounts between the spring and summer of 1882 give an indication of the slow work and wealth at the Horn Silver. In April 1882, the *Southern Utonian* reported "the Horn Silver is not sinking below the 500 foot [152 m] level at present on account of not having enough boiler capacity or sufficient cable to sink deeper" (*Southern Utonian*, 8 April 1881). Just a few months later, the workings were touted as the 'largest mine on earth' (*Southern Utonian,* 3 June 1882). Between 1876 and 1885, the mine had produced more than 193,000 short tons of ore, and nearly 8 million troy ounces of silver (Bassett 2008: 7). From January 1 to August 4, 1882, the Horn Silver Mine produced more silver than any other mine in the world (*Daily Tribune*, 4 August 1882) and the shaft had been opened to depths of 500 feet, containing approximately £9,000,000.00 [$6,000,000.00] worth of silver and lead from decomposed argentiferous galena (Bancroft 1889: 745). The Frisco Mining and Smelting Company processed the ore and also owned the Carbonate Mine, the Dave Mine, Bigelow Mine, and other locations along the Granite Range in Utah, along with a large tract in Osceola County, Nevada (Bancroft 1889: 745).

Unusual weather conditions led to a cave-in at the Horn Silver on 12 February 1885. The collapse occurred from the surface down to the 700 foot [213 m] level. Newspapers, quoting Manager Hill, provide details of the collapse:

> The long dreaded and expected [cave-in at] the mine came last night, fortunately burying no one. What damage it has done I cannot yet tell. I refuse to allow any one upon the levels where any loose ground is.
>
> The surface ground has been working all along. The snow and rain storms have helped it, and last night at midnight the surface settled, and the jar or concussion caused a cave[-in] on the sixth level and so shook up things that the shaft has pinched the cages fast.
>
> I find the seventh level all right this morning, and the damage may not be very great, but I can tell nothing at all about it. When things settle we will examine and see what we can do, but we have had so much trouble from the broken and caving surfaces, and it is so difficult and expensive to do anything in our soft hanging walls, that I may decide to abandon this shaft and discontinue hoisting ore until we can get up bins and arrange to take it out of shaft No. 1. I have spent too much money trying to hold up this shaft already.
>
> The engine and gallows frame have not suffered at all. The boilers have settled, not enough, however, to break the steam pipes. No damage whatever about the new shaft or new machinery (*Deseret News*, 18 February 1885: 9).

Due to the collapse, the mine decreased in prosperity (Butler *et al.* 1920: 503). Additional cave-ins occurred in 1900, preventing access to the 900 ft level, with intermittent exploration on the 1,100 ft [335.28 m] and 1,200 ft [365.76 m] levels (Wray 2006: 338). The *Southern Utonian* kept up with the activities following the collapse: "A new shaft [Horn Silver No. 2 and crosscuts] is being sunk at the Horn Silver with a view of getting at the ore under the cave. Shall they be successful in the undertaking an immense reward awaits them" (*Southern Utonian*, 1 February 1889; Bassett 2008). As a result of the work required to reach the workings, the mine closed for approximately a year. The HSMC and media attributed the closure to a variety of reasons:

> The [HSMC], have been compelled to 'lay off' part of their working force, owing to scarcity of water. We understand it is their intention to sink their large well deeper, and [endeavour] to secure a better supply from that source. And as soon as the necessary supply can be obtained a larger force of men will be puts on and everything will be rushing again in Frisco (*Southern Utonian*, 17 January 1896).

Despite the collapse and layoffs, work continued. By March 1891, the Horn Silver sought to hire an additional fifty miners (*Southern Utonian*, 3 March 1891: 4). In November 1893, a total of 112 men were employed by the HSMC, with some work within the collapsed shaft (*Manti Messenger*, 17 November 1893:1). In 1899, the *Deseret News* (27 November 1899: 6) reported that the "Horn Silver [was] looking well." At that time and by 1900, the HSMC encompassed 13 claims from Squaw Springs at the south, northward to the Dumbarton [Dumb Barton] claim (Lot 73), and the majority of the Horn Silver fault (Wray 2006: 303). A vein at the 1,100 ft [335 m] level was tapped and plans were made to enlarge the smelter. In 1901, the HSMC reported a total capital of £6,500,661.16 and £3,438,849.75 [$10,000,000 and $5,290,000] in total dividends (Union Pacific 1901: 22). P.T. Farnsworth served as the mine manager in 1902 and indicated there were still large quantities of ore in the Horn Silver Mine.[8]

Between 1901 and 1908, the King David Mining Company (KDMC) located a block of 23 claims (M.S. 5921), which they filed on 17 April 1909 (Beaver County Records, Book 258: 207); the KDMC also filed claims for 29 other properties in August 1909 (M.S. 5986) (Beaver County Records, Book 260: 119; Book 263: 209). Wray (2006: 347) indicates that the KDMC properties included 60 claims to the south of the Horn Silver Mine. In August 1909, none of the claims had any improvements (Beaver County Records, Book 260: 119; Book 263: 209).

8 At that same time in 1902, Allan C. Washington was the president of the company, whilst Juan M. Ceballos served as vice-president, and Ambrose I. Harrison served as Secretary and Treasurer (Wray 2006: 338). In 1907, Washington stepped down as president, being replaced by Harrison. Ceballos assumed duties as treasurer, before being appointed as president in 1910. In 1908, M.C. Morris replaced Farnsworth as mine manager. In 1912, B.B. Lawrence served as the company's consulting engineer, and Price Waterhouse & Co., served as auditors (Wray 2006: 339).

Incorporating in the summer of 1908, the KDMC included a steam plant, a compressor hoist, and a water supply (via Morehouse Spring) (Butler 1913: 184). In 1909, the company focused efforts on a shaft just northwest of the Horn Silver and a tunnel in the Grampian claim. A double-compartment shaft was sunk to 440 ft [134 m], with exploration along the 200 and 300 ft [61-91 m] levels; a three-compartment shaft was placed northwest of the Horn Silver No. 2 shaft and reached the 300 ft [91 m] level by 1908. Crosscutting was performed along the 200 and 300 ft [61-91 m] levels. By 1909, after securing water from the Morehouse Spring, the KDMC was able to drive a shaft to 816 ft [248.72 m] (Wray 2006: 347). Present at the King David location in 2012 are a headframe, ore bins, and additional surface improvements.

Between 1928 and 1933, E.A. Hewitt, Albert E. Kipps, and R. T. Walker extensively mapped the Horn Silver, King David and Cactus mines; based on these maps, a decision was made to sink the new King David shaft (Drum Shaft) in 1932 (Wray 2006: 349, 357). The Drum Shaft included a headframe with a double-drum hoist and a surface plant comprised of galvanized iron structures lined with Celotex [fibreboard] (Wray 2006: 357). Additional crosscutting and tunnelling led the KDMC holdings to the Washington No. 6 claim (Cupric Mines Company), in the Cactus stock granodiorite, and very near the Frisco Silver Lead Mining Company's Jennie Fraction and Humbug claims (Wray 2006: 358). In 1933, the KDMC holdings included 62 patented claims over 369.07 hectares [912 acres] (Wray 2006: 356).

The Horn Silver produced another large strike in 1908 on the 700 ft [213 m] level along a face of high grade silver (*Southern Utonian*, 6 March 1908). Local newspapers continued to tout the lucrative nature of the Horn Silver, Frisco Contact, Cactus, and Lulu mines in the SFMD throughout the year (*Southern Utonian*, 6 March 1908; *Southern Utonian*, 28 August 1908).

The Frisco Contact mine, commenced by and expanded after 1900, was 2.41 km [1.5 miles] north of the Horn Silver, adjacent to the Northwest Corner Canyon drainage (Wray

2006: 308). Rohlfing (1901) depicts these workings as "New Shaft." Wray (2006: 308) offers additional descriptions of the Frisco Contact mine:

> The old two-compartment shaft, with caved timber collar, is still visible, [along] with some stone building foundations, but little else remains from the original surface plant. The elevation of the collar is 2.14 km [7021.8 ft]. The shaft is located near the southwest end line of the Scorpion patented claim [MS 5199]. As of 1900, this mine and nearby claims were controlled by the Frisco Contact Mining Company (Rohlfing 1901 [as cited by Wray 2006: 308]).

By 1911, fifty men were hired to work the zinc ore at the Horn Silver (*Southern Utonian*, 8 September 1911). A contract was let between the HSMC and the International Smelting Company of Tooele to handle the vast zinc ore bodies (*Southern Utonian*, 8 September 1911). Work continued, but in 1912, faced a minor setback following a cave-in, which required more than £28,739.36 [$45,000.00] worth of repairs to the Main Shaft and older timbering from the 900 ft [274 m] level to the 1100 ft [335 m] level (Wray 2006: 340).

In May 1916, the HSMC patented two claims that had been located in October 1908 (M.S. 6356). Between 1916 and 1918, the Peck Mill reworked the Horn Silver tailings (Wray 2006: 341). In 1918, the Horn Silver advertised several positions in local newspapers, offering room and board as incentives (*Beaver City Press*, 25 October 1918: 8) (Figure 3-5).

Between 1921 and 1928, tailings and milling ore were shipped to mills in Midvale and elsewhere in Utah (Wray 2006: 349). Also, whilst the mine was owned by the HSMC, actual work was performed by leasers (Wray 2006: 349). C. N. Gerry (1928) noted that "by the end of 1927, 'practically all the slag and old tailings from this old producer have been disposed of,' but little underground work was done in the mine" (see Wray 2006: 349). Utah newspapers indicate that work continued; the *Davis County Clipper* (29 August 1930: 9) reported a high value of gold ore being located in the 300 level [91.44 m] of the Horn Silver. At that time, the newspaper referred to the mine as being owned by the Tintic Lead Company[9].

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9 By the 1930s, the US, including Beaver County, Utah, were in the midst of the Great Depression. From the 1930s and 1940s, the majority of the SFMD claims came under the auspices of four primary companies: (1) The Tintic Lead Company; (2) the KDMC; (3) the Frisco Silver Lead Mining Company;

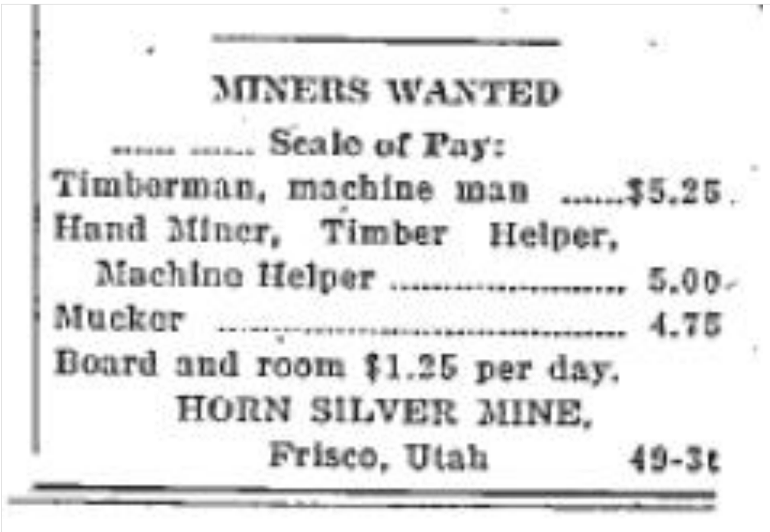

Figure 3-5. Advertisement for Employment with the Horn Silver Mine (*Beaver City Press*, 25 October 1918: 8)[10]

Between 1928 and 1931, mine manager Albert E. Kipps, E.A. Hewitt and geologist R. T. Walker “mapped the old workings, rehabilitated the mine as much as practicable, and constructed in detailed plan, cross and longitudinal sections” (Wray 2006: 349). The mine operated only a portion of that year before economic depression forced closure (Wray 2006: 352). In May 1932, the Tintic Lead Company reorganized into a new corporation known as the HSMC, although Tintic continued to trade on the Salt Lake Stock Exchange until 1939 (Wray 2006: 353).

In March 1940, the HSMC sank a new triple compartment Morrison shaft on the south end of the original mine. The original shaft “was confined to a small area, less than an acre of

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and (4) the Cupric Mines Company (Wray 2006: 348). The Tintic Lead Company owned the Horn Silver mine, several adjacent claims, and the Frisco town site. The Frisco Silver Lead Mining Company held the Peacock Copper Consolidated Mining Company property. The Cupric Mines Company owned a variety of claims south of the Cupric claims and east toward the Washington claim. The KDMC holdings remain the same as in 1908. The only small claims still left to private ownership appear to be those of the Imperial claim group (Wray 2006: 348). On the west side of the San Francisco Mountains was the Cactus holdings, including the Copperopolis, Anaconda, Mascot, Jinney, Blackbird group, New Years, the Cactus and the Cactus extension. North and east of the Cactus were the Beaver Carbonate group, including the Quadmetals mine. By the end of World War II, the Tintic Lead Company had acquired the Cupric Mines Company and Frisco Silver Lead Mining Company, and the Buckhorn-Boundary claims. Cupric Mines Company acquired the Cactus Extension, the New Years claims and most of the Cactus stock, except for the Comet claim (Wray 2006: 372).

10 Note the equivalent rates would be: £3.32 [$5.25], £3.16 [$5.00], £3.01 [$4.75], and £0.79 [$1.25].

ground and has been productive intermittently for over 50 years. The original ore body was found on the surface with little prospecting and was mined to a depth of 700 feet [213.36 m]." In 1940, it was anticipated that the Morrison shaft would need to be dug "several hundred feet before the proper geological horizons for replacement of ore will be reached" (*Kane County Standard*, 1 March 1940). By July 1943, the railroad tracks were removed and mine operations relied upon other means to transport ore to mills. One of the last shipments of gold-silver ore left Frisco for the Garfield smelter in May 1943 (Wray 2006: 363).

In September 1945, crosscuts by Metal Producers (Los Angeles, California) joined the KDMC and the HSMC. The connection was made at the 800 ft [243.84 m] level of the King David and at the intermediate 650 ft [198 m] level of the Horn Silver, at an elevation of 1820 m [5911 ft] (Wray 2006: 364). A new headframe was erected at the King David, along with ore bins and a vertical winze within the 650 ft [198 m] level. This allowed for further exploration to the 1,000 ft level [304.8 m], as well as rehabilitation in the existing workings of both mines (Wray 2006: 364). Metal Producers constructed a 500 ton gravity-feed flotation mill east of the Horn Silver, in Big Wash[11] by 1948 at a cost of £191,595.71 [$300,000.00] and employed approximately 25 men (*Kane County Standard*, 5 March 1948). From there, concentrates were shipped to smelters near Salt Lake (Wray 2006: 365). Metal Producers was affiliated with the mines until 1956 when their lease terminated and the company dissolved (Wray 2006: 365).

By the early 1960s, two affiliated companies, Horn Silver Mines Company (HSMC III) and Tintic Lead Company, held title to the SFMD. In 1969, Tintic Lead Company changed its name to Tintic Mineral Resources, Inc. (TMR) (Wray 2006: 374).[12] Several small companies and individuals continued to work leases within the SFMD, including Peter S. Martin of

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11 The Metal Producers Mill is situated along the north side of Highway 21, between Frisco and Milford.

12 The SFMD included 244 patented mining claims including the Horn Silver mine, the Cactus mine and adjoining properties west and north of the Horn Silver mine, aggregating about 1659.22 hectares [4100 acres].

Milford, who worked Horn Silver ore dumps in 1957; Herman and George Heinecke who worked leases from November 1958 to 1960 (Wray 2006: 374). But in 1964, Page Blakemore[13] organized agreements with HSMC III and TMR, as well as forming two additional mining companies – Plata Verde Mining Company and Cobre Mining Company – to conduct exploratory and developmental work in the SFMD and the Rocky District.

Additional leasees joined the workings:

- Bellevue Mines (1964-1966);
- McMoRan Exploration (1967/1969) which included ties to Art Linkletter and son (Jack);
- Robert A. Hunt (1969-1977);
- Horn Silver Mines, Inc. (1971, July 1974, 1993-1994, 1997)[14];
- Freeport Minerals Company (1982) – including Freeport-McMoRan Inc., and Hunt, Ware and Proffett;
- Arapahoe Mining Corporation of Vancouver, British Columbia (1988-1992)[15];
- Great Basin Exploration and Mining Co., Inc. (1992)[16];

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13 Page Preston Blakemore worked as an engineering and geologist for the USGS and Georgia Bureau of Mines. Blakemore had been a speculator of uranium deposits, but developed an interest in the SFMD. In 1964, Blakemore invested in the HSMC III and TMR venture to conduct exploratory work on the Horn Silver. Within two years, Blakemore assumed position as executive vice-president of TMR (1966-1969) and subsequently served as president of TMR (1969-1977). Additionally, he held the following positions President (1956), Cameron Mining Company; President (1970) Constitution Petroleum Inc.; President (1970), Basin and Range Exploration Company; President (1988) Basin and Range International Exploration, Ltd.; Vice-President (1991), Con-Coyle Oil Field Tool Company and Director of Alta United Mines Company. In 1971, Blakemore formed the Horn Silver Mines, Inc. (HSM), holding more shares than any other officers or directors; he served as vice-president/director (1971-1984), and President/Treasurer (1984-1997). Currently John Bogdanich served as the president of HSM.

14 HSM, under two contracts, operated and mined the old Horn Silver Mine properties from Cameron Mining Company in June 1974. Later that same year, they purchased the milling equipment and leased the patented mill site from TMR and the rights to make a crosscut at the 800 ft level of the King David to access lower levels of the Horn Silver, which had been owned by TMR (60%) and Wangenheim and Wanger (40%). In 1989, HSM acquired one-half interest in the Imperial Mine (seven patented claims over 42.49 hectares [105 acres]) and adjacent mining claims, located 200 new claims, amounting to 1618.75 hectares [4,000 acres]. The following year, HSM located 25 new claims (500 acres) contiguous to the HSM property. Between 1989 and 1990, HSM owned more than 3480.31 hectares [8600 acres], but abandoned 230 unpatented claims in 1993; their properties continued to total 2428.12 hectares [6,000 acres]. In 1993-1994, HSM conducted exploratory work on the HSM properties and along Loeber Gulch. HSM continued work on the King David in 1997; Dotson and PAB assisted with this work, rehabilitating the surface work adjacent to the headframe at the King David. Additionally, HSM operated mines in Nevada and Oklahoma.

15 Araphaoe Mining Company prepared new maps, roads, and conducted preparations for the drilling sites; performed test trenches and geophysical exploration/sampling at the Washington-Double Barrel Tunnel and Imperial Mine.

16 Great Basin Exploration and Mining Company, Inc., prepared core analysis of the HSM properties.

- Crown Resources Corporation (1992)[17];
- Dotson Exploration Company (1993-1994);
- Centurion Mines Corporation (1995-1996);
- PAB Oil & Mining Inc (1996-1997)[18];
- World Hydrocarbons Inc., and Minerals Processing Inc. (1997); and
- Franconia Minerals Corporation (1999-2003).

3.1.3 Grampian Mine

The Grampian Mine was "the first discovery of any magnitude on Grampian Hill, and pre-dated discovery of the much more notable Horn Silver deposit" (Wray 2006: 309). Situated in dolomite, southwest and slightly uphill from the Horn Silver, it was first located on August 15, 1871 and included a tunnel, shaft, minor timbering, and an incline with a windlass. It is unclear if the "Grampian Ledge and Company Claim" (Survey No. 15) is the same described by Hooker (1879) as the "Grampian prospect" (Emmons and Becker 1885: 469). By March 1880, the mine was sold to the Grampian Silver Mining Company of Chicago. The patent, filed December 11, 1880, for the Grampian Ledge and Company Claim also references a cabin – still visible in 2006 – measuring 5.48 by 5.48 m [18 by 18 ft] in dimension (Beaver County Records, Book 87: 281). Silver and gold ore were extracted from the surface and to depths of 24.38 m [80 ft], comprising 0.31 to 2.44 m [1 to 8 ft] of ore (Hooker 1879; Emmons and Becker 1885: 469; Butler 1913: 113). Hooker (1879) estimated the cuttings at amounting to 157 m [515 ft], with less than 200 tons of ore being shipped for smelting.

3.1.4 Cactus Mine

The Cactus Mine was "perhaps the first significant mineral deposit discovered in the district, and due to its location was probably found by one or more prospectors entering the district from the west" (Wray 2006: 307). It is readily visible due to its prominent green-copper stained outcrop at the base of Cactus Canyon, or Copper Gulch.

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17 Crown Resources Corporation focused on work in Loeber Gulch.

18 PAB rehabilitated the HSM headframe and shaft, installed a double drum hoist, installed piping for water and compressed air, retimbered 198 m [650 ft] of the haulage level, and replaced underground tracks.

Originally owned by the South Utah Mines & Smelters Company, the Cactus mine is situated on the western flank of the San Francisco Mountains at an elevation of 1966 m [6,450 ft] (Butler 1913: 172). Claimed in 1870[19], the mine was worked by several different companies between 1870 and 1900, including a Paris-based French company. A small smelter (identified by a single beehive charcoal kiln) was erected in Copper Gulch by 1892 to work the ore, but was closed shortly thereafter.

Between 1896 and 1905, the Cactus began construction and operation of an 800-ton concentrating mill, a steam plant, a compressor, trolley road, and hoists; electric power provided by Beaver River Power Company, replaced the steam plant (Butler 1913: 172; Wray 2006: 308). New concentration works were erected at the Cactus Mine near Frisco (*Southern Utonian,* 18 May 1883). Plans of the mine show a surface tunnel, an old incline, a twin tunnel, three shafts (French Shaft No. 1, No. 2, and Main Shaft), a hoist, and shop (Butler 1913: Plate XXXI). Square-set timbering was used in the Cactus mine, although between 1870 and 1908, the mine was timbered using a caving system, whilst the surface was stripped via steam shovel (Butler 1913: 172-173; Wray 2006: 322). By 1906, portions of the mine were being worked as an open pit mine:

> ...'this was the first open-pit copper deposit in the world to use steam shovels, opening in early 1906' (Krahulec, 1997, p. 201), predating by several months the better-known (and far more successful) steam-shovel application at Bingham Canyon, which began with stripping in June 1906, and actual ore production in June 1907 (Wray 2006: 324).

In 1900, Samuel Newhouse acquired the property and developed the property in 1902 to include a concentrating mill, the Main Shaft (extending to the 183 m [600 ft] depth), and a haulage tunnel connecting to the sixth level (Figures 3-6 and 3-7); three additional levels are situated beneath the haulage tunnel, being developed from a deep inclined shaft (Butler 1913: 172-173; Wray 2006: 321). Ore trains travelled along a trestle and the three mile long

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19 The discovery of the Cactus mine predates the Horn Silver by five years. The French company later operated as Cactus Mining Company, possibly as the Cactus-Massachusetts-Copper Mines, and located a shaft (French Shaft, French No. 1) to the west of the East Glory Hole (Wray 2006: 308). In 1883, they constructed a 50-ton jig concentrator at Copper Gulch.

Newhouse, Copper Gulch and Sevier Lake Rail Road to the Cactus concentrating mill. By 1905, a crusher house, ore load-out bins, a remodelled gravity concentrating mill with electrical power, and other equipment were completed. In 1908, the Cactus had been mined to a depth of 279 m [916 ft], included a sump; and a large tailings pond was created. That same year, the mine collapsed down to the 152 m [500 ft] level, resulting in a temporary closure until 1912. The mine reopened briefly until 1914, at which time, the plant used sulphide concentration (via flotation) to recover copper from the tailings (Wray 2006: 325). In 1915, Utah Leasing Company (owned by William Strange and H.H. Adams) constructed a successful flotation concentration plant at Newhouse. "By the end of 1918, this milling operation had achieved distinction for establishing a national (if not world-wide) record for profitable operation of low-grade copper feedstock" (Wray 2006: 329). In 1919, Utah Leasing Company dismantled the plant, moving it to Colorado (Wray 2006: 329).

Richard Stingley, Newhouse's brother-in-law, served as the first general superintendent of the Cactus Mine; additional superintendents included Charles Runberg, and E.A. Moffit (Wray 2006: 321). Between 1903 and 1910, the Cactus incorporated into the Newhouse Mines & Smelters Corporation. At that time, Samuel Newhouse also began development of a model town, Newhouse (The Los Angeles Examiner 1912: 415; Bradley 1999: 113). In 1910, the company reorganized as the South Utah Mines & Smelters Co. Two years later, the company began a dispute with owners of the Blackbird Gold & Copper Mining Company, which lead to a potential lawsuit. The pending lawsuit and prior mine collapse, led to the closure of the mine (Wray 2006: 327-329; J. Willard Marriott Special Collections n.d.).

Adjacent to the Cactus stock was a group of 15 patented claims identified as the McHale group, encompassing 111.81 hectares [276.29 acres], 3.7 km [2.3 miles] north of the Horn Silver. Charles H. Graham located the majority of the claims in 1901 and deeded his claims to William McHale, a resident of Frisco, the following year; McHale located four additional claims between 1903 and 1905 (Wray 2006: 347). Between 1907 and 1910, patents were issued to McHale, [Senator] Thomas Kearns,[20] and David Keith, founders of the Kearns-Keith Mining Company of Salt Lake City.

World War II led to a boom for copper mines and the Cactus mine was no exception[21]. The Cactus was soon open pit mined through a lease and workings by Mr. Norman Rodgers [Rogers]; these workings included expansion of the East Glory Hole and the West Pit (Wray 2006: 368). The copper ore recovered from the mine was smelted in Salt Lake City by American Smelting and Refining Company (ASARCO), who sent geologist S.I. Bowditch to map the surface of the Cactus and adjacent properties shortly after World War II (Wray 2006: 368). That being said, after 1951, little additional work was performed at the mine with the exception of a few tons of gold and silver-lead-zinc ore between 1956 and 1957 (Wray 2006: 368).

Figure 3-6. Overview of the Newhouse Town Site (photograph courtesy of Paige M. Peyton)

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20 Canadian Thomas Kearns served as a Senator for Utah from 1901 to 1905. He and his partner, David Keith, bought *The Salt Lake Tribune* in 1901. Kearns was one of the original incorporators of the San Pedro, Los Angeles and Salt Lake Railroad which extended to Frisco. His residence in Salt Lake served as the Governor's Mansion since 1937. Both Kearns and Keith were referred to as "the Silver Kings" associated with several productive claims at Park City, as well as in Colorado and Nevada (Wray 2006: 440-441, fn63). According to Wray (2006: 440, fn62), McHale was a widower, staked claims on behalf of Kearns, and in the spring of 1908, was dying of pneumonia. Both Kearns and Keith died in 1918, with Kearns' heirs deeding the interest in the McHale claim group to Kearns Corporation [later Kearns-Tribune Corporation]; Keith's heirs retained a partial interest in the property (Wray 2006: 441, fn63).

21 During WWII, the War Production Board issued Limitation Order L-208 on 8 October 1942, closing all gold mining operations in the US and territories until July 1945. Prices for other minerals, including zinc and lead also fell. Due to financial constraints, most mines were abandoned following the war.

Figure 3-7. Overview of the Cactus Concentrating Mill (photograph courtesy of Paige M. Peyton)

3.1.5 Comet Claim

French investors also operated the Comet Mine in 1888 (Figure 3-8). At that time ore was smelted at Frisco (USGS 1889: 59; Wray 2006: 308). In April 1882, the Comet included a 6.1 m [20 ft] deep shaft and the beginnings of a tunnel. Newspapers touted that “the mine will pay the working expenses, [and] it will likely be pushed ahead of the coming summer as fast as possible” (*Southern Utonian*, 22 April 1882: 2). The Comet was worked for only 30 days in 1889 (Wray 2006: 308; Hekes 1920: 504). In 1890, the Comet Mining & Smelter Works were delinquent in taxes (*Southern Utonian*, 5 December 1890: 3).

The Nevada-Utah Mines & Smelters Corporation owned the Comet claim, a 250-ft deep shaft, and tunnel in 1907 (Butler 1913: 188, see Section 3.1.1). Butler (1913: 188) was unable to visit the workings in 1909, but, by 1910, the mine reached 300 feet in gossan (iron cap) and amassed 162 hectares [400 acres] (*Salt Lake Mining Review*, 30 October 1910: 8). Some drilling and roadwork have been performed adjacent to the Comet (Wray 2006: 331).

Figure 3-8. Certificate for the Comet Mining Company of Utah, 1883 (Source: http://www.ebay.com/itm/COMET-MINING-COMPANY-OF-UTAH-FRISCO-1883-Copper-Mines-TOP-DECO-/310519136404?pt=LH_DefaultDomain_0&hash=item484c620094, accessed 15 February 2013.)

3.1.6 Americus Lode and Lulu Mine

The Americus Lode (Survey No. 11) was filed on 27 November 1879, which prompted even further excitement in the area (Beaver County Records, Book 76: 47). Situated at Lot No. 47, adjacent to the Lulu Claim (Survey No. 12, Lot No. 48), US Deputy Surveyor Frank Olmsted surveyed both of these claims northeast of USMM No. 2 in September 1879. The Americus claim included 6.31 hectares [15.592 acres], whilst the Lulu claim was 8.36 hectares [20.66 acres] in size. The patent for the Americus, filed November 21, 1879, described the improvements as two shafts and tracings along the ledge (Beaver County Records, Book 76: 47). The Lulu patent, filed January 5, 1880, indicates a half interest in a shaft, tracings, and cuttings along the ledge (Beaver County Records, Book 76: 7).

The Lulu Mining Company owned the Lulu claim, which "adjoins the Horn Silver claim immediately to the south and contains the southern strike extension of the Horn Silver (Ring) fault" (Wray 2006: 310). It was considered one of "the most extensive search[es] for ore" in lava (Butler 1913: 187). Newspaper accounts confirm this information between 1881 and 1882:

> The Lulu shaft, first south extension of the Horn Silver has been sunk to a depth of 90 feet [27.43 m]. The indications are [favourable] for the early development of a rich and extensive mine (*Southern Utonian,* 24 September 1881: 2).
>
> Work continued to progress through the fall (*Southern Utonian,* 19 November 1881).
>
> By April 1882, the Lulu shaft had reached 121.92 m [400 ft] (*Southern Utonian,* 1 April 1882).

"Two-compartment shafts were sunk on both claims [the Americus and Lulu], and within the Lulu claim, the Ring fault was prospected by drifts..." (Wray 2006: 310). Despite these attempts, the Americus proved disappointing as it was unable to produce ore in commercial grade quantities (Butler 1913: 187; Wray 2006: 310). The Lulu, in 1906, produced a small quantity of "shipping-grade ore" which led to further expansion (Butler 1913: 187; Wray 2006: 310, 347). Within six years, the HSMC had acquired the Lulu, extending drifts along the Ring fault zone (Wray 2006: 347). In 1929, ASARCO leased the Lulu, constructing a new surface plant there the following year (Wray 2006: 361-362). At that time, ASARCO drifted off the shaft, but failed to identify any commercial grade ore (Wray 2006: 362).

Adjacent to Horn Silver No. 2 and the Lulu Shaft is an adit extending into Grampian Hill known as the Van Cott tunnel (Wray 2006: 362). No further information was available for this claim.

3.1.7 Florida Lode, Antwerp Lode, Bonanza Claim, Hope Claim, and Jay Hawker

In 1880, several additional claims were filed: the Florida Lode (Survey No. 6), the Antwerp Lode (Survey No. 7), the Bonanza Claim (Survey No. 13), the Hope Claim (Survey No. 18), and the Jay Hawker (Survey No. 24) (Beaver County Records, Book 76: 27, 269, 283).

The Florida Lode comprised a single shaft tunnel, patented on February 27, 1880 (Beaver County Records, Book 76: 269; Book 82: 58). The Antwerp Lode encompassed three shafts and a boarding house, and was filed for patent on February 27, 1880 (Beaver County

Records, Book 76: 283). The Bonanza Claim was patented on January 5, 1880, with a shaft, crosscuts, and a tunnel (Beaver County Records, Book 76: 27). The Hope Claim, filed August 16, 1880, listed no improvements, but referenced a boarding house and the locations of the Horn Silver dump, hoist works and shaft (Beaver County Records, Book 82: 58). The Jay Hawker claim was filed on December 11, 1880, with two drifts and a shaft (Beaver County Records, Book 87: 901).

3.1.8 Dolly Mack and Massachusetts

By 1882, the Dolly [Doly] Mack Claim (Survey No. 25) and the Massachusetts Lode (Survey No. 29) had been filed (Beaver County Records, Book 40: 289; Book 111: 221). The Dolly Mack included a shaft patented on January 18, 1882 (Beaver County Records, Book 40: 289). The Cactus Mining Company filed the patent for the Massachusetts Lode on November 20, 1882; among their improvements were a shaft with a drift at the bottom, an additional shaft, and a tunnel (Beaver County Records, Book 111: 221).

3.1.9 Carbonate and Rattler / Beaver Carbonate

Discovered in 1878, the Carbonate (Lot 52) – presumably named for the presence of lead carbonate or calcium carbonate – was later sold to Campbell, Burke & Donaldson (February 1879), who sunk a deep incline shaft (Butler 1913: 179; Wray 2006: 304). The initial claim was made in a small shaft in 1875 upon the workings of the Morning Star (Lot 50) (Wray 2006: 304). Benjamin Hampton and Frank Godbe purchased the Morning Star and erected a hoist on the shaft "made out of a stationary engine from a steam ship" (Wray 2006: 304). The Morning Star claim was never fully patented (Wray 2006: 304). In September 1879, the set of overlapping or flanking claims and fractions – the Carbonate, Rattler, Ingomar, Stepmother, Homestake, North Side and South Side – were sold to the Frisco Mining & Smelting Company (Butler 1913: 113, 120; Wray 2006: 303-304). The Company employed a crew of twenty men for exploration and drifting of the shaft, but did not use timbering between 1879 and 1883.

Butler (1913: 178-179) identifies the Rattler (Lot 45) as the larger of the two mines.

The Carbonate extended eight levels, with a sump being located below the eighth level (Butler 1913: 179). According to patents, in 1879 the Rattler included a frame house and by 1880, the Carbonate encompassed six frame houses, an office, boarding house, dwelling house, sleeping house, an engine and boiler house, and a machine shop (Bassett 2009). Following Hooker's visit (1879), a small building was constructed adjacent to the Carbonate No. 2 shaft for use as a concentration mill, relying on Paddock's pneumatic separators (Figure 3-9) for dry concentrating. The mill also contained "a rotary drier, a rock-breaker, three sets of Cornish [hot rolling mouldings] rolls, six elevators, five revolving screens, having a 35 to 110 mesh, ten Paddock's separators, and one Frue [Vanner][22] concentrator. It was thought this apparatus would concentrate 50 tons in twenty-four hours" (Hooker 1879). The small mill operated until approximately 1886 (Butler 1913: 113, 178; Wray 2006: 305).

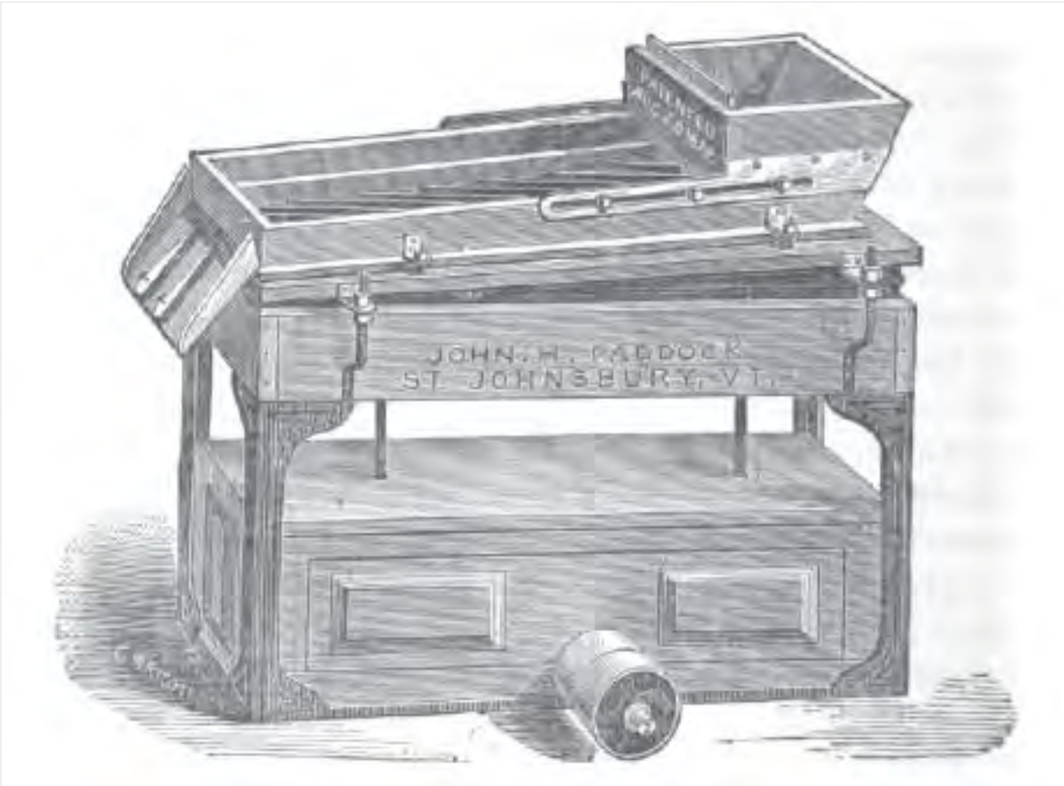

Figure 3-9. Paddock's Pneumatic Separator as shown in the *Transactions of the American Institute of Mining Engineers*, Volume III (1880).

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22 Designed by W.B. Frue, Frue Vanner concentrators are present at throughout North America, as well as at Wheal Basset, Carn Brea, Cornwall, and the King Edward Mine, Camborne, Cornwall. Frue served as Superintendent, Mine Manager, and Agent of the Silver Islet Mine, Ontario, Canada.

Professor Newberry of the New York Mineralogical Institute visited the Carbonate Mine and Osceola Placer Mining Ground in October 1881 under the sponsorship of the Frisco Company (*Southern Utonian,* 15 October 1881). The following year, W.W. Clark became the foreman at the Carbonate Mine (*Southern Utonian,* 15 December 1882). At that time, small steam hoisting works (12 horse-power engine) allowed the shaft to be continued deeper. In June 1882, Joshua E. Clayton, a prominent engineer and geologist from Salt Lake City, described the early developments of the Carbonate and Rattler in a report to Benjamin Hampton. Clayton also recommended that the Frisco Mining & Smelting Company create a new shaft in replacement of Carbonate No. 2, using a three-compartment shaft in order to take advantage of sufficient water flow for full-scale milling of the ore (Wray 2006: 343). John Hays Hammond provided a follow up report in March 1885 regarding the new shaft at the Rattler and plans to extend a drift from the Carbonate eastward along the 5th level (109 m [357 ft] deep) to intersect with the Rattler shaft (Butler 1913: 178-179). Historically, the connection was never completed, although exploratory work in 1986 suggests that some work may have been performed (Wray 2006: 306).

Before Clayton and Hammond's recommendations could be implemented, the mines closed from 1883 to 1886. The Carbonate Mine was leased under a verbal agreement until 1908 by the Bigelows whilst Mr. L.N. Morrison and Associates worked the Rattler mine in 1886 (Wray 2006: 305, 343; Butler 1913: 179). Clark (1906: 1) summarises the lease efforts:

> After the Bigelows took charge [of the Carbonate mine, sometime prior to 1885] their policy was to gut the mine. Never prospecting, but taking all the good ore they could find. As to the Rattler mine, there were fine bodies of ore when I left, but they were gutting it unmercifully. It was worked quite a while after I left [sometime prior to 1885], so I don't know what is in it now.

After 1900, the two mines were consolidated as the "Beaver Carbonate," subsequently known as the Quadmetals mine, owned by Charles Stoneham and Horace Stoneham. By 1905, a group of Salt Lake investors formed the Beaver Carbonate Mining Company, led by President Frank Harris. The new company sunk a two-compartment vertical shaft, known as the Quadmetals shaft, suggesting they attempted to fulfil Clayton's recommendations and corroborating the 1986 explorations (Wray 2006: 306, 343). The following year, however, reports suggest the Beaver Carbonate properties were flooded (Wray 2006: 343). In 1909, a small facility with two Wilfley tables[23] operated, working old tailings (Butler 1913: 178). The mine had no water pump, and as it gradually flooded, the leaser was forced to mine upward (Morrison 1907: 1; Wray 2006: 306):

> Because the lease agreement was only verbal, [Morrison] could not justify the expense of installing pumping machinery. He further noted:
>
> > In our work, however, we left quantities of ore on each level. ...I know that ore was left on the lowest level, and each of the upper levels of both mines, and on the lowest levels of both mines the ore was going down very persistent.

In 1917, the Quadmetals Mines Company began mining again. A new oil flotation plant, the Quad Metals Mill, was constructed near the shaft with Blake rock crushers (Figure 3-10), Hardinge ball mills[24], Dorr classifiers and thickener tanks, Janney[25] flotation cells (Figure 3-11), and Oliver and Portland filters.[26]

Based on records by Bassett (2009), there were three diagnostic pieces of equipment at the site including a winch (Hendrie & Bolthoff Co, Mining Machinery, Denver); an engine (Gardner-Denver WAG 13 mud pump); and a radiator (Young Radiator Company, Racine, Wisconsin). The Telluride Power Company provided electricity to the operation (Wray 2006: 344). Between 1919 and 1923, the Quadmetals Mines Company mines and mill were operated by leasers, which added the Bill Nichols winze to the mine (Wray 2006: 344-345). Although showing limited success, the mine closed again in 1923.

In 1936, Horace Stoneham granted a bond/lease for the Quadmetals mine to D. Eugene

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23 Clifford R. Wilfley first developed a cascading hydraulic flotation machine, known as the Wilfley table, at Mineral Farm Mill in Ouray, Colorado, in 1916.

24 Harlowe Harding designed a conical ball mill used at Pennsylvania and Missouri, but most notably at the Calumet and Hecla Mines in Michigan.

25 T.A. Janney, Superintendent for Utah Copper Company, Bingham, Utah, developed a froth flotation machine under US Patent 1457077.

26 This represents a merger of Oliver Continuous Filter Company of San Francisco, California, and Portland Colorado Iron Works Company, Denver, Colorado. Together, they produced Oliver & Portland Drum Filters.

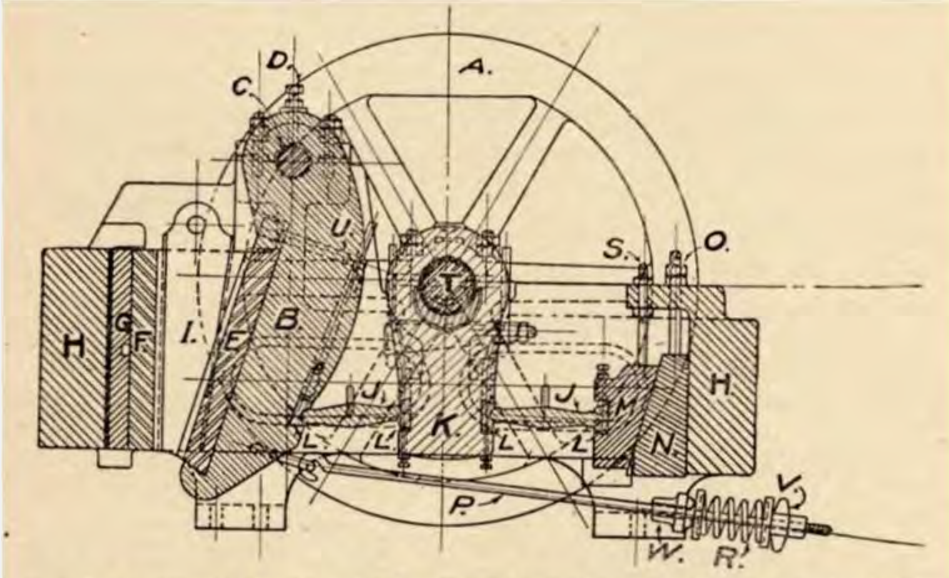

Fig. 9.—Sectional Elevation of the Blake Rock Crusher with Parts Indicated by Letters (after Chalmers & Williams)

A. Flywheel. B. Swing Jaw. C. Swing Jaw Shaft. D. Set Screws for securing Set Jaw to Shaft. E. Swing Jaw Plate. F. Stationary Jaw Plate. G. Stationary Jaw. H. Frame. I. Side Plate. JJ. Toggle Plates. K. Pitman. LL. Steel Bearings for Toggle Plates. M. Toggle Block. N. Wedge Block. O. Wedge Adjusting Bolt. P. Spring Rod. R. Spring. S. Set Screws for Toggle Block. T. Eccentric Shaft. U. Holding down Bolt for Swing Jaw Plate. V. Spring Washer. W. Spring Plate.

Figure 3-10. Blake Rock Crusher (Source: http://quarriesandbeyond.org/states/ga/images/ga-rpt_limestons_marls_coastl_plain_ga_fig_9_p263.jpg, accessed 15 February 2013).

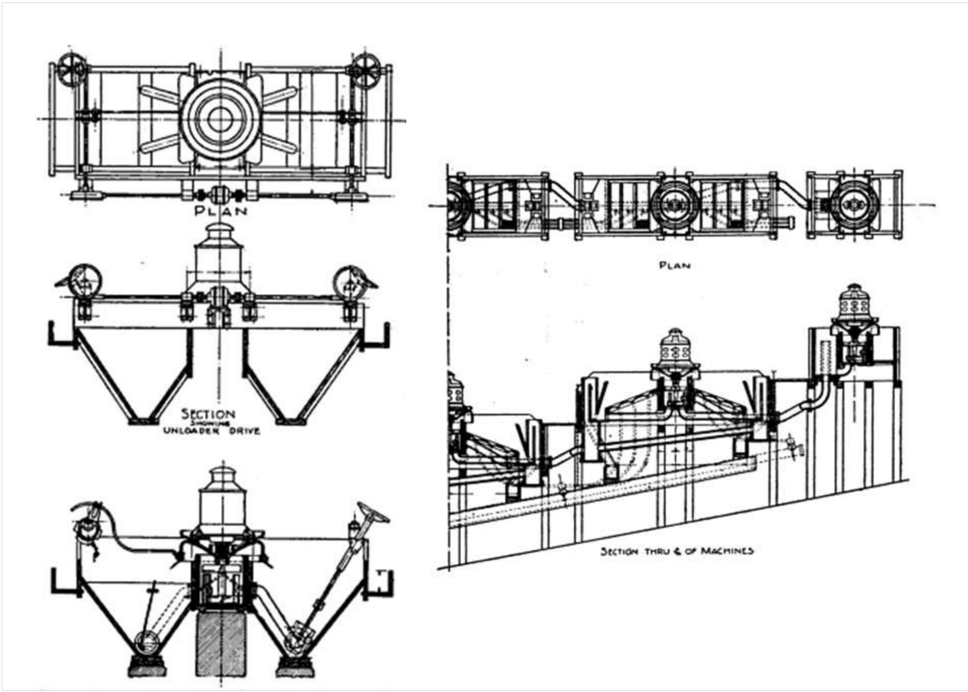

Figure 3-11. Section and Plans of Janney Mechanical Air Flotation Machine and Emulsifier (US Patent Office 1457077)

Kirk, mine manager (1936-1937) and Milford resident (Wray 2006: 353; Horton 2002: 540). Under terms of the lease, a portion was awarded to the Quadmetals Corporation, which incorporated in February 1936 under the auspices of Chester Toutloff. The extended mine was equipped with a gasoline engine hoist and three-drill compressor, two bunk houses for 15 employees, a compressor house, and a blacksmith shop (Wray 2006: 353-354). In 1937, J. Paul Kuhn, an Illinois attorney, acquired controlling interests and, with William H. Hendrickson, former Horn Silver manager, oversaw the shaft expansion and drifting; new hoists and motors were installed at this time as well. All of the ore recovered was shipped to mills in Bauer or Midvale, although from 1928 to 1940, the corporation sought to construct its own mill (including a crusher, rolls, jig and tables) at the mine (Wray 2006: 356, 368). By 1938, Kuhn hired Deseret [Des] N. Hickman as mine manager and J.J. Benson, a Salt Lake geologist. Benson made an unfavourable report regarding future prospects, but Kuhn continued to lease the mine between 1939 and 1940.

Ore bins were situated east of the Quadmetals shaft, whilst the mill itself was constructed south of the waste dump (Wray 2006: 368). A winze was added in mid-1940 in the west ore body and utilised square-set timbering; drifting was performed to the east. Additional work continued for the next two years, although Kuhn struggled with the costs for electricity to operate water and air pumps. Copper Range Company invested in the mine by 1941, suggesting further exploration in terms of drifting and diamond drilling, although the Quadmetals mine closed in 1942 shortly after a partial collapse and flooding (Wray 2006: 369-370). By 1943, the last lessee of the Quadmetals shipped a small tonnage of lead and silver ore from the waste dump (Wray 2006: 370). Wray (2006: 370) provides a description of the Quadmetal holdings in 2006:

> At the present time, all that remains of the Quadmetals surface plant are two partly-collapsed, small metal-sided buildings, a badly-listed wooden headframe, and a perforated steel water tank next to the shaft. The old blacksmith building next to the shaft was usurped sometime in the early 1980s to store a quantity of core from Freeport-McMoRan's drilling project near the Horn Silver mine, where it still remains in significant disarray.

3.1.10 Young America Lode, Lady Franklin Lode, Lady Washington & Dick Taylor

In 1883, the Young America Lode (Survey No. 34) and the Lady [Laky] Franklin Lode (Mineral Survey [M.S.] 3400) were claimed (Beaver County Records, Book 114: 345; Book 191: 259; Book 191: 271; Book 191: 247). Sebrina Grace filed the Lady Franklin Lode claim on 4 August 1897. Over the 14 years between the claim and filing of the patent, considerable work had been performed: the Lady Franklin included two shafts, a tunnel and a winze (Beaver County Records, Book 191: 259). Sebrina Grace served as Frisco's midwife and only medical professional until 1900 (Bradley 1999). She was married to Richard Grace, who operated a blacksmith and wagon shop between 1883 and 1884 (Graham and Company Printers 1883).

Richard Grace filed the claim for the Dick Taylor Lode on August 4, 1897. The claim included a shaft, tunnel, and a winze (Beaver County Records, Book 191: 247). He also filed the patent for the Lady Washington Lode in December 1886. The Lady Washington also included a shaft, a tunnel and a winze (Beaver County Records, Book 191: 271).

Abasime Sarault and Clifton Byram filed the patent for the Young America Lode on September 12, 1883. The discovery shaft included a tunnel (Beaver County Records, Book 114: 345).

3.1.11 Granite Lode & Voorheas Lode

In 1888, the Granite Lode (M.S. 36) and the Vorheas [Voorhes or Voorheas] Lode (M.S. 4750) were claimed (Beaver County Records, Book 149: 145; Book 223: 137). Jonathan C. Royle and George M. Scott filed the patent for the Granite Lode on May 27, 1890; they initially discovered the claim in September 1888 through the placement of a tunnel and a cut (Beaver County Records, Book 149: 145). Ancel Newhouse located the Vorheas Lode in January 1888, patenting his claim on 25 March 1902. Newhouse's improvements included an incline shaft in the amount of £1072.94 [$1680.00] and a tunnel in the amount of £140.50 [$220.00] (Beaver County Records, Book 223: 137). Between 1901 and 1908, however, George Anderson conducted a mineral survey (no. 5295) of three claims in the same area as Newhouse's claim. Anderson's improvements included a tunnel, winze and shaft (M.S. No. 5295, Beaver County Records, Book 239: 375).

3.1.12 Dumbarton Lode

The San Francisco Mining Company located the Dumbarton [Dumb Barton] Lode (Lot No. 73, M.S. 37) in 1891 and patented the claim, which consisted of two shafts, in 1892 (Beaver County Records, Book 159: 354). The claim was filed by the heirs of George W. Crozier, including his widow (Rachel Gordon Crozier) of Salt Lake City, and their young children: Rachel, Bertha Mary, and William Henry Crozier (*Salt Lake Tribune*, 17 August 1893: 5). The mine was named for Crozier's homeland, the seaport of Dumbarton, Scotland.

3.1.13 Peacock Copper Consolidated Mining Company

Four claims (MS 5922) were located along a limestone vein between Marble and Loeber Gulches, including the Reciprocity, Humbug, Jenny Fraction, and Sunbeam No. 1 (Butler 1913: 185; Beaver County Records Book 259: 247; Wray 2006: 360). Together, these claims amassed 32.37 hectares (80 acres). The Peacock Copper Consolidated Mining Company made improvements between 1898 and July 1909 on the Hambug [Humbug] Mine Claim, including an incline shaft and two drifts (Butler 1913: 185; Wray 2006: 309; Beaver County Records, Book 259: 247). Although the Company installed a new hoist, windlass, and whim, and began additional drifting in 1908 (*Inter-Mountain Republican*, 24 May 1908: 8), several shareholders were delinquent: G.S. Hayes, Peter G. Armstrong, M.H. Osborn, R.M. Johnson, and Owen Grover (*Deseret News*, 2 January 1908: 10) (Figure 3-12). Likely due to finances, by 1909, most work appeared idle, although at least one shaft was sunk on the Peacock property by 1913 (Butler 1913: 185). Whilst the name of this mining company inferred the presence of copper, most of the metal obtained from the argentiferous galena ore was lead, zinc and silver (Stevens and Weed 1914: 706; Wray 2006: 309).

Prior to 1914, the Frisco Silver Lead Company leased the claims to Louis F. Block, who served as the president, treasurer and general manager of the Peacock Copper

Consolidated Mining Company (*Salt Lake Herald*, 29 March 1910: 20; *Salt Lake Herald*, 28 June 1910: 8; Stevens and Weed 1914: 706; Wray 2006: 360). Block sank a series of inclined and vertical shafts, crosscuts and drifts along Block Gulch and drainages between Loeber and Marble Gulches, recovering a small quantity of silver and lead ore. He located the Jennie Fraction Lode (M.S. 6170) in 1910, but waited until 6 October 1911 to patent the claim, spending the interim making improvements such as two shafts (Beaver County Records, Book 266: 461). In 1937-1938, the Frisco Silver Lead Company continued to work the Block lease, although by World War II the lease was dormant (Wray 2006: 372).

In the 1930s, mapping by Hewitt identified a group of claims known as the Plumbic claim, including the Buckhorn shaft near Block Gulch (Wray 2006: 359-360). The Buckhorn was dug as a decline shaft to a depth of 76.2 m [250 ft], with the collar being at an elevation of 1767.84 m [5800 ft]. The claim produced a small amount of high grade silver-lead ore (Wray 2006: 360). It is unclear whether these claims were absorbed into the Peacock mines at a later date.

Figure 3-12. Certificate for the Peacock Copper Consolidated Mining Company of Utah (Source: http://www.hwph.de/images/fa9/Los0964.jpg, accessed 15 February 2013.)

3.1.14 Cupric Mining Company

By July 1909, the Cupric Mining Company [Cupric Mines Company] filed a block of 14 claims, which had been located between 1900 and 1904 (M.S. 5946) (Beaver County Records, Book 259: 373; Book 266: 33), including the Washington, Antwerp, Klondyke, Iron Devil, and the Cupric mines. According to the patent, no improvements had been made on the claims by that time.

The Washington Mine – not to be confused with the Lady Washington claim – was situated southwest of the Imperial mine in Loeber Gulch, just west of Grampian Hill, and featured an inclined shaft developed prior to 1900 (Butler 1913: 183). A second shaft, Washington No. 2, was situated to the south. Work on the Washington Mine ceased by the summer of 1909, although it produced high-grade ores of lead, copper, gold and silver during its brief period of operation (Butler 1913: 183-184; Wray 2006: 348).

The Antwerp mine featured two shafts on the hill on the south side of Loeber Gulch, just north of the initial Washington shaft. To the west of the Antwerp is an unpatented claim (Klondyke) on the western edge of the Klondyke Gulch. This area features lead, silver, gold and green oxide copper staining and is characterised by a multitude of prospects excavated prior to 1900 and commonly is referred to as the 'graveyard' (Wray 2006: 310). The Antwerp Lode (Survey No. 7) encompassed three shafts and was patented on February 27, 1880. A boarding house was located south from the corner of the claim (Beaver County Records, Book 76: 283).

The Cupric or Iron Devil mine – a vertical, two-compartment shaft – was situated southeast of Newhouse and had been worked since the establishment of the SFMD for its iron flux, used in the smelters (Butler 1913: 184; Wray 2006: 310, 332).[27] In the mid-1930s, K.G. Hanney identified a deposit of tungsten at the Cupric property. Hanney served as the mine superintendent for Tintic Lead Company. USGS geologist S.W. Hobbs investigated the

27 Wray (2006: 310) identifies the Iron Devil as being situated to the northwest of the Cupric shaft, suggesting these as two separate entities. Butler (1913) contended they were one in the same.

deposit in November 1941 and the following year, the U.S. Vanadium Corporation and the Homestake Mining Company each drilled cores and trenched the surface of the deposit. The US Bureau of Mines conducted additional research between 1942 and 1943. Throughout 1944, the US Government conducted further inquiry into the deposits and placed three adits (Adit 1, Adit 2, and Adit 3) in the vicinity, although no additional tungsten has been mined from this area since that time (Wray 2006: 371).

3.1.15 Michigan Gold & Copper Company

In 1902, the Michigan Gold & Copper Company organized in Salt Lake City with mine offices in Frisco. The board of directors included Lawrence Green (President), Sam S. Porter (Vice President), George Winsness (Secretary), Rodney T. Badger (Treasurer), E. Rummelmeyer (Construction Engineer), and officers H.M. Dinwoody, H.G. Williams, and R.P. Morris. By 1912, the Company had established a series of six claims to the west of the Imperial Mine, including an inclined shaft sunk into a fissure of quartz monzonite with gold bearing ore and published an assessment notice requesting that funds be paid to R.T. Badger (Butler 1913: 185; *Salt Lake Herald*, 30 September 1912: 5). Among the claims operated by the Michigan Gold & Copper Company was that of the New York Group, near the railway at Newhouse. Improvements there included three shafts and a tunnel. Contract labour was used to develop the workings, which successfully recovered copper, lead and silver ore (Stevens and Weed 1914: 584).

3.1.16 Golden Reef Claims

Just north of Frisco, on the east side of the San Francisco Mountains, was a group of three claims operated under the name of Golden Reef. The mines comprised a tunnel driven into the mountain just south of Sawmill Canyon, with drifting along the shaft (Butler 1913: 186). All of the early workings were performed prior to 1900 and included shafts, adits, prospects and open cuts (Wray 2006: 309). No work is documented at the Golden Reef until 1945-1946 (Wray 2006: 372). At that time, several winzes had been constructed and lead, gold, silver and copper ore was being recovered from a long adit (Wray 2006: 372).

3.1.17 Blackbird Gold & Copper Mining Company

The Blackbird Gold & Copper Mining Company mined an area adjacent to Copper Gulch and northwest of the Cactus mine (French Shaft) along a chalcopyrite ore vein within the SFMD (Wray 2006: 329). Although organized in West Virginia, the Company held offices in Lemhi County (Idaho) and in Utah in Newhouse and Salt Lake City. The board of directors included John E. DuBois (President), Chas J. North (Vice President), F.O. Eric (Secretary), B.N. Lehman (Treasurer and General Manager), and L.N. Morrison (Director) (Stevens and Weed 1914: 122).

Within the SFMD, the Company developed 97 claims (87 patented), with several claims featuring shafts and drifting, including the New Year's, Belmont, and Purity Claims (Butler 1913: 187). The Belmont mine featured a three-compartment shaft. The Colburn claim, situated to the north of the Belmont shaft, consists of a shallow shaft and is believed to be part of the Blackbird holdings (Wray 2006: 330). In 1910, the mine closed temporarily as the Company continued to develop and explore through diamond drilling down to the 300 foot level. Between 1911 and 1912, it reopened with new machinery in place (Stevens and Weed 1914: 122).

3.1.18 Indian Queen Consolidated Mining Company

The Indian Queen Consolidated Mining Company owned the Mountain Queen and Galena Mine, and a group of additional claims near the west summit of the San Francisco Mountains near the quartz monzonite and limestone contact (Butler 1913: 188; Wray 2006: 309). High grade lead-silver ore was extracted from these workings and subsequently treated at a smelter by the Wah Wah Springs. Company workings included the Indian Queen tunnel, a crosscut, and an electric powered plant. According to Wray (2006: 310), the Indian Queen group reportedly yielded a large quantity of lead-silver ore amounting to a value of £63,865.24 [$100,000.00]. Wray (2006: 346) also reports that the Indian Queen properties were acquired by the Iron Queen Consolidated Mining Company. Additional holdings, such as the Leland Mining and Milling Company (1906) were later absorbed into the Iron Queen holdings (Wray 2006: 347). Just north of the Indian Queen claims was the Hendrickson claim, which Butler visited and found idle in 1909 (Butler 1913: 189).

3.2 Smelters

Notarianni (1981, 1982 and 1994) acknowledges the use of charcoal "pits" in the SFMD and nearby Wah Wah Mountains between the 1870s and 1880, although the precise locations of these features have yet to be identified. These types of pits were used commonly in the western US, including Nevada, but were less common in the eastern US (Wettstaed 2003: 41, 44; Reno 1996; Heite 1992:127). Charcoal pits and furnaces were essential to smelter production, as "massive amounts of charcoal" were required for fuel (Reno 1996: 29). Reno (1996: 27, 29), who examined charcoal production in Eureka, Nevada, acknowledges the importance of documenting charcoal features with regard to mining landscapes:

> Nearly all material remains of cultural activity such as roads, slash, stumps, camps, and isolated [artefacts] can be confidently associated with charcoal production to produce a complete cultural landscape. This is critical for the holistic approach of this analysis in studying charcoal ranches as complete entities rather than disparate parts.

James R. Wettstaed (2003: 32-33) provides a description of the use of charcoal pits in iron furnace technology. His study of the Nova Scotia Ironworks Historic Mining District (1881-1884) in the Ozark Mountains of the Mark Twain National Forest of southeast Missouri provides an overview of the charcoal production process, which is similar to that in Utah.

> The actual production of charcoal involved three basic steps: cutting and preparing the wood and kiln site, producing the charcoal, and transporting the final product to the furnace. To provide wood for charcoaling, woodcutters usually worked from late October through early spring because the wood was lighter when sap was in the roots, the wood dried quicker, and transport was easier over ice-covered roads in cold areas. Often woodcutters were seasonal employees...responsible for felling the trees, trimming and cutting the logs to the correct length, and hauling the logs to a storage area. The wood was then stacked and left to dry (Wettstaed 2003: 33).
>
> The charcoaling process ran from March through December. Wood was piled in heaps and covered in earth, and a fire was set to char the wood. The demanding process had to be carried out in a careful and controlled manner. Charcoal pits were set on a clean, level ground surface, sheltered from the wind. If the surface was not level, a flat terrace was produced by excavating into the hillside and dumping the spoil on the slope to create a level platform. An area measuring 12-15 m in diameter

> was generally cleared. The logs were stacked, end on end, typically 3.6-4.5 m high. A central chimney opening would be left in place. The pile was covered with a layer of dirt, clean charcoal dust, and wet vegetation several centimetres thick. The pit was then fired through the chimney. The burning rate was controlled using the chimney and vent holes at various locations. In favourable conditions (such as dry, calm weather), a pile could be reduced to charcoal in 7-10 days, though it could take up to 21 days in poor conditions (Wettstaed 2003: 32).
>
> As soon as the charcoal was cool enough to work with, the last step of charcoal production was begun, which involved drawing the charcoal from the heap and hauling it to storage at the furnace. A typical pit of 1,500 bushels would be completely drawn in a week. Rakes were used to remove the charcoal from the heap. If the workers were not careful, the entire pile of charcoal could catch fire while drawing the charcoal. The cooled charcoal was loaded into large, high-sided wagons, each of which carried 100-250 bushels of charcoal, and hauled to the storage sheds adjacent to the furnace (Wettstaed 2003: 33).

Little attention has been given to the recording of the smaller ephemeral features; most archaeological investigation has focused “on the industrial heart of an iron operation, neglecting the thousands of acres of associated features. In order to document the full range of operations associated with the iron industry, it is necessary to conduct intensive surveys of large areas around the industrial plant” (Wettstaed 2003: 44). For example, two types of features have been identified in Missouri associated with charcoal production: collier’s pits and small ephemeral habitation sites. Charcoal pits averaged 12.3 m in diameter by 17 cm deep and all were situated adjacent to the base of a slope on creek terraces (Wettstaed 2003: 29, 35). Artefacts associated with the pits included equipment associated with charcoal production (collier’s rakes, square-cut nails), clothing, animals or wagons (mule/horseshoes, shoe nails, wagon parts, chain links), and food preparations (tobacco, condensed-milk cans), and other miscellaneous metal accoutrements (Wettstaed 2003: 35). Food cans were common, as the burning pits had to be monitored constantly (Wettstaed 2003: 36). Additionally Wettstaed (2003: 37) recorded rock piles of varying sizes (2.0 to 15.75 m) with “mudcat” chimneys, representing a hearth at the base of a mud and stick chimney, surrounded by large concentrations of domestic-related artefacts, which were attributed to short-term habitation sites, such as housing, associated with woodcutters. Landscapes surrounding the charcoal production sites, furnaces or kilns, and associated settlement areas underwent alteration in terms of the vegetation (Wettstaed 2003: 31). In terms of settlement, native species often are replaced by non-native or decorative plants. In the case of charcoal production, pine was the preferred wood.

> All that indicates the location of the furnace stack today are the remains of the last charge and scattered firebrick, while the rest of the industrial complex is evident only as an archaeological site...The legacy of the scale of industrial operations... can be seen in the changed composition of the forest in the area. When... surveys were conducted in 1820, the area was characterised by large (50-75 cm diameter) mature pine trees with an open understory. In contrast, today the area is dominated by black oak with a dense, brushy understory and only small amounts of pine... replacement of pine by oak is largely due to the removal of fire from the ecosystem that accompanied historic settlement in the area (Wettstaed 2003: 31).

The 1861 Annual Report of the Commission of the General Land Office (GLO) provides a brief overview of the natural resources of the Utah Territory. The Uintah River valley, northeast of the SFMD, was considered the best for agricultural purposes, including pine and other timber, water and other “inducements to settlers” (GLO, 30 November 1861). There was little timber in the SFMD, except in the higher elevations, mostly having been removed for timbering within the mines and for charcoal production for smelting (Butler 1913: 19-20).

In 1874, First Lieutenant George M. Wheeler published a report detailing the geography and geology of portions of the western US. He noted in the Star District that “wood for fuel is abundant” and acknowledged that timber in the Utah area was limited to pine, spruce and fir species (Wheeler 1874: 21). With regard to the possible decimation of the timber, he pleaded to Brigadier General A.A. Humphreys, the Chief of the US Army Corps of Engineers:

> Our land-surveys have not reached many of the areas covered by the forests, hence the adventurous squatter has full possession, and consumes the property which he temporarily enjoys at will. The result very naturally appears as an improvident wastage of forest-products, with no return to the Government, and with the danger, at an early day, of the most damaging decimation of the forests containing trees of the kinds above mentioned. It would seem wise that the Government, through some of its branches, should take cognizance of this matter, and, by legal enactment or otherwise, stay the fearful cutting of timber, which, in connection with the many mining-towns, agricultural settlements, and military posts, will fast bring about the disappearance of forest-products that in time must have an effect upon the local climates (Wheeler 1874: 36).

By the 1880s, charcoal production technology switched from pits to the use of kilns (Figure 3-13).

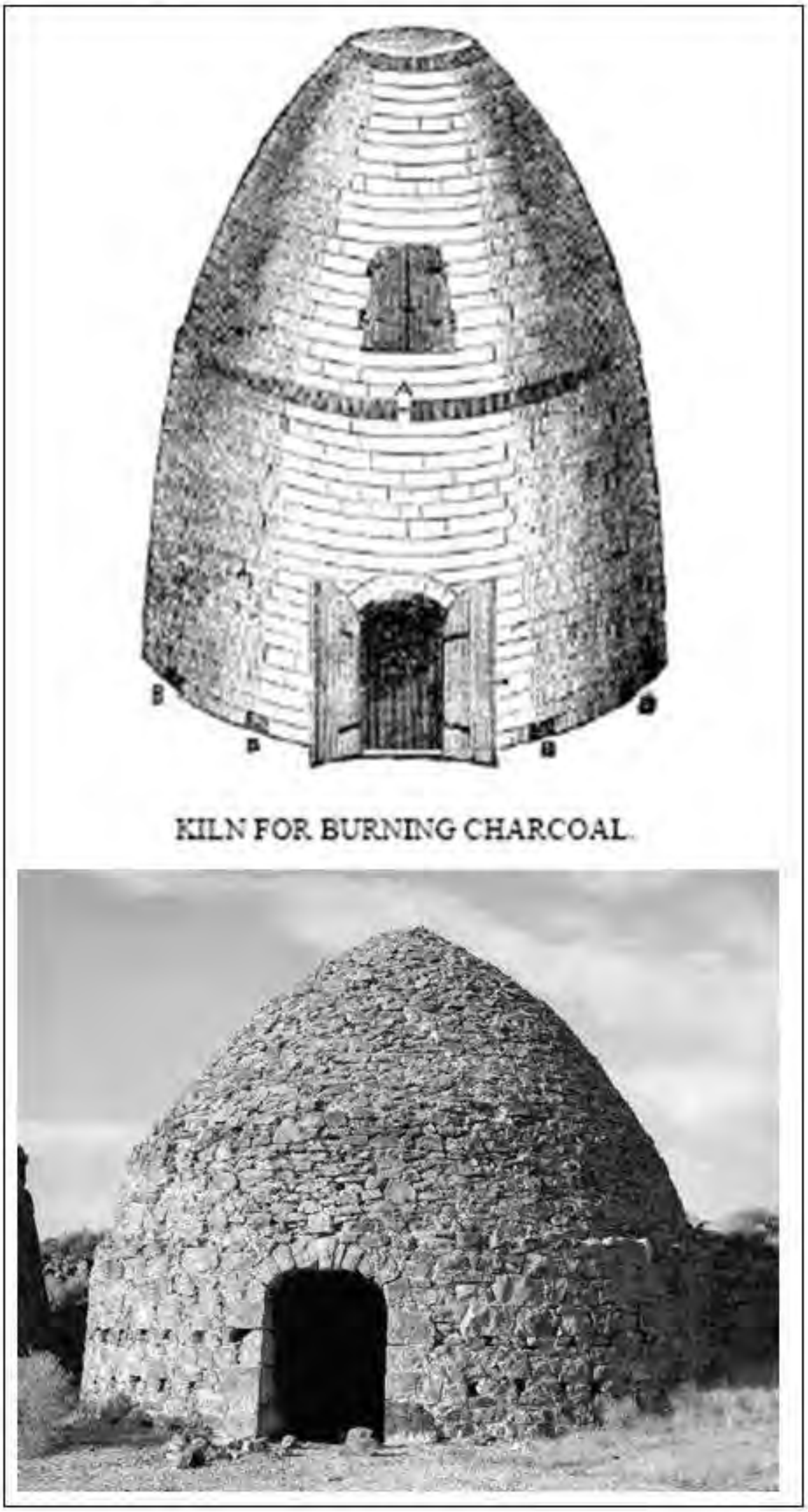

Figure 3-13. Examples of Charcoal Kilns

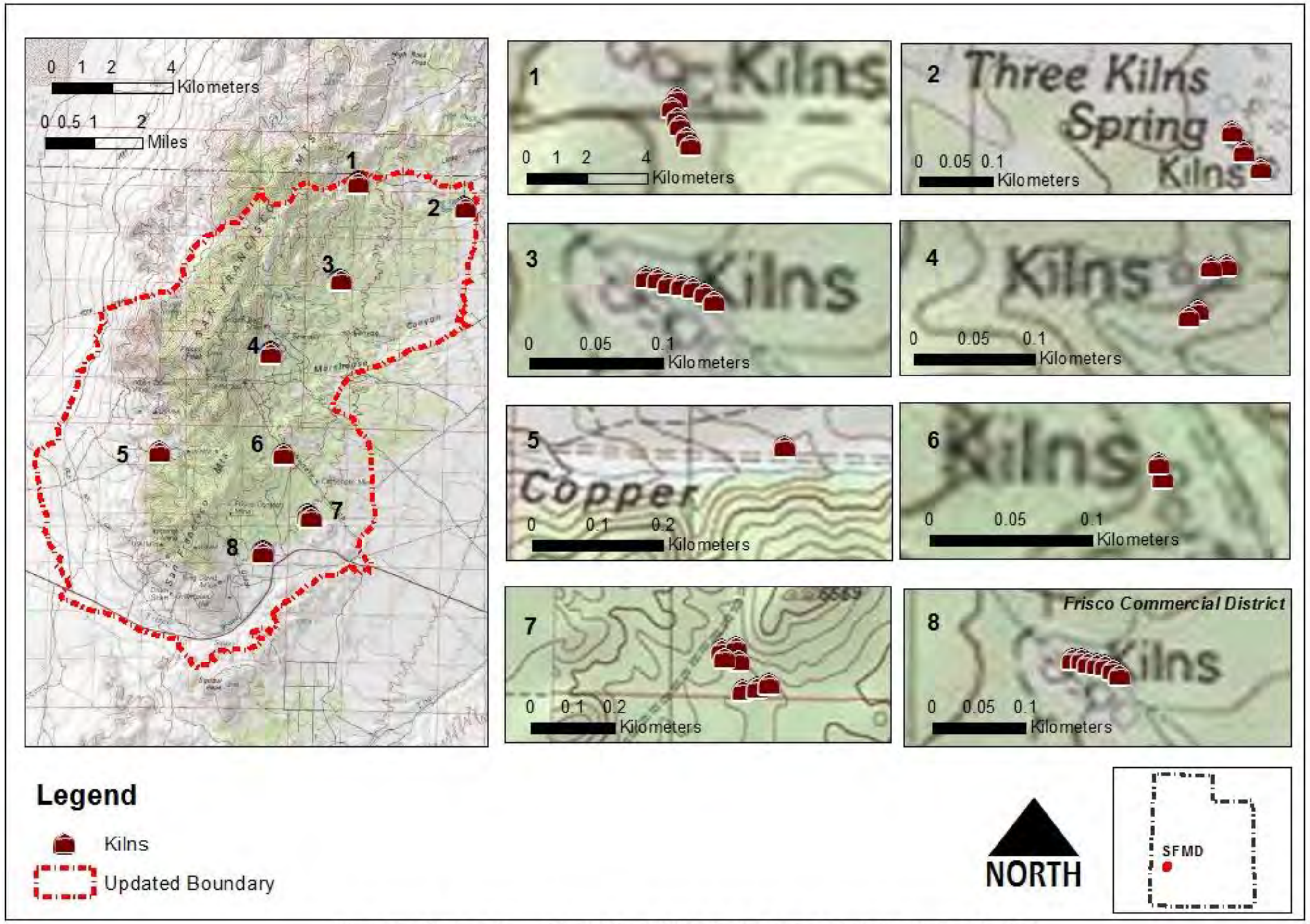

Figure 3-14. Locations of Charcoal Kilns in the San Francisco Mining District

In the SFMD, the peak of charcoal production occurred between 1877 and 1884 (Emmons and Becker 1885: 464). Thirty-six beehive kilns were constructed in eight groups under separate individual management within the SFMD (Emmons and Becker 1885: 464; US Census 1880: 405-489; Whelan and Hintze 1973: 91) (Figure 3-14). All of the kilns were situated in areas accessible to wood (primarily piñon pine and cedar) at distances ranging from 10 to 29 km [6 to 18 miles] from the smelter at Frisco (Emmons and Becker 1885: 464; US Census 1880: 405-489; Whelan and Hintze 1973: 91; Notarianni 1981, 1982, 1994). In addition to the charcoal kilns still present at the Frisco town site, one was constructed along Copper Gulch at the Cactus Mine; two in Barrel Spring Canyon; seven south of Carbonate Gulch; three at Three Kilns Spring; two at Carbonate Gulch; four south of Barrel Spring; seven to the north of Sawmill Canyon; and six along the Beaver and Millard County line.

J.C. Cameron of Marquette County, Michigan, is credited with the design of the beehive kilns in the SFMD (Emmons and Becker 1885: 464, Notarianni 1981, 1982, 1994). Little is known regarding Cameron, although Marquette became a centre of mining activity with the organisation of the Jackson Mining Company (1844-1845) and the Marquette Iron Company (1849). The area, a shipping port for iron and haematite, also contained numerous charcoal smelters, which likely served as a model for Cameron's designs. The use of the charcoal smelters in the Marquette Iron Range centred on blast furnaces (five in 1865, 12 by 1873) (Ottke 1999). Considerable timber removal was required to support the furnaces:

> Radiating progressively outward from the insatiable demand of the smelting fire, few trees were spared being slowly burnt into charcoal in beehive kilns and then used to smelt iron ore into pig iron in the forges and furnaces. Quickly, the hardwoods used to fuel the fires were removed from within close proximity of the furnaces, and new stands were found (Ottke 1999: 39).

Similarly, charcoal production was used for iron smelting in the Hanging Rock Iron District in northeast Kentucky and southeast Ohio. The area encompassed 65 furnaces (1874), 50 of which were noted as charcoal kilns (Cobb n.d.: 114). Approximately 80 to 250 hectares of forest were harvested annually, with secondary forests being harvested again at intervals of 20 to 30 years (Hutchinson *et al*. 2003). This deforestation indicates the magnitude of timber required to support the charcoal industry. Kilns in the Hanging Rock district ranged in size, with most averaging 5 to 8 m [16 or 26 ft] in diameter; those in the SFMD were 6.40 to 7 m [21 to 23 ft] in diameter (Notarianni 1981, 1982, 1994). Smaller kilns hold approximately 15 cords of wood, whilst the larger accommodates 45 cords of wood. Mormons provided labour for timber harvesting, at a cost of £0.80 [$1.25] per cord; transportation of the timber to the kilns was achieved via sledge or wagon at costs ranging from £0.96 to £1.60 [$1.50 to $2.50] per cord in addition to the cutting fee. Each kiln used 32 cords of wood or 1,200 to 1,500 bushels of wood at a cost of £3.83 [$6.00] per cord and averaged six to ten days to burn the wood. Another three to six days were required for cooling, to produce, on average, 50 bushels (7.71 kg [17 lbs] per bushel) of charcoal. In 1882, for example, the Frisco Mining & Smelting Company used 30,000 bushels of charcoal (652 cords of piñon pine and 10 cords of cedar). That year alone, the Company smelted 1,785,260 tons of ore/concentrates (US Census 1880: 405-489; Whelan and Hintze 1973: 91; Emmons and Becker 1885: 464; Notarianni 1981, 1982, 1994).

The 1880 Census provides a listing of individuals working in charcoal production in the SFMD: four coal contractors, twenty-one coal burners, two wood contractors, five wood choppers, seven stone masons, and a brick mason (US Census 1880: 405-489; Whelan and Hintze 1973: 91; Emmons and Becker 1885: 464; Notarianni 1981, 1982, 1994). Maximillian Parker, father of Robert Leroy Parker (American Outlaw, Butch Cassidy), worked as a labourer in the 1880s cutting and hauling wood for the smelters at the Silver Reef Mine (Washington County), Pioche (Nevada), and for the mines at Frisco (Patterson 1998:1-3).

Wray (2006: 313-317) identifies several smelters associated with the SFMD:

- *Williams and Latey Smelter*, located in Milford, Utah, between 1876 and 1878. It featured a flue dust chamber and a single-stack smelter and operated briefly in 1880 (Butler 1913: 115; Wray 2006: 313).
- *Godbe Smelters,* located in Frisco, in 1874 was short lived. Constructed by William S. Godbe, the single-stack smelter was later replaced by the Frisco Mining & Smelting Company in 1877. The initial location is unknown, but postulated as being along a steep hill, possibly along Grampian Hill (Wray 2006: 313).

- *Campbell, Cullen & Co. Smelter* comprised a single-furnace smelter at Frisco (1876-1877). The smelter burned (1877) and was reconstructed as a three-stack smelter (1879). Depicted in a lithograph by Hooker (1879: 32), the smelter was situated on part of the HSMC's patented 5-acre mill site adjacent to the Frisco town site and accessed via railroad after 1880 (Wray 2006: 314).

- *Frisco Mining & Smelting Company Smelter* constructed a smelter and beehive shaped charcoal kilns on the Frisco Mill Site (Lot 41A, patented) at the northwest corner of Frisco (1877-1884). Featuring a single-stack, custom smelter, with rock breaker, and a reverberatory flue-dust slagging furnace, to treat ore from the Carbonate, Rattler, and Horn Silver mines, the smelter was maintained by the Carbonate Mine until acquired by Page Blakemore (Wray 2006: 315). "Contrary to some local belief, the Frisco Mill Site was never owned or controlled by the Horn Silver Mining Co., or its successor companies. The adjoining Old Frisco Smelter Site was never taken to patent and ceased to exist as a mining claim many years ago" (Wray 2006: 315).

- *Wah Wah Springs Smelter* was associated with the Indian Queen claims, such as the Mountain Queen, and was situated near Wah Wah springs (Wray 2006: 317; Butler 1913: 188).

- *Other Smelters*, including small copper smelters in Copper Gulch and at Frisco were small operations that operated briefly in association with the Cactus and Comet mines.

- *Francklyn Smelter* in Murray, Utah, (also known as the Horn Silver Smelter) was constructed by Abner Byram between 1876 and 1881 (*Southern Utonian,* 24 September 1881: 3).

- *Refining Works* were situated at the junction of Lumber and West Twelfth Streets [near the corner of Thirty-ninth and Clark Streets] in Chicago, Illinois (Hooker 1879; Emmons and Becker 1885: 468; Bancroft 1889: 745:72). The Chicago facility, which operated under the auspices of A. Byram and R.S. Payne, included two zinc-mixing furnaces, a lead-refining furnace, four retort furnaces (Faber du Faur), a small cupola furnace for reducing dross, two cupel furnaces, a small sweating furnace, a 5-horse-power engine and boiler, a Sturtevant blower (No. 4), and an assay office.

- *Peck Mill*, built in 1904 by O.B. and W.A. Peck, of the Centrifugal Concentrating Company, included a large flotation mill for the Horn Silver Company at Frisco.

Smelters physically located within the boundaries of the SFMD are described in further detail.

3.2.1 Godbe's Smelters

As early as 1874, W.S. Godbe constructed the Godbe Smelter in the SFMD. By 1880, Godbe, Hampton & Company, who operated smelters in Frisco, also advertised for "Charcoal Pit burners to supply 20,000 bushels of charcoal monthly to Buillionville, Nevada" (*Salt Lake*

Herald, 29 October 1880). Prices for charcoal varied, but reached £0.13 [$0.20] per bushel that year. Godbe's smelter in Nevada touted an "abundance of large nut pine timber, located within 15 miles [24 km] of the works" (*Salt Lake Herald*, 29 October 1880). It may be postulated that Godbe's smelters in the SFMD required similar resources for charcoal production. By 1902, the mountains surrounding Frisco had been denuded of trees for the charcoal furnaces (*Salt Lake Herald*, 1902). In order to meet the required demand for charcoal, the smelters within the SFMD would have decimated hectares of forest lands for fuel.[28]

In the summer of 1877, W.S. Godbe and Benjamin Hampton acquired a contract to reduce 30,000 tons of ore for the Horn Silver Company. Shortly thereafter, Godbe constructed the fifty-ton Frisco Smelting Company at the northwest end of the town (*Salt Lake Herald*, 1902). This smelter likely is the one referred to by Emmons and Becker (1885: 468) as the "draft furnace:"

> It was built like an ordinary furnace, but had a flue extending up the side hill several hundred feet. It was hoped that this would create sufficient draft to dispense with an engine and blower. A few tons of bullion was made, but the draft could not be regulated. The fire would approach the surface of the charge and the bottom would 'freeze' (Emmons and Becker 1885: 468).

In 1879, after difficulty in procuring suitable iron fluxing, Godbe and associates constructed "a second smelter, a reverberatory furnace and four [five] fine charcoal kilns immediately at the plant" (*Salt Lake Herald*, 1902). The furnace was further described as "a

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28 Forestry data for the Southwest US estimates 23 trees (of 12 inch diameter) per acre (whereas 1 acre is the equivalent of 0.40 hectares). A single cord of wood contains 128 ft^3 of split wood or 80 ft^3 of round wood (whereas 1 cord is the equivalent of 3.62 $meters^3$). While burning, pine emits 15.2 million British Thermal Units (MBTU) of energy, per cord of wood. The required BTU for charcoal is 9700 BTU per pound. This amounts to approximately 1147 acres (464.17 hectares) of wood, per year, or 1.012 cords of wood to smelt one short ton (0.91 tonnes) of ore. For smelting, the BTU has to meet the melting point of silver (Ag), which is 1761˚ F (961˚ C). In 1882, the Frisco Smelting Company used 30,000 bushels of charcoal (652 cords of piñon pine and 10 cords of cedar) to smelt 1,785,260 short tons (1757064.55 tonnes) of ore/concentrates (US Census 1880: 405-489; Whelan and Hintze 1973: 91; Emmons and Becker 1885: 464; Notarianni 1981, 1982, 1994, Lanner 1981, Wettstaed 2003). Thus, for the year 1882 alone, the Company would have required the harvesting of approximately 255,767.91 acres (103,505 hectares) of wood. For the peak period of smelting (1877-1894) at Frisco, nearly 516,482.81 acres (209,013.18 hectares) of wood would have been harvested for charcoal production to smelt 3,605,050 short tons (3,662,899.91 tonnes) of ore.

complete one and consists of a Black rock-breaker, a No. 5 Baker blower, two horizontal boilers, one 40 horse-power horizontal engine, several pumps, a shaft furnace and flue-dust chamber, a reverberatory flue-dust slagging furnace, 10 by 36 feet [3 by 17 m], and five charcoal kilns adjacent to the works[29]" (Emmons and Becker 1885: 470). The Godbe smelter was idle in 1881 although Godbe gained the contract for smelting ore from the Horn Silver, reducing approximately 20,000 tons initially (*Southern Utonian,* 8 October 1881). By 1884, more than 300 men were employed by the smelters in Frisco (Bancroft 1889: 745:72). Godbe continued to own several mines, including the Cave Mine, whilst rock was shipped to the Franklyn Smelter and bullion transported to Chicago (Bancroft 1889: 745:72).

3.2.2 Campbell, Cullen & Company

Between 1893 and 1894, a new dry concentration works was constructed two miles northwest of the Frisco town site (HSMC 1894: 6). The mill contained 20 stamps and 12 Frue Vanner tables (Wray 2006: 302). On April 4, 1894, a fire burned the initial mill, creating an economic strain to the local area: "the fire was viewed as a 'hard blow to southern Utah and to Beaver County in particular...'" (HSMC 1985: 4; Wray 2006: 302; Horton 2002: 293). The concentration mill was replaced, including 30 stamps and 18 Frue Vanner tables, and continued to operate until 1905 (Figure 3-15).

Figure 3-15. Campbell, Cullen and Company Smelter (Wray 2006: 314, f.14)

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29 Note these kilns were not associated with Godbe's smelter, but rather with the Frisco Mining & Smelting Company. See Section 3.2.3.

3.2.3 Frisco Mining & Smelting Company

In June 1877, the Frisco Mining & Smelting Company constructed the beehive charcoal kilns adjacent to the Godbe Smelter for the production of fuel for the smelting works associated with the Horn Silver Mine (Notarianni 1981, 1982, 1994) (Figure 3-16). The smelter was closed and dismantled in 1884, although the kilns remained in situ (Notarianni 1981, 1982, 1994: 10). The kilns themselves "remain among the best surviving charcoal kilns in Utah that documents the state's early mining history" (Notarianni 1981, 1982, 1994). Hooker (1879) provides descriptions of the smelting works at Frisco:

> The smelting plant...consists of three shaft furnaces with 40 horse-power engine and boilers, one No. 6 Root's blower, a Blake crusher, and other necessary appurtenances.
>
> The furnaces are placed in line with four dust chambers between stacks, or eight in all (6 feet [1.8 m] by 5 feet [1.5 m] 9 inches [23 cm] by 6 feet [1.8 m] 2 inches [5 cm] each). The furnaces are circular, the hearths being built of a fire-stone of excellent quality (*volcanic tufa*) found in the immediate vicinity... The stack is built of fire-brick and common brick, supported by cast-iron pillars... A single furnace only has been run at a time owing to the scarcity of water. The smelting of the ore is preceded by calcinations or roasting in heaps with wood, and, although it is far from being a complete roasting, it nevertheless puts the ore in good shape for charging the furnace, and has the great advantage of economy. The fuel used for smelting is an inferior quality of charcoal. The principal flux used is iron oxide from various mines in the [neighbourhood], and at present about one-sixth of the ore smelted consists of milling ore. The product is from 6 to 9 tons of lead bullion per stack per diem, carrying an average of 150 ounces silver to the ton. About 1-½ tons of matte are also produced daily, which, after a partial roasting, is charged back into the furnaces. From 1,200 to 1,500 pounds of flue-dust are saved daily.

Emmons and Becker (1885: 468-469) provide additional information regarding the smelting works:

> Before smelting, the ore is roasted in heaps of varying size, about 30 feet wide and 140 feet long being an average. Cedar cord-wood is piled 4 feet high, 20 inches of ore is spread upon it, another layer of wood 1 foot, and a final 1 foot of ore. This requires two or three weeks to burn. One cord of wood for 3 tons of ore is used. Wood costs $2.50 per cord. As the ore which comes from the mine is already oxidized, it is difficult to see how this roasting [affects] it, except to volatilize some arsenic and antimony and to burn off some sulphur still unoxidized. In proof of this, the furnaces still continued to form large quantities of matte, as when treating unroasted ore... Two of the furnaces are lined with a tufa found in the district. The lining is 16 inches thick, and extends 3 feet high. It usually lasts thirty to forty days. A new lining costs $130. The third furnace is a cast-iron water-jacket, vertical for 15 inches, and having a batter at the boshes of 6 inches per side in the remaining 13 inches. These furnaces run with a closed front. A varying quantity of limestone and

iron flux is used. The limestone is quite pure, and costs $2.50 per ton. The iron flux is a limonite and haematite averaging from 55 to 64 per cent iron. It comes from the Wahwah Range, Iron Springs, Star, Beaver Lake, and San Francisco districts, and costs about $8 per ton. The charcoal used is about 25 per cent of the smelting charge. It is an inferior quality compared with that used in the northern part of the territory, and costs 18 cents per bushel for kiln and 16 cents for pit coal. Heretofore no flue-dust has been saved. The lead and iron matte, which was quite abundant, is roasted in heaps and resmelted. It is said that there is considerable difference in the silver and lead contents of the mattes from the stone and water-jacket furnaces. No regular assays have been made, but the average of a few showed results in favour of the water-jacket of 24 ounces silver and 7.5 per cent lead. Whether the charge in each furnace was exactly the same or not is unknown. The furnace lead was quite hard, and contained several per cent of antimony. Since the completion of the railroad cost of shipping to Chicago has been reduced to $33.50 per ton...Owing to the high price of [labour], lack of water, poor quality, and constantly increasing price of charcoal, the company intended to shut down these furnaces and erect others at South Cottonwood.

Figure 3-16. Frisco Mining and Smelting Company, 1883 (Original at Todd's Market, Minersville, Utah)

According to the *Southern Utonian* (11 April 1889), haematite was shipped from Iron City (Utah) to Frisco and locations in Nevada (Pioche and Bullionville) for fluxing silver ore in reduction works. The workings were expanded to include a small leaching plant, which proved to be unsuccessful (Emmons and Becker 1885: 468). Mr. J.D. Williams, who formerly operated a smelter at Milford, was hired as superintendent of the smelter at Frisco for the Horn Silver (*Salt Lake Herald*, 1902). The leaching works were shut down by 1880 (Emmons and Becker 1885: 468; *Salt Lake Herald*, 1902). The following year (September 1881) the Frisco Smelter temporarily closed for repairs, although smelting continued at Francklyn (*Southern Utonian,* 24 September 1881: 3).

The Frisco Mining & Smelting Company began smelting again in December 1881 but closed permanently, with all of the leaching works being dismantled by July 1882 (*Southern Utonian,* 19 November 1881; *Southern Utonian,* 15 July 1882). The equipment was shipped to Tintic (*Southern Utonian,* 15 December 1882). All of the Frisco Mining & Smelting Company workings moved from Frisco to Milford to support the Cave Mine (Bradshaw District, Mineral Range, Beaver County, Utah) (*Southern Utonian,* 26 January 1883, *Southern Utonian,* 16 March 1883). The Frisco Mining & Smelting Company proposed construction of a narrow gauge tramway from the Carbonate Mine to Milford to help reduce the cost of transporting the ore from the SFMD.

3.2.4 Francklyn Smelter

The HSMC established the Francklyn Smelter[30] (1880) along the Francklyn [Murray] station of the Utah Central & D. & R.G. Railways, approximately 11 km [7 miles] south of Salt Lake City (*American Eagle*, 26 December 1903: 6). The smelter, situated at 4600 South West Temple, Murray, Utah, is recognized as an Environmental Protection Agency Superfund Site (UTD 988071585). Smelting began at the Francklyn Smelter in June 1881. By March 1882, the Horn Silver Mine shipped 14-16 carloads of ore per day to Francklyn and ran two stacks at Frisco (approximately 4 carloads of ore per day) amounting to an average output of 18-20 carloads per day (*Southern Utonian,* 18 March 1882: 2). In May 1882, the Horn Silver maintained 12 car loads per day to Francklyn (*Southern Utonian*, 20 May 1882); the mine shipped 1,500 tons of lead and 140,000 ounces of silver that month, whilst the smelter shipped 150,000 ounces of fine silver and sold £40235.10 [$63,000] worth of lead (*Southern Utonian*, 1 July 1882). A collapse at the Horn Silver halted production in 1885 (*Southern Utonian*, 14 August 1885). Rather than reopening the smelter, a 20-stamp mill was constructed near Frisco in 1893 (Butler 1913: 166). Emmons and Becker (1885) provide an overview of the Francklyn Smelter:

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30 The smelter was named for Charles Gilbert Francklyn, who served as the President of the HSMC in New York. Francklyn, the grandson of Samuel Cunard, the founder of the Cunard Steamship line, was born around 1845 in Newcastle, England and died in January 1929 (*The New York Times*, 15 July 1889). During his lifetime, he organized the Municipal Gas Light Company of New York, was noted among the socialites on Mrs. Astor's list, and served on the board of trustees for the Central Trust of New York (later Chase Manhattan Bank). He also owned a home in Elberon, New Jersey, which is where President James A. Garfield died after being shot by Charles Guiteau in September 1881.

This smelter was in process of construction at the time of the writer's visit, at South Cottonwood, on the Utah Southern Railroad, 7 miles [11 km] south of Salt Lake City, and intended to smelt ore from the Horn-Silver mine at Frisco. When finished it is to contain five stacks, though at first but one is to be completed. If experiments with that are successful the others are to be built. It is to be constructed as follows: An iron plate is placed 2 feet [0.61 m] below the surface of the ground. On this the crucible of fire-brick, having a bottom tamped with a mixture of clay, sand, and coke, is built. The water-jackets will be 5 feet [1.52 m] high, of cast-iron, and in ten sections; four on each side and one at each end. The end sections will be hinged at the two upper corners, that they may be easily lifted up by a pulley. The cross-section of the furnace at the tuyeres (inside) is 9 feet by 40 inches [2.74 by 1.02 m], with the corners rounded on a radius of 14 inches [0.36 m]. Cross-section at the feed-floor, 9 feet by 68 inches [2.74 by 1.73 m]. Distance between tuyeres and feed floor, 10 feet 7-½ inches [3.24 m]. The ends of the furnace are vertical. Tuyeres to lead-well, 10 inches [25.4 cm]. There will be sixteen tuyeres, eight on each side, opposite each other; two tap-holes, one at each end; but only one lead-well. The capacity is estimated at 80 tons per day. Each furnace will have a No. 6 Baker blower and a separate fine-dust chamber (Emmons and Becker 1885: 436).

By January 1888, production reached a high point, as witnessed by newspapers:

During last month the Horn Silver shipped 20 carloads of twelve tons each to Salt Lake. The force of men on this mine has now been increased to about 70, most of whom are engaged in prospecting. The stoping of ore seems to be restricted to 240 tons monthly. [Rumours] are whispered of a rich strike recently made in the eleven hundred foot level but its extent is not yet made public. One thing is certain, however, the Horn Silver is not yet played out (*Southern Utonian*, 13 January 1888).

The Horn Silver still keeps up its shipment of five carloads of ore daily. The ore is disposed of in the Salt Lake market, and ranges from £22.35 to £25.55 [$35 to $40] per ton. The reason of this low price is that the ore comes under the head of refractory' being largely impregnated with zinc (*Southern Utonian*, 2 March 1888).

Mr. P.T. Farnsworth of the Horn Silver has shipped 800 tons of ore, and could have shipped 200 more had there been car sufficient. The people of Frisco are jubilant over the new management of the mine and justly think a bright future is before them (*Southern Utonian*, 1 February 1889).

In 1897, John Erickson and Ray Graham were arrested for stealing iron from the old Horn Silver [Francklyn] Smelter. They were tried and discharged by Justice Steward in Salt Lake court for insufficient evidence (*American Eagle*, 13 November 1897: 1). Despite the Francklyn Smelter grounds being abandoned, baseball teams from Murray used the grounds for practice games (*American Eagle*, 17 May 1902: 8). In 1910, the HSMC sold the smelter to raise additional funds (Wray 2006: 340).

The SFMD also relied on smelters un-associated with the district, itself. Among those were the ASARCO[31] Smelter in Murray and the International Smelting and Refining Company's lead smelter in Tooele (Wray 2006: 374). The earliest smelter in Murray was constructed by Billy Morgan (1869, 5189 South State Street). The following year, the Woodhall Brothers constructed a furnace (State Street). In 1871, the Germania Refinery & Wasatch Smelter was added. In 1872, the Hanauer Smelter was constructed, followed by the Francklyn or Horn Silver Smelter (200 West and 4800 South) and the Highland Boy Plant (Bullion Street, at 5600 South, between 700 West and 800 West) (Figure 3-17).

In 1880, there were ten active lead smelters in Utah, including the HSMC (Frisco and Murray); the Old Telegraph Company (Midvale); the Mingo Furnace Company (Sandy); the Morgan Smelter (Murray); the Germania Smelting & Refining Works (Murray); the Chicago Smelter; the Waterman Smelter; the Marsac Company; and the Pascoe Smelter (*Deseret News*, 7 January 1880). By the turn of the century, the Utah Ore Sampling Company (UOS) was constructed (5500 South, 380 West). Over the next nine years, ASARCO organised, combining the Germania, Hanauer (Murray), Mingo and Ibex (Leamington) Smelters. In 1902, a new ASARCO smelter was constructed at the former Germania plant location (5200 Major Street, north of Murray High School). The Hanauer Smelter was engulfed by fire in 1885 but was rebuilt shortly thereafter. By 1941, ASARCO operated smelters in Murray and Garfield, whilst the US Smelting Refining & Mining Company operated a smelter in Midvale; Combined Metals Reduction operated in Bauer; and International Smelting & Refining operated in Tooele (*Kane County Standard*, 23 October 1941) (Figure 3-18). The International Smelting and Refining Company's smelter closed in 1971 (Figure 3-19).

31 Henry H. Rogers, William Rockefeller, Adolph Lewisohn, and Leonard Lewisohn established ASARCO in 1899; two years later, Meyer Guggenheim and sons acquired the industry. The Murray ASARCO was completed in 1902 and operated until 1949. As noted above, in 1929, ASARCO made claim to the Lulu Mine within the SFMD.

Figure 3-17. Approximate Location of Smelters Utilised by the SFMD in Murray

Figure 3-18. Approximate Location of International Smelting & Refining Company, Tooele

Figure 3-19. International Smelting & Refining Company, Tooele (Photograph taken from Historical Marker, Tooele, Utah)

3.2.5 Peck Mill

In 1904, O.B. and W.A. Peck, of the Centrifugal Concentrating Company, constructed a large flotation mill for the Horn Silver Company at Frisco. According to *The Salt Lake Mining Review* (30 June 1904: 19),

> ...the [HSMC]...agreed to deliver at least 50,000 tons upon a basis satisfactory to all concerned. In the construction of the building 300,000 feet of lumber will be required and the equipment will consist of several carloads of machinery. Water will be secured from the Newhouse Mines & Smelters corporation, by building a pipe line over the mountains intervening between Frisco and the reservoir at Newhouse, a distance of about three or four miles. A pumping plant will be built near the summit of the range.

The old 30-stamp gravity mill operated until 1905. The Peck mill operated between 1904 and 1911, but closed temporarily for remodelling. At that time, crusher rolls and Wilfley tables with jigs were installed (Wray 2006: 303). As indicated by Wray (2006: 303), the newer mill allowed for concentration of lower-grade and higher grade ores, as well as direct-smelting (Figure 3-20).

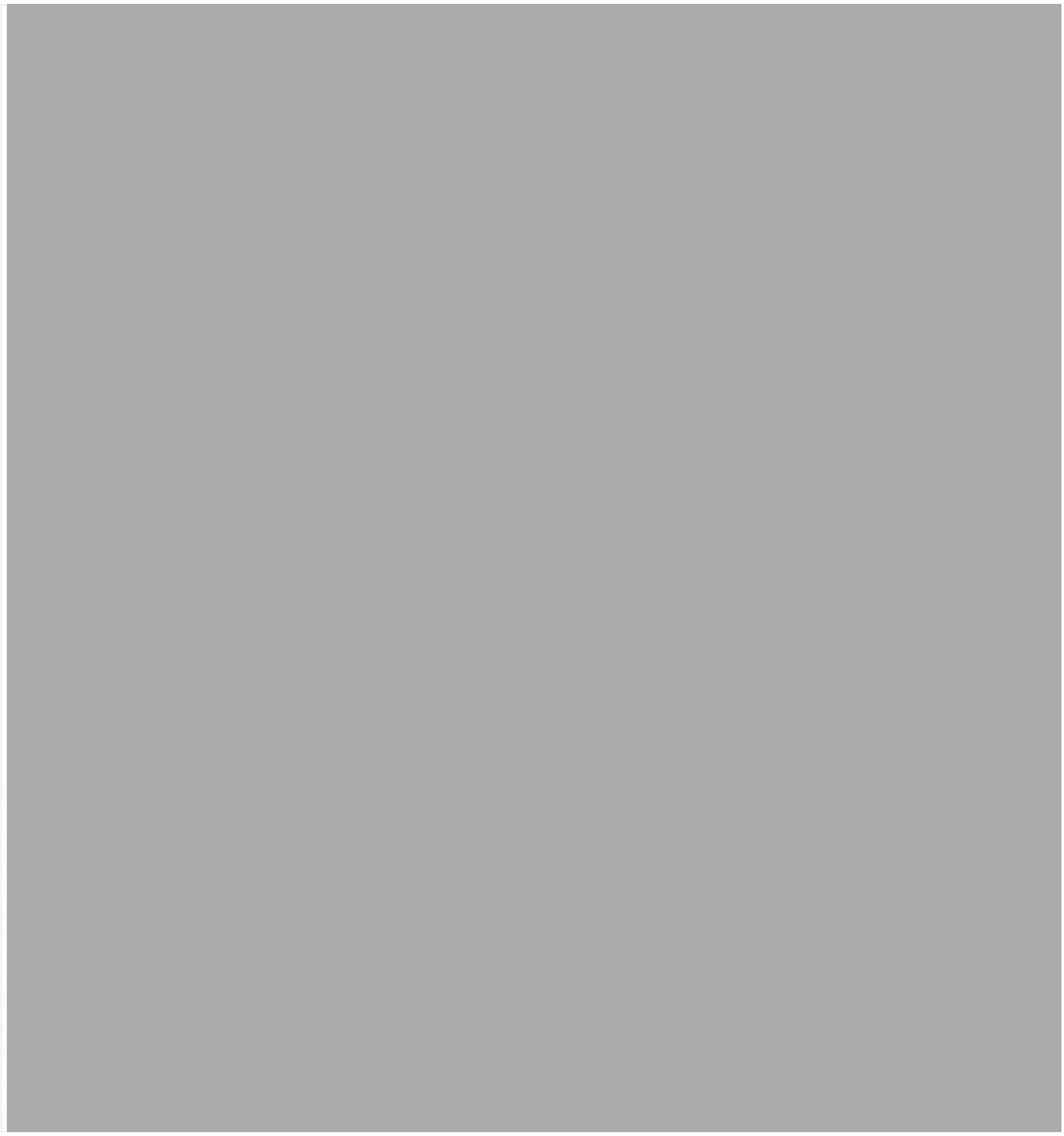


Figure 3-20. Overview of the Peck Mill, Horn Silver Mine circa 1920s (Wray 2006: 341 f. 36; Wray 2006: 349 f. 37; Wray 2006: 350 f. 38, 39)

3.3 Timbering Operations

In January 1882, McDonough, Blackner and Gentry contracted to furnish the Horn Silver with 18,288 m [60,000 ft] of square mining timbers[32] (Figures 3-21 and 3-22). Previously

32 Square-set mining timbers were utilised not only at the Horn Silver, but also at Newhouse in the Cactus mine. According to Mine Timbering (Sanders *et al.* 1907: 141), the square-set system was used in Bingham Canyon, Utah, and in the Comstock Lode, Nevada.

Fennemore & Company produced the timbers. A percentage of the required timbers were delivered monthly until the expiration of the 6-month contract, which had an option for renewal. Huntington's Steam saw mill produced the timbers, whilst a City Lot (in Beaver) formerly owned by W.P. Jones, east of the *Southern Utonian* office, was rented for the lumber yard (*Southern Utonian,* 14 January 1882: 3). D.L. McDonough and Company constructed a mammoth crane at the railroad station in Milford to load the timbers for shipment to Frisco, with Bush and Grant serving as charges for the railroad (*Southern Utonian,* 28 January 1882).

In July 1882, Mr. Hill and Mr. Decker of Salt Lake County were awarded the contract for providing sawn mining timbers to the HSMC of Frisco, in lieu of the contract being held by D.L. McDonough and others of Beaver (*Southern Utonian,* 1 July 1882). In December 1882, the *Southern Utonian* (1 December 1882) published several advertisements for teams to haul lumber from Beaver to the Horn Silver Mine. Two men from Beaver, John Taylor and Jos. Huntington, won the contract for furnishing 106,680 m [350,000 ft] of lumber and mining timbers to the Horn Silver and two other mines in the western part of Beaver County (*Southern Utonian,* 5 January 1883; *Southern Utonian,* 18 January 1883). The steam saw mill turned out nearly 1829 m [6000 ft] of timber per day for the mines at Frisco alone (*Southern Utonian,* 26 January 1883). Newspapers continued to run John Taylor advertisement for teamsters to haul the timber from Beaver to Frisco and noted the Wah Wah Mountains west of Frisco as being:

> infected with a gang or gangs of Norwegians, who are furnishing the 'Horn Silver' with sawn timbers at £1.28 [$2.00] per thousand feet less than is furnished by the lumbermen of our city. These Norwegians are erecting temporary saw-pits, using whip saws to cut the timbers (*Southern Utonian,* 27 April 1883).

A sawmill was located in Sawmill Canyon in the SFMD (Wray 2006: 318).

> Notwithstanding that Beaver has three steam saw mills of large capacity all of which, are now filling contracts for mining timber for the Horn Silver mine at Frisco; yet, they seem to be unable to supply the extraordinary demand now existing at that mine, for that class of lumber and a contract for an additional 100,000 feet [30,480 m] of lumber has recently been awarded to Parowan parties (*Southern Utonian*, 9 January 1891).

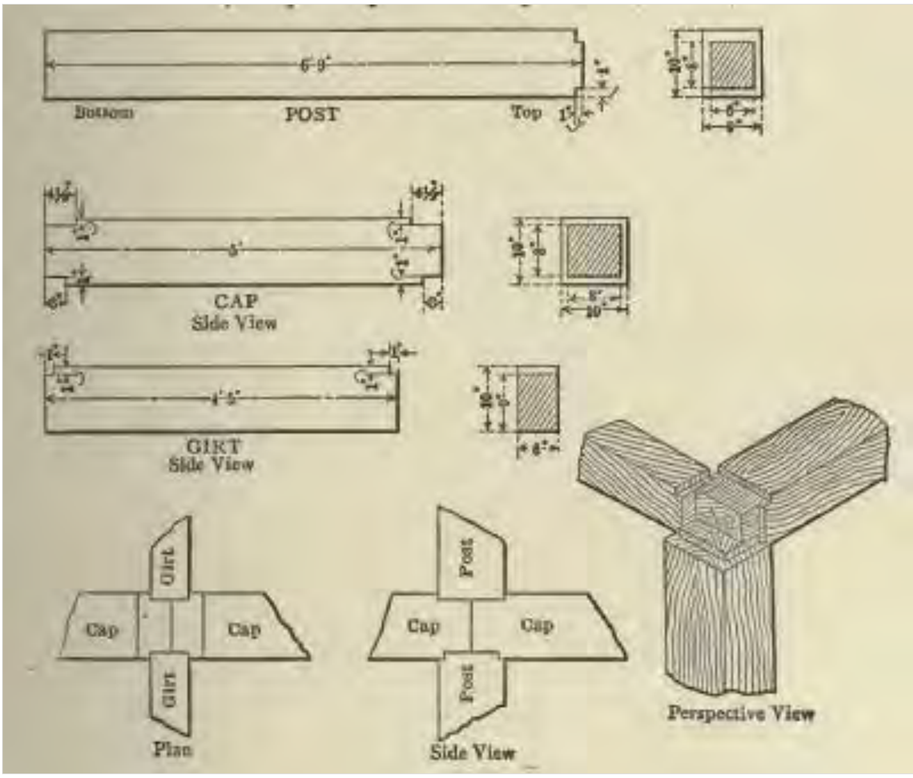


Figure 3-21. Example of Square Set Mining Timbers (Sanders *et al*. 1907: 141)


Figure 3-22. Square Set Mining Timbers in the King David Mine, 1995
(http://www.youtube.com/watch?v=lOuDo27cA_M&feature=related)

In 1915, engineer James Aylward – considered one of the experts in wire cable – installed cable within the Horn Silver and King David mines (*Eureka Reporter*, 23 April 1915).

3.4 Transportation in the San Francisco Mining District

Within three years of the initial discovery, the SFMD included Frisco, smelters, charcoal kilns, and a stage coach station (Hooker 1879, Wray 2006: 295; West 1885). By 1885, the railroad extended west from Milford and a stagecoach stop was noted at Squaw Spring, also identified as the San Francisco Spring or San Francisco Station (Hooker 1879; West 1885; Wray 2006: 295). Additional stagecoach way stations were noted by Wheeler (1874: 21) at the North Star District, east of Frisco: "A 'jerky' connects daily with the Salt Lake and Pioche [Nevada] line of stages; country-roads are winding and steep." The Rocky District (Beaver County) was "not a stage-station, but on the Pioche and Salt Lake Stage Route" (Wheeler 1874: 21). Pioche is situated 157.72 km [98 miles] southwest of Frisco. A stage route, known as the Southern Express, ran between Pioche, Levan, Nephi and Chicken Creek [Juab], Utah, in 1870[33] (Figure 3-23). By 1881, several additional interior stage lines extended between mining camps and towns (Wren 1904). Among these were a tri-weekly stage route from Osceola, Nevada, connecting to the Utah Southern (*Salt Lake Herald*, 25

33 In 1849, William H. Russell, Alexander Majors and William B. Waddell founded the Leavenworth & Pike's Peak Express Company (NPS 2006). Operating as the Central Overland California & Pike's Peak Express Company (1860-1861), the mounted riders (Pony Express) established a transcontinental mail service route between Missouri and California. Mail could be delivered within ten days via the "Butterfield" Overland Mail Stage Line, along the Overland Trail, from Denver, Colorado, and locations east to the Mississippi River (NPS 2006). Ben Holladay then assumed operation of the Pony Express line (NPS 2006). Beginning in 1852, Wells Fargo (named for Henry Wells and William Fargo) provided stage service through much of the western US (Wells Fargo 2006). By 1857, Wells Fargo and additional express stage lines (Overland Mail Company), providing mail service between San Francisco, California, and St. Louis, Missouri. Under the supervision of John Butterfield, the overland mail route (Butterfield Line) was surveyed and extended southward from St. Louis to El Paso, Texas; west to Tucson, Arizona; and then west to Los Angeles and northwest to San Francisco. In 1861, an additional Wells Fargo route was utilized from the Great Plains, west to the Rocky Mountains, the Great Basin, and the Sierra Mountains; this route included mail and passenger service, with stops in Virginia City and Salt Lake City (Wells Fargo 2006). At the same time, service was offered via the Overland Express and Overland Stage Route. During the American Civil War, stage and mail service operated sporadically. For instance, Pony Express mail service operated only between Sacramento and Salt Lake City, from March to October 1861 (NPS 2006). In 1861, the transcontinental telegraph offered service between Omaha, Nebraska and Sacramento. In 1866, Holladay sold the Pony Express and the Overland Express and Stage Route/Butterfield Stage to Wells Fargo (Wells Fargo 2006).

December 1885: 2); a daily route from Pioche eastward through Bullionville, Panaca, and Clover Valley to the Utah Southern at Frisco; a semi-weekly route from Pioche to Hiko; a tri-weekly route from Pioche to Mineral Park and Yuma (Arizona); and a tri-weekly route between Eureka and Pioche (Figure 3-24; Wren 1904, Thompson and West 1881: 102-108).

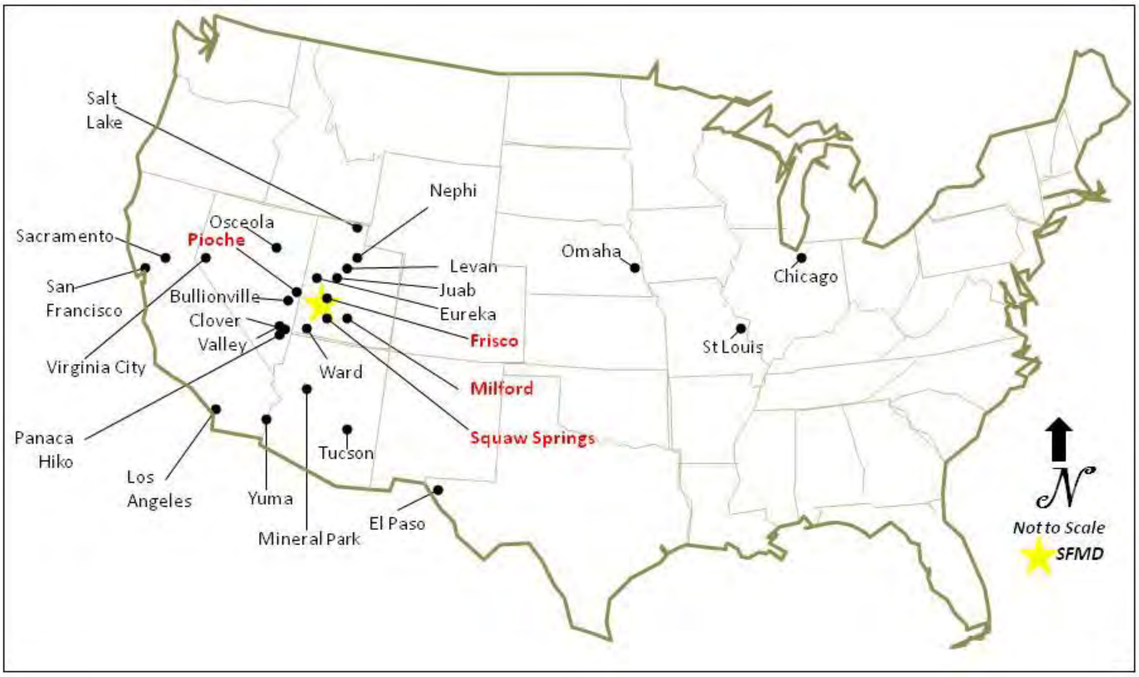
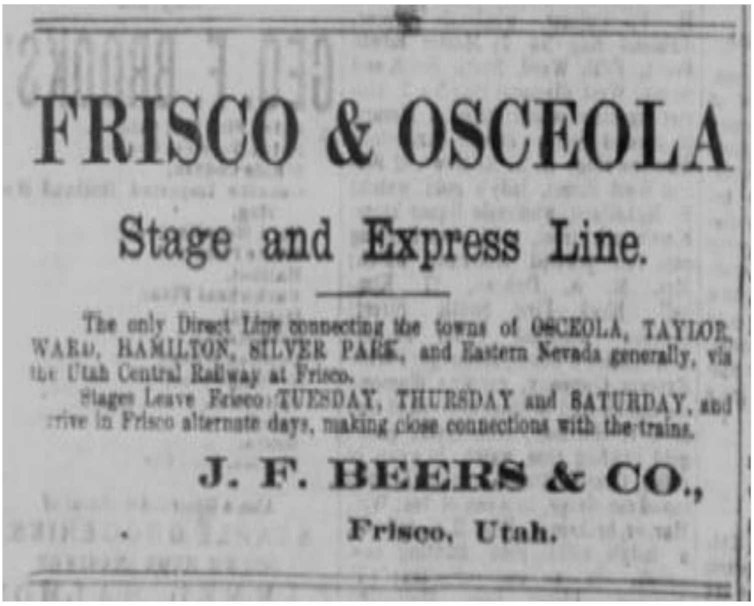


Figure 3-23. Destinations to and from Frisco



FRISCO & OSCEOLA

Stage and Express Line.

The only Direct Line connecting the towns of OSCEOLA, TAYLOR, WARD, HAMILTON, SILVER PARK, and Eastern Nevada generally, via the Utah Central Railway at Frisco.

Stages Leave Frisco TUESDAY, THURSDAY and SATURDAY, and arrive in Frisco alternate days, making close connections with the trains.

J. F. BEERS & CO.,

Frisco, Utah.

Figure 3-24. Stage Advertisement for Frisco (*Salt Lake Herald*, 25 December 1885: 2)

Whilst most stage service ended with the advent of the transcontinental railroad in 1869, independent stage lines continued to offer service to remote areas lacking railroad infrastructure (Wells Fargo 2006). The former stage route between Milford and Pioche, including Frisco, was incorporated later into Utah State Highway 21. Wray (2006: 337) provides a descriptive view of the route as it changed over time:

> The road was fundamentally a rutted 'two track' wagon road with little if any improvements along most of its length, but was suitable for the low-intensity use of the times. The bulk of the 'heavy moving' of equipment into the district, and ore and concentrates out of the district, was accomplished over the rail line. Horse and mule teams pulling wagons hauled supplies and equipment into the hills, and transported ore out to the railroad stations at Frisco and Newhouse.

Jay Cooke helped finance 283.24 km [176 miles] of rail lines to the Horn Silver. As a result of the population boom, one of the first telegraph lines in the Western US was built from Salt Lake City to Milford, then west via Frisco, to Pioche (*Kane County Standard*, 18 March 1949) (see Figure 3-23). Construction of the Utah Southern Railroad began in Salt Lake City in May 1871. By December 1873, the line stretched to Provo, and then Juab (1879). The line continued to Milford via the Utah Southern Railroad Extension Company (May 1880) and on June 23, 1880, the line serviced the SFMD. Wray (2006: 321) notes that this spur comprised a 26.55 km [16.5 mile] long stretch called the "highline" extension. A branch to Newhouse was added in 1905, which served as the terminus for the line (Butler *et al.* 1920: 120). The line between Frisco and Milford was known as the Utah Southern Railroad Extension, or the Frisco Branch, and then later, the San Pedro, Los Angeles & Salt Lake Railroad (eventually the Los Angeles & Salt Lake Railroad Company) (Wray 2006: 336).

The Utah Southern Railroad Extension was acquired by the Union Pacific prior to 1887 (*The New York Times*, 8 June 1887). At that time, it included a route running from Ogden, south to Frisco, for a distance of approximately 450.62 km [280 miles]. The Union Pacific planned to extend the route through Western Utah, into Nevada, and on toward California, but due to economic constraints between 1883 and 1885, that idea was scrapped (*The New York Times*, 8 June 1887).

In 1901, the Oregon Short Line purchased the Utah and Pacific Railroad. The railroad line is depicted on Union Pacific brochures from 1901; it extends west from Milford and terminates at Frisco (Union Pacific 1901). The line extended 121 km [75 miles] long and connected with the Oregon Short Line at Frisco (*The New York Times*, 7 April 1901).

Maps of the area between 1911 and 1920 show the town connected to a spur of the Los Angeles and Salt Lake Railroad (USGS 1911; Butler *et al.* 1920: 75, fig. 5A) (Figures 3-25 and 3-26). The spur extends south from the town site to a second (east-west trending) spur that terminates at the curve of Grampian Hill. The eastern extent of the spur forms a “Y” that connects to the main line near the present day Utah State Highway 21; it continues south-southwest, then westerly toward Newhouse. The main line continues eastward toward Milford (Butler *et al.* 1920: 75, fig. 5A).

In 1937, the tracks between Newhouse and Frisco were removed. By July 1943, the remaining portion of the line between Frisco and Milford was abandoned; the tracks were removed subsequently (Bradley 1999: 341; Wray 2006: 337).

As noted above, Utah State Highway 21 has been paved over portions of the former stage route and rail line between Milford and Frisco. Milford was unusual in that from 1955 to 1957, it was one of the first cities in Utah to oil its roads, thus having an “all-paved road system” (Bradley 1999: 341; Wray 2006: 337). Utah State Highway 21 was either oiled or paved to the Nevada border by June 1959, although it was possible that the road from Milford to Newhouse had been paved as early as the 1920s (Wray 2006: 337).

3.5 Settlements in the San Francisco Mining District

3.5.1 Frisco, Grampian and Newhouse

At one time, the Horn Silver Mine supported not only a smelter, but also a community estimated at 2,500 people (*Kane County Standard*, 5 March 1948). Wray (2006: 311) notes that “prospectors and miners need to live no more than one or two miles [3.22 km] away from

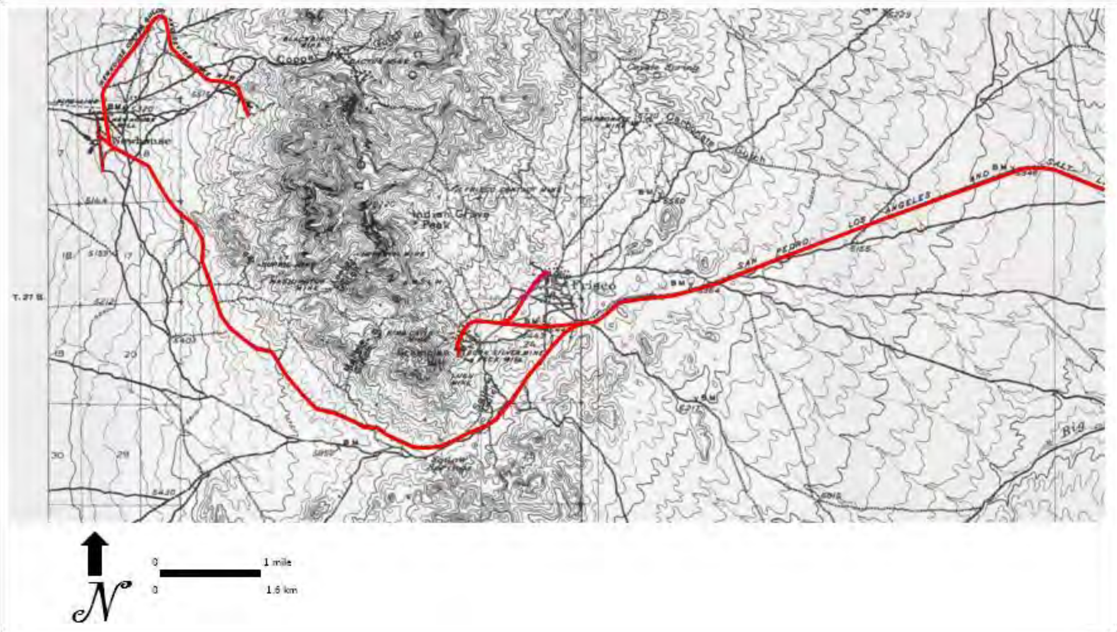


Figure 3-25. 1911 Map Showing Los Angeles and Salt Lake Railroad at Frisco (USGS 1911); note route shown in red

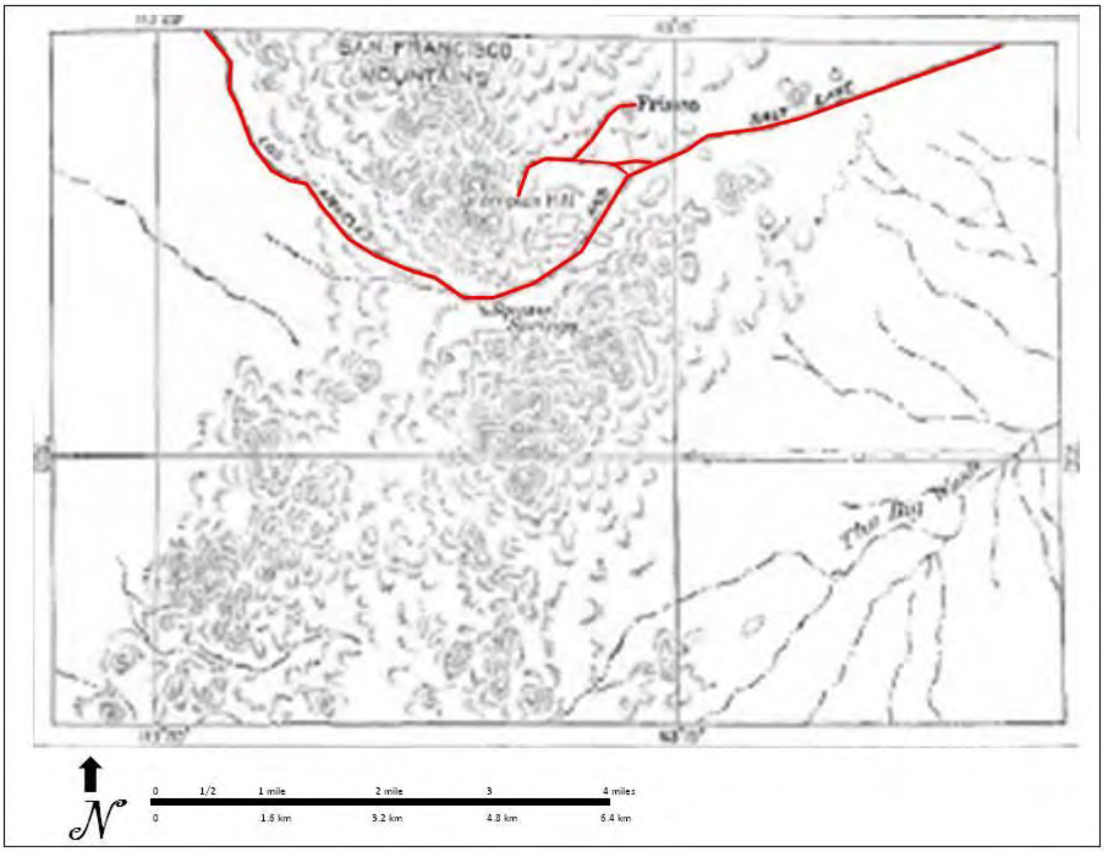


Figure 3-26. 1920 Map Showing Los Angeles and Salt Lake Railroad at Frisco (Butler et al. 1920: 75, fig. 5A) ; note route shown in red

the diggings or mines (the distance to conveniently walk to work), and often the settlements were right under the shadows of the headframes." The SFMD was no exception, and a few thriving areas were established quickly on the eastern flanks of the San Francisco Mountains, including Frisco and Grampian, whilst Newhouse was situated on the western side. At least one area associated with Chinese immigrants, commonly identified as 'Chinatown,' developed on the outskirts of the Frisco settlement and was associated with Hop Lee, who served as boss; Lee purchased a building formerly occupied by Sam Wing Hing (Hickman 2006; *Southern Utonian,* 15 October 1881). Additionally, shanties, stone cabins, and other temporary dwellings were constructed throughout the district.

The US Census provides a glimpse at the population for the SFMD area between 1880 and 1940, whilst additional information is gleaned from the newspapers and Utah Directories from 1883 to 1893 (see Appendix D1).[34] The *Utah Directory and Gazetteer for 1879-1880* (Culmer 1880) includes the names of several prominent businessmen in Frisco, including those affiliated with the Horn Silver Mine, Frisco Reduction Works, and 35 other properties within the commercial district. At the time, Hooker (1879) provided an early glimpse of the street plan for Frisco, showing 24 structures, including the two smelters, and three primary but unnamed roads. Businesses included meat markets, livery stables, assayers, blacksmiths, wheelwrights, a bank, general merchandise or grocers, hotels, saloons, brewery, restaurants, grain and provisions, stationers, hair dressers, and a druggist and physician (Culmer 1880: 329). Shipler (1918) provides a glimpse of the interior of the bank (Figure 3-27). Advertisements for the Frisco Bank and HSMC general merchandise are included in the Gazetteer (Culmer 1880: 329) (Figure 3-28).

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34 A 1921 fire at the Department of Commerce resulted in the damage and loss of the 1890 Census records. The only records that survived for 1890 refer to portions of Alabama, Georgia, Illinois, Minnesota, New Jersey, New York, North Carolina, Ohio, South Dakota, Texas, and the District of Columbia. A schedule relating to Union veterans of the American Civil War is available for Kentucky and Wyoming. Per Title 44, US Code, federal population censuses are considered confidential for 72 years. As a result, no additional Census information for enumerations after 1940 is currently available (National Archives Records Administration April 2012).

Figure 3-27. Bank Interior, Frisco (Shipler 1918; USHS 2001)

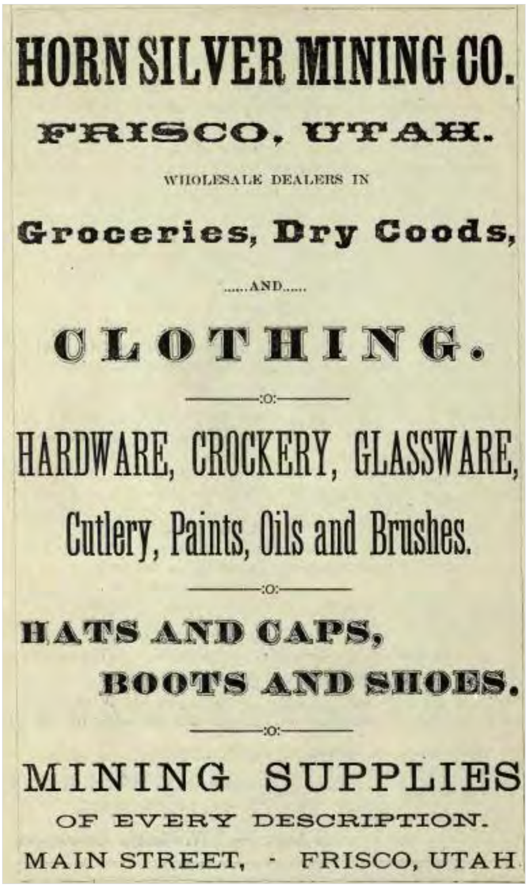

Figure 3-28. Frisco Business Advertisement, 1879-1880 (Culmer 1880: 329)

Prompted by the discovery of the silver ore by Ryan and Hawkes, the Frisco town site formed between 1874 and 1876 along the eastern hill slope of the San Francisco Mountains. The town has been described as being “scattered randomly [among] the juniper trees with only two [discernible] streets in the town [Main Street and Horn Silver Avenue[35]]…Frisco had no green grass, but it did have juniper trees” (Hickman 2006: 4). Business directories note the town being “situated on the Eastern base of the San Francisco mountains…with its valuable mineral claims bids fair to remain one of our best and permanent mining camps” (Graham & Co. 1884: 284; see also Appendices D1 and D2). At that time, Frisco included a series of stores, saloons, three smelters (the Frisco Mining & Smelting Company; Godbe’s Smelter; and the Campbell, Cullen & Company Smelter), an iron reflux mine, and a telegraph line. As indicated by the *Salt Lake Tribune* (1 January 1879: 8), the commercial district featured a series of permanent structures fashioned from locally available rock (rhyolite) and wood frame. Based on the presence of brick used for some structures, it may be postulated that certain structures were constructed more permanently than others, or at least at a higher cost. With the arrival of the train, bricks may have been available in larger quantities, suggesting that prior construction was dominated by wood structures. For example, J.J. Ferren of Silver Reef (Utah) owned the Southern Hotel in Frisco. Reported by the *Salt Lake Tribune* as “one of the best outfitted hotels in this region,” the hotel was described as being constructed of “‘pink rock’ [rhyolite] cut from the quarries at the mouth of Beaver Canyon, fifty miles to the east. The rooms were well furnished and clean, and it sported a fine balcony overlooking Main Street…” (Hickman 2006: 39). In October 1882, Compson purchased a fireproof cellar adjoining the Southern Hotel in Frisco at a public auction whilst Kelly and Lipscomb purchased the Lochne [Lochrie] House (*Southern Utonian,* 13 October 1882). Likewise, the HSMC Store featured a “fine two-story, cut stone edifice is completed externally, and makes a splendid appearance. It is the finest and most substantial building in

35 Horn Silver Avenue sometimes is referenced as Cedar Street.

Frisco and shows an unlimited faith in the permanency and future growth of Frisco" (*Southern Utonian*, 22 October 1881). Newspaper accounts, such as that of the *Salt Lake Tribune* (1 January 1879: 8) indicate a growing population, development, and amenities at Frisco just four years after the discovery of the Horn Silver mine:

> Frisco has increased in size just about double to what it was a year ago, and improvements go on. Quite a number of fire proof buildings have been erected. Among the finest of them and just completed is that of Burke & Kelly – a double building to be used as a saloon and bank.
>
> A new hall 23 x 50 feet [7 x 15 m] has just been completed by Henry Bonen, to be used as a theatre or for dances.
>
> Among the many enterprising business men who have come here and established themselves and are today doing well, are the firm of Hightower & Miller, Schwartz, [Olsen] & Forgie, Savior & Co., J.F. Grant, G.H. Herbert's drug store, J.J. Ferrell, International Hotel, P.A. Malloy, J.R. Lindsey, Ryan & Lochrie, M. Ormond, D. Grehig, Dau. McKay & Co., Boatright & Co., Campbell, Cullen & Co., and a host of others.
>
> T. Ormond, our worthy postmaster, has done well. He has increased the mail service and has discharged the duties of his position satisfactorily to all. He also keeps a news depot, where the latest and all kinds of publications can be had, including THE SALT LAKE TRIBUNE, which has doubled to circulation here in the past year and still keeps increasing.
>
> The incoming of a railroad and the general improvements that will follow such an undertaking, will make this part of Zion a busy metropolis and its wealth surprise the natives (*Salt Lake Tribune,* 1 January 1879: 8).

In 1877, B.F. Grant constructed a small general store which he sold in 1885 to Samuel N. Slaughter (Figure 3-29). Slaughter added a post office and operated under the name, S.N. Slaughter General Mercantile Clothing. In the early 1900s, the Griffiths family took over the store, which then housed one of two Bell Telephones in town; the other telephone was located at the HSMC office. Previously, in order to send messages from Beaver to Frisco via electricity, the communication had to go to Nephi and from there, be repeated over the railroad telegraph line to Frisco. In February 1889, the people of Beaver hoped to establish a telephone line between Beaver and Minersville, and on to Frisco (*Southern Utonian*, 15 February 1889) (see Figure 3-1). The Slaughter Store burned in a fire in 1922, leaving no remains (Hickman 2006: 55). Historic photographs of the town in early 1879 depict the Horn Silver mine; the Frisco Mining & Smelting Company mill; the Horn Silver Store; a well; and a single tree. Note the metal window coverings on the Horn Silver Store (Figure 3-30), utilised not only for security of the merchandise, but also for protection against the harsh desert winds. Boardwalks or primitive sidewalks are present, adjacent to the buildings, providing pedestrian access away from the unpaved streets (Figure 3-31). Additionally, business directories provide names that are not accounted for in the 1880 Census, whilst the Census provides information regarding the commercial district of Frisco; miner's residences and positions held: assayers, blacksmiths, coal burners, engineers, a machinist, smelter hands, tin and copper smiths, labourers, teamsters, and freighters (US Census 1880; Appendix D1). Other businesses identified in the Census include butchers, cooks, retail grocers, saloon keepers, a French restaurant keeper, two waiters, a shoemaker (Figure 3-32), store clerks, hotel clerks, hotel keepers, hotel porters, a lodging/boarding house, druggists, a physician/surgeon, jeweller, a telephone operator, a painter, a livery stable, a lumber merchant, a carpenter, and a Justice of the Peace (US Census 1880). According to the *Southern Utonian,* (24 September 1881: 17), early settlers to the area included E.S. Anderson, R.S. Anderson, Mr. Charley S. King, Mr. Melvin Morris and wife (Lydia Osborn Morris, originally from Minersville), 'Brother' Jakeman, and A.W. Atkins. Interestingly enough, none of these individuals are listed in the 1880 US Census. According to newspaper accounts, there were a total of 801 people residing in the SFMD, with 751 of these residing in Frisco alone (*Southern Utonian,* 22 October 1881: 3). This information conflicts with the US Census of 1880, which accounted for 401 people in Frisco at that time (US Census 1880, Appendix D1). Either this accounting is an error, or suggests that the Grampian community included a total of 50 people – at least – between 1880 and 1881 (see Appendix D1).

Local newspapers offer insight into the residents of the SFMD, many of which relocated to Beaver either just before the mine collapse or shortly thereafter. Charley S. King, former editor of the *Salt Lake Tribune*, served as editor of the *Frisco Times* (*Southern Utonian,* 17 September 1881: 3). The *Tribune* also published weekly excerpts of the *Frisco Times*, despite it being Anti-Mormon and Anti-Polygamy: "Frisco, where no such thing as polygamy

Figure 3-29. Grant / Slaughter Store (Hickman 2006: 66)

Figure 3-30. Horn Silver Store, Frisco (*Desert Magazine,* March 1961 (24) 3: 21)

Figure 3-31. Frisco Commercial District, 1879 (*The Daily Graphic: New York*, 2 July 1879: 16)

Figure 3-32. George Hardy Shoeshop at Frisco (Horton 2002)

or bigamy is supposed to exist" (Graham & Co. 1884: 284; Hickman 2006: 4-5) (Figure 3-33). From 1881 to 1883, Frank R. Clayton served as publisher and editor of the *Southern Utonian*, a weekly (Saturday) published in Beaver. He also served as co-editor of the *Beaver County Record* in 1883. At that time, Ed Burlingame was named the foreman of the *Frisco Times* (*Southern Utonian,* 16 March 1883).

NEW TO-DAY.

THE SOUTHERN UTAH TIMES.

By Charles S. King.

THE SOUTHERN UTAH TIMES AT FRISCO, Beaver Co., Utah, will resume publication

SATURDAY, SEPTEMBER 6TH, 1884.

Its policy remains UNCHANGED, and it will continue—as for four years past—to represent the ANTI-POLYGAMY cause, and the MINING interests of Southern Utah.

FRISCO is the home of the HORN SILVER MINE, the Largest Lead Silver Mine on Earth, and in the BUSINESS CENTER of a Large Mining Region.

The SOUTHERN UTAH TIMES is the only Anti-Mormon Journal in Utah south of Salt Lake City.

CHAS. S. KING & CO., Publishers.

Subscription, $5 Yearly. W. H. MEEK, Bus. Manager.

Figure 3-33. Advertisement for the *Southern Utah Times*, 1884 (*Salt Lake Tribune*, 17 August 1884: 1)

"Mr. [Robert] H. Burke leased the building formerly occupied by the late Dr. A.W. Smith, opening Store of Drugs, Medicines, Wines & Liquors. 'Bob' says he has some of the purest liquors on the Pacific Coast which he will sell at bed rock prices" (*Southern Utonian,* 11 March 1882: 3). S.W. Simpson worked as a prescription clerk at R.H. Burke & Co, a pestle and mortar drug establishment at Frisco (*Southern Utonian,* 8 October 1881). Burke and Simpson closed the drug store in Frisco by January 1883, relocating to Beaver, where Burke hired Dr. Meeks, also of Frisco, as his assistant (*Southern Utonian,* 18 March 1882: 2; *Southern Utonian,* 25 March 1882; *Southern Utonian,* 19 January 1883).

Mr. Sylvester Reeves, former clerk at HSMC Store at Frisco worked at the Beaver Co-Op (*Southern Utonian,* 11 March 1882: 3). The Co-Op store in Beaver, which sold school books, jewellery, and alligator boots, was in controversy with the HSMC, claiming that Boatright owed them £383.19 [$600.00]. Horn Silver intervened, claiming the property (*Southern Utonian,* 12 January 1883; *Southern Utonian*, 9 January 1891).

Hugh [Bally] Sackett's constructed a small blacksmith shop at the corner of Main Street and Horn Silver Avenue, east of the HSMC Store (Hickman 2006: 56). Additional establishments were located along the hillside, constructed in dugouts. Examples include John Savior's place which catered to the Hispanic trade, and Tom Loughney's saloon and oyster parlor (Hickman 2006: 40).

Charley Schmitt, Frisco shoemaker, moved to Beaver (*Southern Utonian,* 9 September 1882), possibly replaced by, or in competition with, George Hardy (see Figure 3-32). W.P. Jones was identified as a new resident to Frisco in 1883 (*Southern Utonian,* 5 January 1883). A barber identified as "Kennedy" sold summer hats throughout the streets of Frisco (*Southern Utonian,* 24 September 1881: 17).

A small well provided water to the smelters, but not for drinking purposes. Drinking and culinary water was hauled in by tanker wagon from Wah Wah Springs or Black Rock until 1882 (Figure 3-34); at that time, water was brought to Frisco via the train from Milford (Hickman 2006: 40). Mr. McGeary, the registration officer of Beaver County and resident of the Milford area, provided Frisco with milk and also worked as a professional rancher (*Southern Utonian,* 2 September 1882).

Minerals and marble works produced by Colonel H.B. Compson at Frisco were exhibited at the National Mining and Industrial Exposition exhibit devoted to Southern Utah (*Southern Utonian,* 26 August 1882: 2). The expedition was one of three successive annual exhibits held in Denver between 1882 and 1884. Mr. Zeehandelaar, Utah Commissioner for the 1883 World's Fair, sought to showcase the mining of the Utah Territory (Southern Utonian, 19 January 1883).

Figure 3-34. Water Wagon, Frisco (Hickman 2006)

The Utah Directory of 1883-1884 touted the Horn Silver as the richest mine in the world (Graham & Co. 1884: 284), just prior to the collapse of the Horn Silver shaft in 1885. In September 1882, the *Southern Utonian* (23 September 1882) noted that there were 260 people registered to vote in Frisco (previously 525). At least 70 various businesses are noted within the town limits at that time, including hotels, meat markets, mercantile shops, livery stables, drugstores, printer and newspaper publisher, banks, bakery, boarding houses, saloons, blacksmith and wagon shops, laundry services, milliner and dress makers, a post office, attorneys at law, assayers, shoemakers, furniture shop, and a watchmaker (Graham & Co. 1884: 284).

Local newspapers indicate that there were reportedly 300-400 unemployed men in Frisco in 1885; many relocated elsewhere after the shaft collapsed (*Southern Utonian*, 20 February 1885). The mines closed briefly, further slowing development in the town (*Southern Utonian*, 14 August 1885). Regardless, the Grampian suburb continued to develop rapidly and by 1887, the Precinct elected judges, including P. Lochrie, C. Lammersdorf, and L. Holbrook (*Deseret News*, 20 July 1887: 7).

In March 1888, W.L.H. Dotson & Son opened new stores in Frisco and Minersville; they advertised at 'bed-rock prices' (*Southern Utonian*, 2 March 1888). Advertisements in 1891 suggested the store carried a line of dry goods, groceries, kitchen items, clothing, notions, farming implements, furniture, carpet, and mining supplies (*Southern Utonian*, 9 January 1891).

The population of Frisco was estimated at four to five hundred in 1889 (*The New York Times*, 15 July 1889), although the 1892-1893 business directory (Stenhouse & Co. 1892-1893) indicates only eight businesses within the town, and a population of 250 people. Among those listed were two mercantile shops (Dotson & Son General Merchandise and the HSMC Mines and General Merchandise), four saloons (including those owned by Charles Lammersdorf, N.C. Lawrence, R.S. Lipscomb, and D.W. Smithson), a hotel owned by Mrs. T.N. Sacket, and a butcher shop (Osborn & Sons) (Stenhouse & Co. 1892-1893). The town itself is described as "the scene of the Horn Silver mine, and whatever of importance it enjoys at present is due to the magnitude of that property. It is essentially a mining camp, with the consequent fluctuations in population and prospects. It is seventeen miles from Milford, and a branch line of the Union Pacific runs there" (Stenhouse & Co. 1892-1893: 73).

According to Stenhouse & Co. (1892-1893), the Frisco Post Office was a "money order office…, authorized to issue and to pay money orders and postal notes." The post office at Frisco operated between 1877 and 1928, whilst a second post office in the SFMD was located at Newhouse between 1904 and 1929 (Forte n.d.). Charles R. Hopkins served as the postmaster from 1880 to 1882; he and his family relocated to Salt Lake City in August 1882 (*Southern Utonian,* 26 August 1882: 2). In 1882, Mr. Krug, formerly mail agent on the U & N Railroad, became the postmaster assigned to Frisco (*Southern Utonian,* 2 September 1882).

In 1893, "the company's store at Frisco [also was] booming and a general good business [was] being done" (*Manti Messenger*, 17 November 1893:1). According to the County Surveyor's Map, a jail was situated at the south end of Main Street near the train station. The train station included a wood platform and station house. Within three to four years, the population dipped to 250 people (Utah Directory 1892-1893). The *Index of Public*

Documents for the State of Utah, 1911-1912 (Part 2), reports that the Grampion Precinct contained 215 people in 1890 and a total of 562 in 1900; Frisco is not listed in the *Index* (1911-1912: 274). This suggests that either the Grampian area had grown tremendously, or that the population count included these two communities as a whole (see Appendix D1). Local miner and timber supplier, Mr. John Taylor indicated in 1898 that "Frisco is rapidly and surely drifting back to the palmy days of the [eighteen] seventies. The Horn Silver...is a better mine today than ever before in its history; with over a quarter of a million [dollars] in the treasury and bigger ore bodies in sight than ever before" (*Deseret Evening News*, 12 December 1898).

At the turn of the century, the population for both communities surged slightly to 544, likely associated with the new developments at the King David Mine (US Census 1900, Frisco and Grampian Precincts). By 1900, electricity was brought to both Frisco and Newhouse (Merkley [ed] 1948: 273; Wray 2006: 333). In addition to mining, sheep ranching has been one of the mainstays within the SFMD. Newspaper accounts from 1904 indicate several sheep companies in operation in the Frisco area (*Deseret News*, 11 January 1904: 11). Further, newspapers provide additional insight into the arrangement of the commercial district and outlying residences in the Frisco area at the turn of the century.

> So Frisco thrived amazingly and the one long, straggling street of the town [Main Street] was lined for a half-mile with rows of modest dwellings, liberally interspersed with saloons and gambling places, and houses. Long lines of freight teams, laden with ore and charcoal, filed in and out, making the streets lively with the cracking of whips and shouts of the drivers (*Salt Lake Herald*, 1902).

Mrs. Richard Jones provides a description of most of the houses at Frisco around 1910 (Osborn and Callahan 1968: 9):

> Well, the houses, you'd always try to find the best one. There wasn't too many that was elaborate or anything. We'd always try to find the best house if we had to move, you know. And I'm going to say this right when I start: I believe I papered every old house in Frisco, trying to make them the best... They were all lumber shacks. There was brush. We all cleaned around our places and made them nice to be around... Our little hillside, the last place we lived in, it was a nice place and all; but we didn't have a shade tree; but our neighbour about three houses away had a shade tree in front of her house. It was the only tree around. There wasn't [sic] very many trees in that town.

A Native American named Coyote Indian, resided in a cave at Frisco, but died. "They just put a blanket around him, dug a hole along side of him, and rolled him in" (Richard Jones, see Osborn and Callahan 1968: 6). It is possible the cave referred to in the oral histories was situated near Indian Grave Peak. The 1930 US Census offers listings for Piute within the Grampian Precinct (see Chapter 2, Figures 2-7 and 2-8).

Newhouse formed as early as 1900, a company town situated around a small tent town, later replaced by stone structures by 1904 (Wray 2006: 333). At that time, water was available through a pipeline extending from Wah Wah Springs to Newhouse; the mill also utilised the spring water. By 1908, the town of Newhouse featured a population of approximately 500 people, as well as a railroad depot, hotel, two boarding houses, the Cactus Cafe (or Newhouse Cafe), an opera house, a post office, livery stable, drug store, mercantile stores, a hospital, library, a town park with trees, and a miner's clubhouse – the Cactus Club. One saloon and a small red light district were within proximity, but situated outside of the town. The town remained prosperous until 1914 when the Cactus Mine ceased operations. The Cactus Cafe burned in 1921, but most of the residents had relocated to Milford or elsewhere shortly after the closure of the mine (Wray 2006: 333).

By 1911, the Newhouse Precinct organised separately from the Grampion Precinct (*Index* 1911-1912: 274). Ten years later, the population in the SFMD dwindled to 238 people (US Census 1910). Despite the population drop, maps from the early 1900s indicate a thriving settlement at Frisco, Grampian, and on the western flanks of the San Francisco Mountains, at Newhouse (see Appendices D1 and D2, and Appendix E). The *Southern Utonian* (11 December 1914) provides the locations of some residences based on a delinquent tax list for Beaver County, Utah, including H.B. Sacket, Wm. Matheson, Dau. James, J.W. Ball, George Anderson, Cooper Gianco, the Key to Success Mining Company and the New Copper and Gold Mining Company. Figure 3-35 shows the locations of the H.B. Sacket (Lot 1, Block 14) and J.W. Ball (Lot 10 Block 25 and Lot 12, Block 21) property.

In 1915, Frisco's population remained steady at 250 people (Dun 1915; Millison 2003). A

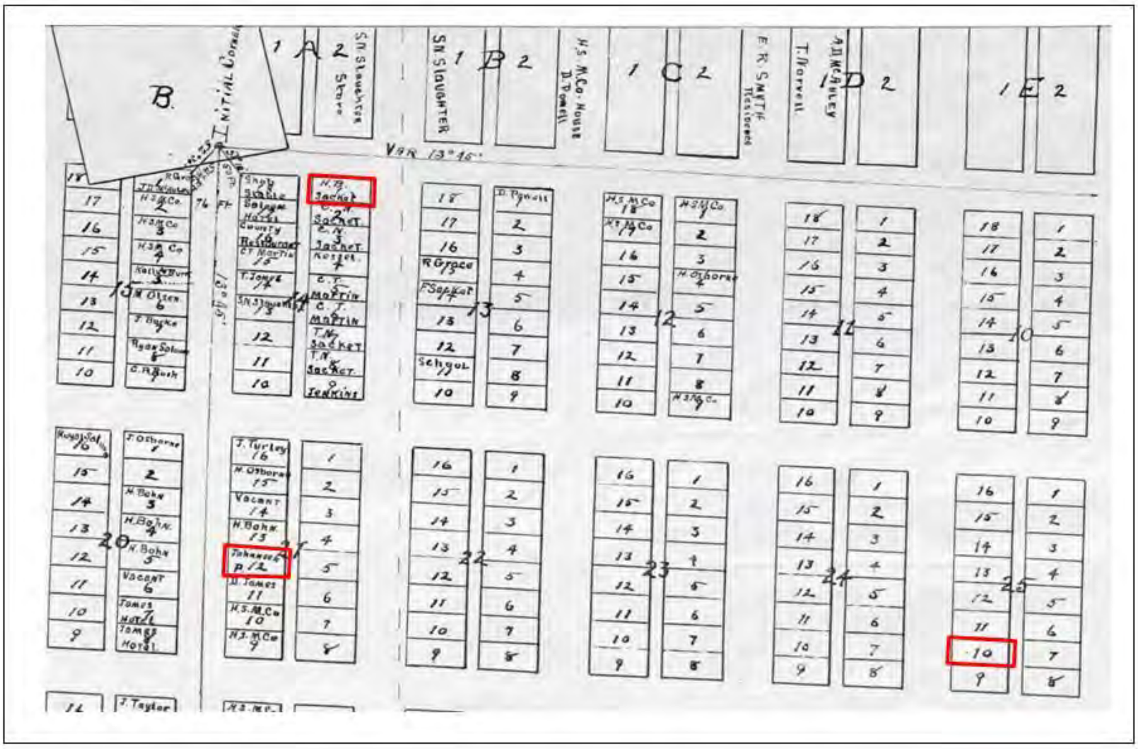

Figure 3-35. Delinquent Tax Parcels, Frisco Commercial District, 1914

general store, operated by J.L. Griffith, the HSMC General Store & Mining Supplier provided retail options (Dun 1915, Millison 2003). Mrs. Chris Johansen offered notions, whilst G.L. Williams operated a saloon (Dun 1915, Millison 2003). The population remained stable somewhat in 1920 (216 people, US Census 1920). Figure 3-36 provides an overview of the commercial district by 1927. By the following year, however, the population had dwindled, with only 100 people were residing in Frisco (US Census 1930). At the time, S.W. Moebis operated the only store listed in the Beaver County, Utah Mercantile Agency Reference Book (Dun 1928, Millison 2004). Moebis sold second-hand automobiles.

Between 1931 and 1941, most of the residents relocated, with the town being controlled by the Tintic Lead Company (Wray 2006: 335; US Census 1940). “Machinery subsequently was largely removed by scrap collectors and scavengers, and most of the buildings have now succumbed to the weather and vandalism” (Wray 2006: 335). Today, the Horn Silver Mines, Inc., owns the Frisco town site, the patented lands, and the cemetery.

3.5.2 Sports

In addition to gambling, the communities within the SFMD participated in other sports activities. Prior to 1900, the town had a race track for racing horses. According to Richard Jones, who resided at Frisco between 1907 and 1919, the track, located in town, was "one of the biggest paying race tracks in the western US" (Osborn and Callahan 1968: 1). Jones continues to describe the races (Osborn and Callahan 1868: 2):

> The last race, one of the last races, that I remember them telling about, when they run two saddle ponies, not race horse, just common cow horses for seventy-two thousand dollars [£45,982.97]. Now, that's a lot of money to bet on your saddle horse. But they did it then. They were men with money. They were gamblers. They were mining men that owned the place, and they believed in celebrating; and they did celebrate.

The location of the race track is speculated to be around a short knobby rise to the southeast of the present-day cemetery; however, comparisons to historical maps, photographs, and aerials failed to identify the exact location of this track.

In 1912, the Frisco Baseball team played against the Newhouse team. In June, they scored 14-18. "The game was well attended and pleased the crowd" (*Southern Utonian*, 28 June 1912). According to newspapers from May 1912, the Frisco team had its own diamond (*Southern Utonian*, 31 May 1912); however, this baseball field was not identified from historical maps, photographs or aerials. Richard Jones claimed that there were 350 men on three shifts, with ball teams on each shift (Osborn and Callahan 1968: 4). In addition to a baseball team, the town also hosted a brass band (Hickman 2006: 58).

3.5.3 Freemasons

Masonry in Utah had its earliest roots in 1859, when soldiers of Johnston's Army formed a Lodge at Camp Floyd (*Salt Lake Herald*, 21 October 1906: 8-9). A Masonic fraternity organized as St. John's Ancient Free & Accepted Masons (A.F. & A.M.) Lodge in Frisco and the Grand Lodge of Utah chartered the Frisco lodge on 18 January 1882 (Anonymous 1886: 60, *Salt Lake Herald*, 3 December 1905; *Salt Lake Herald,* 21 October 1906: 8-9, Goodwin 1931). Initially, they met on the second-floor of a new building constructed for the HSMC,

Figure 3-36. Frisco Commercial District in Decline, 1927

with meetings being held regularly on every second Thursday of each month (Diehl 1882, 1883, 1885, 1886, 1887). Philip Henry Emerson served as Grand Master of the Grand Lodge, whilst Major Henry Craig Hill[36] served as the Worshipful Master of the St. John's Lodge (Anonymous 1886: 60). Officers included Albert Chauncey Wilson (Senior Warden), Francis Degen (Junior Warden), James Eli Berkley (Treasurer), George Wilson Crozier (Secretary), William Lewis Raht (Senior Deacon), Felix Frank Castellano (Junior Deacon), Watkin Watkins (Senior Steward), William James (Junior Steward), James Earles (Tyler) (Anonymous 1886: 60). Master Masons included Robert Seward Anderson, Charles Anderson, Gastav Adolf Eugene Bergath, Henry Lester Barnes, Adam Cunningham, Phillip Fleming, Nicholas Ewald Hutter, George Hall, John William Jackman, Edgar Moss Janney, John Smith Jenkins, Homer Lindsley, John Moorhouse, William Martin, Peter Martin, James McGarry, John Sheridan Reilley, John Friend Streeter, Thomas Griffith Williams, and Alexander Wood (Anonymous 1886: 60). Other members included Christopher Diehl, J.S. Scott, and H. Wagner (*Southern Utonian,* 26 November 1881).

Whilst a new meeting house was proposed shortly before the charter was issued, and discussed in local newspapers, the Lodge continued to meet in local establishments. In October 1881, a new meeting house was constructed in the town, measuring 7 by 9 m [24 by 30 ft], at a cost of £542.85 [$850.00] (*Southern Utonian,* 8 October 1881). In 1883, the Masons met in the dining room of the Southern Hotel (*Southern Utonian*, 5 January 1883: 3). There, they held a grand ball. It is unclear why the proposed meeting house was not constructed, but possibly relates to the shift in settlement and economics following the collapse of the Horn Silver shaft in 1885.

In 1886, Leroy Farnham and Hugh McNeills were demitted from the Lodge, and Daniel Porter Elsom died (Anonymous 1886: 60). The St. John's Lodge No. 8 surrendered its charter on 9 March 1888 (Anonymous 1886: 60). The altar and three officer's pedestals that

36 Henry Emerson was a local miner and also served as the 1910 enumerator for the Grampion Precinct Census. His daughter, Effie Emerson served as the school teacher in 1910 (US Census 1910). Major Hill was the manager for the HSMC.

belonged to the St. John's Lodge were later transferred to the Tintic Lodge No. 9, in Eureka, Utah, and then later donated to the St. George Lodge No. 33 (Grand Lodge of Utah 2005). Although the lodge was closed within Frisco, it still operated within the mines there; in January 1904, the lodge provided £1277.30 [$2000.00] to the Izabella Smith Rees, the widow of Watkin Rees, who fell 24.38 m [80 ft] down in the shaft of the Horn Silver Mine and died (*Deseret News*, 11 January 1904: 11).

By 1905, there had been twelve lodges located in Utah in addition to the Grand Lodge in Salt Lake City, including the Wasatch Lodge, Mt. Moriah Lodge, Argenta Lodge, Story Lodge No. 4, Corinne Lodge No. 5, Weber Lodge No. 6, Uintah Lodge No. 7, St. John's Lodge No. 8, Tintic Lodge No. 9, Damascus Lodge, Rocky Mountain Lodge No. 10, and Highland Lodge (*Salt Lake Herald*, 3 December 1905).

3.5.4 Frisco School

According to a newspaper article in the *Ogden Standard* in March 1880, there was a thriving school in Frisco (*Ogden Standard*, 13 March 1880: 4). It is unclear how many students were attending the school at this time, although the 1880 census indicates only three students (Helen, Clara and Elsa Roth) (US Census 1880).

In June 1881, school elections were held in Frisco, with more than 500 votes being polled; Mr. Williams and Mr. Morehouse were elected as trustees (*Deseret News*, 15 June 1881: 1). By September 1881, a spacious new school house almost was complete in Frisco (*Southern Utonian,* 24 September 1881:17). Local newspapers described the school as "a credit to the camp, and reflects credit upon the Trustees who have the matter in charge" (*Southern Utonian,* 24 September 1881: 17). Miss Lillian Lawless, a lady teacher from the East, was hired by the school district and reopened the school by 1883 (*Southern Utonian,* 19 January 1883). No further information could be located for Miss Lawless.

In March 1888, the local newspapers reported a "case of adultery...in the district school of Frisco" between two pupils (*Southern Utonian*, 2 March 1888). No further information regarding the case or and legal matters were not presented in the newspaper afterwards. Note at this time, however, that the Milford and Adamsville district schools were discontinued, and a reform school was proposed between Cache and Beaver counties (*Southern Utonian*, 2 March 1888). The closures apparently did not last long, as in 1891, the Territorial allotment of school money for Beaver County included schools in Beaver City, Adamsville, Minersville, Milford, and Frisco; Frisco received £192.39 [$301.24] in allotments (*Southern Utonian*, 9 January 1891).

In September 1888, three new trustees were elected, according to Superintendent F.B. Clayton. No notification of their election, or bonds, was filed, and after 20 days, the election results expired; thus, the school had no trustees (*Deseret News*, 19 September 1888: 3).

In 1900, there were approximately 93 students attending school within the Frisco and Grampian Precinct (US Census 1900). This total included students from Squaw Springs, Copper Gulch, Wah Wah, and Pine Grove, as well (US Census 1900). At the time, La Priel Dunn, daughter of Joseph Wilson Dunn[37] and Martha Ann Clark, served as the school teacher (US Census 1900). Ten years later, Effie Emerson, daughter of Henry Emerson[38] and Elizabeth Reese (Rees), was listed as the school teacher (US Census 1910).

According to the *Southern Utonian* (10 July 1914), the Frisco School District (No. 6) was located n Township 29 South. This location is inaccurate, as Township 29 South is situated approximately 12 miles south of the Frisco town site. The 1904 Tolton survey map depicts the school in parcel 11 in Block 13 (Figure 3-37). No physical evidence of the school is noted at this location to date. Mr. Eugene Halverson provided a photograph of the two-room, red school at Frisco (Figure 3-28). His uncle, Conrad Holmes (1), mother, Signe Holmes (2), and the teacher, Mrs. Boyer (3), are shown in the photograph. Mr. Halverson also provided the interior view of the school (Figure 3-39).

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37 Joseph Wilson Dunn served as the Superintendent of the Horn Silver Mines Company store at Frisco in 1901 (*Ogden Standard*, 23, May 1901: 4).

38 Henry Emerson was a local miner and also served as the 1910 enumerator for the Grampion Precinct Census (US Census 1910).

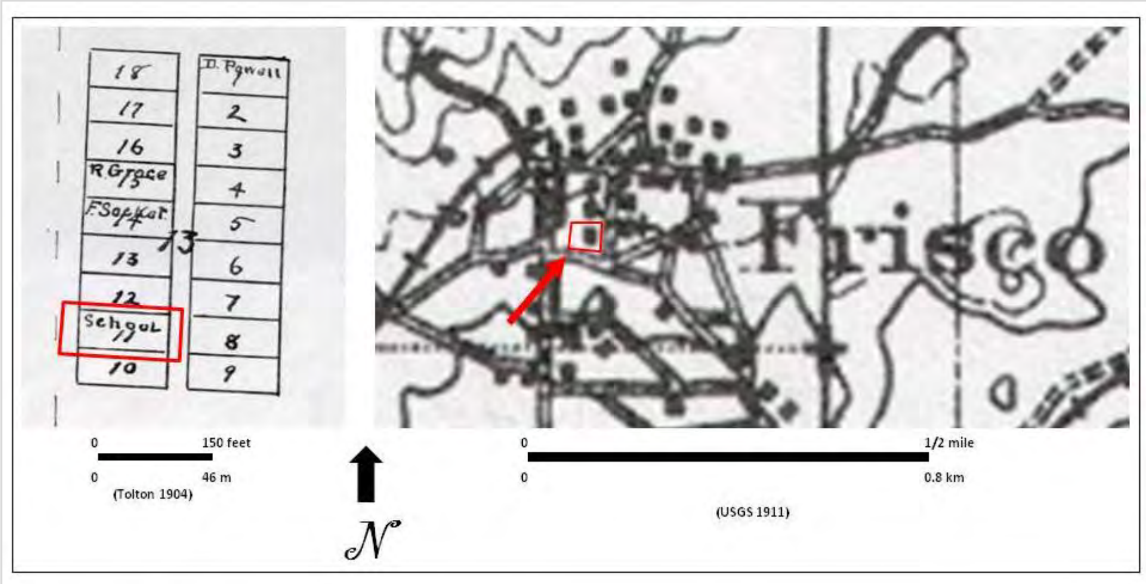

Figure 3-37. Approximate Location of the Frisco School House (Tolton 1904).

Figure 3-38. Students from the Frisco School House (Halverson 2013).

Figure 3-39. Interior of the Frisco School House (Halverson 2013).

3.5.5 Saloons and Gambling

Murray Shick (WPA 1941: 323-324, Horton 1957: 40-41) describes Frisco in 1879:

> Frisco was booming. From Alta and Ophir, Utah, and from Colorado, Nevada, and Arizona came 'boomers' – miners, gamblers, gunmen, and dance hall girls. A sheriff – Pearson, first name forgotten – who came from Pioche, was elected to clean up the town. With the simple philosophy that dead men give no trouble, he put on a law enforcement campaign; there were no fines to be paid, no jail sentences to serve, and burial expenses were not excessive. Pearson gave a man his choice –shoot it out, or leave town. Many tried to shoot it out, but Pearson had strong nerves and a quick trigger-finger. He was known to have killed as many as six men in one night, and if finally became necessary to hire a 'body mover' to clean up after him. The 'wagon' made the rounds every morning and hauled away one or two corpses; they were buried without questions or funeral announcements. Frisco acquired a reputation as the wildest camp in Utah. Each of the twenty-one saloons had its stories of killings. In one place two men were killed over fifty cents in a faro game.

In 1880, a visitor to Frisco reported to the *Ogden Standard* that

> Frisco is by all odds, the most orderly mining camp I ever visited. There have been no murders, and as a consequence, the graveyard is thinly populated – a very unusual thing for a camp five years old; and rows of any kind are not of frequent occurrence (*Ogden Standard*, 13 March 1880: 4).

Local newspaper editor, Charles King, of the *Frisco Times,* however, published that "the name of Frisco should be changed to 'necessity' because it knows no law" and referred to the town as "Dodge city, Tombstone, Sodom and Gomorrah, all rolled into one" (Hickman 2006: 74).

Thus, as indicated by Hal Hickman (2006: 74), whose family resided at Frisco, a committee of businessmen from Frisco formed to resolve the crime problem. Rather than hiring someone within the Utah Territory, the committee opted to search for a sheriff from Pioche, Nevada, a mining town approximately 160.93 km [100 miles] west of Frisco. A delegation from the committee including John Burke, Dennis Ryan, and Tom Loughney travelled to Pioche via stage line and offered the Sheriff's position to Deputy [James] Pearson (Hickman 2006: 74). "The town had just built a new jail of kiln-dried brick with adequate office space" (Hickman 2006: 76).

Prior to the election of 1880, the committee reformed to find another sheriff; that year, R.S. Lipscomb served as the Justice of the Peace (US Census 1880). In 1881, the town of Frisco temporarily hired Ben Tasker, a local gunfighter, as Sheriff (Hickman 2006: 49). In November 1882, Constable Sackett arrested Feltzer for aiding a deserted soldier (*Southern Utonian,* 10 November 1882). According to the *Southern Utonian* (24 September 1881: 3), the night watchman, a man named Mahoney, had a busy week. "Drunks, disputes and fights have been numerous in camp this week" (*Southern Utonian,* 24 September 1881: 3). Note that the 1880 US Census does not list anyone with the name "Pearson," "Mahoney," or "Tasker" (US Census 1880). No other law enforcement personnel are listed in the Census (US Census 1880, 1900, 1910, 1920, 1930; see also Appendix D1). In 1911-1912, H.D. Kenney served as the Justice of Peace for the Grampian Precinct – which included Frisco, whilst Robert Fox was the Constable (*Index* 1911-1912: 357). In the Newhouse Precinct, Andrew Cochrane served as the Justice of the Peace, whilst Abe Heslington was the Constable (*Index* 1911-1912: 357). Richard Jones notes the last Marshall at Frisco was Pat Ryan; other lawmen included Frank Osborn (Osborn and Callahan 1968: 3).

Frisco boasted of both an attorney (E.S. Anderson) and a Judge (R. S. Anderson) (*Southern Utonian,* 3 September 1881, 10 September 1881, 17 September 1881:3). It is unclear whether E.S. and R.S. Anderson were related. R.S. Anderson was known as 'Handsome Bob of Frisco' in the Beaver Courts and must have arrived in the SFMD between

1880 and 1881, before relocating to Beaver in 1882 (*Southern Utonian,* 18 March 1882: 2). He was identified as “one of the most prominent and successful attorneys at Frisco” (*Southern Utonian,* 29 September 1882).

A new jail was constructed in the late 1880s; as observed in photographs from 1916, the jail was rectangular in shape, consisted of local rock construction, and was located at the south end of Main Street, near the railroad station (Hickman 2006: 83) (Figures 3-40 and 3-41).

The town was not free from crime. The following summarises incidents taking place within the SFMD:

> Every saloon-keep in Frisco, eleven in all, were indicted by the grand jury for violating the Territorial Statute prohibiting the selling of liquor upon Sundays” (*Southern Utonian,* 18 March 1882: 3). In August 1882, there was a complaint of the dangerous section of the camp where ‘drunks were rolled for their wealth;’ drinks were spiked/drugged (*Southern Utonian,* 5 August 1882).
>
> In June 1882, San Pete teamsters travelling between Frisco and Squaw Springs were robbed at shotgun by Nicholas Jordan and C. Ley O’Newell (*Southern Utonian,* 17 June 1882). The stage road continued from Frisco to Squaw Springs, and onward to Pioche, Nevada (see Figure 3-25). Two Horn Silver Company checks, amounting to £94.58 [$148.10], and cash, were stolen; they included one numbered 2512 for £55.12 [$86.31] paid to N.C. Sorensen and check numbered 2613 for £39.69 [$62.15] paid to A. Andersen. The teamsters quickly returned to Frisco and had the payment on the checks stopped (*Southern Utonian,* 17 June 1882). The robbers were caught and sent to the Beaver County Jail; they later escaped, along with murder suspect Dan O’Brian (*Southern Utonian,* 8 July 1882; *Southern Utonian,* 5 August 1882).
>
> Major Hary C. Hill of the HSMC of Frisco was in Beaver to hear a case, Jas. Muldoon v. Horn Silver Co. The Plaintiff was suing for £31,932.62 [$50,000.00] in physical damages sustained whilst working at the mine (*Southern Utonian,* 16 March 1883).
>
> At the same time, a case was heard in Iron County against Bart Davidson, accused of shooting in Frisco in the fall of 1882 (*Southern Utonian,* 16 March 1883).
>
> Charles Staples, at his father’s furniture store in Frisco, pulled an eight-inch Colt Revolver on his sister, Gertie. He shot a bullet through the window onto Grasshopper Avenue (*Southern Utonian,* 13 April 1883).
>
> In 1903, Red [or Rex] Brennan, employed by the Horn Silver Mine, shot into William Andrews’ saloon in Frisco, which was patronized by several Fins. Constable Smythe arrested him (*Salt Lake Herald*, 18 April 1903: 1).
>
> M.C. Lawrence of Ophir, Tooele County, appointed John S. Lawrence of Frisco, agent of his saloon in Frisco. The saloon operated under the name “Pat Ryan’s” (*Southern Utonian*, 21 March 1889).

Figure 3-40. Former Jail at Frisco (Hickman 2006)

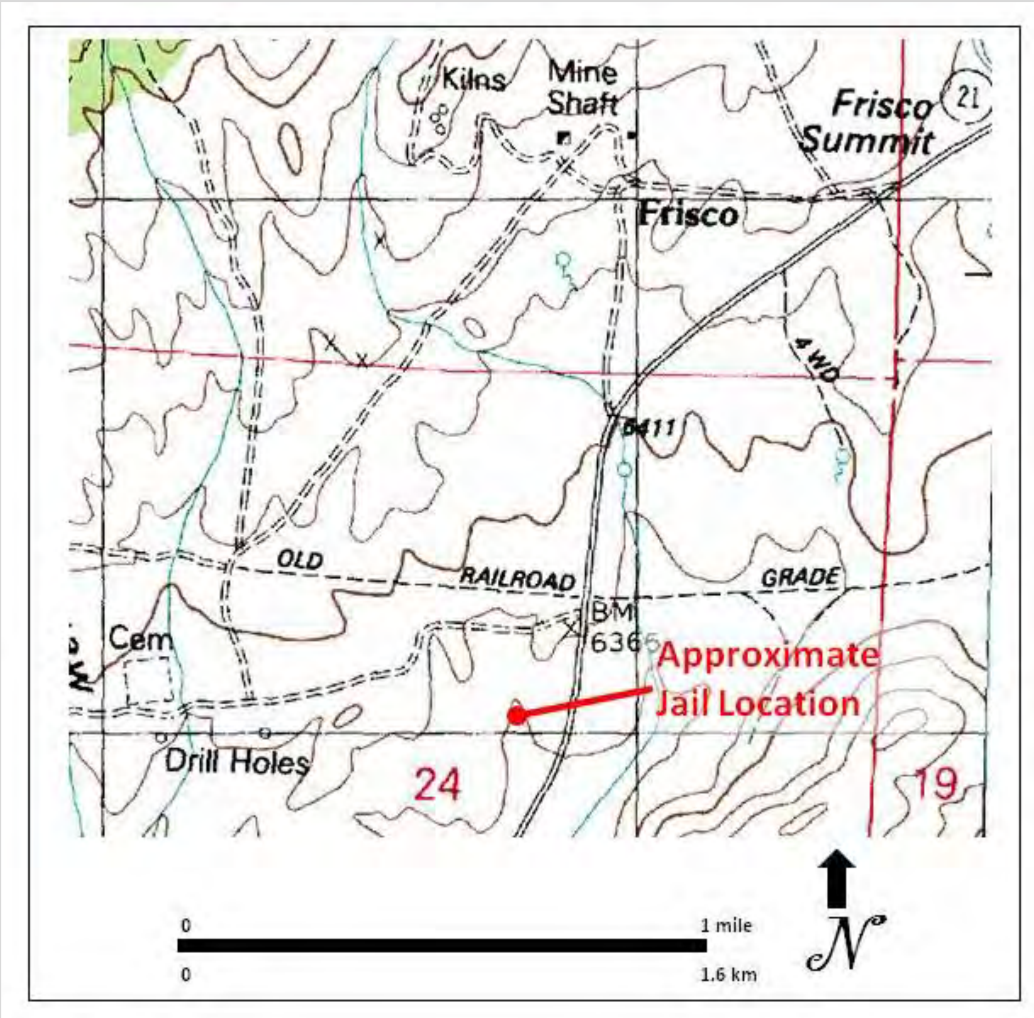

Figure 3-41. Approximate Location of Former Jail at Frisco (Tolton 1904)

> Mr. Charles Lamersdorf was indicted for selling liquor on Sundays in his saloon in Frisco (*Southern Utonian*, 16 May 1889). Mr. Lamersdorf indicated at the Beaver justice court that the saloon in question was owned by his wife and had been operating for over six years at that point (*Southern Utonian*, 16 May 1889).

As early as 1908, several states began support for the temperance movement in the US. At that time, there were more than 600 saloons throughout Utah[39]. The following year, the state legislature narrowly defeated a stateside prohibition bill. In 1909, several of the prominent mining leaders in the SFMD petitioned the Beaver County Commissioners to prohibit the sale of intoxicating liquors within "Frisco and in the vicinity of the mines..." (*Salt Lake Herald*, 16 April 1909: 3). Among the petitioners were C.M. Morris of the HSMC; Jesse Knight and David Evans of the King David Mining Company; D.P. Rohling and Patrick Ryan of the Lulu and Contact Mining Companies; and Grant Snyder of the Beaver Carbonate Mining Company (*Salt Lake Herald*, 16 April 1909: 3). According to the petition, the men argued that the "labouring men squander their money for drink, unfit themselves for work and deprive their families of the common necessaries of life" (*Salt Lake Herald*, 16 April 1909: 3). By 1911, the state allowed for communities to prohibit the sale (i.e., designation of 'dry' versus 'wet' communities) of alcohol. Nationally, prohibition did not become an issue until 1917.

3.5.6 Fires

In October 1881, fire erupted in the cellar at the home of Tommy Atchison; it had a gravel topped roof (*Southern Utonian,* 8 October 1881). There is no listing for Atchison on the 1880 Census and the 1904 plat map (Tolton 1904) does not depict a parcel associated with Atchison. Thus, it is possible that Atchison moved to Frisco after the 1880 Census, rented a home, and relocated prior to (or following) the collapse of the Horn Silver mine shaft in 1885.

In 1894, the concentrating plant and hoisting works at the Horn Silver were damaged by a fire (*Ogden Standard*, 6 April 1894: 1). Due to the burned hoisting works, the shaft caved to

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39 The Census for 1900 lists two saloon keepers or liquor dealers; two boarding house or hotel proprietors; and one restaurant proprietor. The Census for 1910 lists only one hotel proprietors. The Census for 1920 is illegible. No listings for saloons is available in the City Directories or Utah Gazetteers for this period.

the 200 ft level (*Ogden Standard*, 6 April 1894: 1). The loss amounted to approximately $100,000.00 in damage (*Ogden Standard*, 6 April 1894: 1).

In February 1906, fire ransacked several structures along Cedar Street/Horn Silver Avenue, such as the St. James Hotel, a saloon, and at least one wood frame house used for storing grain (*Deseret News*, 14 February 1906: 10). L.D. Joseph leased the hotel, which lost all beds and bedding, kitchen utensils, and some additional furniture (*Deseret News*, 14 February 1906: 10). Loue Martin, saloon keeper, had renovated the saloon just prior to the fire (*Deseret News*, 14 February 1906: 10). Buildings across the street escaped the fire, although the intensity of the heat caused several windows to be broken; wet blankets were placed around the Sackett Hotel to prevent fire damage (*Deseret News*, 14 February 1906: 10). An additional fire in July 1913 burned "the offices and warehouse of the Horn Silver Mining company and a saloon building there" (*Salt Lake Herald*, 9 July 1913: 6). Whilst the newspaper account suspected arson, the fire was the result of "an explosion of giant powder cups. The explosion sent one wall of the warehouse crashing down, crushing the feet of 15-year-old Harold Blake" (*Salt Lake Herald*, 9 July 1913: 6). The Newhouse fire department helped expend the fire, which spread rapidly, causing over £15,966.31 [$25,000.00] worth of damage.

Photographs from 1916 show the northwest side of Main Street, including a saloon and the Horn Silver Company store flanking either end of the Frisco Banking Company, and an unknown structure. According to Hickman (2006: 38), by 1916, virtually all of the structures on the east side of Main Street had been torn down. In comparison to the Census between 1910 and 1930, the population had been decreasing (from 238 people in 1910 to 100 by 1930), and with the fire and fewer mining activities, many of these buildings likely would have been abandoned.

3.5.7 Cemetery and Death

There is a cemetery within the SFMD boundaries, southwest of the commercial district of Frisco, and slightly east-northeast of Grampian. Previous accounts provided rosters of 47 interments, although historical photographs depict a cemetery of greater numbers (Figure 3-42). Genealogical research identified at least 66 individuals as being buried at the Frisco Cemetery, and possibly as many as 73 individuals, based on seven children of unknown interment (see Appendix D1).

According to Hickman (2006: 53):

> The small cemetery southwest of the old townsite of Frisco had a special section for [paupers]. In the southeast corner, it is said, the residents who committed suicide, miners who fell down shafts and had no family to mourn for them, men killed in various fights (both gun and fist), and other itinerant travellers and workers, all had a place for burial. It is on the northwest side where today's visitor will find the few headstones and more permanent graves (Hickman 2006: 53).

The information provided by Hickman (2006:53) seems false, as there do not appear to be any divisions between the children, miners, or other readily identifiable people (see Appendix D1).

3.5.8 Modern Economy

Today, the economy of Utah is based on five primary industries including mining, cattle ranching, salt production, government services, and tourism (Rood and Thatcher n.d.). Within the SFMD, minor mining activities are carried out on a limited basis, whilst the lower flanks of the San Francisco Mountains offer opportunities for sheep and cattle ranching. The settlements of Frisco, Grampian, Squaw Springs, and Newhouse have been abandoned.

3.6 Summary

As noted with Chapter 2, the historic context is considered a necessity to the HLC model as a means to identify features physically and chronologically along the landscape. Further, the development of the historic context is considered vital for the determination of significance thresholds and application of National Register of Historic Places (NRHP) eligibility criteria in the US. As such, it serves as a foundation on which the HLC model can be constructed; subsequent chapters rely on this compilation of newspaper archives and other information for the interpretations of the features and artefacts identified during the ground-truthing effort.

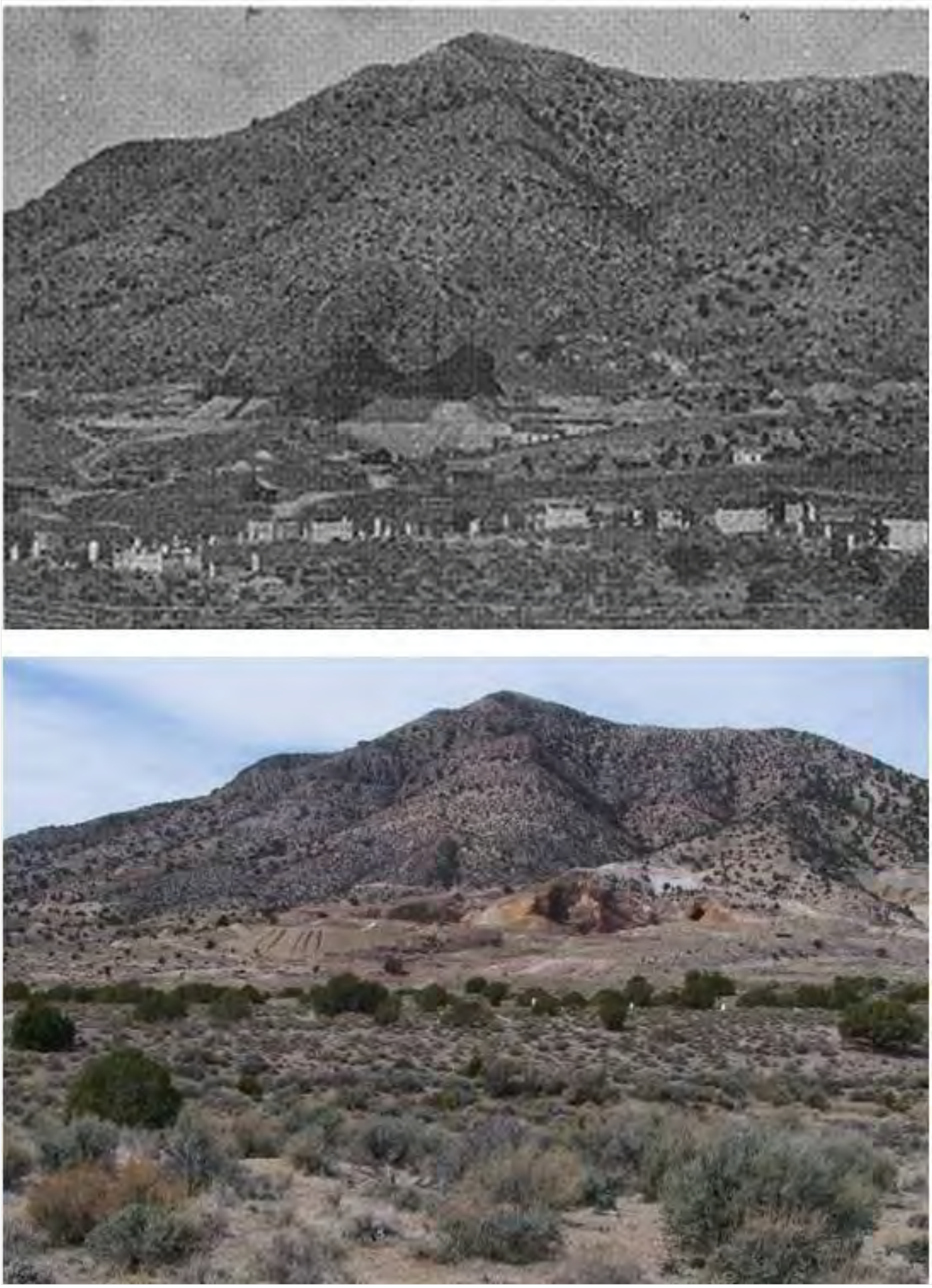


Figure 3-42. Comparative Overviews of Frisco Cemetery (Bradley 1999; author photograph, 2008)

4.0 GIS INTEGRATION WITH THE HLC MODEL

The use of GIS with the HLC model is vital in identifying the physical representations of the themes within the SFMD. The GIS element primarily is desk-based, and represents an overview of the HLC rather than an intensive historic landscape survey programme. The GIS allows one to query the map in a large number of ways in order to display data and perform a variety of analyses. Thus, in terms of a landscape analysis, GIS serves as the key element for examining multiple layers of data for extensive areas of space. The HLC Model for the SFMD relies upon the ESRI program, ArcGIS versions 10.0 and 11. The ArcGIS suite includes ArcMap, ArcCatalog, ArcReader, and Arc/Info. ArcGIS is utilised for asset/data management, planning and analysis, business operations and situational awareness, and incorporates the concepts of geodatabases, imagery, computer-aided design, and standards and interoperability with other programs (ESRI 2010).

Through its application, GIS allows a series of transparently overlaid layers (i.e., themes or levels, shown in terms of shapefiles) to reflect information culminating in a searchable geographic database (Box 1999: 10-11). For the purposes of the current study, basic information is required for the study area, such as the geology, topography, hydrology, transportation networks, settlements, communications and utilities, and boundaries of mining claims. This chapter serves to explain the integration of the GIS model within the HLC model at the SFMD. Supplemental information regarding the Geodatabase and additional accompanying maps are provided on the enclosed CD (Appendix E [GIS2]); ESRI ArcMap 10.0 is required to view the maps and data.

4.1 Creation of Shapefiles

The current model used the North American Datum of 1983 (NAD 83), Zone 12 North, and Geodetic Reference System 80 geographic coordinate system.

Feature class types (i.e., line, polygon, or point) are assigned to each item on the database. It is vital to consider what types of data might be extrapolated through the GIS, such as the acreage, etc., that may need to be represented as polygons versus lines or points. In some cases, such as a telegraph line, it is required to symbolize both a point and line for the same feature type; roads vary from railroads and stage routes, whilst the cemetery may be represented by both a boundary (polygon) and individual plots (points).

Catalogue systems are developed for assigning unique identifiers to features. This is conducted in a Microsoft Access database, whilst the inventory is prepared. A minimum set of necessary attributes is developed to be collected consistently for each site type. These attributes are formulated in conjunction with the historic context and other background research. The Access database is joined to the GIS as warranted, using a unique identifier. Attribute data is best kept in a relational database for ease of manipulation.

Certain information is extracted from vintage maps (Hooker 1879, Tolton 1904, USGS 1906/1911, Butler 1913). In these instances, the background maps are georeferenced as best as possible, or locations are plotted manually. The technique varies based on the scale and accuracy of the historical maps in question, as warranted. For instance, GIS data for historic roads and trails, geology, hydrology, pipelines, utilities, and vegetation were provided by the Utah GIS Portal (State of Utah 2011); however, when layered and compared to aerial photography, the data for the roads and trails were off by approximately 100 m. Thus, many of the roads and trails were plotted manually for better consistency of the data. Additional locations for features, such as kilns, were plotted manually using ESRI provided data (i.e., aerial imagery, current topographic maps). Boundaries and locations of archaeological sites were included after georeferencing of IMACs site maps and information from survey reports (Bassett 2008, 2010).

Shapefiles created for use in the GIS model included those for features visible on the 1906/1911 maps – mines, structures, pipelines, railroad, and roads – claims from 1913, modern locations of roads and kilns, and observation points for data collected during the field effort. Further, the GIS data are presented in a series of maps that are compared to the physical landscape during ground-truthing exercises.

An initial polygon derived from claim maps, topography, hydrology, and settlements within the SFMD aided in the creation of the boundary. The boundary provided geographical limits within which the themes could be depicted in the HLC's GIS model. Through comparisons of historical maps, the contextual information, and application of the themes, a more refined boundary was defined (Figure 4-1).

4.2 Themes

4.2.1 Vegetation and Hydrology

Dominant vegetation for the SFMD includes Utah Juniper/conifer (*Juniperus osteosperma*, A1); sagebrush/wormwood (*Artemisia sp*., C1); greasewood (*Sarcobatus vermiculatus*, C2); shadscale (*Atriplex confertifolia*, C3); and rabbitbrush (*Chrysothamrus sp*., C6). Of particular interest was the location of piñon pine and juniper that may have provided fuel for the charcoal kilns and timbering for the shafts within the SFMD. Historical documents indicate that several sawmills were situated adjacent to large washes or ephemeral drainages, such as Sawmill Canyon. As a result, the GIS model included an examination of the vegetation, hydrology and locations of the charcoal kilns (Figure 4-2). The Utah GIS Portal (State of Utah 2011) provided shapefiles for the current vegetation and hydrology data for the whole of Beaver County. The polygons and attributes for each vegetation type were incorporated into the SFMD HLC model.

Although present on the modern landscape, the model reflected no piñon pine within the SFMD as a dominant species, and there were no historical data to reflect large stands of trees within the SFMD. Comparisons were made for the distribution of piñon and juniper for Utah (Figure 4-3). The archival record indicates that piñon pines were brought from six to eighteen miles to the smelter at Frisco (Emmons and Becker 1885: 464; US Census Bureau

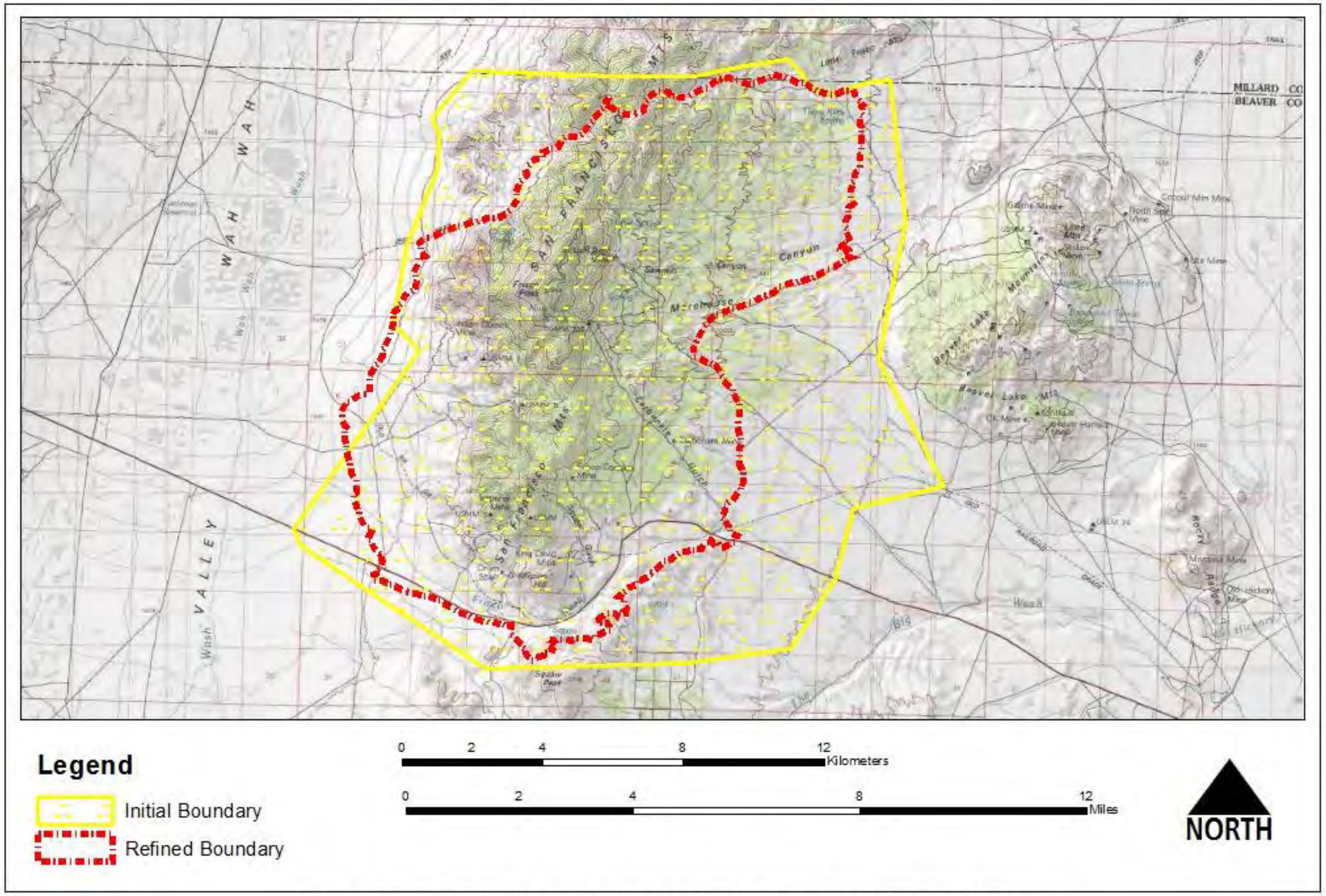


Figure 4-1. Initial and Refined Boundaries of the San Francisco Mining District

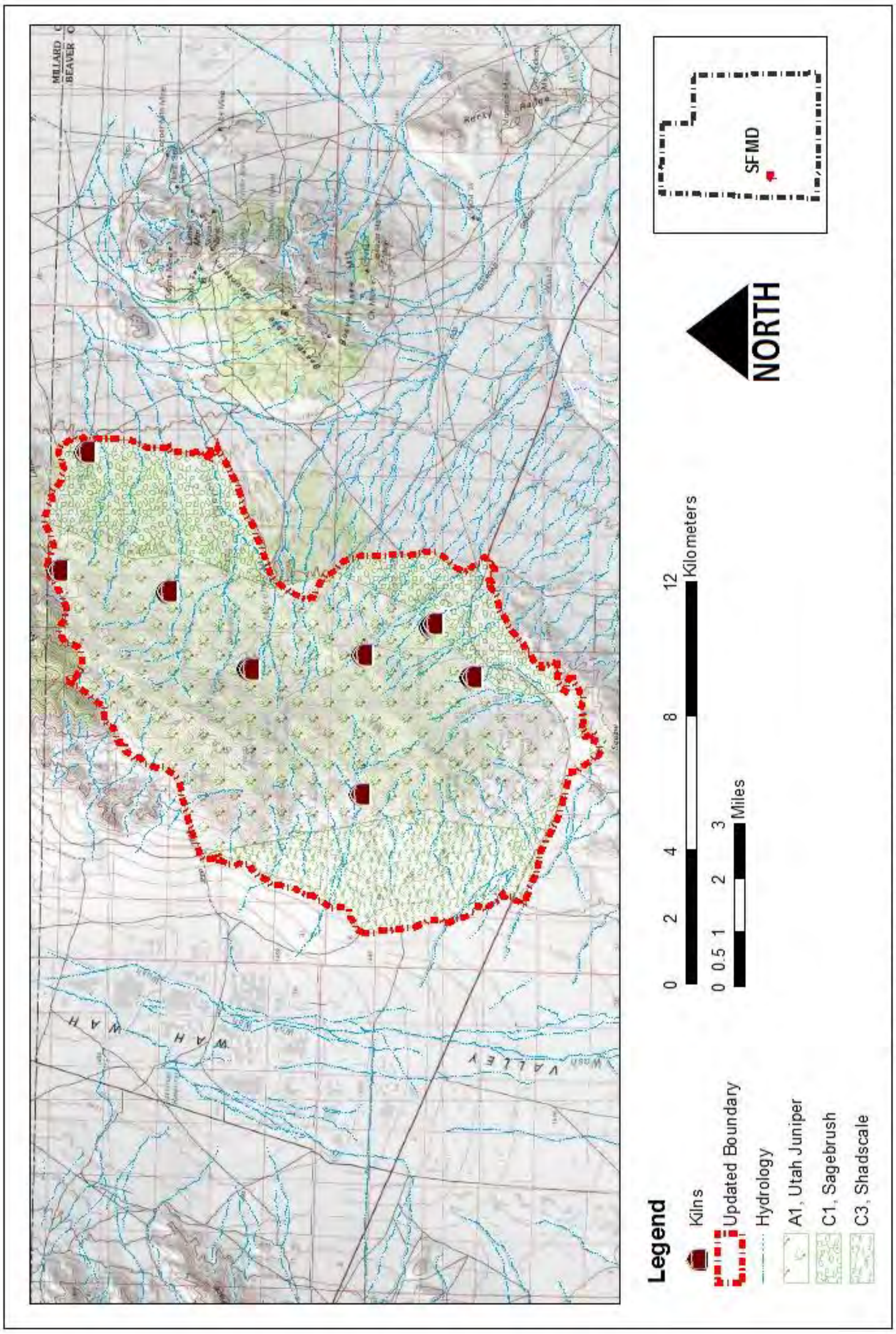


Figure 4-2. Vegetation, Hydrology and Charcoal Kilns within the San Francisco Mining District

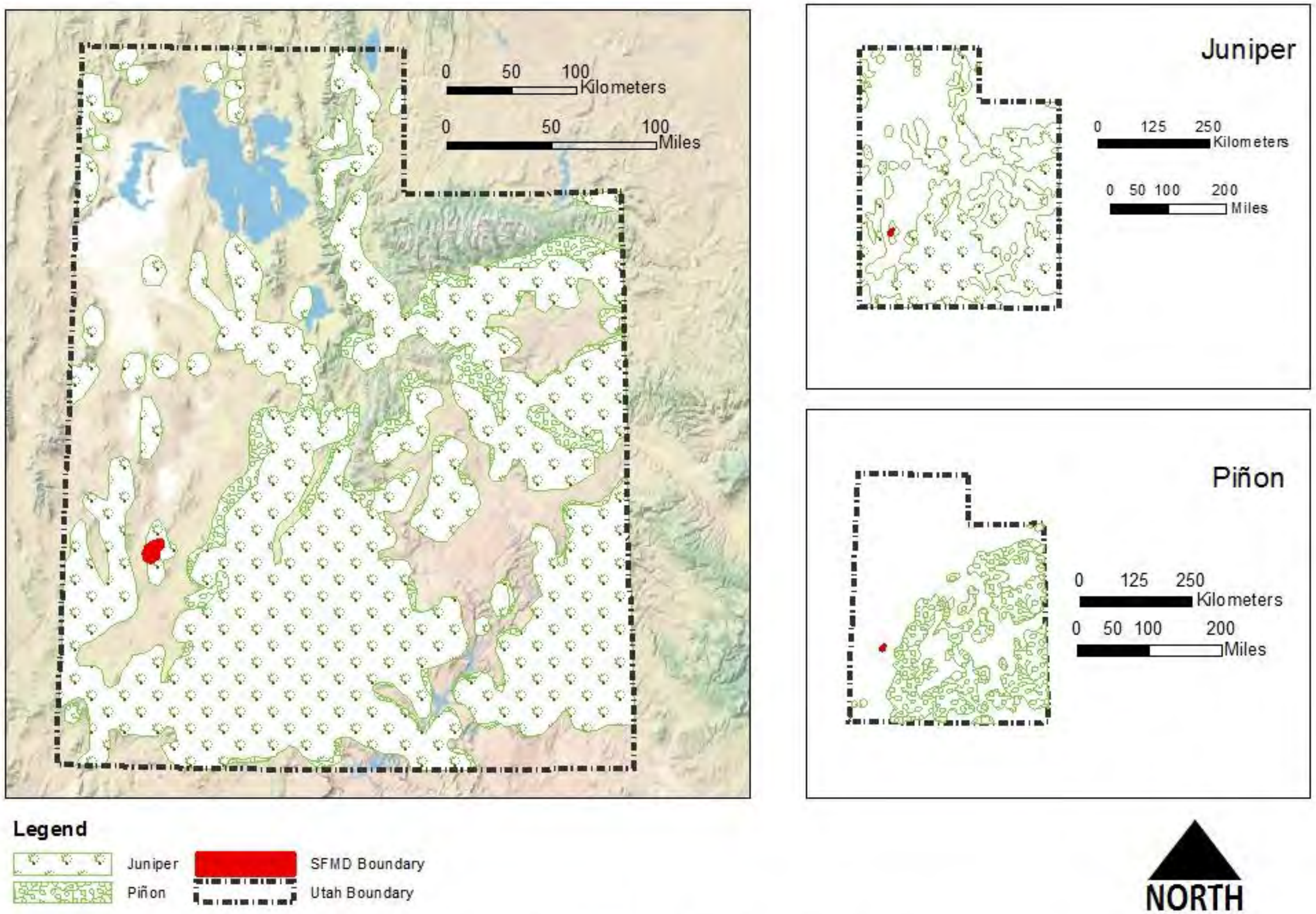


Figure 4-3. Juniper and Piñon Distribution for Utah

1880: 405-489; Whelan and Hintze 1973: 91; Notarianni 1981, 1982, 1994); based on the GIS model, the pine was located in regions outside of the SFMD, possibly as far west as the Wah Wah Mountains. The only indication of vegetation within the SFMD prior to the turn of the 20th century is a lithograph (Hooker 1879) and historical photographs after 1900, all of which show the dominant species indicated in the GIS model.

4.2.2 Geology and Claims

The Utah GIS Portal (State of Utah 2011) provided shapefiles for the geology of the SFMD. The elevations of the SFMD range from 716 m (5400 ft) to 2,743 m (9,000 ft), with former shorelines of Lake Bonneville along the western flanks of the San Francisco Mountains. The geology of San Francisco Mountains is comprised of rocks from the Cambrian to the Quaternary (East 1966, as cited by Whelan and Hintze 1973: 88; Hintze 2005; Stokes 1986). Butler (1913: 27) notes that the east and west side of the northern portion of the San Francisco Mountain range is bounded by a fault, as is well shown in the Horn Silver mine. The fault does not extend south of, but it determined the position of, the Squaw Springs Pass. Whilst more than 109 minerals have been documented within the SFMD, the most dominant metals present included sulphur, gold, silver, copper, tungsten, zinc, and commercial grade lead (Butler 1913: 91-92, Wray 2006: 286, 399, 415-418).

The geological information was considered as vital as the other themes to the HLC model. Without the presence of certain geological features, the mineralogy would have not been conducive to support the mining district. Figure 4-4 represents the how the GIS model incorporated the geology, mines, and claim data into the HLC for the SFMD, including the lines and attributes, corresponding to Butler (1913).

4.2.3 Settlements and Transportation

At least three settlements have been identified within the SFMD: Grampian, Frisco; and Newhouse. Settlements include supporting infrastructure, such as transportation networks;

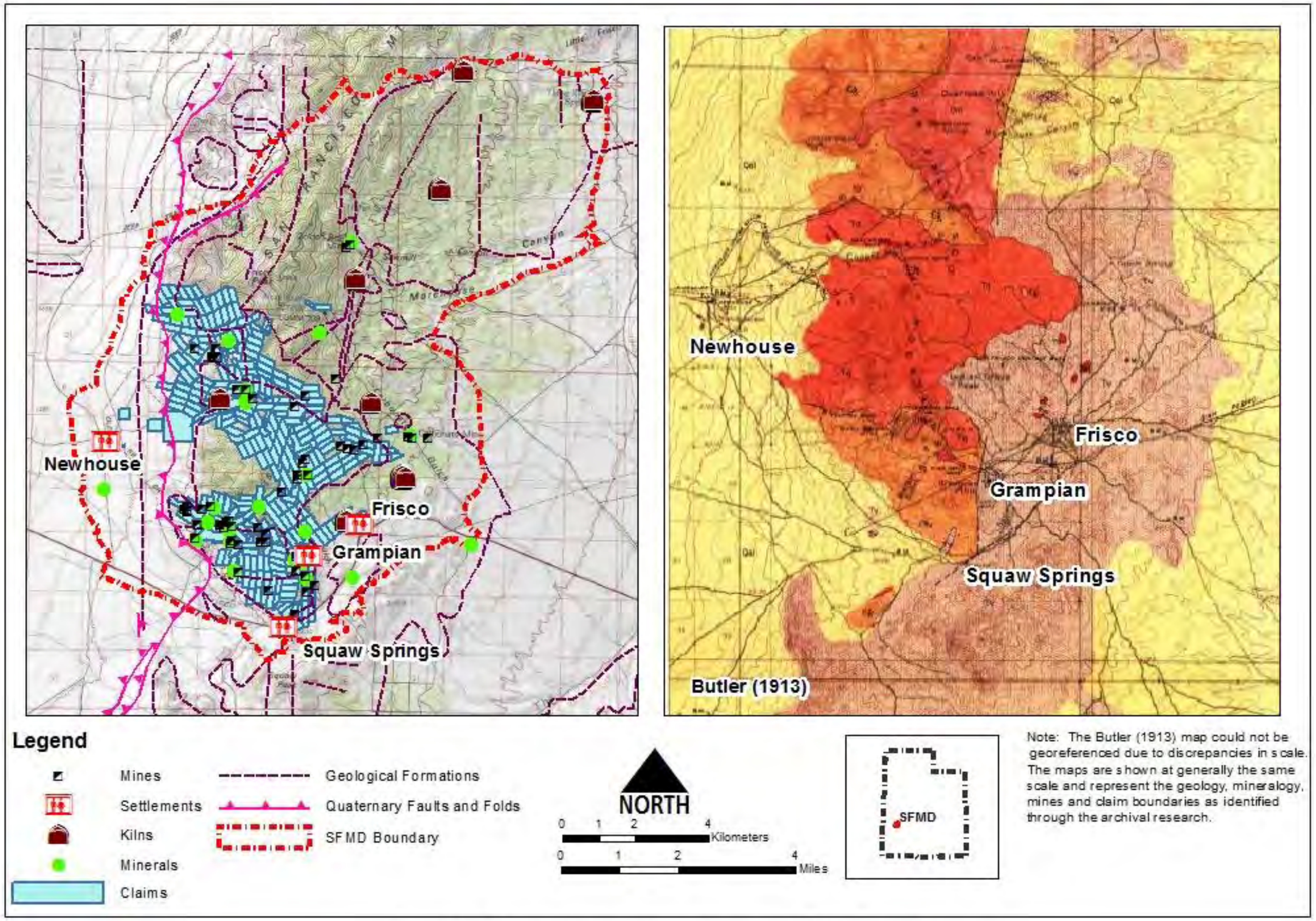


Figure 4-4. Geology, Mineralogy, Mines and Claim Boundaries

communications and utilities; cemeteries; etc.

For the SFMD HLC model, the data for the settlements was based on archival research and historical maps. The locations of the structures, transportation routes, and mining related features were plotted manually and then overlain in the GIS for comparison (Figure 4-5). It should be further noted that the GIS aided in the completion of a “Building Gazetteer” prepared for the SFMD (see Appendix D2) that corresponds to structures identified from the historic maps and photographs. In instances when the property owner or resident was identified, the GIS could be queried along with the “People Database” prepared for the SFMD (see Appendix D1).

Transportation routes within the SFMD include dirt roads, railroad, and highway; no routes associated with the stage coach could be identified readily as to the locations from the archival materials. As predicted, the transportation routes fall fairly in line with mining features and show the distances travelled between the residential, commercial and industrial areas of the SFMD (see Figure 4-5). Figure 4-6 provides a comparison of the transportation routes over time.

4.2.4 Archaeological Sites

Archaeological sites in Utah are recorded under the IMACS system, which operates under the auspices of the University of Utah (Figure 4-7). Site types commonly identified within Utah and associated attributes are defined by the IMACS. Examples of prehistoric archaeological sites include rock art, granaries, caches, or artefact scatters, whilst examples of historical sites may include camp sites, structural remains, irrigation features, fences, trails, ranch equipment or discarded trash. Some archaeological sites may include features or artefacts representing both the prehistoric and historical era; these are denoted as mixed or multi-component sites.

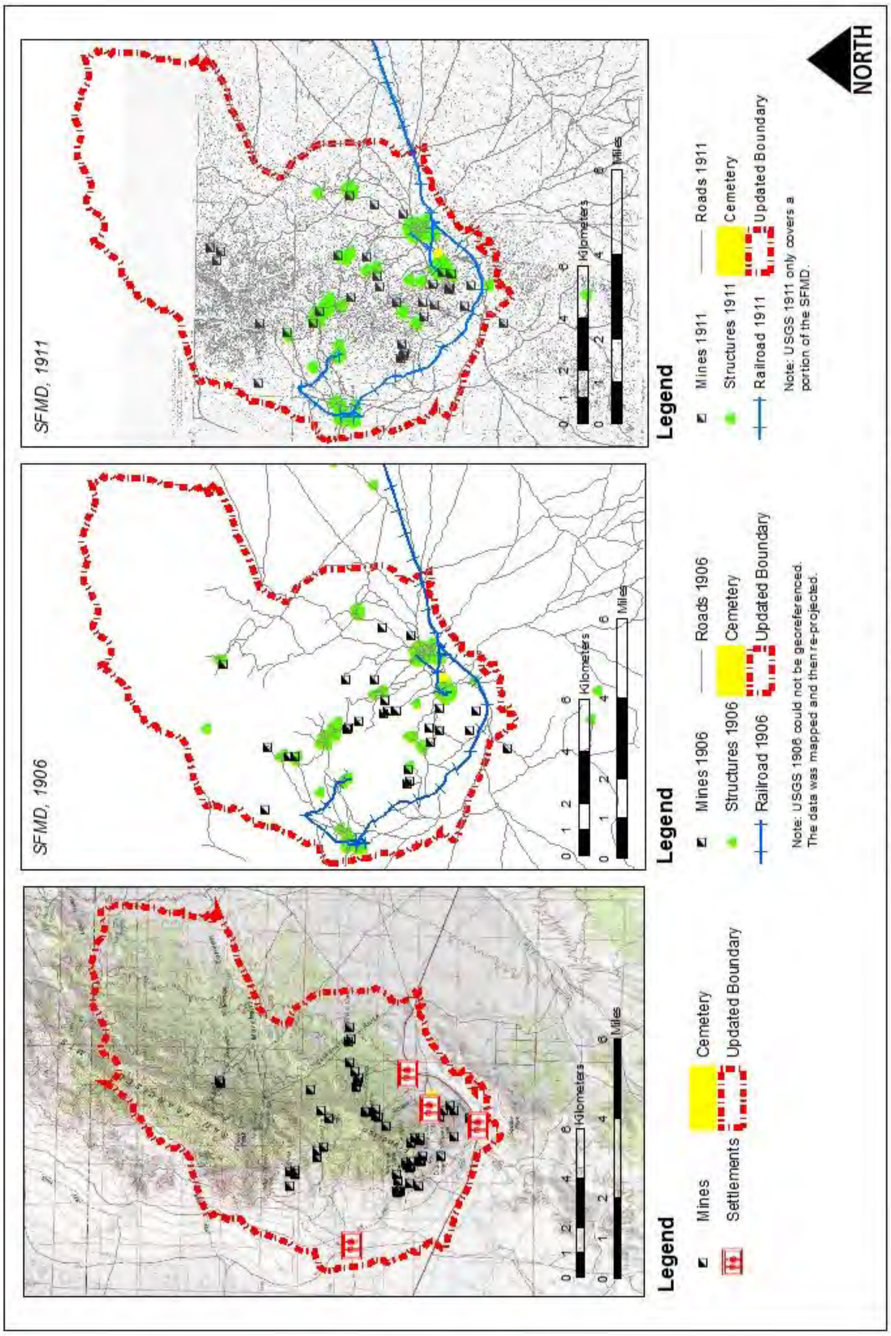


Figure 4-5. Settlements, Cemetery, and Mines

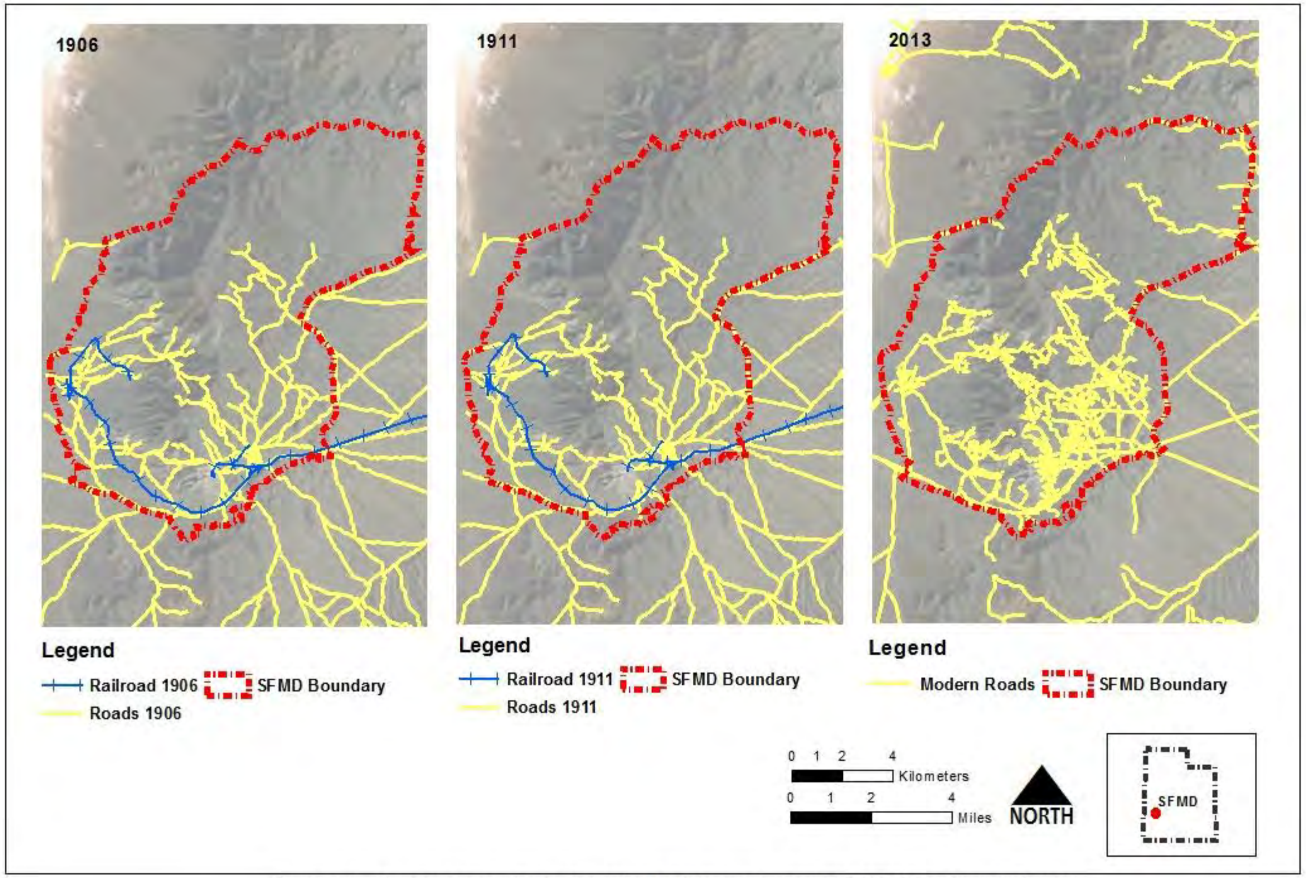
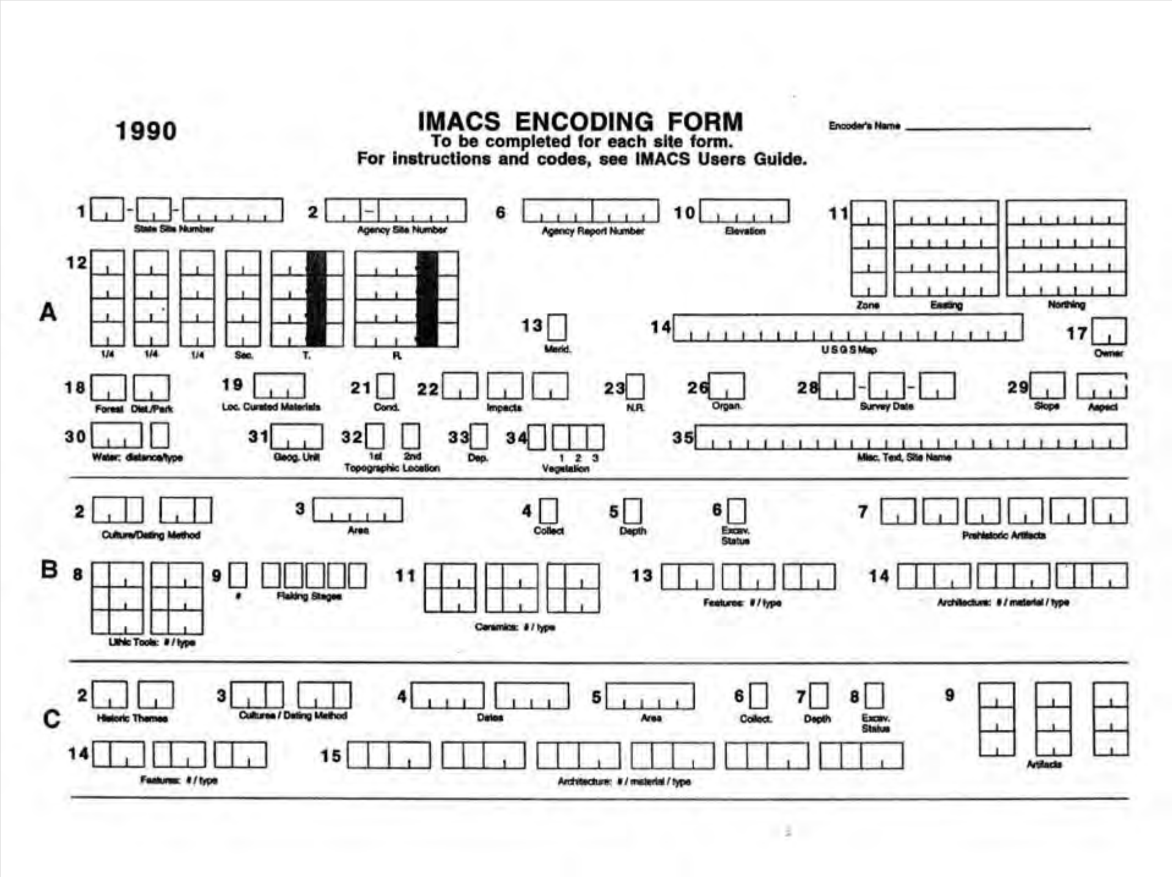


Figure 4-6. Comparisons of Transportation Routes within the San Francisco Mining District



1990

IMACS ENCODING FORM
To be completed for each site form.
For instructions and codes, see IMACS Users Guide.

Encoder's Name

A

1 State Site Number 2 Agency Site Number 6 Agency Report Number 10 Elevation 11 Zone Easting Northing

12 1/4 1/4 1/4 Sec. T. R.

13 Merid. 14 USGS Map 17 Owner

18 Forest Dist./Park 19 Loc. Curated Materials 21 Cond. 22 Impacts 23 N.R. 26 Organ. 28 Survey Date 29 Slope Aspect

30 Water: distance/type 31 Geog. Unit 32 1st 2nd Topographic Location 33 Dep. 34 1 2 3 Vegetation 35 Misc. Text, Site Name

B

2 Culture/Dating Method 3 Area 4 Collect 5 Depth 6 Excav. Status 7 Prehistoric Artifacts

8 Lithic Tools: # / type 9 # Flaking Stages 11 Ceramics: # / type 13 Features: # / type 14 Architecture: # / material / type

C

2 Historic Themes 3 Cultures / Dating Method 4 Dates 5 Area 6 Collect. 7 Depth 8 Excav. Status 9 Artifacts

14 Features: # / type 15 Architecture: # / material / type

Figure 4-7. Example IMACS Encoding Form for Recording Archaeological Sites (University of Utah 1990)

Information for the archaeological sites was provided through the BLM, USHS, the UT AMRP, and from the field investigations performed in association with the current study (Bassett 2005, 2008, 2010; Dalley 1991a-d, 1994a-b, 2001a-c; Dalley and McEwen 2003a-c; Higgins 1997a-f; Nielsen 2002; Notarianni n.d., 1981, 1982; Peterson 1973; Peyton 2010; Puckett 2008; Southworth 1990). UTM coordinates for each of the site locations were entered into the geodatabase and archaeological site maps were georeferenced for incorporation into the GIS data for all 54 archaeological sites recorded within the SFMD boundaries (Figure 4-8). The majority of these sites are associated with the mining landscape, and comprised adits, shafts, structural remains, equipment mounts, refuse and abandoned machinery. Additional areas included in the ground-truthing exercises were recorded through the use of a Garmin Etrek handheld GPS as Observation Areas. Artefacts

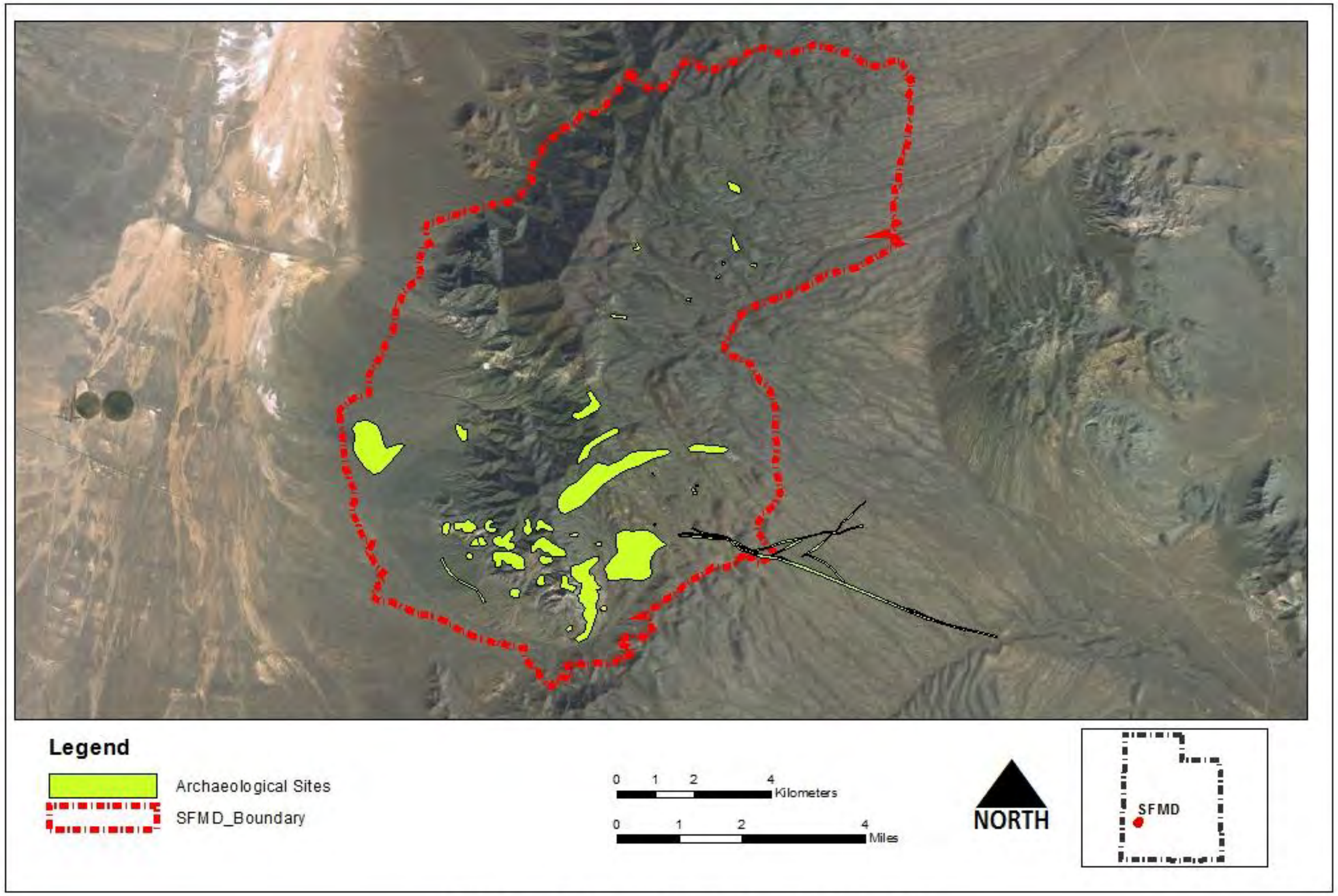


Figure 4-8. Previously Recorded Archaeological Sites

corresponding to the Observation Areas were noted and can be identified through a query of the GIS (Appendices C and E).

4.3 GIS Integration

As noted in Figure 4-8, the locations of the previously recorded archaeological sites were included in the GIS. Through georeferencing of maps and other data, the locations of roads, structures and other features were added to the GIS data manually. Comparison to modern aerial photographs (i.e., raster images) allowed for the identification of several additional activity areas that had not been recorded as archaeological sites for various reasons (e.g., access to location not permitted by land owner; previous recordation work focused on mining features as opposed to support structures; etc.). Figure 4-9 provides a comparison of the newly identified activity areas in relation to the archaeological sites.

From the GIS data, seven primary areas were identified for further ground-truthing exercises (Figure 4-10): (1) the Newhouse town site; (2) the commercial district or centre of the Frisco town site – including the Frisco Mining and Smelting Company site; (3) the Horn Silver, King David, Lulu Mines and the Grampian settlement; (4) the Frisco town site's railroad depot; (5) the Squaw Springs stage stop; (6) Marble Gulch; and (7) outlying areas around the SFMD. These areas were depicted in the GIS model showing each of the relative themes and aided in the identification of various forms of land use, shape and disposition of roads, distribution of buildings, contours, geology and soils, vegetation, hydrology, settlement patterns, and other features within the SFMD HLC model.

4.4 Ground-Truthing Landscape Characterisation Data

Whilst archaeology focuses primarily on subsurface cultural features, the goal of the present study is to adapt and apply the English Heritage HLC model to a historic mining site in the US. Ground-truthing allows for visual inspection of the site; aids in determining the discreteness of loci; gaining dimensions of features displayed in the model; and verifying the

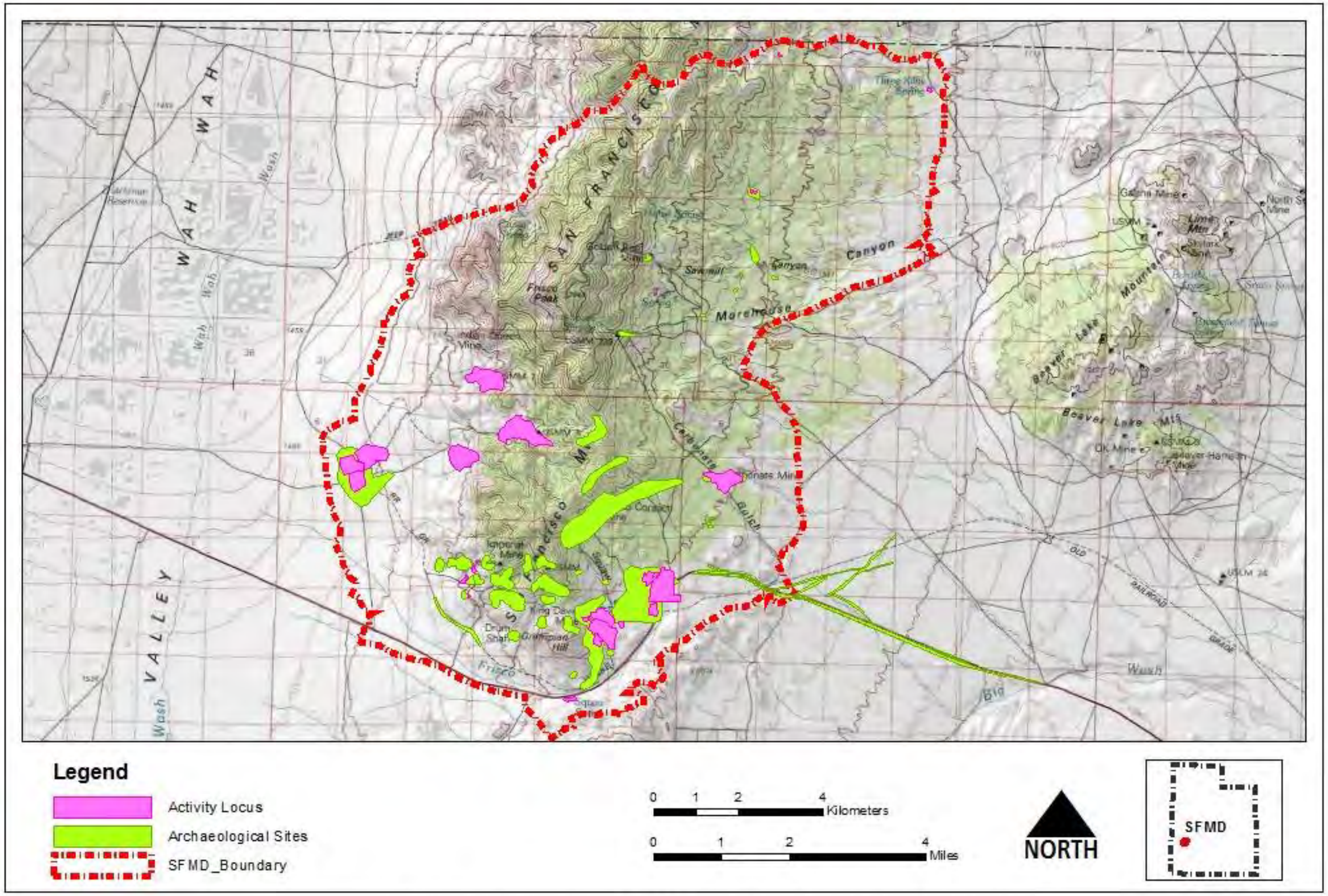


Figure 4-9. Archaeological Sites and Activity Areas within the SFMD

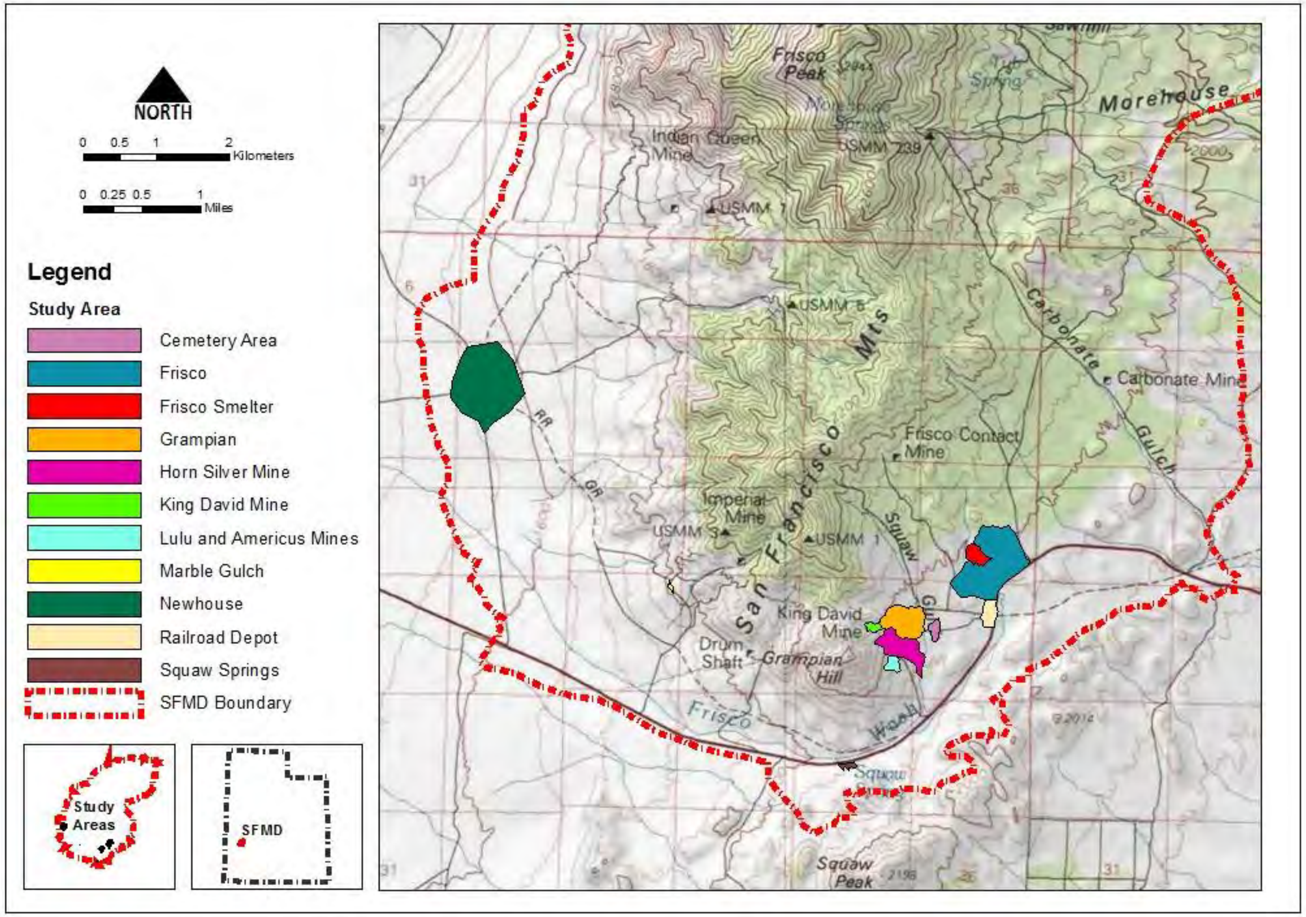


Figure 4-10. Sample Locations within the San Francisco Mining District

location of such features. Features that are present physically may be verified versus what may be misidentified through pixilation on imagery or differing scales on maps. Ground-truthing also allows an opportunity to identify the state of preservation or the integrity of each feature within the landscape. Thus, the following questions may be answered through ground-truthing:

- Have preliminary interpretations identified features within the landscape correctly?
- What is the specific physical composition and cultural context of each feature within the landscape?
- Are ambiguous anomalies accurately identified or may they be dismissed as features?

4.4.1 Ground-Truthing of the SFMD

In order to adequately verify, interpret and compare the historical maps and photographs to the current physical disposition of the SFMD, a GIS model was produced. The model incorporates topographic maps, historic photographs, satellite imagery, and aerial photographs with themed data such as geology, hydrology, soils, vegetation, transportation, settlement, mining claims, and utilities. From the model, a series of maps were produced from the data for comparison in the field. Ground-truthing investigations helped identify features within the landscape correctly. Anomalies viewed on aerial photographs were inspected in the field to verify their physical composition. In some instances, features were dismissed in the field (e.g., trees that appeared to be structures due to pixilation). A majority of the features identified through the historical documentation and physical representations could be linked to cultural contexts of the SFMD. Thus, the ground-truthing phase of the field work demonstrates that the English HLC model may be applied effectively to the SFMD and other mining districts in the US.

Initial site visits to record elements of the SFMD were made in the summer of 2003, and again in July 2004, August 2005, June 2006, April 2008, June and October 2010, and August 2011. The first visit was made to the site, with a focus on the beehive charcoal kilns and cemetery in 2003. Between 2003 and 2004, preliminary research was undertaken to determine whether the SFMD had been recorded as an archaeological site and identify any sources of history.

Visits between 2004 and 2006 focused on comparisons between the archival record and readily identifiable features within the Frisco town site (i.e., commercial district) and structural remains near the Horn Silver Mine. These visits included comparisons to the town cadastral map (Tolton 1904) and historic topographic maps (USGS 1906/1911).

In 2008, site visits extended to the Frisco Mining & Smelter Company and its related charcoal kilns, the cemetery, and portions of the commercial district of Frisco. The 2008 visits included comparisons to a town cadastral (Tolton 1904), historic topographic maps (USGS 1906/1911), and historical photography in order to better discern features on the landscape. Further, attempts were made to identify the San Francisco Station as Squaw Springs based on historical maps (Hooker 1879, *Southern Utonian* 17 June 1882, Butler 1913: 27, Wray 2006: 295, 303).

More formal investigations were made in June and October 2010. In June 2010, features near the DUP marker were compared to the archival record; the potential locations of the former railroad depot, and several other structures were identified. In October 2010, site visits were performed to include inventory and testing of certain features. Inventories were placed at the former Frisco Mining & Smelter Company, three mining focus areas (Horn Silver, King David, and Lulu Mine), and at various locations around the town site.

In August 2011, site visits focused on outlying areas of the SFMD, including portions of Newhouse, Marble Gulch, various areas within the commercial district of Frisco, and to the north of Frisco. At this time, multiple attempts were made to locate the former jail house, as well as double checking feature locations at the depot against historical maps (Tolton 1904). Additional features were mapped, photographed and noted within the commercial district, including the location of the Horn Silver Spring; and roads to the north of Frisco were inspected for evidence of mining or settlement. A mine shaft and associated ore bin were recorded at Marble Gulch during August 2011 as well.

The methodology varied in each area based on the complexity of the site, the presence or absence of cultural materials, the level of illicit collector behaviour (i.e., looting), and ability to access the area for investigation. From comparisons to historical maps, photographs and physical remains, it was determined that the mining activity and residential area at Grampian included a portion of the Horn Silver Mine, Assay Building, and other associated mining infrastructure. The Frisco town site appeared to have varying activity locations, including a commercial district, multiple residential areas, and then areas to the south including transportation features (i.e., depot). Thus, areas selected for ground-truthing were loci believed to address research questions posed with regard to mineralogy, mining and settlement practices, technology, demographics, and policy. Ground-truthing exercises included judgmental transects (SU1, TU1, TU2) and visual inventories (VI02-VI51). Photographs were made, and, where feasible, features were measured.

4.4.1.1 Squaw Springs

Squaw Springs is situated to the south of the San Francisco Mountains and Grampian Hill, along the south edge of Utah State Highway 21, approximately 1.61 km (one mile) south of the Frisco town site (Figure 4-11). The site is mentioned in several accounts as the ‘Squaw Springs,’ ‘San Francisco Springs,’ and ‘San Francisco Station’ (Hooker 1879, *Southern Utonian* 17 June 1882, Butler 1913: 27, Wray 2006: 295, 303). Although no structures are depicted, the location of the stage stop and springs appears on historic maps from 1879 to the present (Hooker 1879; USGS 1906/1911, 1913, 1959, 1960; Butler 1913). Figure 4-12 provides an overview of the Squaw Springs area including topographic and aerial views, and a view of the spring and structural remains (USGS 1906/1911). From Squaw Springs, travellers could go to Pioche, Nevada, via Osceola (*Salt Lake Herald*, 25 December 1885: 2).

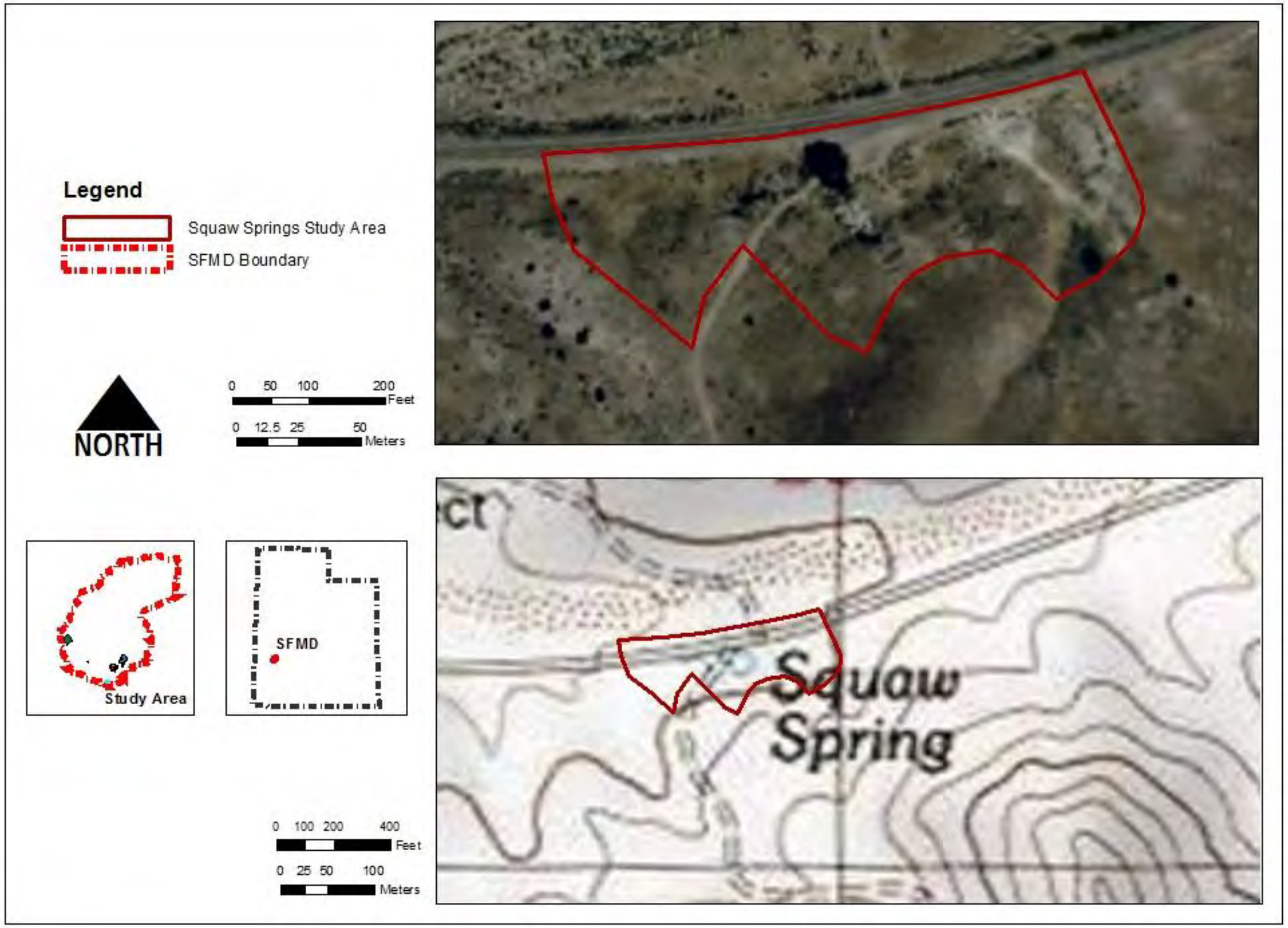


Figure 4-11. Squaw Springs Study Area

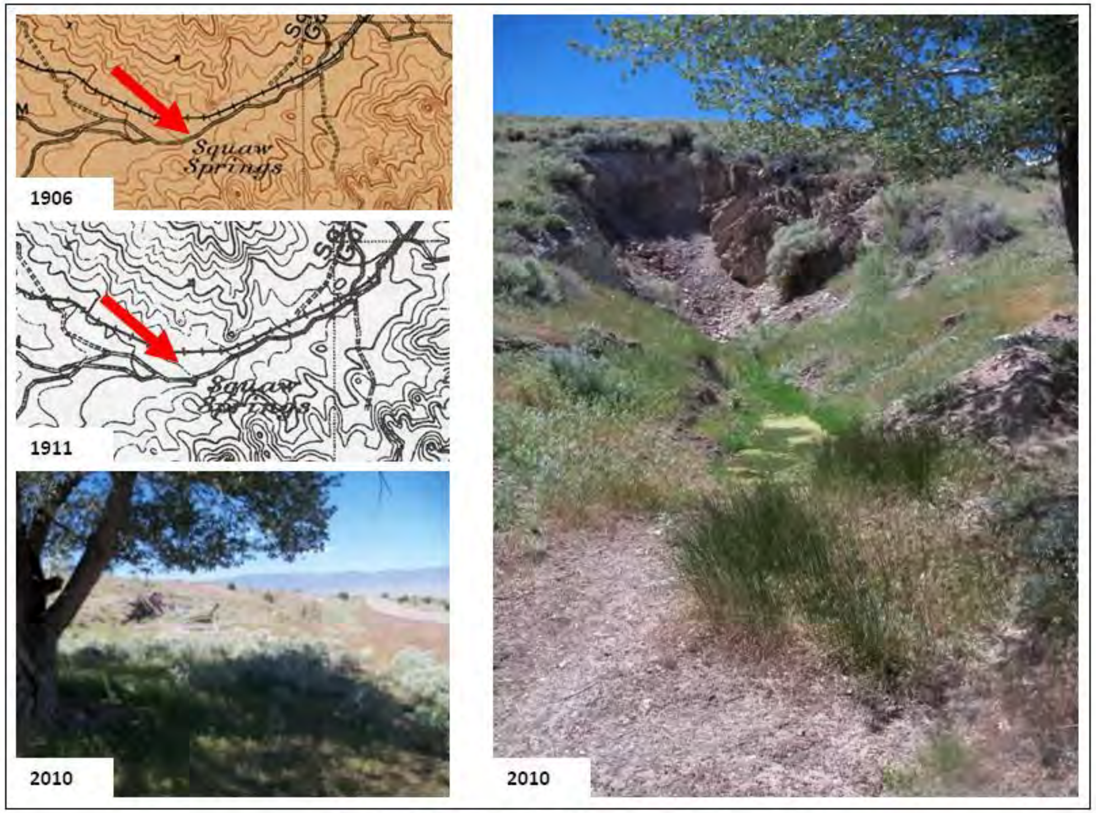


Figure 4-12. Squaw Springs Overview

Present are the remnants of the Squaw Springs stage station, such as wood fencing, wood structural remains, a cement-lined cistern, and the spring itself. A dirt road extends to the southwest, likely the former route to Pioche, Nevada, utilised by the stage coaches (see Figures 4-11 and 4-12). Four shallow prospect pits are present to the east of the springs. Tailings and a claim marker are present, adjacent to the prospects. The area is devoid of historical artefacts, whilst modern, intrusive items have been discarded in the vicinity.

4.4.1.2 Railroad Depot and Railroad Features

The railroad to Frisco from Milford was part of the Utah Southern Railroad, also known as the Utah Southern Railroad Extension; the Frisco Branch; and later the San Pedro, Los Angeles & Salt Lake Railroad (Wray 2006: 336). A 1904 cadastral map (Tolton 1904) depicts the San Pedro, Salt Lake & Los Angeles Railroad Spur south of the Frisco commercial district and northeast of the Horn Silver Mine. This location appears on a modified version of the 1904 map (Brown 1996) and Plate XXVII from Butler (1913). Whilst Butler (1913, Plate XXVII) does not indicate any other structures in this vicinity, it does show the depot northeast of the USMM No. 8. The cadastral map (Tolton 1904, Brown 1996) shows three other names within Parcel 47: W. Reese; Jud Alea; and M.B. Farnsworth. The 1900 Census lists William Reese and wife, Elizabeth, as residing in the Grampian Precinct (US Census Bureau 1900); William was employed as a labourer. Both William and Elizabeth were born in Utah; their parents emigrated from Wales. There is no listing for Jud Alea in 1880 or 1900 (US Census Bureau 1880, 1900). There are numerous Farnsworths who lived in Beaver County in the late 19th and early 20th centuries. Robert John Farnsworth and wife Irene Lucilla Gay Farnsworth resided in Frisco; Irene gave birth to at least three children in Frisco between 1897 and 1904 (US Census Bureau 1900; see also Appendix D1).

Figure 4-13 depicts the railroad study area. The topographic map (USGS 1906/1911) depicts at least six structures adjacent to the railroad, just west of a “wye” (i.e., spur) intersection (Figure 4-14). Today, much of this area is disturbed heavily due to the

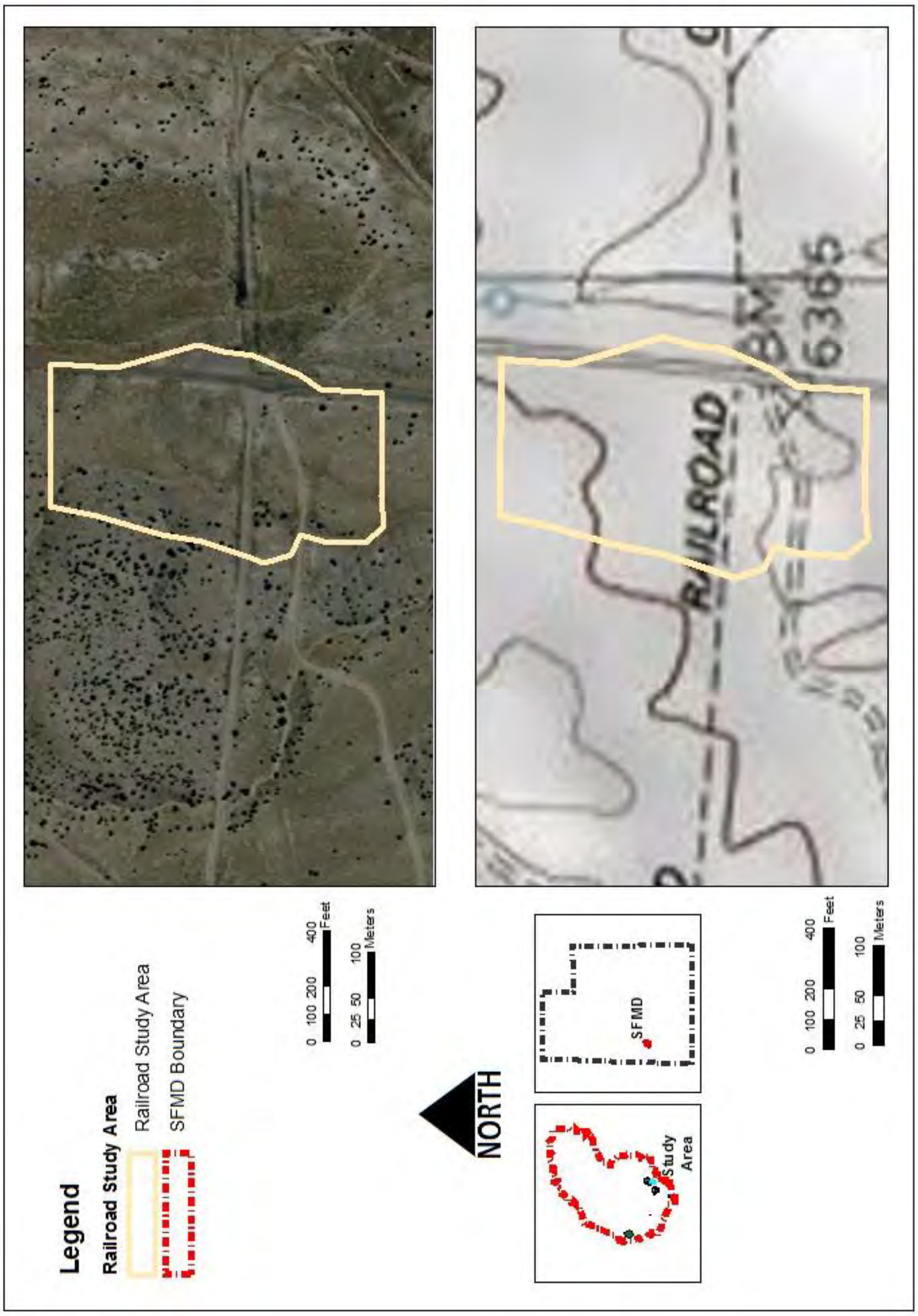


Figure 4-13. Railroad Study Area

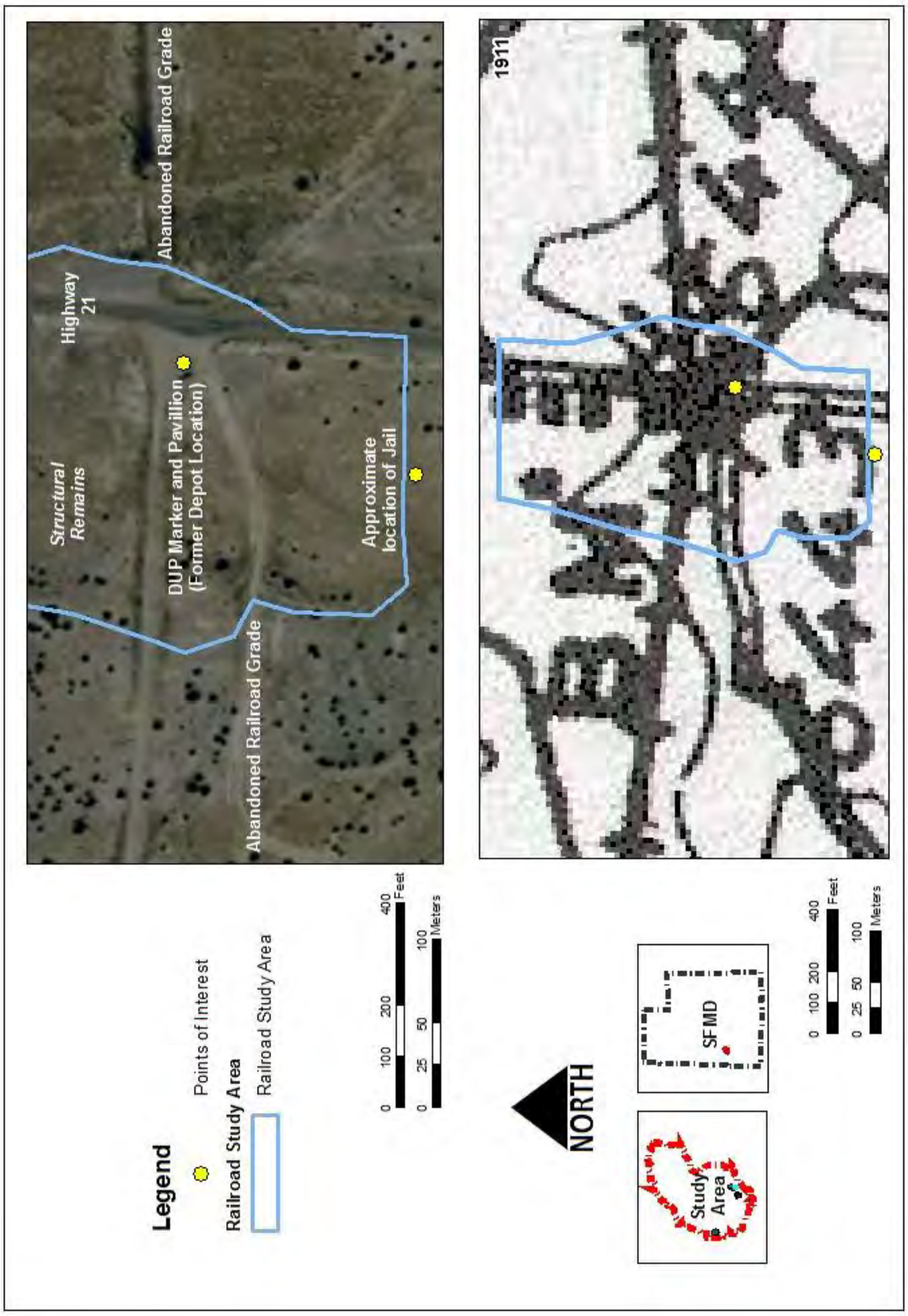


Figure 4-14. Approximate Location of Depot and Related Structures

construction of a recreation pavilion and a DUP historical marker. The track has been removed from the railroad grade, which is now utilised as a dirt road to access the cemetery and other roads to explore the former town and mines. The remains of four structures were observed to the north of the depot location, including at least one wooden structure, and three stone foundation platforms. Among these are the Farnsworth house and the W. Reese house. Adjacent to the north side of the abandoned railroad grade is what appears to be a well head. It is topped with a concrete pad and an iron cap; the iron cap has been welded with the lettering “WO” – possibly for “wash out.” Adjacent to this feature is a square vault constructed of concrete with a metal inset. A State Road Right-of-Way marker, associated with Utah State Highway 21, also is present. Upon observation, it was determined that the railroad depot most likely was constructed at the location of the current picnic table and DUP monument (see Figure 4-14). The vicinity surrounding the potential location of the depot was inventoried. Looters’ pits and scattering of historical artefacts are present throughout this area, including a large can deposit, barrel hoops, and railroad-related materials. South of the former depot location are possible structural remains that may relate to the location of the jail. Few artefacts are present, but include aqua glass, a sanitary can, and small rhyolite cobbles.

North of Squaw Springs, along the base of the former railroad grade, is a wood storage structure, possibly associated with the railroad. It is constructed of railroad timbers with metal hinges (Figure 4-15). It too is devoid of historical artefacts.

4.4.1.3 Frisco

To the north of Squaw Springs and the railroad depot location rests the commercial district of Frisco (Figure 4-16). The town square is depicted on various historic maps (Hooker 1879, Tolton 1904, USGS 1906/1911, Butler 1913). The earliest of these (Hooker 1879) depicts between 23 and 24 structures within the fledgling commercial district at Frisco, with most of the structures situated along a north-south trending road, later named “Main


Figure 4-15. Wood Structure Adjacent to Railroad, 2010

Street"[1] (Figure 4-17). The layout of the town, the depot, and claims are depicted on Butler (1913) (see Figure 4-17). More than 50 structures are depicted on the topographic map (USGS 1906/1911), with a majority of these structures representing the commercial district of Frisco (Figure 4-18). That being said, this map is representative of the settlement after the turn of the century, 26 years after the collapse of the Horn Silver Mine (1885). Most of the original transportation corridors are visible still on the landscape.

In addition to historic maps and aerial photographs, archival research relied upon a review of newspapers, US Census, Utah Business Directories and the *Utah Gazetteer* (Graham, J.C. and Company Printers 1880, 1883; Stenhouse & Company 1892; US Census Bureau 1880, 1885, 1900, 1910, 1920, 1930). These sources provide a glimpse of the commercial district within the Frisco town site from 1879 until 1928 (Table 3-1). For instance, between 1879 and 1880, there were 36 businesses in Frisco. This increased to 71 businesses in 1883-1884 in Frisco, Grampian and Newhouse, just before the collapse at the Horn Silver Mine in 1885. A separate listing for 1884 lists 32 businesses in the commercial district of

1 Brown (1996) misidentifies Main Street, the north-south trending street, as "Cedar Street." According to historical accounts, Cedar Street was situated to the north and extended east/west. Main Street also was named "Horn Silver Avenue" in some accounts.

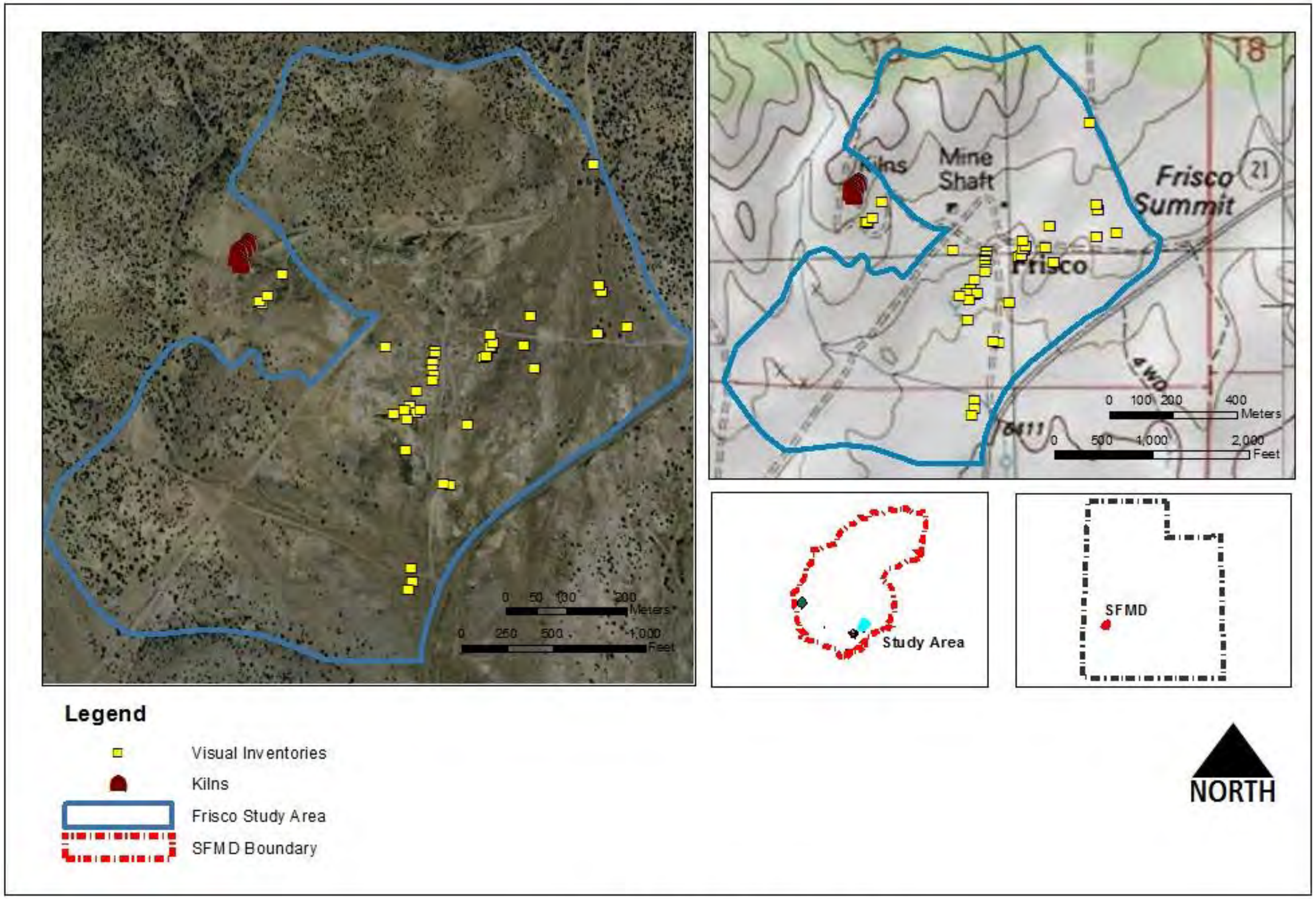


Figure 4-16. Frisco Study Area

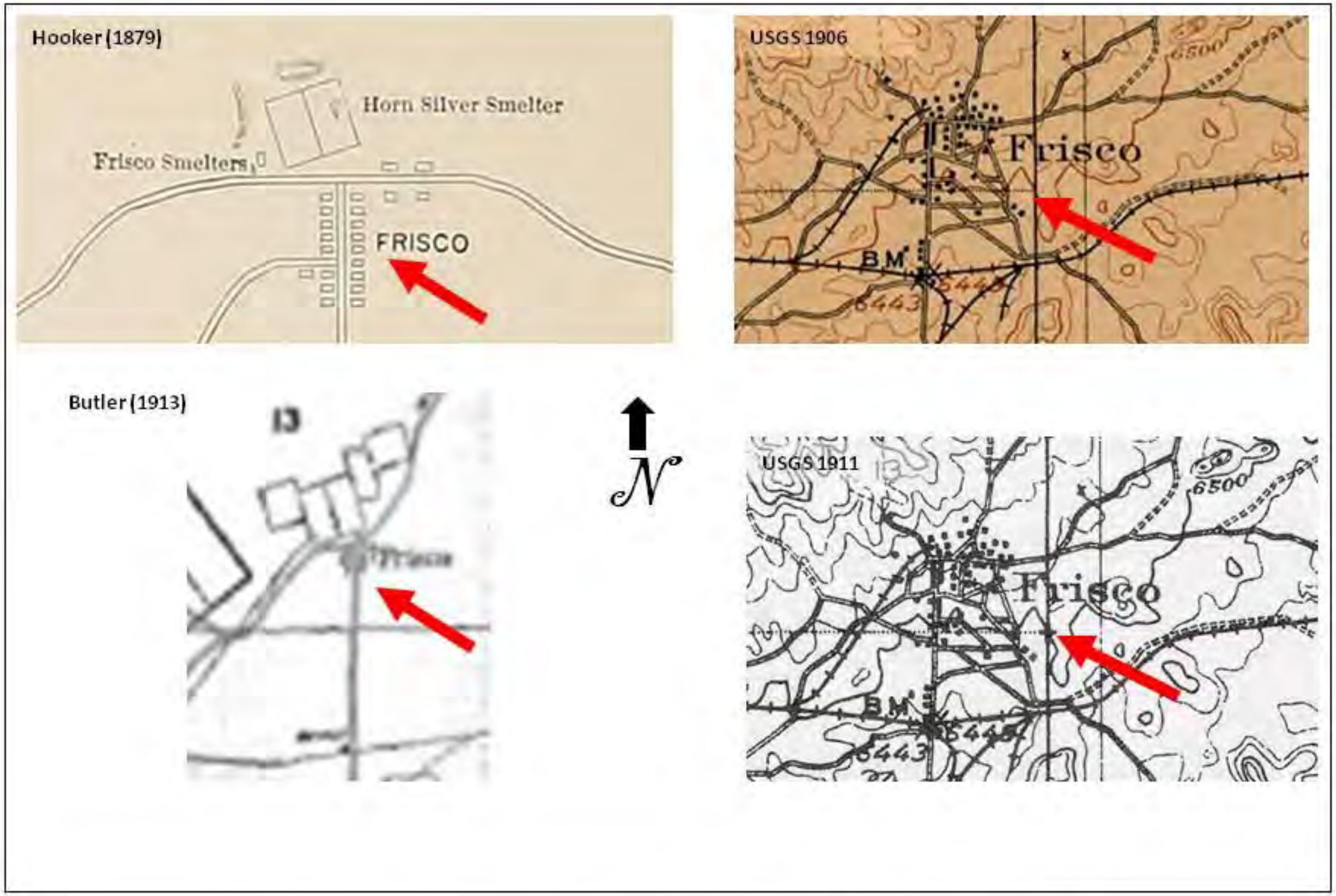


Figure 4-17. Frisco (Hooker 1879; Butler 1913; USGS 1906/1911)

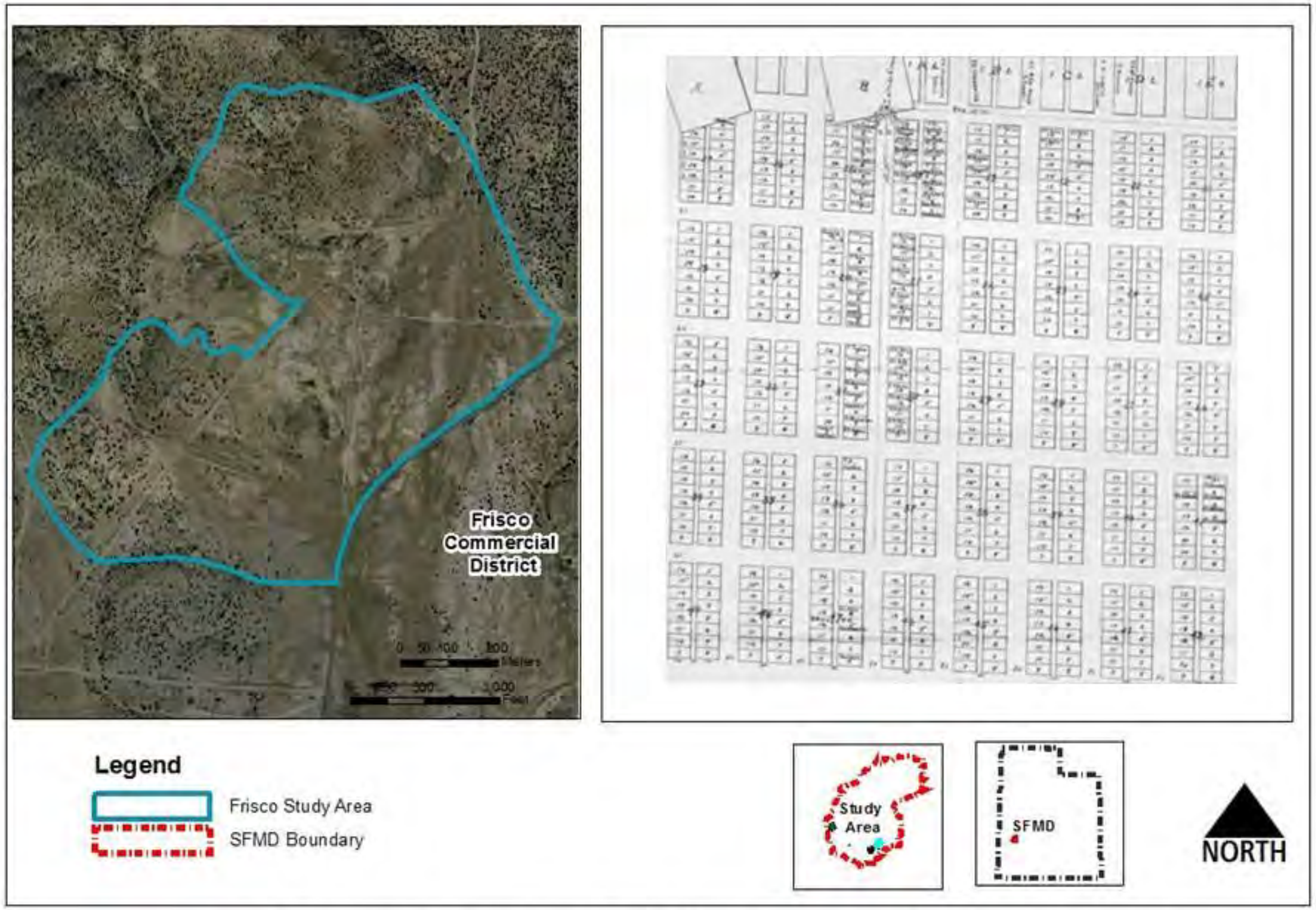


Figure 4-18. Town Cadastral of Frisco (Tolton 1904) and Corresponding Aerial for the Commercial District

Table 4-1. Business Listings, Frisco, Utah, 1879-1928

Date Range	Name of Proprietor	Type of Business
1879-1880	Godbe, F.	assayer
	Simpson, E.	assayer
	Olsen & Forgie	grain and provisions
	Burke, John M. (cashier)	Frisco Banking Co.
	McKay & Grace	blacksmith
	Terrell, J.J. (proprietor)	International Hotel
	Barrett, John	meat market
	Dodd Bros.	meat market
	Vail, D.D.	hair dresser
	Lipscomb, R.S.	Justice of the Peace
	Bowen, H.	livery stable
	Easly & Turley	livery stable
	Raht, W.L. (manager)	Frisco Reduction Works
	Godbe, William S. (manager)	Frisco Smelting Co.
	Hampton, Byram Y. (superintendent)	Frisco Smelting Co.
	Atkins, M. (agent)	Frisco Smelting Co.
	Meek, W.H.	druggist
	Norton, Thomas	Physician
	Ormand & Lovett	stationers
	Kelly, E.	restaurant
	Stoddard, M.	restaurant
	Savior & Co.	brewery
	Humphrey & Kelly	saloon
	Kelly, S.D.	saloon
	Lindsay & Co.	saloon
	Mulloy, Patrick A.	saloon
	Ormand, M.	saloon
	Richardson, J.S.	saloon
	Ryan, P.	saloon
	West, C.W.	saloon
	Hopkins, R.R.	Frisco Store, general merchandise
	Campbell, Cullen & Co	general merchandise
	Grant, J.F.	general merchandise
	Pattie & Goldstein	general merchandise
	Hagar, R.T. & Co.	grocers
	Boatright, Wm.	wheelwright
1883-1884	Latimer, T.H.	assayer
	Raht, Wm. L.	assayer
	Duggan, Mrs. L.C.	Bakery
	Duggans, S.M.	flour
	Orth, P.L. (cashier)	Frisco Banking Co
	Boatwright, W.	blacksmith & wagon shop
	Grace, Richard	blacksmith & wagon shop
	Orrick, Wm.	blacksmith & wagon shop
	Riley, A.	boarding house
	n/a	Cactus Boarding House
	Reilly, H. (proprietor)	Carbonate Boarding House
	Barnes, H. (proprietor)	Horn Silver Boarding House
	Barnes, E.H.	Hotel
	Mahoney, M. (proprietor)	Southern Hotel
	Haynes, Wm. (proprietor)	St. James Hotel
	Barrett & Bowen	meat market

Table 4-1. Business Listings, Frisco, Utah, 1879-1928 (continued)

Date Range	Name of Proprietor	Type of Business
1883-1884 (continued)	James & Angel	meat market
	Dodds Bros.	stock dealers, butchers
	Fordonski, David	tonsorial artist
	Kennedy, A.	tonsorial artist
	Orth, P.L.	Life & Fire Insurance
	Hanafin, Mrs. John	Laundry
	Lee, Hop	Laundry
	Hing, Sam	Laundry
	Ching, Wo Hing	Laundry
	Lochrie, P.	attorney-at-law
	Lipscomb, R.S.	Justice of the Peace & US Commissioner
	Boatright & Carver	livery & sale stable
	Bowen, W.	livery stable
	Smith, John	livery stable
	Campbell, Allan G. (President)	Cactus Mining Company
	Ryan, P. (manager)	First South Extension HSM Co.
	Bigelow, C.D. (president)	Frisco Mining & Smelting Co
	Hill, Harry C. (manager)	Horn Silver Mining Co.
	Grant, J.F. (secretary)	Italian Marble Co.
	Burnison, W.H.	mine manager
	Lammersdorf, C.	precious stones
	Burke, R.H. & Co.	drugstore
	King, Charles S.	Postmaster
	Burlingame, E.	job printer
	King, Chas. S. & Co.	Southern Utah Times (publishers)
	Anthony, C. (proprietor)	Frisco Restaurant
	Mow, C. (proprietor)	LaFayette Restaurant
	Clarke, J.W.	Saloon
	Fenney, Daniel	Saloon
	Fitzgerald & Ryan	Saloon
	Graham, J.M.	Saloon
	Haynes, W.	Saloon
	Kelley, S.D.	Saloon
	Malloy, Patrick A.	Saloon
	Murray, S.	Saloon
	Mahoney, M.	Saloon
	Ryan & Co.	Saloon
	Savior, John	Saloon
	Schmidt, J.	Saloon
	Shwartz, P.	Saloon
	Reher, J.C.	saloon
	Meyerfield, Chas.	saloon & shoe shop
	Rehr, John (proprietor)	St. Louis Brewery
	Rehnstrom, John	merchant tailor
	Jones, Miss B.E.	milliner and dress maker
	Hagan, R.T. & Co.	notions
	Schmitt, C.	shoemaker
	Staples, J.R.	furniture
	Bennett, Holbrook & Co	general merchandise
	Grant, J.F. & Co	general merchandise
	King, Chas S. & Co	general merchandise, cigars, tobacco and stationery

Table 4-1. Business Listings, Frisco, Utah, 1879-1928 (continued)

Date Range	Name of Proprietor	Type of Business
1883-1884 (continued)	Schwartz, P.	general store
	n/a	Horn Silver Mining Co. General Merchandise
	Minard, J.B.	watchmaker
	Naglor, R.	watchmaker
1884	Raht, W.L.	assayer
	Boatright, William	blacksmith
	Grace & Richards	blacksmiths
	Barnes, H. (proprietor)	boarding house
	Hawkes, J.R.	Hotel
	Kimple, P.M.	hotel and saloon
	James, Thomas	butcher
	Adsit, A.M.	physician
	Ivy, H.S.	barber
	Reber, John C.	ice dealer
	Burns, T.C.	attorney-at-law
	Lochrie, P.	attorney-at-law
	Carver, O.S.	Livery
	Sackett, T.N.	Livery
	Bigelow, A.M. (supt.)	Frisco Mining & Smelting Co
	Grant, J.F. (secretary)	Italian Marble Co.
	King, C.S.	Southern Utah Times (publishers)
	King, C.S. and Co	newsdealers and druggists
	Clark, J.W.	Saloon
	Galvin, John	Saloon
	Lammersdorf, C.	Saloon
	Malloy, P.A.	Saloon
	Murray, Simon	Saloon
	Ormond, M.	Saloon
	Cummins, E.	Tailor
	Rehnstrom, John	Tailor
	Christensen, L.	shoemaker
	Hardy, George	shoemaker
	Holmes, G.	shoemaker
	Bennett, Holbrook & Co	general merchandise store
	Horn Silver Mining Co.	General Store
	Nagle, R.	watchmaker
1892-1893	Sacket, Mrs. T.N.	Hotel
	Osborn & Sons	butcher
	Lammersdorf, Chas.	Saloon
	Lawrence, N.C.	Saloon
	Lipscomb, R.S.	Saloon
	Smithson, D.W.	Saloon
	Horn Silver Mining Co.	Mines and General merchandise
	Dotson & Son	general merchandise
1915	Williams, G.L.	Saloon
	Johansen, Mrs. Chris	notions
	Griffith, J.L.	general store
	Horn Silver Mining Co.	general store & mining
1928	Moebis, S.W.	secondhand automobiles

Frisco alone. By 1892-1893, the effects of the mine collapse were reflected by the dwindling businesses in Frisco; at that time, only eight businesses were in operation. By 1915, the number dropped to just four. The last year of business listings is 1928, when just one business was in operation in Frisco.

Still discernable today along Main Street are properties identified on the cadastral map (Tolton 1904) in Parcel 14 (e.g., Shol or Shob Stable, Saloon Hotel, Country Restaurant, Catonder Thomas Martin, Thomas James, and Samuel N. Slaughter), Parcel 15 (e.g., Richard Grace, John D. McAuley [Macaulay], Horn Silver Mines properties, Kelly N. Burk, M. Olsen, J. Burke, Ryan Saloon, C.R. Bush), Parcel 20 (e.g., Royal Saloon), and Parcel C2 (e.g., Ephraim Robert Smyth Residence)[2] (see Figure 4-18). Figure 4-19 depicts the S.N. Slaughter store.

Figure 4-19. Samuel N. Slaughter Store, Commercial District (Courtesy Hal Hickman)

2 John D. McAuley, or Macauley and his wife, Thomascene Osborne, were immigrants from Rose, Perranzabuloe, Cornwall. Catonder Thomas Martin married Jennie O'Dell, who was the daughter of Charles R. O'Dell, buried in the Frisco Cemetery. Thomas James married Ann Phillips; both were immigrants from Wales – he from Swansea, Glamorgan, Wales, and she from Llanelly, Carmarthen, Wales. Richard Grace and wife Sebrina [Sabrina] Land Grace owned several mines in the area; Sebrina served as the town's midwife. The Graces died one day apart in May 1908; both are buried in nearby Milford. Samuel Nathaniel Slaughter was born in Capetown-Province, South Africa; his parents were from Chilham and Sandwich, Kent, England. Slaughter's wife, Annie Elizabeth Huey also was born in South Africa; her parents were from South Africa and Nova Scotia, Canada. Slaughter's store was owned originally by B.F. Grant. See also Appendices D1 and D2.

4.4.1.3.1 Frisco Mining & Smelter Company

The Frisco Mining & Smelter Company was constructed in 1877 on the Frisco Mill Site (Lot 41A, patented) (Figure 4-20). Operating until 1884, it featuring a single-stack, custom smelter, with rock breaker, and a reverberatory flue-dust slagging furnace, to treat ore from the Carbonate, Rattler, and Horn Silver mines (Wray 2006: 315) (Figure 4-21). The smelter and five of its associated beehive charcoal kilns are situated to the northwest of the commercial district of Frisco.

Ground-truthing of the Frisco Mining & Smelter Company and kilns included the placement of a 10 by 10 m SU, designated as SU1. The inventory revealed a variety of artefacts including container and flat (window) glass fragments, nails (wire and square nails), firebrick, burned lumber, a ferrous metal strap, ore and slag. Glass fragments included aqua, sun-altered amethyst, brown, light olive, and heavily patenated burned glass. A plastic bottle was present, but is considered intrusive to the locus. In addition to the artefact concentration, several associated features were observed.

The majority of the smelter building is no longer discernible, with the exception of three partially standing equipment mounts (Figure 4-22). Fourteen loci were identified within the footprint of the former smelter, including a concentration of refuse (flat glass, amethyst coloured glass, yellow glazed ceramic fragments, porcelain fragments, machine cut nails, a zinc canning jar lid, a frog brick, M & E Utah firebrick, and sanitary cans); several rubble piles; a depression; and at least four slag piles (sorted by colour – black, orange, reddish coloured slag); a brick engine mount; and two rock and brick engine mounts. The beehive charcoal kilns are in fair condition (Figure 4-23).

4.4.1.3.2 Commercial District, Frisco

The commercial district is defined on historical maps from 1879 to 1911. Historical photographs provide insight into the establishments that lined Main Street (Figure 4-24). Several locations were selected along the commercial district for additional ground-truthing.

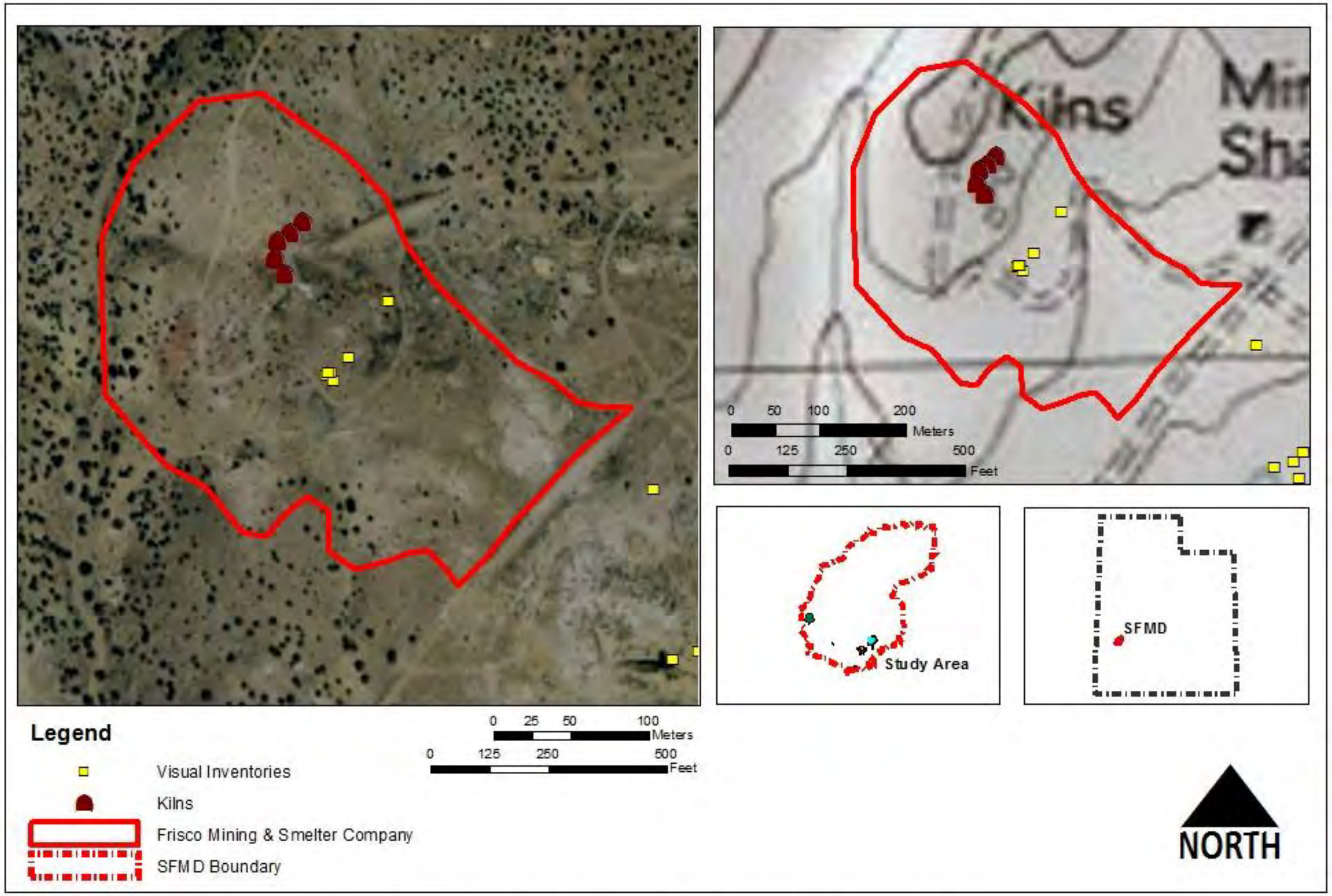


Figure 4-20. Frisco Mining & Smelter Company Study Area

Figure 4-21. Frisco Mining & Smelter Company, 1879, 1883 and 1927 (Hooker 1879, see Wray 2006: 316; NPS HAER 25D-1; Hal Hickman

Figure 4-22. Overview of Structural Remains, Frisco Mining & Smelter Company, 2013

Figure 4-23. Beehive Charcoal Kilns
(NPS HAER 25-1, 25A-2; Author Photograph, 2010)

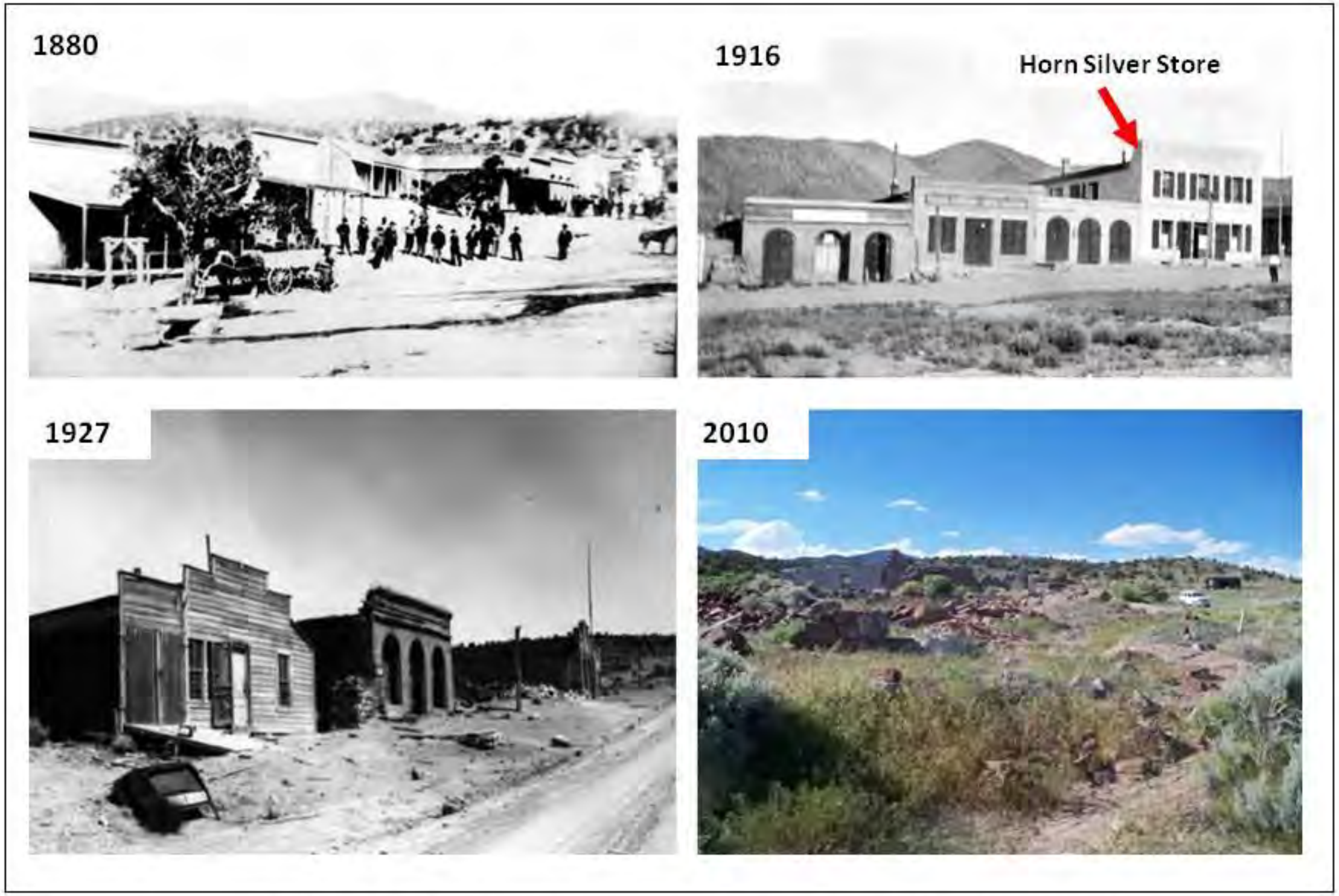


Figure 4-24. West Side, Main Street, Commercial District, Frisco, 1880, 1916, 1927, 2010
(Courtesy Hal Hickman; Author Photograph 2010)

A one by one metre (m) Inventory Grid (TU1) was placed atop a looter spoil pile approximately four blocks east of Main Street and the Horn Silver Store (i.e., Tolton 1904, Tract 12 or 13). TU1 was scraped with materials being sorted into material types. The Munsell Soil colour was defined as 10YR3.2 (i.e., very dark greyish brown). Inventories were made of items, with collection of certain diagnostic artefacts for further analyses; these items are further discussed in Chapter 4. Several additional areas were inspected in the general area of TU1; visual inventories (VI2-5) were made throughout the rest of the area adjacent to TU1, along looter spoil piles.

Visual inventories (VI 7-9) also were performed south of the Horn Silver Store, on the west side of Main Street. Visual Inventory 7 was conducted at the plotted location of the Royal Saloon (i.e., Tolton 1904, Tract 20). Visual inventories 8 and 9 are along the west side of Kelly Burk, M. Olsen, and J. Burke properties (i.e., Tolton 1904, Tract 15). All of the artefacts observed and/or recovered within the commercial district reflect the opulence of the town during the late 1880s, as well as the types of establishments in the vicinity (i.e., saloons, restaurants, butchers, tonsorial artists, sewing and notions, school, general merchandise, etc.).

4.4.1.3.3 Residential Area, Frisco

Residential properties were located throughout the SFMD from Frisco, southward to Grampian, and on the west side of the San Francisco Mountains near Newhouse. The focus of the ground-truthing at the SFMD entailed an examination of properties to the northeast of the commercial district, including that of the E.R. Smyth residence and unidentified properties to the east (Tolton 1904, Tracts D and E).

Visual inventory 6 was placed by a cluster of Juniper trees and an area adjacent to an abandoned cistern (Tolton 1904, Tract E). A concentration of historic period refuse is located beneath the trees, and is likely the result of illicit collector activities. Additionally, a one by one metre TU (TU2) was placed to the north of junipers and to the north/northeast of a cistern feature, which has been fenced and is adjacent to a large looter pit. The cistern is cement lined, with a plaster interior; it had a wood lid secured with bolts. The cistern is 180 cm (6 ft) by 180 cm (6 ft) in size with a 15 cm (6 inch) thick lip and is 5 ft [1.5 m] deep. Inside, the cistern is filled with soil, stoneware crock rim, galvanized pail, pipe, metal hardware, a bird skeleton and two dead mice, wood, metal box with handles, aerosol cans, cosmetic jar, and sanitary milk cans. Pipes are located on the south interior wall at a depth of 4.5 ft [1.4 m] deep, suggesting the presence of a well in the vicinity. The well head was not identified.

4.4.1.3.4 E.R. Smyth Residence

Historical accounts identify the Ephraim Robert Smyth and Charlotte Powell Smyth Residence as a boarding house and restaurant, in addition to serving as a residence for the Smyth family. Although born in Sacramento, California, Ephraim was the son of Irish immigrants, John A. Smyth and Susana Lyons, served on the Beaver County Board, and died in April 1930 of a heart attack (Death Certificate, see Appendix D1). Charlotte was the daughter of David Powell and Ann Morris, both of Wales. He and Charlotte married in Charlotte's home town of Beaver, Utah, on 23 April 1902. Together, they had two sons, Powell Lyons Smyth and Morris Robert Smyth.

The location of the Smyth Residence is depicted on the 1904 Cadastral Map (Tolton 1904) (Figure 4-25). Photographs of the structure from 1927 and 2010 allowed for comparison to the topography and ground-truthing of the property (see Figure 4-25). All that remains today are scattered structural remains, such as wood, flat glass, and hardware; butchered/cut bone; ceramics; beverage and medicinal bottle fragments; men's shoe leathers; and cans.

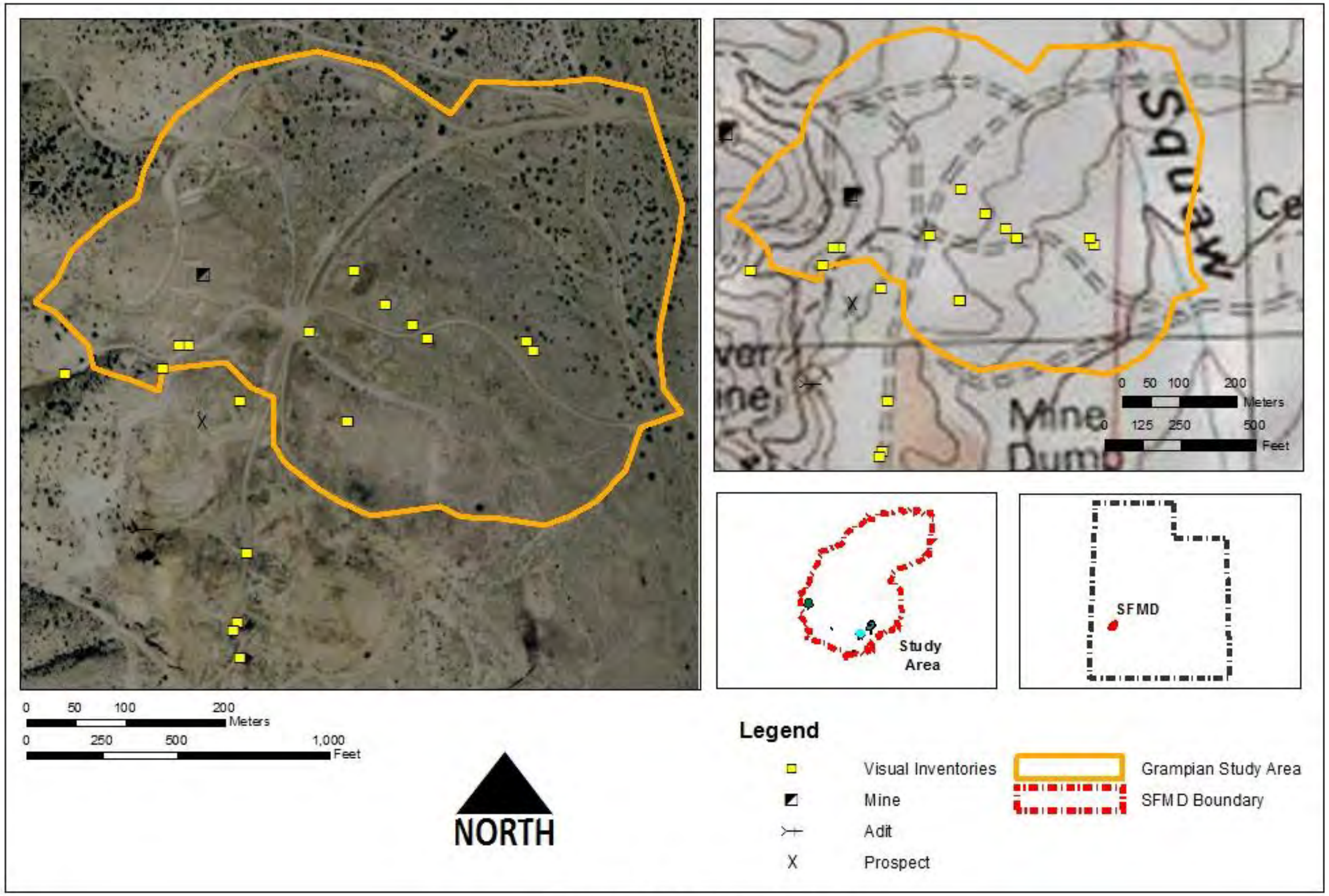


Figure 4-26. Grampian Study Area

4.4.1.4 Grampian

Grampian, or Grampian Precinct, initially developed as a suburb of Frisco (Figure 4-26). This area of development primarily consisted of mining-related structures, closer to the mines themselves. Along with the development came boarding houses, cabins, and other infrastructure. During the height of the mining activity in the mid-1880s, it is likely that tents and other temporary structures dotted the slopes of the San Francisco Mountains, and in the areas between Grampian and Frisco. Based on topographic maps from 1911, there were more than 50 structures situated in the area around the Horn Silver, King David and Lulu Mines at the base of Grampian Hill (Figure 4-27). Wray (2006: 364) provides an overview of the Grampian area depicting mine workings at both the Horn Silver mine and the King David mine, as well as several nearby buildings, and the cemetery in the foreground.

Ground-truthing in the Grampian area focused on structural remains situated along the northwest-southeast trending road extending between the King David/Horn Silver Mine workings and the Frisco Cemetery. Aerial photographs were compared to historic photographs and maps to discern possible locations of structural remains on the landscape (Figure 4-28). In addition to the former railroad spur that accessed the Peck Mill, several rock and wood foundations were noted, as well as a few standing structures. Generally, rock structures were formed of locally available rhyolite and volcanic tufa.

Two rhyolite foundations were noted along the north side of the former railroad spur (Figure 4-29). Both are small, one- to two-room structures constructed of wood beams and stacked rock. Both structures likely served as small miner's residences, based on their size and location near the mine. No artefacts were noted in association with these structures, although a larger deposit of refuse was noted to the south side of the former spur. It is possible the refuse deposit served as a centralised community trash dump or privy; it contains a variety of cans and is adjacent to a looter pit (Figure 4-30). At least three wood structures are noted along the north side of the abandoned railroad spur as well. One

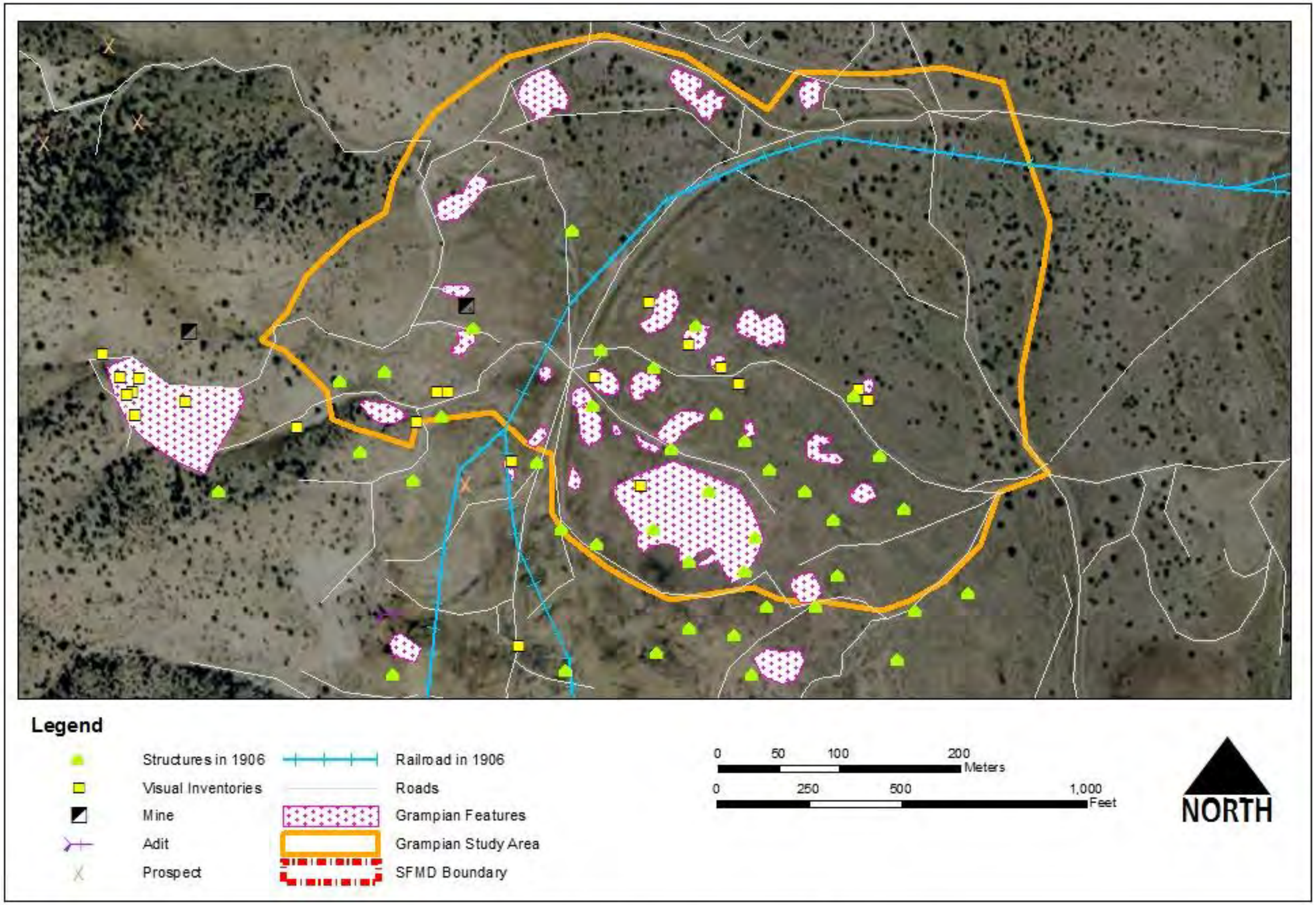


Figure 4-28. Overview of Features at Grampian

Figure 4-27. Overview of Grampian, Horn Silver, King David and Lulu Properties, 1911 (Wray 2006: 364, f.41, and f.56)

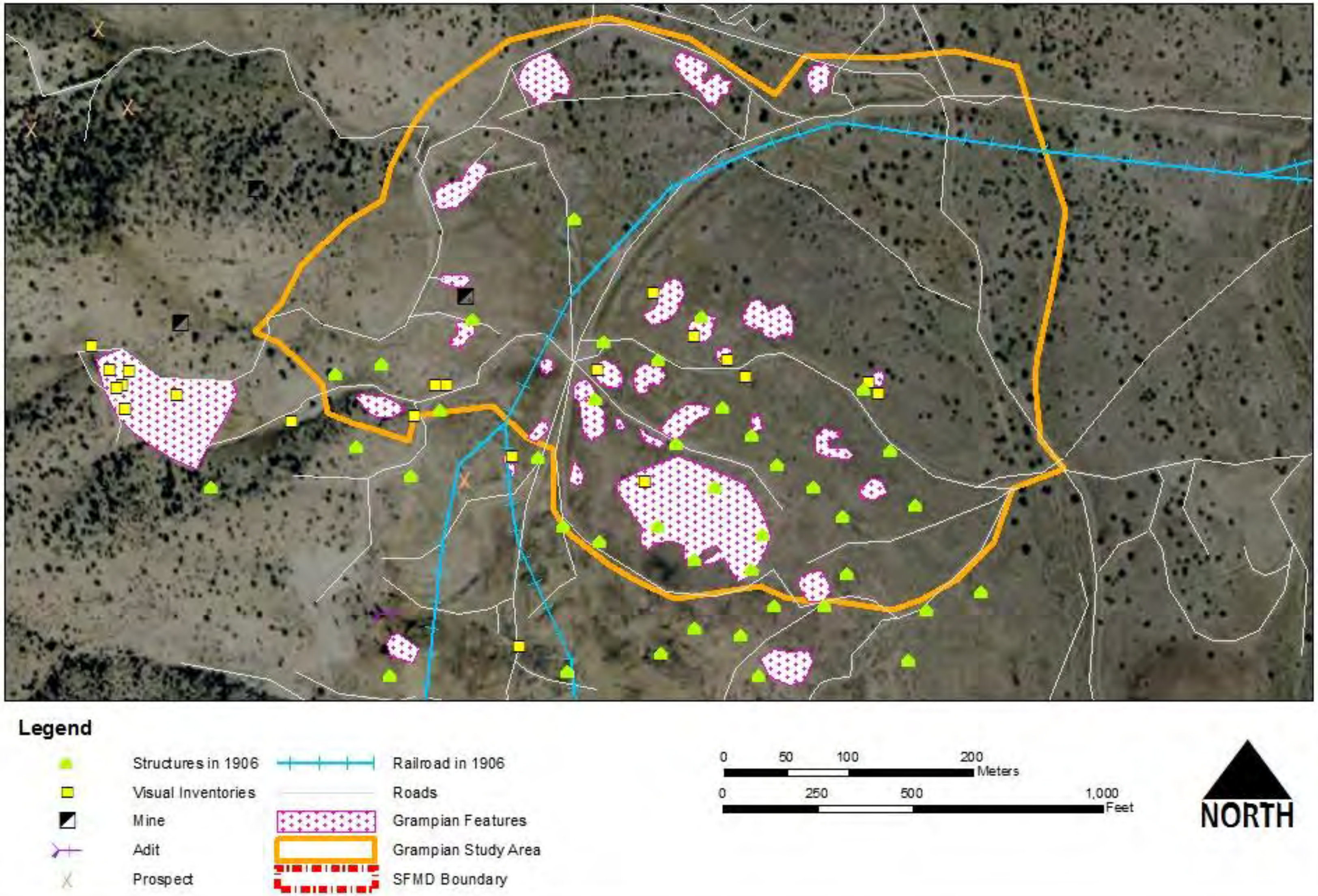


Figure 4-28. Overview of Features at Grampian


Figure 4-29. Example of Rhyolite Structural Remains, Grampian, 2010

appears to be a root cellar (Figure 4-31); one a small residence (Figure 4-32); and one, a restaurant or boarding house, based on the size of the foundation and the presence of a commercial cooking range (Figure 4-33). At least one cistern was present to the south of the abandoned railroad spur although no well head was identified in the vicinity, and, based on historical accounts water was not readily available in the SFMD.

Aerial photographs depict a concentration of dark rubble along the north side of the abandoned railroad spur (see Figure 4-28). Ground-truthing allowed for identification of this area as a rhyolite structure; a wood and rock structure with an earthen roof; and a dense concentration of rhyolite rubble (Figure 4-34). Whilst not clear, it appears that the rubble is from demolition of other structures in the vicinity. Additionally one structure was noted along the junction of two railroad spurs close to the Horn Silver workings. It appears to be a wood and corrugated metal winding house associated with a mine shaft. Figure 4-35 provides a view of the exterior of the winding house, the interior, door, and an overview with the shaft. The shaft has been closed by the UTAMRP and is fenced for safety purposes.

Figure 4-30. Large Refuse Deposit and Looter Pit, Grampian, 2010 (Author photograph)

Figure 4-31. Root Cellar, Grampian, 2010 (Author photograph)

Figure 4-32. Remains of a Small Wood Structure, Grampian, 2010 (Author photograph)

Figure 4-33. Restaurant or Boarding House, Grampian, 2010 (Author photograph)

Figure 4-34. Wood, Earthen, and Rhyolite Structure (L) and Entry (R), Grampian, 2010
(Author photograph)

Figure 4-36. Winding House and Shaft, Grampian, 2010
(Author photograph)

The winding house is similar to those noted at Snailbeach, Shropshire, UK (Figure 4-36).

Remnants of several other structures are noted throughout the Grampian area. Among these are rock outlined foundations (Figure 4-37), partially standing cabins, water tanks (Figure 4-38), and a property believed to be the Account House (i.e., Count House) for the Horn Silver Mine (Figure 4-39). The Count House, which served as the mine office, containing all of the Mining Company's receipts, payments and legers; because of the significance of the Count House, it would have been located in an area which allowed view of all the mine workings (Mayers 2004:118). The four-roomed building at Grampian was constructed with a variety of furnishings, including linoleum, tongue and groove boards, corrugated tin, and metal decoration along the interior roof trusses (Figure 4-40).

Few timber or wood structures are noted in Cornwall or West Devon landscapes today. At Hayle, South Quay, few timber structures were built and wood was used primarily at mill locations. At Camborne, Truro and Falmouth, many of the timber strcutres have been removed. Structural use of timber is noted in the bridges and viaducts, however, such as the tresses designed by British Engineer, Isambard Kindom Brunel at Truro. Note too that these timber structures at numbers mines both in the UK and the UK were susceptible to fire and may have since burned (see Chapter 3, Section 3.5.6).

Figure 4-37. Winding House, Snailbeach, Shropshire, UK , 2009
(Author photograph)

Figure 4-39. Water Tank and Pipe, Grampian, 2010
(Author Photograph)

Figure 4-40. Count House and Other Mining Support Infrastructure,
Grampian, 2010 (Author Photograph)

Figure 4-41. Interior Count House, Grampian, 2010
(Author photograph)

4.4.1.5 Horn Silver Mine

As noted in Chapter 3, Ryan and Hawkes discovered the Horn Silver claim in 1875. Four years later, W.A. Hooker (1879) provided an early illustration of the workings at the Horn Silver, which included ore bins, the new shaft, and at least one miner's cabin (Figure 4-41). Initially the mine included a horse or donkey-powered whim, with sloping roof-boards atop the working shaft. In 1885, the mine collapsed from the surface, destroying all workings to the 152.40 m [500 ft] level. Following that time, the workings were rehabilitated, including the sinking of a new three-compartment shaft, and the construction of a 30-stamp gravity concentrating mill (which burned but was reconstructed), and operated until 1905 (Wray 2006:339). An additional collapse in 1912 resulted in damage from the 274.32 m [900 ft] level to the 335.28 m [1100 ft] level (Wray 2006: 340). These collapses and recent use of mechanised equipment created the large scar visible on the landscape today (Wray 2006: 294) (Figure 4-42). At the turn of the century, the Centrifugal Concentrating Company constructed a large flotation mill (Peck Mill) and by 1916, an additional mill (Caldo Mill) began reworking the mill tailings (Wray 2006: 339, 341) (Figures 4-43 and 4-44). Very little of these massive structures remain visible in the landscape today (see Figure 4-42).

To the south of the Surface Plant is a stone structure, appearing on historical maps and in few historical photographs (USGS 1906/1911) that is believed to be an Assay Building (Figure 4-45). With a lintel constructed of railroad rails, the building was electrified, based on the presence of porcelain insulators in the ceiling trusses. It has a pyramidal roof which is partially covered in corrugated tin and wood thatching. Locally available rhyolite was used in the construction of the walls. The Census indicates eight assayers residing in the area between 1879 and 1930 (see Appendix D1). Based on the location of this structure near the Horn Silver and Lulu mines, this building likely served as a primary assay office for the larger mine workings in the SFMD. Just south of the Assay building, between the Horn Silver and Lulu claims, is a collapsed adit (Figure 4-46).

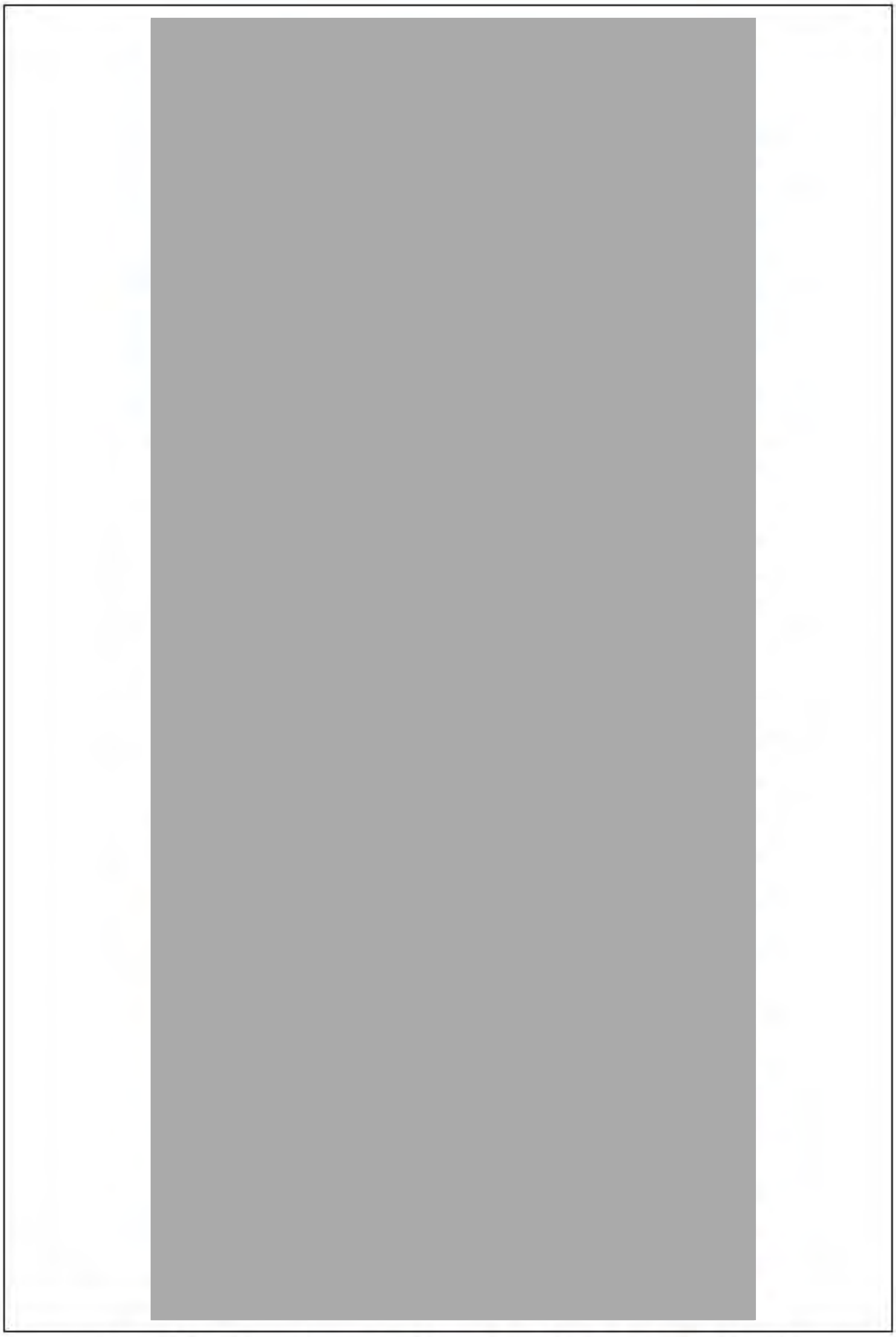


Figure 4-42. Overviews of the Horn Silver Mine and Surface Plant (Hooker 1879; Hooker 1879, after p. 32, as cited by Wray 2006: 296, f.6; Author Photograph 2010)

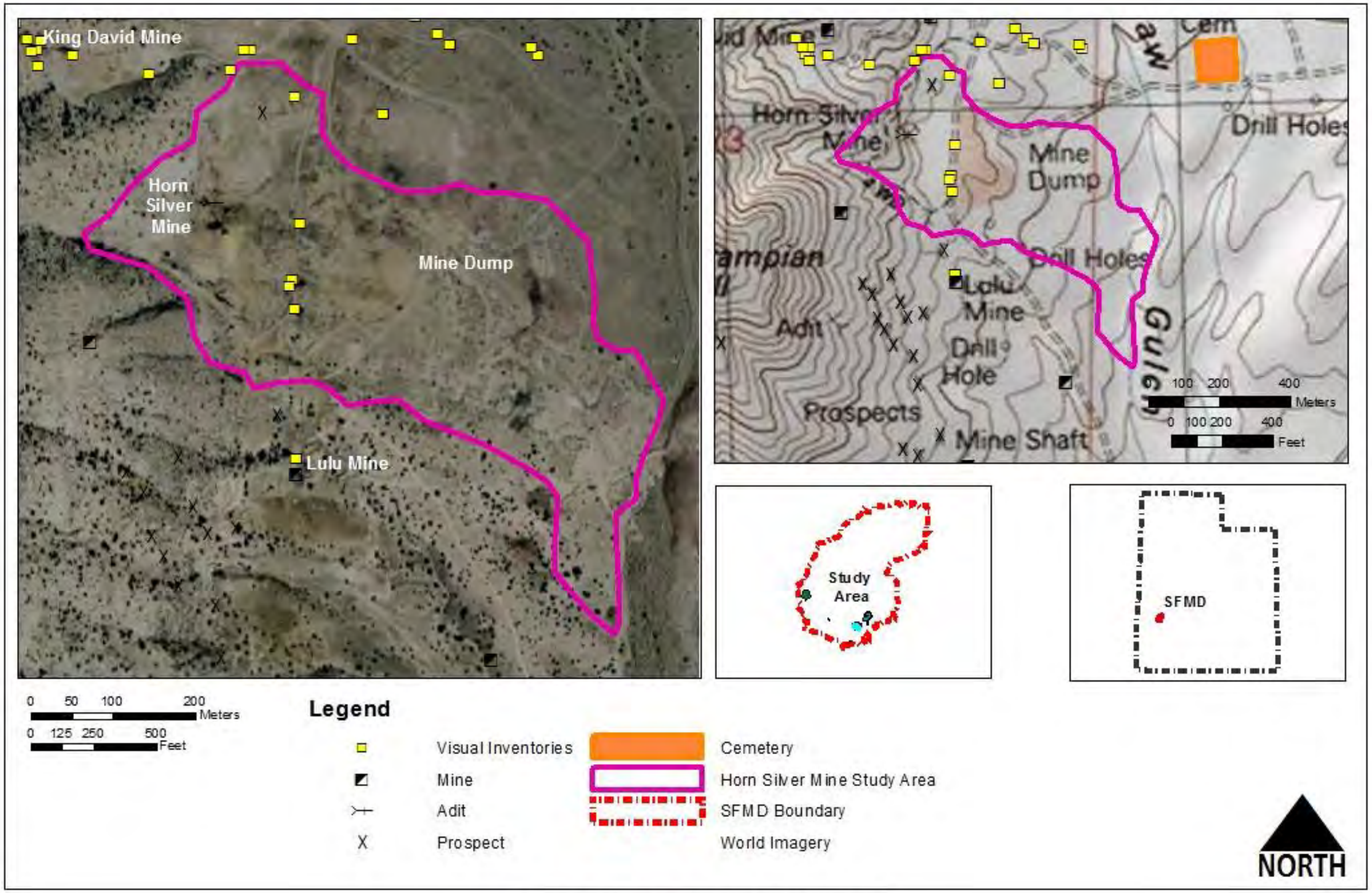


Figure 4-42. Horn Silver Mine Study Area

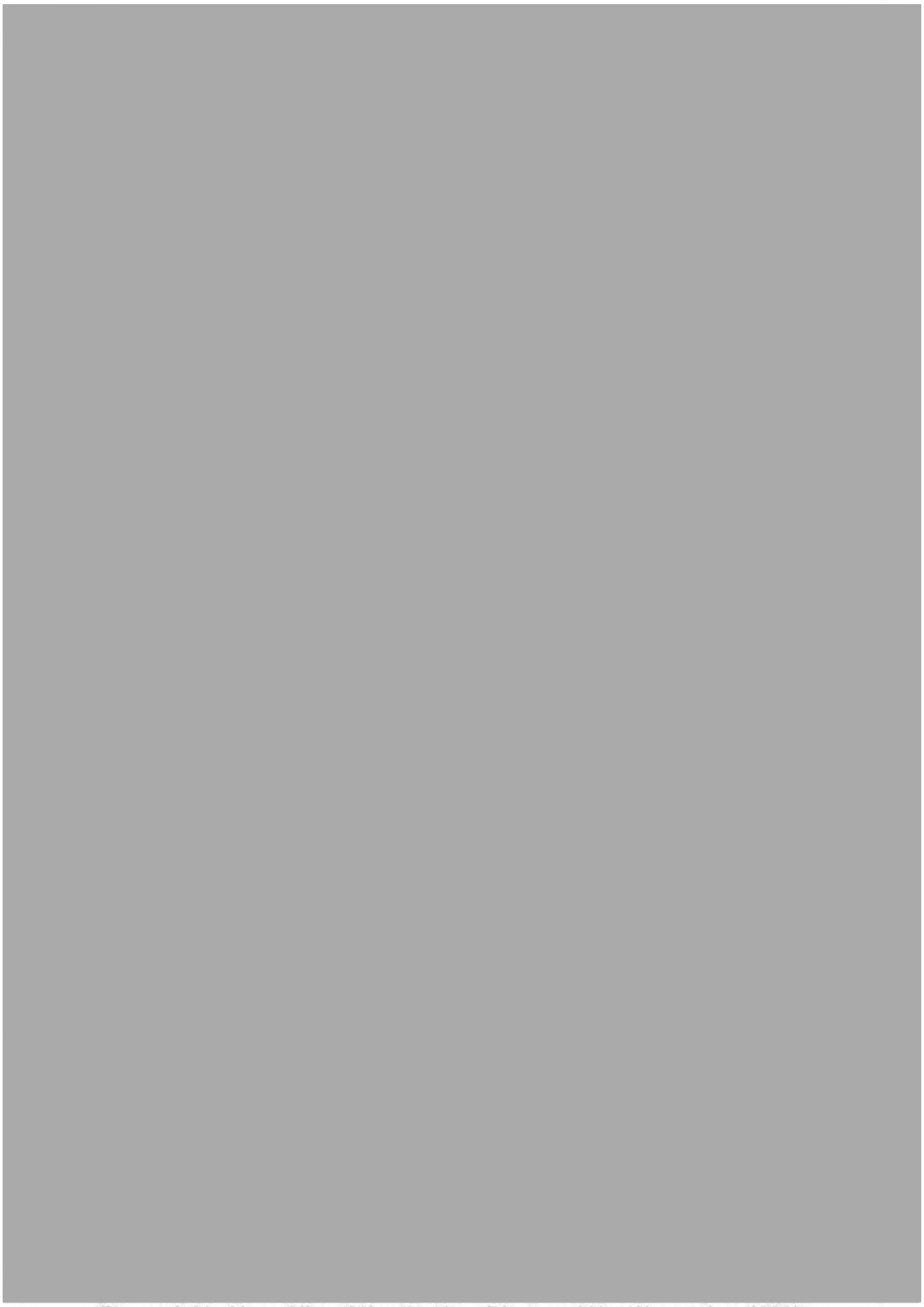


Figure 4-44. Horn Silver Mine Surface Plant and Headframe (ca. 1930)
and Remnants of the Surface Plant (2010)
(Wray 2006: 351, f.40, f.42; Author Photograph 2010)

Figure 4-45. Horn Silver Mine Surface Plant and Railroad (ca. 1930) and Comparative Views (2010)
(Top: Wray 2006: 351, f.42, f.54; Bottom L: Hal Hickman n.d.; Bottom R: Author Photograph 2010)

Figure 4-46. Assay Office, Horn Silver Mine, 2010
(Author Photograph)

Figure 4-47. Collapsed Adit, Near Horn Silver Mine, 2010
(Author Photograph)

4.4.1.6 King David

Between 1901 and 1909, the King David Mining Company located 52 claims (M.S. 5921 and M.S. 5986) (Wray 2006: 347). The King David Mining Company organized in the summer of 1908 and included a steam plant, a compressor hoist, and a water supply (via Morehouse Spring) (Butler 1913: 184). The following year, the company focused efforts on excavation of a double-compartment shaft just northwest of the Horn Silver mine and a tunnel in the Grampian claim. Present at the King David location today are a headframe, six-chute ore bins, a winding house, concrete winding and engine mounts, a winch, an assay or forge building, a small shed, a rock wall, and additional surface improvements (Figures 4-47 thru 4-49).

Between 1928 and 1933, E.A. Hewitt, Albert E. Kipps, and R. T. Walker extensively mapped the Horn Silver, King David and Cactus mines; based on these maps, a decision was made to sink the new King David Shaft (Drum Shaft) in 1932 (Wray 2006: 349, 357). The Drum Shaft included a headframe with a double-drum hoist and a surface plant comprised of galvanized iron structures lined with Celotex (Wray 2006: 357). Additional crosscutting and tunnelling led the King David holdings to the Washington No. 6 claim (Cupric Mines Company), in the Cactus stock granodiorite, and very near the Frisco Silver Lead Mining Company's Jennie Fraction and Humbug claims (Wray 2006: 358). During ground-truthing investigations in 2010, at least one adit was noted by the King David property (Figure 4-50).

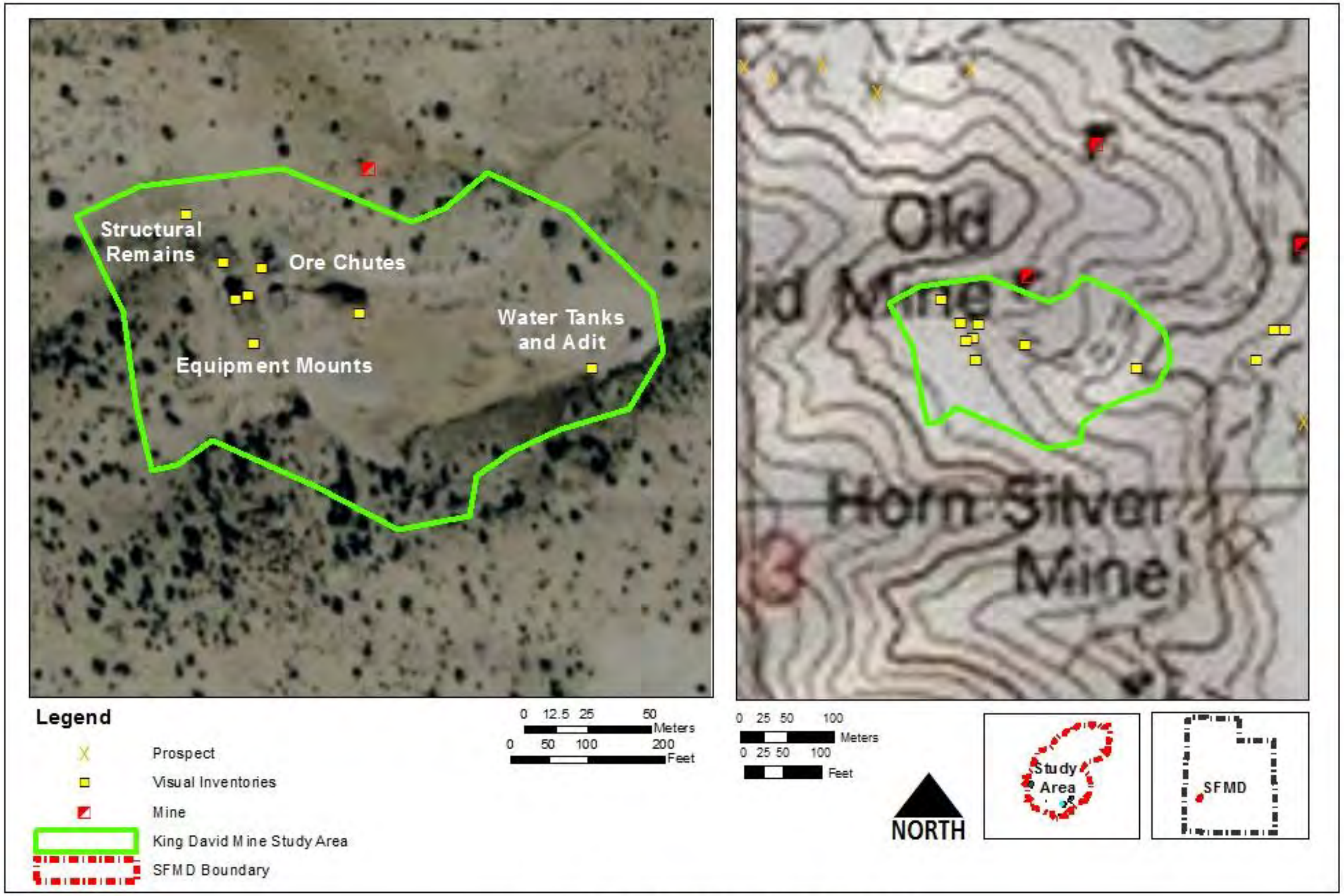


Figure 4-47. King David Mine Study Area

Figure 4-48. Features at the King David Mine, 2010
(Author Photograph)

Figure 4-49. Ore Chutes, King David Mine, 2010
(Author Photograph)


Figure 4-50. Adit Near King David Mine, 2010 (Author Photograph)

4.4.1.7 Lulu and Americus Mines

The Lulu Mining Company owned a claim adjacent to the Horn Silver claim (Figures 4-51 and 4-52). Within six years of the discovery, the Horn Silver Mining Company acquired the Lulu claim (Wray 2006: 310, 347). In 1929, ASARCO leased the Lulu claim, constructing a new surface plant by 1930 (Wray 2006: 361-362). Bassett (2008) recorded the Lulu Mine, and the adjacent Americus Claim, as archaeological site 42Be3116. The Lulu Mine appears on topographic maps from 1911 to the south of the Horn Silver Mine. The remains of the ASARCO Surface Plant are visible on the landscape including a shaft with a cement collar and a collapsed headframe; two additional vertical shafts; two to four powder magazines; multiple structures; a cistern and a support frame for a water tank (Figures 4-53 thru 4-55).

Figure 4-51. Lulu and Americus Study Area

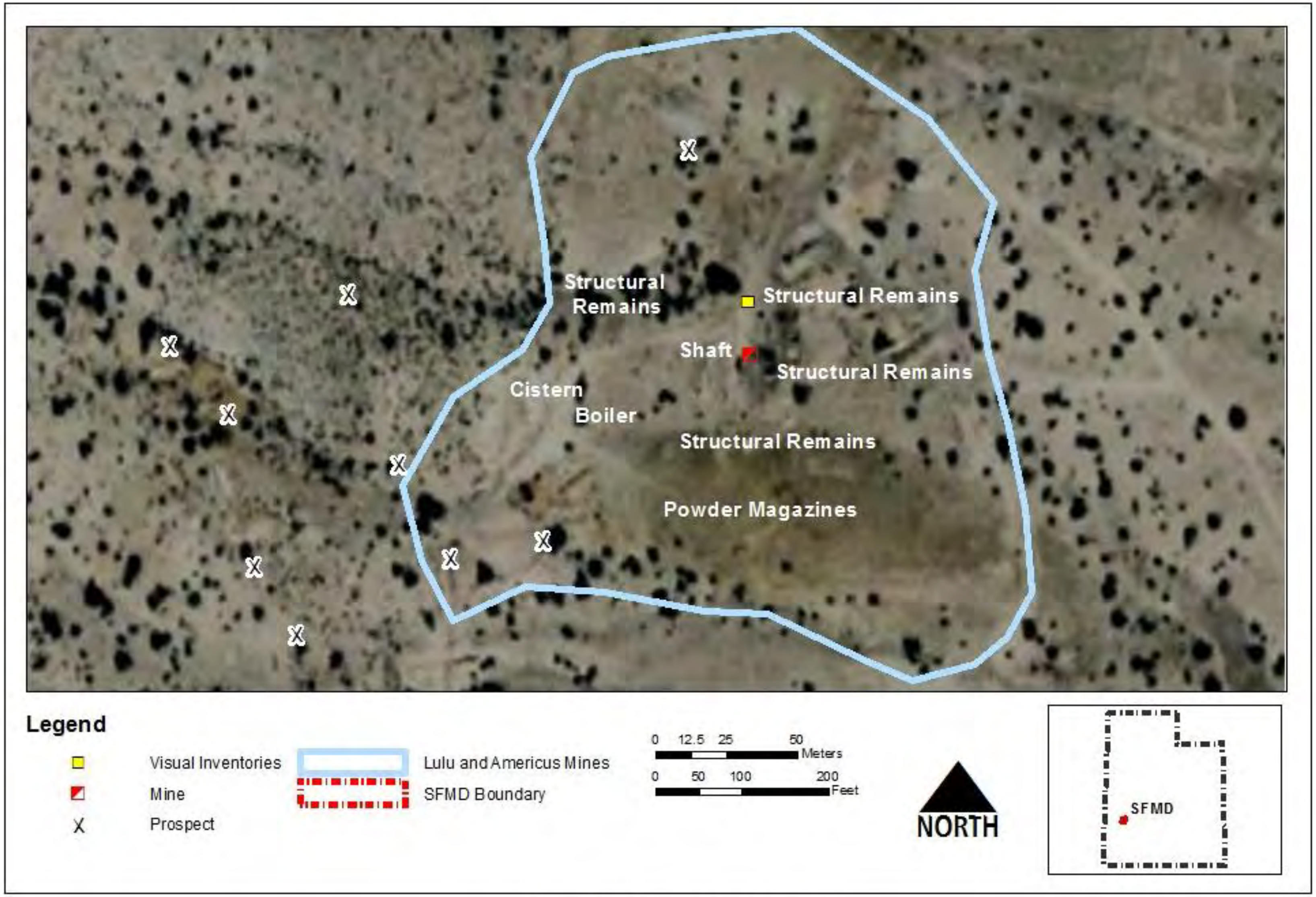


Figure 4-52. Aerial of Lulu Mine

Figure 4-53. Features at the Lulu Mine, ASARCO Surface Plant, 2010 (Author Photograph)

Figure 4-54. Powder Magazine, Lulu and Americus Claims, 2010
(Author Photograph)

Figure 4-55. Wood Collared Shaft and Structural Remains, Lulu and Americus Claims, 2010 (Author Photograph)

4.4.1.8 Marble and Loeber Gulches

At the south end of the San Francisco Mountains are Marble and Loeber Gulches (Figure 4-56). These areas contain marble quarries, known as Tintic White (*The Deseret Weekly*, 17 September 1893; Wray 2006: 310). Louis F. Block and the Peacock Copper Consolidated Mining Company owned the mines in this area since 1908, among these, the Reciprocity claim (*Salt Lake Herald*, 29 March 1910: 20; *Salt Lake Herald*, 28 June 1910: 8; Butler 1913: 185; Beaver County Records, Book 259: 247). In 1937, the Frisco Silver Lead Company leased the Reciprocity to Block who added several shafts and drifts along the gulches.

A single shaft and ore bins were noted just south of the primary marble workings (Figure 4-57). The shaft and ore bins are located on the south west slope of the San Francisco Mountains, overlooking the Wah Wah Valley. No artefacts were observed in association with the shaft or ore bins.

Figure 4-57. Ore Chute and Shaft, Marble Gulch, 2010
(Author Photograph)

4.4.1.9 Other Areas

To the north of the commercial district of Frisco are a network of dirt roads and trails extending to additional mines. Structural remains from at least one small building were observed on the south side of a northwest trending road, just north of the commercial district of Frisco (Figure 4-58). The structure was constructed of rhyolite cobbles and appeared to be a single room, rectangular in shape. No surface artefacts were observed in association with the structure. Evidence of mining was noted to the west, including small tailings associated with prospecting.

Additional inspections were made to the cemetery (Figure 4-59) and neighbouring Newhouse (Figure 4-60). It was postulated that the cemetery was much larger than the current fenced area; rosters range from 47 to 73 interments. The Newhouse town site formed adjacent to the Cactus property by 1900.

Figure 4-58. Possible Structural Remains, North of Frisco, 2011

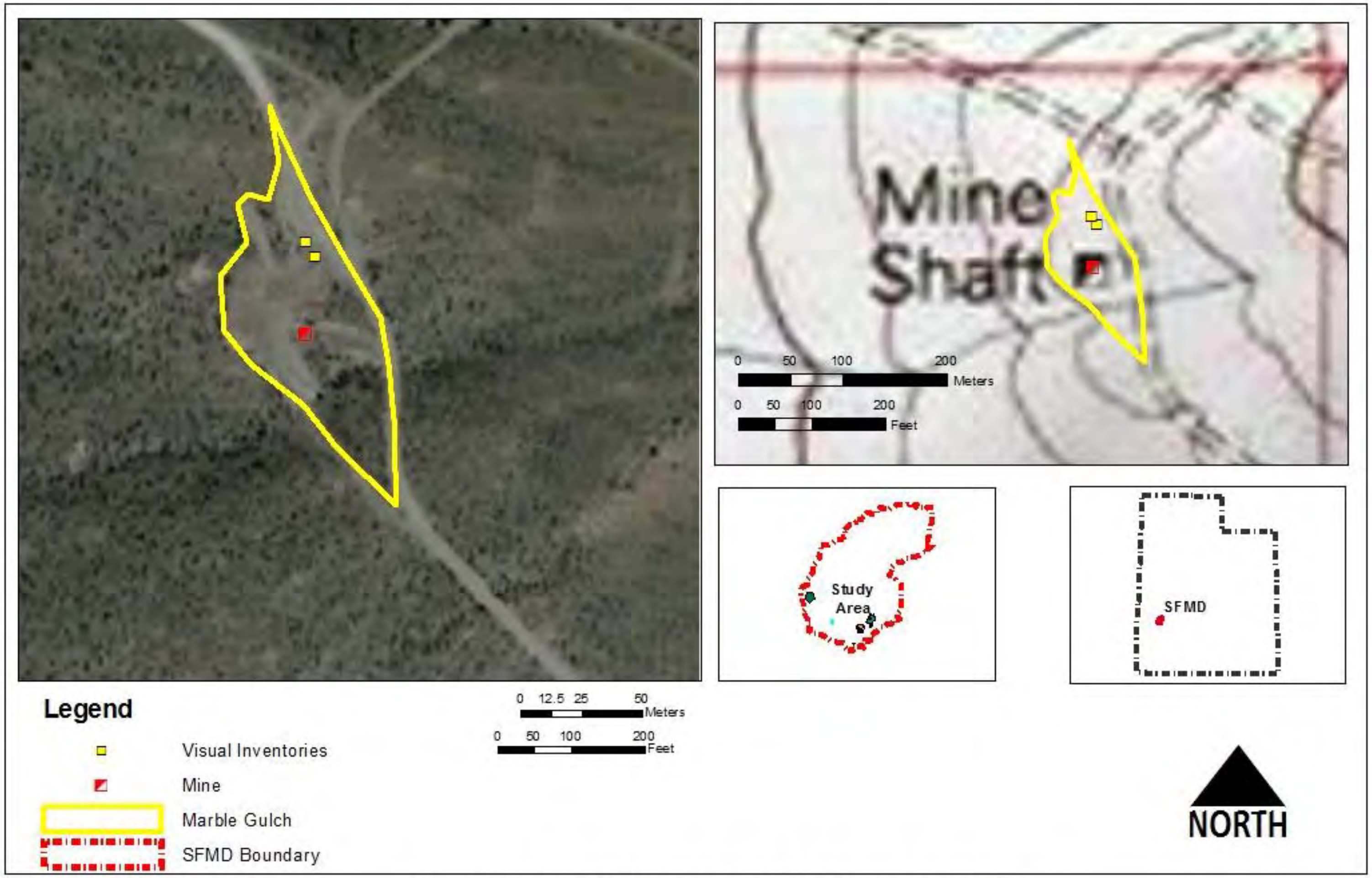


Figure 4-56. Location of Ore Chute and Shaft, Marble Gulch, 2011

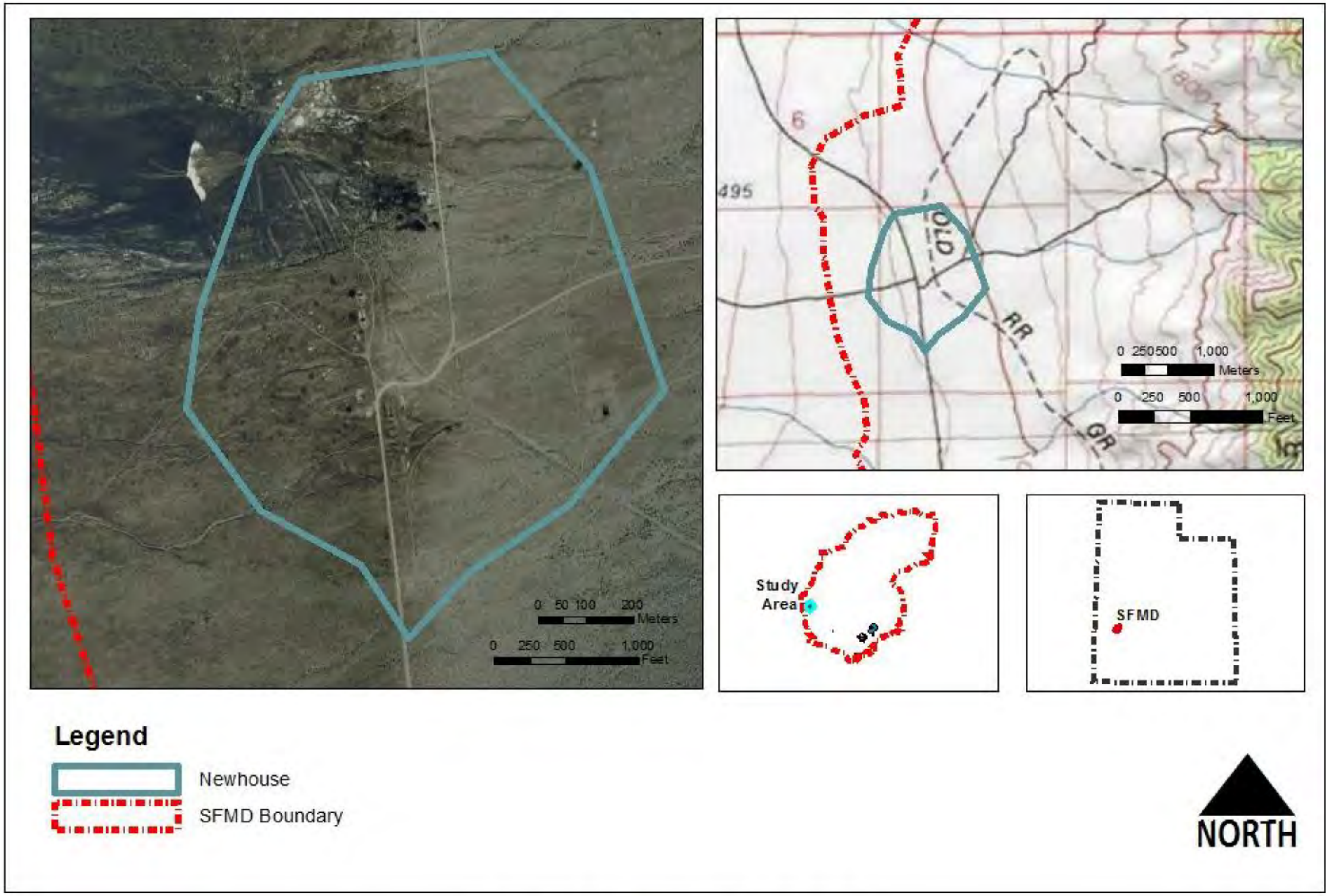


Figure 4-60. Newhouse Study Area, 2011

4.4.2 Map Issues

The HLC relies heavily upon the interpretation of mapping. In the UK, the Ordnance Survey mapping (1:25,000 scale) has been adopted; whereas in the US, mapping relies upon the USGS topographic quadrangle series. The USGS series maps for the SFMD date from 1911 (1:24,000 scale) and are used in comparison to older maps at differing scales for identifying patterns of land use. Satellite imagery aids the spatial data and allows for the identification of features not visible on the maps, is available readily, and offers detailed resolution (30 m pixel size or greater).

For the SFMD, the earliest representation of Frisco (town grid) and the early workings of the Horn Silver are depicted by Hooker in 1879, one year before the 1880 Census and approximately eight years after the initial discovery of the Horn Silver. Hooker (1879) shows 24 structures at the commercial district but does not identify them as to function or use (Appendix D2). Because the Hooker (1879) map was not drawn to scale, it could not be georeferenced to the GIS. Comparisons were made using Adobe Photoshop CS, whereby the images were overlain using landmarks for matching points.

The next map depicting the SFMD dates from 1904 and represents the Beaver County Cadastral Map (Tolton 1904); numerous property owners are identified within the commercial district of Frisco. Likewise, this map could not be readily georeferenced to the GIS; features appeared shifted between the current placement and the road alignments on the Cadastral Map (Tolton 1904). Again, comparisons were made using Adobe Photoshop CS, whereby the images were overlain using landmarks for matching points.

An even later map (USGS 1906, revised 1911) shows the developments at both Frisco and the Horn Silver Mine. The USGS map (1906/1911) could be georeferenced with the data available from ESRI using USA Topo Maps in the GIS, although some of the structures and topographic lines appear to be shifted as much as 10 to 20 m to the west.

Butler (1913) provides an even more in-depth map of the SFMD with Newhouse to the west, Squaw Springs to the south, the Horn Silver in the centre, and the Frisco Commercial District on the east. That being said, the Butler (1913) map could not be georeferenced to the GIS without distortion of the information; therefore, Adobe Photoshop CS allowed for limited comparison of the images. Additionally, Butler (1913) provides photographic overviews of the SFMD, with images of Frisco, the Horn Silver, and railroad depot that allowed for additional comparisons to be made to the modern landscape.

The biggest issue in the mapping data is the gap between 1879 and 1904, which misses the primary period of development for the SFMD. As a result, artefacts and physical remains must be compared to historical photographs and the present landscape in order to identify features and material culture that relate to the 1879-1904 gap.

The maps and physical remains may be compared to other contemporary mines. For instance, Hardesty (2010: 120-121) describes the layout of Shoshone Wells (Lander, Nevada) as a 'neighbourhood' organized with structures aligned along a central road network. Construction styles of the buildings range from stone buildings to dug outs and wood frame houses. Stone buildings dominate the physical landscape at the SFMD and include angular cobbles of native stone, stacked with stones, mud and some mortar. The majority of the structures are small, single room structures; along Main Street, buildings have shared or common walls. Due to the structural integrity, few structures retain roofs; remnant walls indicate the use of both flat (e.g., false front) and gabled rooflines and little fenestration other than a few windows or pedestrian entries. There is no evidence of adobe structures within the commercial district of Frisco, although adobe may have been utilised and is no longer visible on the physical landscape. Boarding houses, saloons, and settlement layouts complete with tents and frame houses are noted in the historical maps and early photographs of the district. Like Gold Bar in Death Valley (Hardesty 2010: 125-126), the settlements in the SFMD have been subject to bottle hunters, offering a small glimpse of life in the frontier.

5.0 ARCHAEOLOGICAL ARTEFACTS AND ANALYSIS

Reconstruction of the industrial landscape of the SFMD was aided through the identification of archaeological remains and artefacts. Historic period artefacts may help gauge human behaviour by reflecting the personal choices made by household consumers, their social status or class, ethnicity, financial or political status, organization and size of household, trade networks, transportation routes, market demands, and product availability (Hardesty 1990, Rathje and Murphy 1992: 21, SHA 1988, Toulouse 1971, Riordan and Adams 1985, Schulz and Gust: 1983: 1). Further, the analysis helps reconstruct the past using science-based studies. It ties the documentary and physical evidence for interpretation and understanding using spatial relationships, as seen at archaeological sites associated with the World War I Western Front, maritime sites examined by Oxford, etc, or similar to the equipment and/or tailings at mining sites (Francaviglia 1991).

The analysis of the artefacts observed and recovered from investigations at the SFMD follows patterns established by New Western historians[1] that focus on the role of women, children, and minorities in the history of the western US. Background studies such as these provide additional insight and approaches for meaningful interpretations of historic period material culture. The following chapter presents the analysis of the artefacts recovered from the field investigations at the SFMD and was used to supplement the ground-truthing exercises conducted in response to HLC modelling.

[1] The New Western History Perspective is a revisionist history approach that may be applied to historical archaeology and counters Frederick Jackson Turner's (1893) thesis regarding the "frontier" of the American West. The New Western History Perspective emerged in the 1970s and 1980s out of a new view of social history (Peterson 1975, Limerick *et al*. 1991), although roots in the paradigm originated much earlier (Pierson 1942, Wade 1959, Paul 1964). Rather, New Western Historians argue that the frontier did not end with the conquest of the western US, but also includes Alaska and Hawaii; the idea that frontier is a racist/nationalist term similar to conquest; that settlement of the American west included women, children and other ethnicities; that interaction between various ethnicities in the west helped create the idea of what is typically considered 'American' and that this interaction still continues (Limerick *et al.* 1991, Etulain 1999, White and Limerick 1994, Hardesty 1995, UW Showcase 1997, San Paolo 2007).

5.1 Characterisation of Artefacts

In 1977, Stanley South's *Method and Theory in Historical Archaeology* established a new paradigm in the US for characterising artefacts in terms of historical archaeology. Variations of South's (1977) classification have been utilised over the years. In 2007, the Society for Historical Archaeology (SHA) and the Anthropological Studies Center at Sonoma State University established an artefact catalogue system loosely based on South's (1977) general functional classification system, but adapted his categories to meet archaeological sites in the Western US dating from the mid-19th to early-20th centuries. Erica Gibson, Mary Praetzellis and Bryan Much developed the "Sonoma Historic Artifact Research Database," or SHARD, using a Microsoft Office Access 2003 system. SHARD includes broad group divisions, split by type, category, and description to classify historical artefacts. This classification system was adapted for use in a variety of studies in the Western US (Nettles *et al.* 2003, Van Bueren 2004a, 2004b, Nettles 2006, Praetzellis and Praetzellis 2004), and was utilised for the current study (Table 5-1).

Table 5-1. Artefact Classification Scheme

Group	General Category	Specific Type
Activities	Entertainment	Music (harmonicas)
	Pets/Livestock	Collars, bird feeders, etc.
	Tools	Axes, files, rulers
	Transportation	Carriage parts, horseshoes, harness parts
	Writing	Pens, pencils, ink bottles, slate, erasers
Domestic	Clothing Maintenance	Needles, irons, thimbles
	Food Preparation / Consumption	Kitchen (skillets, pots, baking pans), serving (teapots, platters), tableware (plates, utensils), drinking vessels (tumblers, stemware, cups)
	Food Storage	Canning jars, crocks, retail food containers (pickle bottles, ketchup, Worcestershire sauce, Tabasco)
	Food	Cut bone, shell, etc.
	Furnishings	Furniture, flowerpots, vases, linoleum, carpet, wallpaper
	Heating / Lighting	Stoves, coal, lamps, chimneys, light bulbs, candle holders, insulators
Industrial	Machinery	Gears, belting, boilers
	Mining	Assay (cupels, crucibles); blasting caps; carbide cans
Personal	Accoutrements	Purses, eyeglasses, jewellery
	Clothing	Garments, buttons, buckles
	Footwear	Shoes and shoe parts (eyelets, soles, leather)
	Grooming / Health	Medicine bottles (patent/proprietary, bitters, vials, pharmacy), syringes, toiletry items (perfume bottles, brushes, chamber pots)

Table 5-1. Artefact Classification Scheme (continued).

Group	General Category	Specific Type
(Personal)	Social Drugs	Retail alcoholic beverage containers and closures, spittoons, pipes, opium lamps, tobacco tins
	Toys	Dolls, tea sets, marbles
Structural	Fixtures	Sinks, toilets
	Hardware	Door knobs, hinges, brackets, nails
	Materials	Window glass, brick, plaster
Indefinite		Identified items with more than one potential use
	Misc. Closures	Closures associated with contents of indefinite use
	Misc. Containers	Bottles, jars, and cans with unidentified contents
	Misc. Metal Items	Hardware (wire, sheet metal, tubes) or items with more than one potential original use (bells)
Unidentified		Unidentified items (melted glass, amorphous metal)

5.2 Collection and Observation Strategy

As previously noted, due to the complexity of the site and high degree of vandalism (illicit collector behaviour or looting), a sampling strategy was defined in coordination with Dr. Roger White of the University of Birmingham. Seven survey areas were defined: the commercial district of Frisco, the mining activity/residential area adjacent to Grampian, the Frisco Smelter and charcoal kilns, an area near the purported San Pedro railroad depot, an area adjacent to the commercial district of Frisco, the Lulu Mine, and the King David Mine. Note that the mining activity/residential area at Grampian include the Horn Silver Mine, Assay Building, and other associated mining infrastructure. Subsequent investigations were made along Marble Gulch, Newhouse, and to the north of the commercial district of Frisco.

The sampling goal was to identify artefacts and features to address research questions posed with regard to mineralogy, mining and settlement practices and technology, and demographics such as ethnicity, socioeconomic factors, and policy. Two formal one- by one-m Test Units (TU1 and TU2) were placed at the SFMD: one at the commercial district of Frisco and one to the north of Frisco in a residential area. A five- by five-m Surface Unit (SU1) was placed at the Frisco Smelter and charcoal kilns. The remaining areas were investigated through judgmental transects and Visual Inspections (VI01 through VI51), which were recorded using the GPS. Minor artefact collection was performed in conjunction with the ground-truthing to include diagnostic materials that would be of interest for illicit collection and resale (glass bottles, toys, or ceramics). Following the project, these artefacts were packaged following curation standards (in accordance with 36 CFR 79) and retained for a teaching collection for the Milford Archaeological Research Institute, which operates in Milford, Utah; upon request, the artefacts may be submitted to the HSMC, which is the present land owner.

5.3 Dating Methods

All artefacts were analyzed to see if they are temporally diagnostic, based on embossments, manufacturing techniques, patterns or shapes. Diagnostic artefacts may offer dates that assist in determining the age and/or occupation dates of historical archaeological sites (Hill 1982, Ward, Abbink and Stein 1977, South 1972). Occasionally, products, such as metal, glass or ceramic items, retain patent dates, which may be researched via the US Patent Office, or through trade catalogues such as Sears Roebuck & Company, or Montgomery Ward & Company. Collector book series, such as those offered through Schroeder Publishing Co., Inc., also provide information for artefact identification (Lehner 1988; Lage 2004).

Date ranges were determined based on dates of manufacture, taking into account the dates when each company formed, merged or changed ownership. Product patent or trademark dates, embossed manufacturing names, colours of glass (sun-altered amethyst and straw glass), and readily accepted dates for certain items were considered. Diagnostic artefacts were plotted on a temporal chart based on these dates. From the table, the *terminus post quem* (TPQ) and *terminus ante quem* (TAQ) were identified. When combined, the TPQ and TAQ produce a temporal range, during which the deposition may have occurred. TPQ refers to the date after which an artefact is deposited, whilst TAQ refers to the date prior to the deposition. Whilst this process is generally easier for features with stratigraphy, it may be applied to deposits of refuse containing a wide array of diagnostic artefacts. Examples of how these dates were determined are provided below.

Typically, glass artefacts, such as bottles, are embossed with manufacturers' marks that may be researched to determine the origin of the bottle, its contents, and date ranges for production; labelling may identify product distributors; and the bottle shape or finish may reveal details regarding its use or age. Mold seams, pontil marks, and finish/closure types of bottles assists in determining dates of manufacture. For instance, pontil marks are visible on bottle bases prior to 1860 up to 1870, while 'blob top' finishes (made via hand-tool techniques) are prevalent for vessels manufactured between 1870 and 1920. The Owens Bottle Machine produced a scar on the bottle base as well; this machine was readily available after 1904 (Fike 1987). Pressed glass may be identifiable by its patterns, which may be attributed to a specific manufacturer.

Ceramics may be identified by their decorative patterns (edge decoration, painted designs, transfer prints, decals), firing techniques (earthenwares, stonewares, porcelains, improved wares), vessel shapes, or through maker's hallmarks (maker's mark or back stamp on the base of the vessel). Often, marks are added after the wares have been fired, and may be added either through mechanical or manual application. Legislation regarding ceramics aids in the identification of many wares. For instance, the location of manufacture, or country of origin, is required on all wares produced after 1891 [per the McKinley Tariff Act of 1891 (Slocum and Van Grol 1999)], and all patterns and shapes of ceramics registered with the Patent Office of London are required to bear ceramic registry marks (assigned for periods of three year intervals) (Anthropological Studies Center 2001). Further, certain styles of decoration or specific colours or designs, reflect peaks in popularity in certain ceramics (Nettles *et al.* 2003). Also, it should be noted that ceramic thickness is described in terms of 'gauge' rather than weight; the thickness may help identify a general date range for production. For example, a thin earthenware fragment may be described as a 'fine gauge porous body.' Designs, including decals and transfer prints, are added after the bisque firing, but prior to the decoration firing (Conroy 1998).

Also taken into account are dates of product usage, or “lags” between the period of manufacture and deposition of the artefact. Certain products or wares may be discarded long after their period of manufacture (dairy products versus medicinal products, or freshness versus spoilage). As noted by Hill (1982), there are several reasons to account for time lags, such as:

- Changes or delays in new styles of manufacturing or technology;
- Continued use of old styles of manufacturing after new styles are introduced;
- Transportation times between the product sources/manufacturers, and the site locations/consumers (port versus market, urban versus rural, or markets versus frontier);
- Storage time at the manufacturer’s location prior to product shipment;
- Storage time between purchase and consumption or ‘immediacy of use’; and
- Container reuse or recycling.

5.4 Artefact Recovery / Materials Observed

The following section provides a description of the artefacts recovered or observed during the field work in the SFMD by their functional group under the Artefact Classification Scheme. The section also denotes information pertaining to artefact material types, dates of usage, and manufacturer’s information. Catalogues of artefacts are contained in Appendix C. Artefacts retained for analysis will be kept for future use as a teaching collection for the Milford Archaeological Research Institute.

5.4.1 Functional Group: Activities

This functional group includes artefacts associated with certain activities such as entertainment, pets/livestock, tools, transportation, and writing. Artefacts observed or recovered from the “Activities” functional group include a harmonica, wire, galvanized metal pails, a galvanized metal wash basin, horseshoes, an eraser, and slate. An abandoned car body was noted in an ephemeral drainage to the southeast of the Horn Silver Mine and is included in the discussion relating to transportation activities. Whilst the majority of these items were observed or recovered from the commercial district at Frisco, tools, such as the pails and galvanized metal wash basin, were noted at the Frisco Smelter and at Grampian. None of these items are diagnostic as to manufacturer; however, some interpretation of the materials can be inferred.

5.4.1.1 Entertainment

Three harmonica reed plate fragments were observed in TU1 (Figure 5-1). The earliest harmonicas were constructed in Vienna as early as 1824. During the late 1800s, harmonicas were mass-produced. Hohner, who began production of harmonicas in 1857, began shipping harmonicas to the US in 1868. The musical instruments, which could be transported easily in a pocket, gained popularity throughout the US. Mail order catalogues feature various models of harmonicas including those by Hohner, Richter, Windsor, Genuine Hohner, Carl Essbach, Koch, Ludwig, and Bell (Montgomery Ward & Co. 1895: 241-242). Likely, harmonicas provided a sense of entertainment within the commercial district of Frisco. As noted by the *Utah Gazetteer* between 1879 and 1893, there were a number of saloons in operation throughout Frisco[2] (Graham and Company Printers 1880, 1883, Stenhouse and Company 1892).

5.4.1.2 Pets/Livestock

A concentration of hog wire is present within the commercial district of Frisco. Information from the *Utah Gazetteer* and City Directories indicate several livery stables in operation between 1879 and 1884 (Graham and Company Printers 1880, 1883, Stenhouse and Company 1892). Cadastral maps from 1900 indicate the operation of a stable (Shol Stable) in the vicinity. The wire was similar to that sold in mail order catalogues from the 1890s,

[2] The 1879-1880 *Utah Gazetteer* lists eight saloons; there are 16 listed between 1883 and 1884; and by 1892 to 1893, the number had dwindled to just four.

comprised of galvanized steel wire, used extensively for hogs and sheep (Montgomery Ward and Co. 1895: 387).

Figure 5-1. Harmonica Reeds, TU1, Commercial District, Frisco

5.4.1.3 Tools

Galvanized ware cleaning pails, wash tubs, and water pails were observed at Grampian, as well as near the Frisco Smelter. These items would have been available at any of the general merchandise stores located within the commercial district of Frisco between 1879 and 1915 (see Graham and Company Printers 1880, 1883, Stenhouse and Company 1892), or via mail order catalogue (Montgomery Ward & Co. 1895; Holbrook, Merrill & Stetson 1928: 140-142).

5.4.1.4 Transportation

Horses were a mainstay to the mining community, especially prior to the construction of the railroad to Frisco in 1880 and Newhouse by 1905. Squaw Springs, to the south, operated as a Stage Coach stop (Wheeler 1874: 21, Thompson and West 1881: 102-108, *Southern Utonian* 17 June 1882, *Salt Lake Herald* 25 December 1885:2, Wells Fargo 2006, Wray 2006: 337). Further, as noted by Wray (2006: 337): "Horse and mule teams pulling wagons hauled supplies and equipment into the hills, and transported ore out to the railroad stations at Frisco and Newhouse."

Dale E. Berge's (1980) study of the Simpson Springs Pony Express Station in Western Utah provides an overview of horse trappings, including a history of horseshoeing, characteristics and nomenclature of horseshoes, wear patterns, and differences between horseshoes and mule shoes. According to Berge (1980: 232-234), the Greek and later Romans utilised the earliest horseshoes, comprised of rawhide; by the 9th Century A.D., the Byzantines adopted the use of iron shoes under Emperor Leo VI (Berge 1980: 233). With the arrival of the conquistadors in America, and due to a lack of suitable iron for horseshoes, the Spanish reverted to the former method of rawhide shoeing; Native Americans later adopted the rawhide technique, which became a common practice for most of North American Native American tribes (Berge 1980: 234).

Berge (1980: 235-248) also notes that the shape of the shoe is determined by the shape of the horse's foot, and horseshoes differ between front and hind shoes, as well as those for correcting imperfections of the gait or hooves. Based on Berge's (1980) illustrations and definitions of horseshoe styles, it was determined that at least one of the horseshoes observed at the commercial district of Frisco was a front shoe (Berge 1980: 238, f.83b) and has a normal or uniform wear pattern (Figure 5-2).

The other horseshoe observed at the commercial district of Frisco was a fragment from a hind shoe with calks (Berge 1980: 243, f.87a). Calks, as defined by Berge (1980: 242) are a "protrusion from the flat ground surface of the shoe"...that is "used for gripping the ground-surface, primarily in the winter on ice." Harsh weather, such as that in 1885, combined with the sandy soil matrix of the SFMD, may have required the use of calks on some of the horses.

Whilst horses and wagons were utilised concurrently with the introduction of the railroad in the SFMD, evidence of the railroad is noted due to the presence of berms, ballast, and

Figure 5-2. Front Horseshoe from Commercial District, Frisco

railroad ties. Also, the railroad is depicted on several historical maps of the area (Hooker 1879, Tolton 1904, Butler 1913, USGS 1906, 1911, 1959, 1960). The railroad tracks were removed between Frisco and Newhouse in 1937 and from Frisco to Milford by 1943 (Wray 2006). Highway 21 may have been paved as early as the 1920s, but was oiled and paved by June 1959 (Wray 2006). According to the Beaver County, Utah Mercantile Agency Reference Book (Dun 1928, Millison 2004), in 1928, S.W. Moebis sold second-hand automobiles in Frisco.

The automobile body observed in the drainage had a turn-crank engine, a steel frame chassis, four wheels, room for four seats, and curved mudguards (fenders) (Figure 5-3). Whilst many automotive companies (Renault, 1899; Ford, 1903; Mercedes, 1902; Stanley, 1902) produced open-bodied touring cars – also referred to as horseless carriage or motorised transport – during the 1920s, the most popular automobile in the US was the

Model T, produced by Henry Ford's Ford Motor Company in Dearborn, Michigan. Prior to 1911, none of the open-bodied cars featured opening doors for the driver and most cars had an open frame prior to 1915. By 1919, cars utilising an electric starter were marketed throughout the US. Four seat Ford Model T's sold from as high as £548.78 [$850.00] in 1909 to £187.23 [$290.00] in 1920. It is unclear if the abandoned automobile body near Frisco is a Ford Model T. Only the chassis and mudguards remain intact. The automobile appears to have been rolled, either through violent flash flooding, an accident, or as a result of later abandonment or discard. It is not clear whether the automobile body relates to activities near Frisco, but it does represent the transportation aspect of the SFMD HLC model.

Figure 5-3. Abandoned Automobile, Drainage near Frisco

5.4.1.5 Writing

The rubber eraser and slate, such as that from a student's small hand-held slate board, were recovered from TU1 (Figure 5-4). Based on the 1900 Cadastral map, this area is just east of the school, and as a result, one would anticipate locating school-related materials in the vicinity. The Montgomery Ward & Company's 1895 catalogue offers listing for rubber erasers and school slates (Montgomery Ward & Co. 1895: 116, 119). According to the listing, the 'Rhombic Rubber Erasers' sold for £0.026 [$0.04] each or £0.27 [$0.42] per dozen and erased "type writer, ink, or pencil marks" (Montgomery Ward & Co. 1895: 116). The 'Hyatt' patent wire bound school slates were the most prominently advertised writing material. Featuring wood frames, the slates "combine strength, lightness, durability and uniformity of finish of surface; being wire-bound they cannot come apart, and machine-smoothed they present an absolutely even writing surface free from ridges" (Montgomery Ward & Co. 1895: 119). The catalogue offered the slates in various sizes ranging from 15.24 cm [6 in] by 22.86 cm [9 in] to 20.32 cm [8 in] by 30.48 cm [12 in], at prices from £0.026 [$0.04] each to £0.27 [$0.42] per dozen for the 15.24 cm [6 in] by 22.86 cm [9 in] variety up to £2.91 [$4.50] per case of twelve of the 20.32 cm [8 in] by 30.48 cm [12 in] variety (Montgomery Ward & Co. 1895: 119).

Figure 5-4. Slate and Rubber Eraser, TU1, Commercial District, Frisco

5.4.2 Functional Group: Domestic

This functional group includes domestic artefacts such as clothing maintenance (sewing, repair, etc.), food preparation and consumption, food storage, food waste, furnishings, and heating or lighting. Artefacts associated with the "Domestic" Functional Group include clothes pins and sewing hooks; food waste such as bone, nut shell and oyster shell; food preparation or consumption items such as cutlery, flatware, enamelware, ceramics, or stemware; bottles, cans, canning jars and associated canning equipment, and crockery; decorative glass bowls or vases, clocks, linoleum, stoves, and decorative wood from furniture; chimney lanterns, lantern wick bases, coal and insulators.

5.4.2.1 Clothing Maintenance

A sewing implement or hook, somewhat like a button hook, was noted in TU1 (Figure 5-5). Montgomery Ward & Company advertised button hooks in their 1895 catalogue (Montgomery Ward & Co. 1895: 86). Likewise, a clothes pin spring was recovered from TU1 (see Figure 5-5).

In 1883, the town boasted of a milliner or dress maker (Miss B.E. Jones), a merchant tailor (John Rehnstrom), a shoe shop (Chas. Meyerfield), and a notions shop (R.T. Hagan & Co.) (Graham and Company Printers 1883). During that same year, four laundries were operated in the area, including that of Mrs. John Hanafin, and three Chinese laundries: Hop Lee, Sam Ning Hing, and Wo Hing Ching[3]. In 1915, Mrs. Chris Johansen operated a notions shop[4] in Frisco (City Directories 1915-1928).

5.4.2.2 Food Preparation and Consumption

A fork was recovered from VI6, whilst a wood handle from cutlery was obtained from TU1. Montgomery Ward & Company advertised flatware, cutlery and other utensils in their 1895 catalogue (Montgomery Ward & Co. 1895: 190, 447). The fork appears to be a "Tipped" flatware piece (Montgomery Ward & Co. 1895: 190; Hagan 1990: 9-11) (Figure 5-6).

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[3] Sam Ning Hing is listed in the 1880 Census as being 22 years old, born in 1858 in China. He was single and resided with Charles Lue Ling. Both Sam Ning Hing and Charles Lue Ling are listed their occupation as "washing" in the 1880 Census (http://www.familysearch.org, Family History Library Film 125535, Film Number T9-1335, Page 34C).

[4] Historically, in the US, a 'notions shop' was one that sold sewing items, such as buttons, ribbons, zips, needles, fabric, cottons, etc. In the UK, this would be similar to a haberdashery.

Figure 5-5. Clothing Maintenance Artefacts, TU1, Commercial District, Frisco

According to Tere Hagan (1990: 9), the ‘Tipped S’ or ‘Fiddle S’ styles of flatware were “two of thirteen patterns from the late 1800s to early 1900s made by virtually every manufacturer of silver plated flatware, with slight variation, and including dinner, luncheon forks, serving, soup, teaspoons, and some serving pieces among these patterns. Mail order catalogues, such as Montgomery Ward & Company, featured ‘tipped’ flatware including teaspoons, tablespoons, dessert spoons, medium and dessert forks, butter knives, sugar shells, pickle forks, coffee spoons and mustard spoons. Cutlery included a variety of steak and butcher knives with beech handles (see Figure 5-6).

In mining camps, such as Grampian, Frisco, Newhouse, and comparative sites such as Silver Reef, Pioche, or Virginia City, dinner was the main meal of the day, eaten in the late afternoon or evening. As a result, plates, soup plates, small plates, serving dishes, tumblers and stemware were used during this meal. Porcelain may have been used for pastries, biscuits, or other forms of dessert. In commercial settings, utilitarian hotel wares may have been used, with little to no decoration; in saloons, more affluent restaurants, or some

Figure 5-6. Tipped S Flatware and Cutlery Handle, TU1, Commercial District, Frisco

residences, plates, soup plates, platters, and cups may have featured decorative relief, transfer-prints, or other designs. Several of the ceramics featured maker's marks that could be attributed to certain manufacturers (Figure 5-7). Among these are wares by Johnson Brothers; Thomas Furnival and Sons; Cartwright and Edwards; Homer Laughlin; Knowles, Taylor and Knowles; and Turner Goddard and Company.

Figure 5-7. Ceramic Maker's Marks, TU1, Commercial District, Frisco

5.4.2.2.1 English Potters

Four brothers – Henry, Robert, Alfred and Fred Johnson – formed Johnson Brothers, of Hanley, England, produced a variety of wares including Evangeline, Utopian, Peach Blossom, Victoria, Columbia, Lexington, Forget-me-not, and Montrose beginning in 1904 (Lehner 1988: 526; Lage 2004: 159; Kowalsky and Kowalsky 1999: 246). The company also operated potteries in Tunstall, Staffordshire (Kowalsky and Kowalsky 1999: 246). According to Kowalsky and Kowalsky (1999: 246), the 'Johnson Bros' mark was used on various designs between 1883 and 1913; the word, 'England,' was added after 1891 and the addition of 'Ltd.' appears after 1896. At least one of the ceramic fragments featured a Johnson Brothers maker's mark (see Figure 5-7a).

Lage (2004: 111) indicates that Thomas Furnival and Sons operated between 1818 and 1890. Kowalsky and Kowalsky (1999: 200) dispute these dates, suggesting that the company operated between 1871 and 1890 in Staffordshire. Wares including the maker's name 'T. Furnival & Sons' and Royal Arms mark generally dates between 1875 and 1890. Between 1818 and 1890, Furnivals, Ltd. operated in Cobridge, Staffordshire, printing an anchor and dagger trademark such as that found at TU1 (Figure 5-7c). Other marks used by Furnival include the company name in a ribbon (Figure 5-7b).

According to Kowalsky and Kowalsky (1999: 141), Cartwright & Edwards operated potteries in Longton, Staffordshire. Cartwright and Edwards produced wares similar to that recovered in the commercial district of Frisco, between 1870 and 1890 (Lage 2004: 58).

Turner, Goddard and Company operated in Tunstall, Staffordshire, England between 1867 and 1874 (Lage 2004; Kowalsky and Kowalsky 1999: 355). At least one ware attributed to Turner, Goddard and Company was noted within TU1 (Figure 5-7g).

Wedgwood & Co., Ltd., produced wares between 1860 and 1956 in Tunstall, Staffordshire. One fragment observed at the E.R. Smyth Restaurant features a mark that reads "[ROYAL or IRON]STONE CHINA / [WE]DGWOOD & CO," and was produced between 1860 and 1890 (Kowalsky and Kowalsky 1999: 364) (Figure 5-9).

Another ware produced in Tunstall, Staffordshire, that was observed in the commercial district of Frisco features two marks, including one that reads "[IRO]NSTON[E]," and an impressed mark that reads "ELSMORE & S[ons] / TUNSTALL" (Figure 5-7d). According to Kowalsky and Kowalsky (1999: 189), this ceramic was used by Thomas Elsmore and Son of the Clayhills Pottery, in Tunstall, Staffordshire between 1872 and 1887.

A ceramic fragment from a platter was recovered from the Horn Silver Mines Company property (Parcel 15, Cadastral1904). The maker's mark indicated that it was produced by Charles Meakin of the Trent Pottery in Burslem, England, between 1876 and 1882 (Figure 5-10). The mark features the Royal Coat of Arms (Kowalsky and Kowalsky 1999: 277).

Figure 5-8. Leaf Decal, Similar to Cartwright & Edwards, TU1, Commercial District, Frisco

Figure 5-9. Wedgwood & Co Ceramic, E.R. Smyth Restaurant, Frisco

Figure 5-10. Charles Meakin Ceramic, Horn Silver Mines Company Property, Frisco

5.4.2.2.2 American Potters

The Homer Laughlin China Company has its origins in East Liverpool, Ohio, as early as 1869, although the company did not use that name until 1897 (Lehner 1988: 245). At least three wares produced by Homer Laughlin were noted including a fragment from the Hudson line, a fragment from the Genesee line, and a fragment of Hotel China (Figure 5-11).

Homer Laughlin produced the Hotel China line between 1901 and 1915 (Lage 2004: 174; Lehner 1988: 247). Cunningham and Nossaman (2002: 115) indicate that:

> Most all of the potteries produced a white hotel ware line. Hotel ware lines were composed of necessary and useful items and the shapes used by the different potteries were similar if not identical.

Several additional fragments of hotel ware were observed throughout the commercial district refuse (Figure 5-12) and refuse at Grampian. Whilst many of the fragments had no decoration or maker's marks, they can be identified by utilitarian function; the following were represented: platters (also referred to as oval dish), plates, tea and coffee cups, as well as hall boy jugs (Cunningham and Nossaman 2002: 115).

According to Lois Lehner (1988), Laughlin produced "Hudson, an early dinnerware around 1900." The patent for Hudson was filed by February 1912 and again in April 1956 stating that the mark had been utilised on or before 31 December 1879 on earthenware table service (Lehner 1988: 247, 248 no. 16). Cunningham and Nossaman (2002: 116) suggest that the Hudson shape was introduced first in 1908. "Hudson...can be found in plain white, gold trim, and a wide variety of decorations" (Cunningham and Nossaman 2002: 116). Among the decorations were 'Carnation Beauty,' 'Minton Rose,' 'Peerless,' 'Majestic,' and several patterns assigned numeric designations featuring miniature roses, and other floral motifs. The Hudson ceramic fragment is shown in Figure 5-7e. Genesee, a Homer Laughlin dinnerware with smooth rims and rounded handles, was produced beginning in 1911, featuring varying decorations, although undecorated wares also were produced (Cunningham and Nossaman 2002: 91). This ceramic was noted within VI 5 (Figure 5-12a).

Figure 5-11. Homer Laughlin Hotel China, Grampian Area

Figure 5-12. Ceramics, VI 5, Commercial District, Frisco

At least one fragment observed at the E.R. Smyth Restaurant (White House) featured a partial eagle wing from a maker's mark (Figure 5-13). Homer Laughlin used a similar eagle maker's marks on dinnerware at the turn of the 20th century (Lehner 1998: 247). According to Lehner (1998: 247), the mark featured a prostrate lion being attacked by an eagle, "signifying the end of British domination in the dinnerware field used before 1900."

Figure 5-13. Homer Laughlin Fragment, E.R. Smyth Restaurant, Frisco

Another pottery from East Liverpool, Ohio, was Knowles, Taylor and Knowles, which produced ceramics in from 1854 to 1931 (Lehner 1998: 238). The company is named for John W. Taylor, Isaac Knowles, and Homer Knowles. Based on the maker's mark from the ware recovered at the commercial district of Frisco, the ceramic dates from 1890 (Lage 2004: 170).

The Burford Brothers Pottery was located in East Liverpool, Ohio, as well, from 1879 to 1904 (Lehner 1988: 67). By 1902, the company produced various semi-vitreous porcelain wares, cream-colored wares, plain and decorated hotel ware, ironstone and granite wares (Lehner 1988: 67). At least one fragment attributed to Burford Brothers was observed in the Grampian area; it reads “BURFORD / HOTEL CHINA” (Figure 5-14).

Figure 5-14. Burford Hotel China, Grampian Area

One ware, featuring a partial mark that reads “Dieu Et Mon [in a ribbon] / T.P.C-” is attributed to the Trenton Pottery Company of New Jersey (Lehner 1988: 474). The ceramic, which was observed at VI 5, was produced between 1852 and 1904 (Lehner 1988: 474) (Figure 5-12b).

5.4.2.2.3 Other Ceramics

Two ceramic fragments were attributed to manufacturers based on the patterns. One is possibly produced in 1884 by Ernst Teichert (Lage 2004: 334) (Figure 5-15), whilst the other with a scalloped edge appears to be a Syracuse China fragment (1893-1898) (Lage 2004: 329) (Figure 5-16).

Figure 5-15. Ceramic with Blue Pattern Attributed to Ernst Teichert, E.R. Smyth Restaurant, Frisco

Figure 5-16. Scalloped Edge Ceramic with Rose Pattern Attributed to Syracuse China, E.R. Smyth Restaurant, Frisco

Three of the ceramic fragments have unidentified marks and patterns: one reads “[Se]MI / - ROUD / K. CO,” possibly attributed to Knowles, Taylor & Knowles (ca. 1890); one reads “IRONSTONE - CHINA,” possibly attributed to Johnson Brothers; and the third, a vitreous ware, has an impressed mark [displayed backward] that reads “AHCNY” (see Figure 5-7f).

A fragment from a stoneware stout bottle was recovered at Frisco from the Horn Silver Mines Company property (Parcel 15, Cadastral Map 1904). It reads “H. KENNEDY / BARROWFIELD / 24 / POTTERY / GLASGOW” (Figure 5-17) and is attributed to the Barrowfield Pottery operated by Henry Kennedy and Sons between 1882 and 1929 (Cruickshank 2008: 28). The Ordnance Survey Map of 1893 shows two banks with eighteen kilns, which indicates that this was the largest of any Scottish potters (Cruickshank 2008: 28). Additional fragments from stout bottles – including yellow ware, brown glazed and stout bottle fragments – were recovered from TU1 (see Figure 5-17).

Yellow ware fragments also were recovered from TU1 (see Figure 5-17). Yellow ware products, like other forms of crockery, were used for a variety of purposes, from mixing bowls to storage containers. As indicated by Schablitsky (2002: 154), potteries in Oakland, Los Angeles and San Francisco, California, produced a large quantity of yellow ware products between the 1850s and 1900.

Likewise, brown glazed stoneware jars were observed (see Figure 5-17). Schablitsky (2002: 154) attributes these to historic-period Chinese sites in the US. These types of vessels were produced for a variety of uses, and in various shapes and sizes, and “were often recycled and used to store condiments and other small foodstuffs by both Chinese and non-Chinese” (Schablitsky 2002: 154). At least two ceramic fragments, attributed to a porcelain Chinese rice bowl, were noted at the Grampian area (Figure 5-18). Based on information from the Utah Directory from 1883 to 1884, there were at least three Chinese men residing in Frisco, operating laundry services: Hop Lee, Sam Ning Hing, and Wo Hing Ching. The 1880 US Census indicates that Hing resided with another Chinese man, Charles Lue Ling, who was employed for “washing.” In 1900, three Chinese men were residing in Frisco, but were employed as cooks: Sung Youk, Ogh Lung, and Bet Suk (US Census 1900). It is not clear where the Chinese resided in Frisco, Grampian, or on the outskirts of both communities.

Figure 5-17. H. Kennedy and Miscellaneous Stout Bottle Fragments, Commercial District, Frisco


Figure 5-18. Chinese Rice Bowl Near Grampian

5.4.2.2.4 Glassware and Stemware

Glassware recovered from TU1 includes at least one tumbler and glass stemware (Figure 5-19). Stemware has been recovered at saloons associated with the Comstock Mining District (Virginia City, Nevada) as well; Dixon (2002: 111) notes "the crystal stemware calls attention to the value that archaeology can bring to the stereotypical perception of the rugged western saloon by providing material remnants of this institution's occasional sophistication." The assemblage represented in Figure 5-19 also depicts rim fragments from at least four decorative vessels (vases or cut glass bowls), a portion of a goblet/stemware, and base fragments from two additional vessels.

Figure 5-19. Stemware and Decorative Glassware, TU1, Commercial District, Frisco

5.4.2.3 Food Storage

Food storage includes a variety of containers, such as glass bottles, cans, crockery, and canning jars. A large quantity of glass fragments were observed throughout the commercial district, depot, and residential areas of Frisco, as well as in the Grampian area. Several of the bottle necks, bases and side walls could not be identified as to specific contents, but primarily are attributed to alcoholic beverages (personal functional group, social drugs). That being said, due to ease of identification and association with food and beverages, all of the glass products are described in the following sections. The glass assemblage observed and recovered from the SFMD includes sun-altered amethyst, aqua, brown, green, clear (colourless), and cobalt fragments; these fragments are associated with beverages, sauces, extracts, medicinal products, pepper sauces, oils, and other condiments. Canning jar fragments were noted as well.

Sun altered amethyst glass, or glass produced with manganese, turns a purple hue colour after exposure to sunlight. Several fragments of sun altered amethyst glass were observed and/or recovered from Frisco and Grampian. Due to the supply of manganese being limited during World War I, many US bottle manufacturers ceased production of bottles using the manganese. As a result, amethyst bottles can be dated from 1880 when they were introduced, until approximately 1925 (Fike 2002: 14). Seven sun altered amethyst bottle necks were recovered from TU1, in the commercial district at Frisco (Figure 5-20), including three flat or patent bottle necks (medicinal stopper top) [a, b], including one with a flat panel front [e]; a threaded bottle neck [c]; one prescription bottle neck [d]; one English Ring, deep lip or packer bottle neck [f]; and straight brandy or wine [g] (Fike 1987: 8). All predate 1900 (Fike 2002: 5).

Figure 5-20. Sun-altered Amethyst Bottle Necks, TU1, Commercial District, Frisco

An aqua glass bottle base embossed with the wording “Perfectly Pure Soda Water” was observed near the purported San Pedro depot. The Syphon Arrated [Aerated] Water Company, Limited, in Sydney, Australia, offered a variety of beverages ranging from ginger beer to lemonade, tonic water, and seltzer (Figure 5-21). The company operated throughout the 1880s and early 1900s in Sydney and in London (*The Sydney Morning Herald*, 26 October 1889: 10). During the Calcutta International Exhibition (1883-1884), several Syphon Aerated Water Company products were on display. In 1910, the factory was located in a building owned by Jemima H. Hogben, situated at 538 Elizabeth Street, with Robert H. Crimp serving as the factory manager (Council of the City of Sydney 2006).


PERFECTLY PURE SODA WATER
Lemonade
Tonic
Ginger Ale
Lithia
Potash
Seltzer
Sparkling Electrine.

SYPHON AERATED WATER COMPANY, Limited.
Depot, 10, O'Connell-street, Sydney.

Figure 5-21. Perfectly Pure Soda Water (*The Sydney Morning Herald*, 26 October 1889:10)

Soda water bottles embossed with “Cantrell & Cochrane / Belfast & Dublin” were noted at TU1 and nearby visual inventory locations (VI 2) (Figure 5-22). Kelly Dixon (2002: 86-87) notes that soda water, or artificially carbonated water, was used throughout Europe and North America by the 1800s, as a “non-alcoholic temperance alternative;” as a medicinal product to remedy fever, thirst, dyspepsia, or constipation; and a mixer for spirits. Later, mixing with flavoured beverages, soda water aided with the creation of modern carbonated beverages. “Sir Henry Cochrane and Dr. Thomas Cantrell opened a soda business in Dublin and Belfast in the 1850s. Their company dominated the Irish market throughout the following century and continues to operate this day” (Dixon 2002: 88). Dixon (2002: 91) also notes that due to the lack of quality drinking water in the Comstock Mining District (Virginia City, Nevada), soda water "likely provided occasional alternatives to the region's natural water supply." This may have been true at the SFMD as well.

Additional aqua bottle necks were recovered from TU1, within the commercial district of Frisco (Figure 5-23). They include a double ring [a]; two flat or patent [b, c]; a double oil or mineral [d]; and a double ring [e] from a panel bottle (Fike 1987: 8). All predate 1900 (Fike 2002: 5). Iron oxides in the sands used for bottle manufacturing produces the aqua colour of the bottles during the firing process (Fike 2002: 14).

Figure 5-22. Cantrell & Cochrane Bottles, TU1, Commercial District, Frisco

The embossed fragments include two fragments from a Cantrell & Cochrane bottle (Figure 5-23f, g); fragments from two panel bottles – including one that reads "[M. DIM]MITT / [ST] LOUIS" and one that reads "[PROPRI]ETOR"(Figure 5-23h, i); and a fragment of a slightly aqua coloured bottle that reads "D" (Figure 5-23j). Marcellus Dimmitt began a wholesale and retail patent medicine company in 1864; in 1870, the company was renamed

"M. Dimmitt and Bro." and produced a variety of bitters, cough balsams, and capillaria for hair (Fike 1987: 23-24). The panel fragment (Figure 5-23i) likely relates to a cough balsam bottle. The [PROPRI]ETOR bottle is attributed to Lewis M. Green's Dr. A. Boschee's German Syrup, a patent medicine primarily composed of laudanum or morphine, tar, wild cherry and ipecac used for coughs, colds and consumption (Fike 1987: 224; Johnson 1911: 434-435 [see North Dakota Agricultural Experiment Station 1910]). According to the packaging, Dr. Boschee's German Syrup was "...a remedy for all diseases of the throat and lungs, whooping cough and croup, asthma, pleurisy, etc., especially used for the cure of consumption... has cured its thousands in Germany and performed almost miracles since its introduction into this country" (Johnson 1911: 434-435 [see North Dakota Agricultural Experiment Station 1910]). Johnson (1911: 435 [see North Dakota Agricultural Experiment Station 1910]) also notes that "the claims...made for this product are extravagant beyond a reasonable doubt, and the product is in violation of the [North Dakota Drug Law]." Fike (1987: 224) indicates that Green operated a wholesale drug business and 'manufactory' in Woodbury, New Jersey between 1866 and 1871, introducing Boschee's German Syrup in 1872.

Three additional fragments featured embossments, including a sun-altered amethyst glass bottle base with a leaf pattern; a colourless or clear fragment that reads "4/5" and a brown/patinated base that reads "Y."

Brown glass fragments recovered from TU1 are shown as Figure 5-24; most display patina (tarnish). The brown or amber colour was produced by adding carbon, nickel, or iron during the firing process (Fike 2002: 14). The honey or straw colour is produced when selenium was used in the firing process and the bottles are exposed to sunlight for long periods of time (Fike 2002: 14). The brown glass fragments from TU1 include straight brandy or wine bottle necks [Figure 5-24a, c]; crown [Figure 5-24b], melted [Figure 5-24d], double oil or mineral [Figure 5-24e, f]; and double ring [Figure 5-24g] (Fike 1998: 8). Three of the necks [Figure 5-24e, f, g] display lip finishes that were applied during the bottle

Figure 5-23. Aqua Bottle Necks and Embossed Fragments

manufacturing process (Fike 2002: 8). All predate 1900, although the crown cap bottle neck could have been manufactured between 1897 or 1905 (Fike 2002: 9).

Green and olive glass fragments recovered from TU1 include a blob top (Figure 5-25a); a champagne or wine (Figure 5-25b); an English Ring, deep lip or packer (Figure 5-25c); and an unidentified shoulder fragment (Figure 5-25d) (Fike 1998: 8). All of the bottle necks were produced prior to 1900 (Fike 2002: 9). The green or olive colour was produced by adding copper, chromium, or iron during the firing process (Fike 2002: 14).

One fragment of cobalt blue glass was recovered from TU1 (Figure 5-26). It most likely relates to a medicinal product, such as Phillips' Milk of Magnesia, introduced in 1880 by Englishman Charles Henry Phillips (Fike 1998: 141). Phillips patented his medicinal product in 1873 as "hydrate of magnesia mixed with water;" it is a formulation of magnesium hydroxide used as an antacid and/or laxative (Charles H. Phillips Chemical Co. 1941). Although Phillips died in 1882, his sons incorporated the business in 1885 as the Charles H. Phillips Chemical Co., and operated the company until 1923, when they sold to Sterling Products (Incorporated) (Charles H. Phillips Chemical Co. 1941).

The inventory at TU1 revealed an additional 460 fragments of miscellaneous container glass, four pieces of melted glass, and 16 fragments of flat glass (window glass, all uniform in thickness). Miscellaneous containers include beverage bottles, as well as culinary bottles such as sauces, extracts, pickles, olives, oils, chow chow, pepper sauce, mustard, etc., which are considered common to mining sites.

Like the glass fragments, the cans observed within the SFMD have multiple uses and are described best in the following section. At nearly all of the activity locations, cans were noted. Among these were the following: kerosene and fuel cans, tobacco tins, sanitary (fruit and vegetable) cans, soldered or hole-in-cap condensed milk cans, paint cans, key-opened rectangular meat cans, carbide cans, and lard or peanut butter containers. Barrel hoops are present at numerous locations throughout the SFMD and represent both containers for

Figure 5-24. Brown Glass Bottle Necks

Figure 5-25. Green Glass Bottle Necks

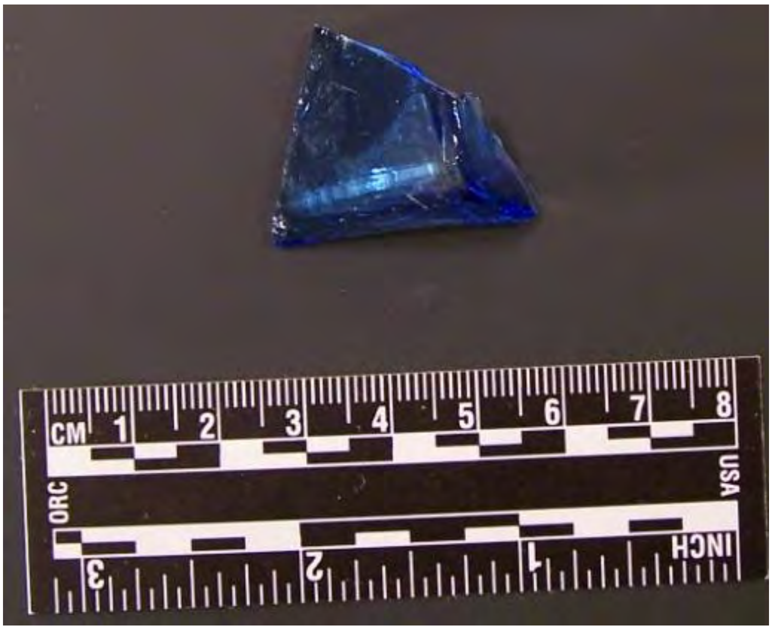

Figure 5-26. Cobalt Bottle Base Fragment

holding foodstuffs and water, as well as other products. Intrusive items observed at VI19, within the cistern, included aerosol cans. Whilst canning has a long history, the earliest patent for tin cans was held by Augustus de Heine and Peter Durand in 1810 in England (Berge 1980: 259). Cans with double seams and crimped tops and bottoms were introduced in 1897 by Charles Arns and Julius Brenzinger in New York City (Berge 1980: 261). The hole-in-top can, introduced by A.W. Cobb in 1902 replaced the crimped styled cans. The earliest companies in the American canning business include the Sanitary Can Company, owned by Cobb; the American Can Company – which later absorbed the Sanitary Can Company; and the Continental Can Company (Berge 1980: 261). Dale L. Berge (1980) provides some additional dates for cans: fruits and vegetables (c. 1820), milk (1856), kerosene (1865); sardines (1875), tobacco (1892, flat pocket tobacco in 1910), modern paint can (1906), key opened collar cans (1917), and aerosol cans (1940s).

Canning jars, inserts and lids were present at the Grampian area, near the depot, and in the commercial district of Frisco. Home canning gained favour in the US between the 1840s and 1870s. In 1858, John L. Mason patented a reusable glass container (jar) with threadedmoulded top, sealed with zinc lids and rubber rings, making a seal between the lid and jar. This type of canning jar was utilized until 1920 (Puckett 2006a). In 1859, Lewis R. Boyd and the Sheet Metal Screw Company designed zinc screw lids, which became common by 1869; Boyd and Mason formed a partnership in Consolidated Fruit Jar Company using Mason's jar and Boyd's lids (Puckett 2006). The canning jar fragments, zinc lids and canning jar inserts include those produced by Consolidated Fruit Jar Company.

5.4.2.4 Food Waste

Refuse associated with TU1 contains a dense assemblage of food waste dominated by cut food bone. As Peter D. Schulz and Sherri M. Gust (1983: 1) note, "food bones are often preserved in greater abundance than...more popular items of investigation and are certainly less affected by 'curation' prior to discard or by looting prior to scientific excavation." Thus, discarded food bone may prove to be "more informative about many aspects of daily life and living conditions among the depositing population," such as demographics, relative market values, retail availability, and sources for dietary information (Schulz and Gust: 1983: 1).

Schulz and Gust (1983) base their interpretation of faunal remains in Sacramento on several previous studies, including Schulz's (1979) own investigation of a mining camp in Panamint City, California. The Sacramento study includes an examination of deposits from a City Jail, two saloons, and a hotel (Schulz and Gust 1983). From this, they observe the following:

1. "During the late 19th century, beef was more abundant in the California market than any other type of meat" (Schulz and Gust 1983: 47; see also Hittell 1882: 268). Friedmann (1980: 434) acknowledges "The vast cattle ranches of the area had been the basis of [Los Angeles'] economy during the Mexican era (and for more than a decade after the conquests." Following the discovery of gold at Sutter's Mill, the rancheros shipped cattle northward to the mining communities (Friedmann 1980: 434).
2. "Since late 19th century butchering methods, except for the absence of power tools, were essentially like those in use today (Gust n.d.; cf., DeVoe 1867; National Meat and Livestock Board 1976), it was possible, after initial study, to assign the vast majority of the bone to the major secondary butchering units represented" (Schulz and Gust 1983: 48).

3. “Differential access to food sources on the basis of class or status is a common factor of complex social organization. Indeed, unequal access (within given age and sex categories) to the basic resources that sustain life has been seen as the defining feature of stratified society” (Schulz and Gust 1983: 51; see also Fried 1967).

4. “Faunal ethnicity seems to be an important variable only when Chinese, Hispanic, or Native American populations are involved” (Schulz and Gust 1983: 51; see also Appendix A).

These observations were taken into account when examining the faunal materials observed at the SFMD. Cut bone was noted in a dense area along the east side of the commercial district of Frisco and may be attributed to a meat-ranking system, similar to those used by Schulz and Gust (1983), Gust (2001), Nettles *et al.* (2003), Goodman (2006), and Nettles (2006). A variety of cut bone was noted and was identified based on the types of meat cuts offered by butchers, such as sirloin, rib, shank, etc. John D. Goodman II (2006) notes that in the US, “American butchers generally produced dressed beef, pork, and mutton carcasses using standard western European butchering methods,” whereas the carcasses were divided in half, heads and feet removed, and internal organs being discarded. From there, cuts were portioned into primal (wholesale) cuts, or into standard (secondary) retail cuts. Tools for butchery ranged from axes, to knives, cleavers, and hand-saws. Meat-cutting saws were not introduced readily until the late 1920s (Goodman 2006: 5).

Friedmann (1980: 437-438) offers insight into the development of butchering in Los Angeles, California that may be compared to the SFMD:

> Because of the crude state of the art, the foul nature of the waste products, and the ease with which the free-roaming cattle of the ranches could be stolen, the authorities early imposed restrictions on butchering. In 1850 it was found necessary to prohibit the slaughtering of cattle in the streets... More comprehensive rules followed in 1855. Animals to be slaughtered for commercial purposes were required to have their brands registered, to be inspected for wholesomeness, and to be killed in a designated city corral. In outlying areas of the city, people were allowed to butcher for home use on their own premises... In 1874 commercial slaughter within the city limits was prohibited, except by special permission from the Council...
>
> There is no indication of any butcher shop in the town in 1850... The number of butchers increased to thirteen in 1860 and reached fifty in 1880, about half of them Europeans...

The 1880s US Census lists two individuals as butchers in the commercial district of Frisco: T.P. Cuman from Pennsylvania, and Timothy Setson [Seston] of England. No information could be identified for either of these individuals.

The *Utah Gazetteer for 1883-1884* lists three butchers in Frisco: Barrett & Bowen, meat market; Dodd Bros, stock dealers, butchers; and James & Angel, meat market (Graham and Company Printers 1883). According to a history of Nevada, four brothers from Arkansas, known as the "Dodd Boys" moved to Pioche, Nevada, during the early days of mining activity (Scott as cited by Davis 1912). The Dodd Brothers subsequently settled at Pine Grove Creek in the 1870s (Van Cott 1991: 295). The *Gazetteer* (1879-1880) lists only two of these meat markets as being in operation: John Barrett and Dodd Brothers (Graham and Company Printers 1880).

The *Utah Gazetteer for 1892-1893* lists "Osborn & Sons, Butcher" as the sole butchery in Frisco (Stenhouse and Company 1892). Cadastral maps from the turn of the century indicate properties associated with the Osborns [Osborne] in Lot 21 along the southeast side of Main Street; and to the east of present-day Highway 21. Considering the commercial slaughtering ordinances being enacted in western cities such as Los Angeles, it can be postulated that the Osborns utilised the area to the east of Highway 21 for slaughtering their cattle, while the parcel within the main commercial district was utilised for the wholesale of the butchered meat.

In 1900, the sole butcher for Frisco was listed in the US Census as Thomas James; he was from Swansea, Glamorgan, Wales. The 1910 US Census lists three additional butchers: Daniel James (son of Thomas James), Owen Grover from Illinois, and Frank Waldomer who was of Swedish descent. Owen Grover married Abigail Lucina Squire of Wah Wah Springs in 1895; they continued to reside in Beaver County until Owen Grover's death in Beaver in 1922. The Cadastral map provides a listing for Daniel James in parcel 21 and in parcel 31. The elder, Thomas James, died in December 1902 in Salt Lake City, suggesting that he transferred the butcher business to his son before relocating. Daniel James and his wife, Eliza Belle Sherwood James, also moved to Salt Lake City, where Daniel James died in 1949. Waldomer lived in Frisco in 1910, but had relocated to Idaho between 1920 and 1930. No butchers are listed in the 1920 or 1930 US Census for Frisco or Grampian Precinct.

Friedmann (1980: 442) indicates that in Los Angeles during the 1860s up to the 1880s, food distributors were referred to by a number of terms ranging from grocers, to shopkeepers or merchants. In the 1850s, commonly "grocery-saloons" were in operation, which suggested the proprietor maintained a license for the bar, saloon, dance hall, restaurant, and grocery. "Specialization did not take place until about 1880" (Friedmann 1980: 442). Taking that into account, a comparison was made between the US Census and the *Utah Gazetteer* between 1879 and 1893 (Graham and Company Printers 1880, 1883; Stenhouse & Company 1892; US Census 1880, 1885, 1900, 1910, 1920, 1930). During that time, the commercial district of Frisco varied from 35 businesses in 1879 to 71 businesses in 1883, and then decreased to just 8 businesses by 1893. Note that the decrease in businesses by 1893 likely reflects the economic situation following the collapse of the mine in 1885. In 1879-1880, there were 11 saloons, five general merchandise stores, one druggist, and one hotel operating in the commercial district of Frisco. Just four years later, the commercial district included a hotel, a druggist, two barbers (denoted as tonsorial artists), five general merchandise stores, and 20 saloons/restaurants/hotels. In contrast, in 1893, only two general merchandise stores, one hotel, and four saloons were in operation.

Based on observations of the cut bone present, beef (*Bos primigenius taurus*) bone dominated the assemblage, followed by discarded oyster shell, and at least one undifferentiated bone fragment. The large quantity of cut bone was indicative of a restaurant, saloon, or butcher. A total of 150 fragments of cut bone, predominately bovine (*B. p. taurus*), was observed within TU1. Observed were ribs, vertebrae, phalanges and tarsals, long bones, shoulder bones, a mandible, and "t"-bones. Likewise, ribs and long bones were observed at three visual inventory locations (VI 2-5 and 8). Faunal material, such as ribs and long bones, is present at the E.R. Smyth Restaurant (also known as the “White House”). Utilising the previously mentioned meat-ranking classifications for the assemblage, it was determined that the assemblages in the TU, Visual Inventory locations and the E.R. Smyth Restaurant contained a high quantity of primal or wholesale cuts of beef (high and moderately priced cuts of beef), while standard or secondary (lower priced cuts) also were represented. The following figure (Figure 5-27) provides a visual representation of the types of beef cuts whilst Table 5-2 summarises the associated price ranking (Schulz and Gust 1983, Gust 2001, Nettles *et al.* 2003, Goodman 2006, Nettles 2006).

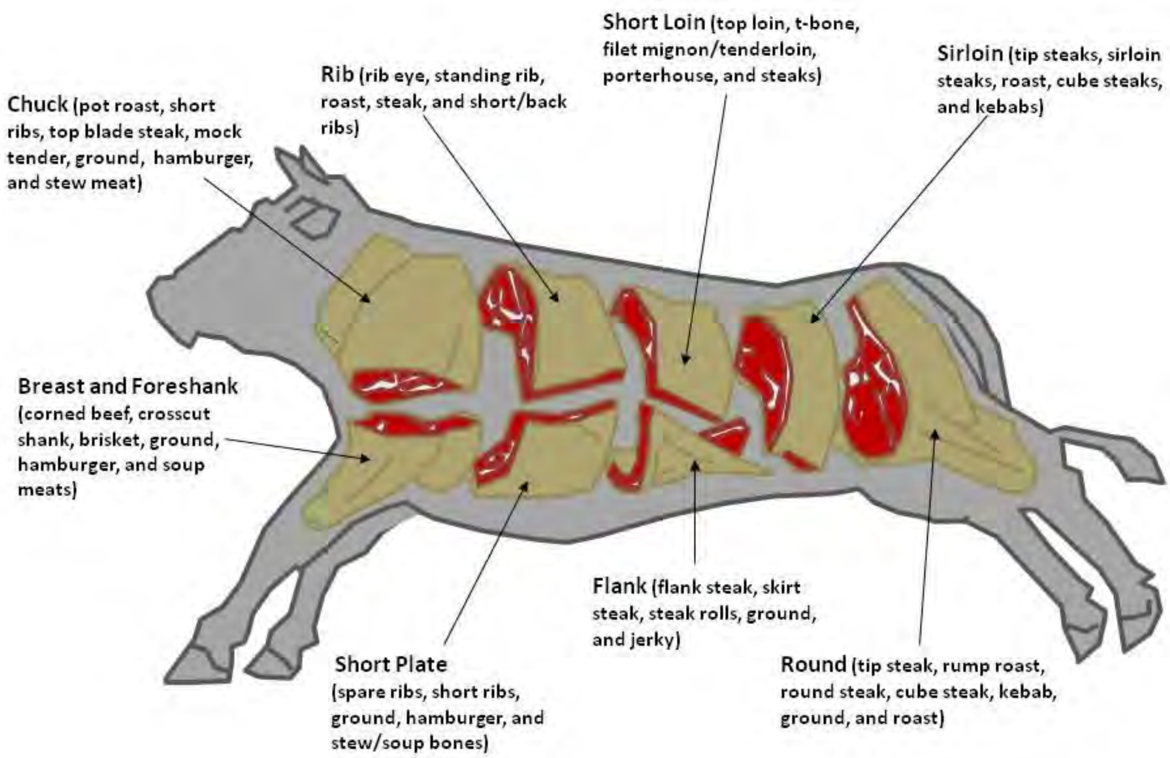

Figure 5-27. Illustration Showing Cuts of Beef (revised by author from *Encyclopædia Britannica* Inc., 1996)

Table 5-2. Beef Cuts by Price Ranking.

Price Ranking	Cut	General Use
High	Porterhouse, Sirloin, Prime Rib	Tenderloins, filet mignon, T-bones
Moderate	Round, Rump, Chuck, Rib	Lean cuts, roasts, hamburger, short ribs, rib-eye steak
Low	Hindshank, Brisket, Foreshank, Neck	Soups, stews, barbeque, corned beef, pastrami, stocks, sauces, gravies

Present in the assemblage from the commercial district of Frisco from TU1 are short loin (porterhouse, T-bone), sirloin, rib (rib eye roast and steaks, back ribs) chuck (short ribs), round (round steak, rump roasts), and foreshank bone (Figure 5-28). VIs 2 through 5 were situated to the south of TU1; each of these contained small quantities of bone. VI 2 contained rib bones. VI 3 and VI 4 contained rib, foreshank, and round (rump roasts). VI 5 contained round and foreshank bone. VI 8 is situated to the west of the commercial district of Frisco. It contained a small quantity of cut bone indicative of beef foreshank. The assemblage from the E.R. Smyth Restaurant contains round (rump roast) bone (Figure 5-29). As noted by Gust (see Nettles *et al.* 2003: E.1):

> For beef, the rankings indicate the highest-priced meat section to be the short loin until relatively recently, when flank became number one. Sirloin and rib rankings indicate some differences of opinion by various authors as to which was preferred, but both are relatively expensive. Round, rump, and chuck were ranked about equal and are moderately priced cuts. Inexpensive cuts were plate/brisket/navel, shanks, and neck.

Goodman (2006: 2) further notes regarding faunal ethnicity:

> In Anglo-American cultural traditions superior meat cuts associated with wealthy groups often contain an abundance of discarded lumbar vertebrae sections from the short loin area ('T'-bone and porterhouse steak refuse bones) sacra and ilia pieces from the sirloin area ('wedge' and 'flat' bones from sirloin steaks) and other areas that have select/high meat-to-bone ratios. Inferior cuts associated with subordinate groups often consist of numerous cranial parts, cervical vertebrae, distal long bones, podials, and soup bones. In general, when lower-status groups purchase butchered meat from the same source as the higher-status groups, the former predominantly have access to the cuts less-esteemed by the dominant group. This dichotomy becomes clouded; however, since higher-status groups used many poor-quality bones to make soups, broths, stews, and gravies.

Figure 5-28. Samples of Bone, TU1, Commercial District, Frisco

Figure 5-29. Bone Observed at E.R. Smyth Restaurant, Frisco

Evidence of at least one mandible, as well as tarsal and phalanges in TU1 indicates that these bones were discarded with the food waste, and not separately. This suggests these portions may have been used in stews or soups. A high proportion of roast bones noted at saloons may be attributed to operational economics, such as the offering of free lunches to draw patrons to the establishment (Schulz and Gust 1983: 49). Higher valued cuts may be attributed to saloons or restaurants in which “at various times of the day individual patrons could order meals, specifying preferences for cuts and cooking;" in these situations, "roasts failed to afford sufficient flexibility, and proprietors consequently relied on individually prepared steaks" (Schulz and Gust 1983: 50).

Also observed among the faunal assemblage from TU1 at Frisco is that yearling cattle were consumed as veal. It should be noted that prices for cattle ranged considerably between 1896 and 1909. For instance, prices for yearlings ranged from £12.27 [$19.00] to £23.24 [$36.00] for three to four year old steers; yearling heifers were £10.98 [$17.00] whilst older cows sold for £16.14 [$25.00] (Investigation Relative to Wages and Prices of Commodities 1910). As compared to pork or lamb, beef, generally was a higher priced commodity. The following table (Table 5-3) summarises the costs of the livestock in terms of availability for consumption; the costs were provided through an investigation performed based on testimony before the US Senate in 1910 (Investigation Relative to Wages and Prices of Commodities 1910). Interestingly, the cheapest of these – sheep – were in abundance in Utah since 1870 (Bancroft 1889) but are not represented in the faunal assemblage. Rather, they were utilised primarily for their value to the woollen mills in Utah.

Table 5-3. Prices for Cattle, Hogs and Sheep, 1896-1909, With a Comparison of 2013, in Terms of Commodity.

Year	Cattle (per 100 lb)		Hogs		Sheep	
1896	£2.52 – £2.84	$3.90 - $4.40	£1.78 - £2.87	$2.75 - $4.45	n/a	n/a
1900	£3.07 - £3.58	$4.70 - $5.55	£2.62 – £3.76	$4.05 - $5.82	£1.29 – £4.20	$2.00 - $6.50
1905	£2.68 - £3.78	$ 4.15 - $5.85	£2.74 - £4.14	$4.25 - $6.42	£1.78 - £2.91	$ 2.75 - $4.50
1909	£3.49 - £4.71	$5.40 - $7.30	£3.55 - £5.62	$5.50 - $8.70	£1.29 - £4.45	$2.00 - $6.90
2013	£82.19 - £87.20	$125.30-$132.95	£52.20-£60.08	$79.58-$91.60	£36.08-£81.99	$55.00-$125.00

An interview with Mr. and Mrs. Richard Jones, who resided at Frisco between 1908 and 1919, indicates that "you could buy the best cuts of beef steak for seven cents, seven or eight cents, a pound" (Osborn and Callahan 1968: 13).

Oyster shell was present within TU1 and represented both Pacific and Eastern oyster fragments, similar to that identified in deposits at Virginia City, Nevada. With regard to Virginia City, Dixon (2005: 93) notes that "local folklore tends to highlight the more opulent saloon menu items, indicating that people from all walks of life enjoyed champagne and oysters, symbols of the boomtown's ostentatious wealth, in the community's drinking houses." "Native, or rock, oysters came from the Pacific Coast from southern California to Southeast Alaska, while eastern oysters came from the Atlantic Coast" (Dixon 2002: 171). Both were made available to inland mining settlements with the introduction of the railroad, transported from either markets in San Francisco, California, or from the Atlantic Ocean. Julie Schablitsky (2002: 147-148) identifies that oysters were a seasonal food, could be eaten on the half shell, pan fried, or used in a stew. Whilst the beef bone was present in higher quantities, it is clear that patrons in the commercial district of Frisco also dined on such delicacies. An oyster can was observed at TU2 and is embossed with the wording "A. Booth & Co." (Figure 5-30). A. Booth & Company, operated by Alfred E. Booth, was organized in 1876 for the "catching, selling, and distributing of fish and oysters" (*The New York Times*, 11 September 1908). The company previously operated under the name A. Booth Packing Company – perhaps as early as 1869, with offices in Baltimore, Maryland; Chicago, Illinois; and New York. They also operated several salmon canning houses along the western coast of the US (Ingersol 1881: 202, Barrett 1963: 26, 31). At least one newspaper advertisement from the *Alta California* (22 October 1869) described the earliest shipment of Atlantic oysters to the San Francisco area: "The first carload of Baltimore and New York oysters in shells, cans, kegs, all in splendid order has arrived, packed and shipped by the pioneer oyster house of the West, A. Booth, Chicago, Illinois" (Barrett 1963: 26). The company later sold a portion of its oyster interests to Morgan Oyster Company (Barrett 1963: 31), although A. Booth & Co., faced financial difficulties and allegations of illegally taking rebates from railroad companies in 1908 (*The New York Times*, 1 July 1908; *The New York Times*, 11 September 1908).

Other types of foods likely were served that were not preserved by the harsh desert environment, such as fruits, vegetables, breads, cheese, or nuts. Bills of sale from the Horn Silver Mining Company's General Merchandise store to T. H. Reese (1 June 1897, on

Figure 5-30. A. Booth & Co. Oyster Can, TU2, Residential Area, Frisco

display at the Silver Reef museum) indicate that a variety of perishable foods were available including potatoes, rice, butter, eggs, cheese, currants, raisins, lemons, apples, and oranges. Other contemporary bills of sale indicate flour, oats, and salt pork being consumed in Frisco. None of these items would have left an archaeological footprint. That being said, a dense concentration of nutshell such as hickory (*Juglandaceae* sp.), was noted at TU2.

Modern faunal material, including two dead rodents and a partial bird skeleton are present within the cistern at TU2.

5.4.2.5 Furnishings

Three fragments of linoleum were recovered from TU1. They feature a black and red floral type pattern (Figure 5-31). Additional linoleum fragments were noted inside structures at Grampian, and at least one structure at Grampian included remnants of wall paper or canvas insulation. The Montgomery Ward & Company's catalogue from 1895 provides an advertisement for linoleum. "Linoleum is but another name for an oil cloth of superior quality, and is made of ground cork and oil. Patterns are the same as in oil cloth. Linoleums are made in three widths only, other widths cannot be furnished” (Montgomery Ward & Co 1895: 344). Prices ranged from £0.29 [$0.45] per square yard to £2.26 [$3.50] for four square yards.

As noted in the section above regarding stemware, several fragments of decorative glass bowls, vases, and glassware were recovered from TU1. These items served not only to address research questions regarding affluence, but also suggest a desire to lessen the harsh desert environment. In addition to the glasswares, clockworks were observed within TU1.

Decorative wood like dentil moulding, such as that which may have been used inside a saloon or other business, was observed within the commercial district of Frisco (Figure 5-32). Dentil moulding is comprised of closely spaced rectangular blocks on the moulding and is used for decoration of furniture and structures. Historical photographs such as Harry Shipler’s (10 April 1918, USHS 2001) view of the Liberty Bond booth inside the bank at Frisco, or the interior view of the Slaughter Store (USHS 1903), provide insight into the materials used for interior decoration (see Figure 5-32).

A steel hotel range is present within the structural remains in the Grampian area of the SFMD (Figure 5-33). Similar ranges were produced by Cesco and sold through mail order catalogues such as Holbrook, Merrill & Stetson (1928: 504) (see Figure 5-33). According to the catalogue, this particular range was used with coal or wood:

> Designed especially for Hotels, Restaurants and Institutions desiring a High Grade, Economical, Serviceable Range. A Fuel Saver and Heat Producer, which are the two Essential Features of a Satisfactory Range; All Parts even to the Smallest have been carefully selected to stand the hardest use (Holbrook, Merrill & Stetson 1928: 504).

5.4.2.6 Heating and Lighting

Chimney lanterns, lantern wick bases, coal and glass insulators were observed and/or recovered from the investigations at Frisco, Grampian and other locations throughout the SFMD (Figure 5-34). Lantern parts are present in the commercial district, while glass

Figure 5-31. Linoleum, TU1, Commercial District, Frisco

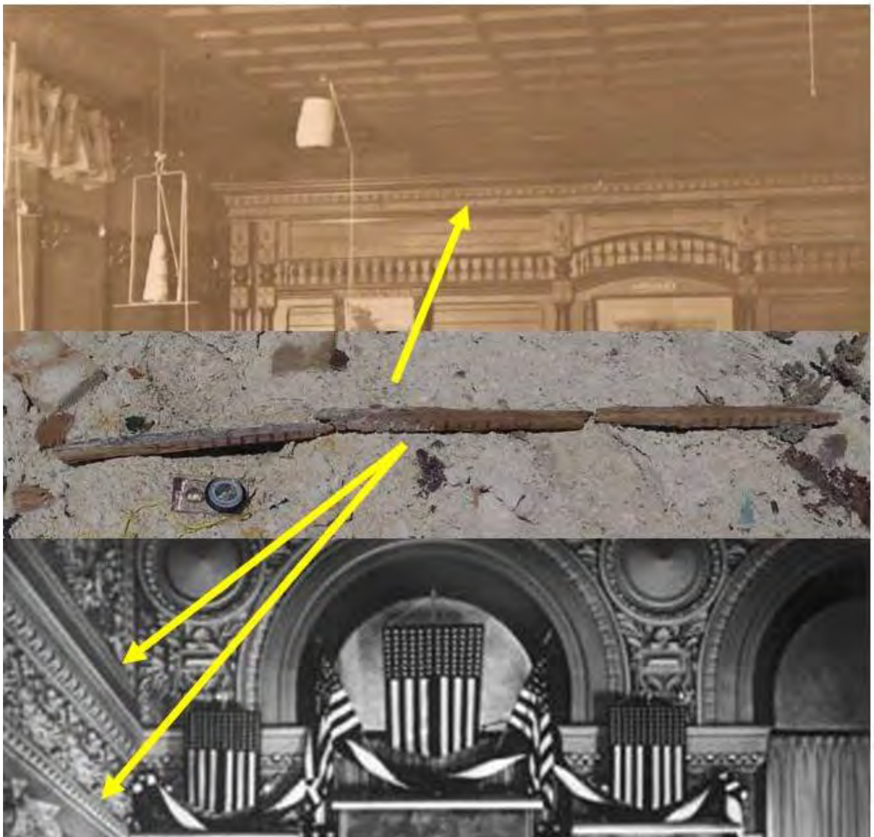
Figure 5-32. Wood Moulding, Commercial District, Frisco

Figure 5-33. Cesco Hotel Range at Grampian (Holbrook, Merrill & Stetson 1928: 504)

insulators are noted near the purported location of the railroad depot. Electricity was available to Frisco as early as 1900 (Merkley [ed] 1948: 273; Wray 2006: 333, 344; Fiege and Ore 1988). Prior to that, lanterns, candles, and other means of lighting would have been necessary in saloons, restaurants, stores, and residences throughout the SFMD. Crystal glass night lamps, hurricane lanterns, lantern burners and chimneys were sold through mail order catalogues (Montgomery Ward & Co. 1895: 551, 554).

5.4.3 Functional Group: Industrial

This functional group includes industrial machinery such as gears, spark plugs, belting, and other items associated with industrial activities. The group was modified from SHARD (Gibson *et al*. 2003; Van Bueren 2004; South 1977) to include mining related artefacts such as assaying equipment (crucibles and cupels).

Just north of Squaw Springs, southeast of the Horn Silver Mine works, and south of Frisco, a part from a water well turbine pump was observed in an ephemeral drainage

Figure 5-34. (Left) Lantern Wick and Wick Base; (Right) Glass Insulator, Frisco

(Figure 5-35). The part is embossed with the wording “JACKSON-CHURCH,” and is attributed to the Jackson-Church Company, Los Angeles, California. Byron Jackson produced one of the first deep well turbine pumps in the US in 1900, basing his company out of San Francisco, California. In 1910, two of his former employees, including Sam Church and a Mr. Jackson (first name unknown, unrelated to Byron Jackson), formed the Jackson-Church Company; it operated between 1910 and 1916 (Lundy 1968: 14). It is possible the turbine pump part has been removed from one of the mines, or may be associated with one of the drilling attempts to obtain water in the Frisco vicinity. The turbine pump part was observed within an ephemeral drainage, indicating that it is not in its original location.

Primarily mining related artefacts are found in conjunction with the mining features, such as the prospecting locations, adits, or shafts, headframes, or other mining support infrastructure. In some cases, these artefacts may include equipment that was abandoned in place due to their size or weight; examples include boilers, hoists, crushers, amalgamating pans, aerial trams, ore carts or buckets, etc.

Hoisting equipment is present at the King David Mine, whilst boiler equipment is present at both the Lulu Mine and adjacent to the Horn Silver Smelter. Hoists are utilised in

Figure 5-35. Example of Jackson-Church Turbine Pump (Clarke 1913) and Jackson-Church Turbine Pump Part, SFMD

conjunction with a headframe for lifting ore, equipment and miners in and out of the mine. Varying in sizes, hoists are sometimes contained within a building, or are small such as a hand winch used for prospecting activities (Sagstetter 1998: 50-51). The hoist at the King David Mine was developed by Charles E. Sterne for Sterne Brothers Company of San Diego, California (Figures 5-36 and 5-37). On 27 August 1907, the US Patent Office issued Sterne a patent (number 864,492) for the hoist. Often, hoists are powered through the use of tubular steam boilers, such as that observed at the Lulu Mine (Figure 5-38) and in the Frisco town site adjacent to the former location of the Horn Silver Smelter. Steam boilers served multiple functions, from powering the hoist to heating associated structures (miner's dry, boarding houses, etc.) and any other equipment necessary for the mine. As noted by Sagstetter (1998: 53), "the tubular boiler was so popular at mining camps, that it was the only mining boiler offered for sale in the 1912 Mine and Smelter Supply Company catalogue."

Smaller evidence of mining activities is denoted by the presence of carbide cans, blasting cap cans, slag, crucibles, and cupels. A powdered dynamite or carbide can was noted in a looter pit in the Grampian area. Both types of cans featured a powder keg, with ribbed siding. Carbide was used for lighting miner's headlamps post 1900 and often had a large, screw-on lid (Sagstetter 1998: 45). Powdered keg type containers generally held twenty-five

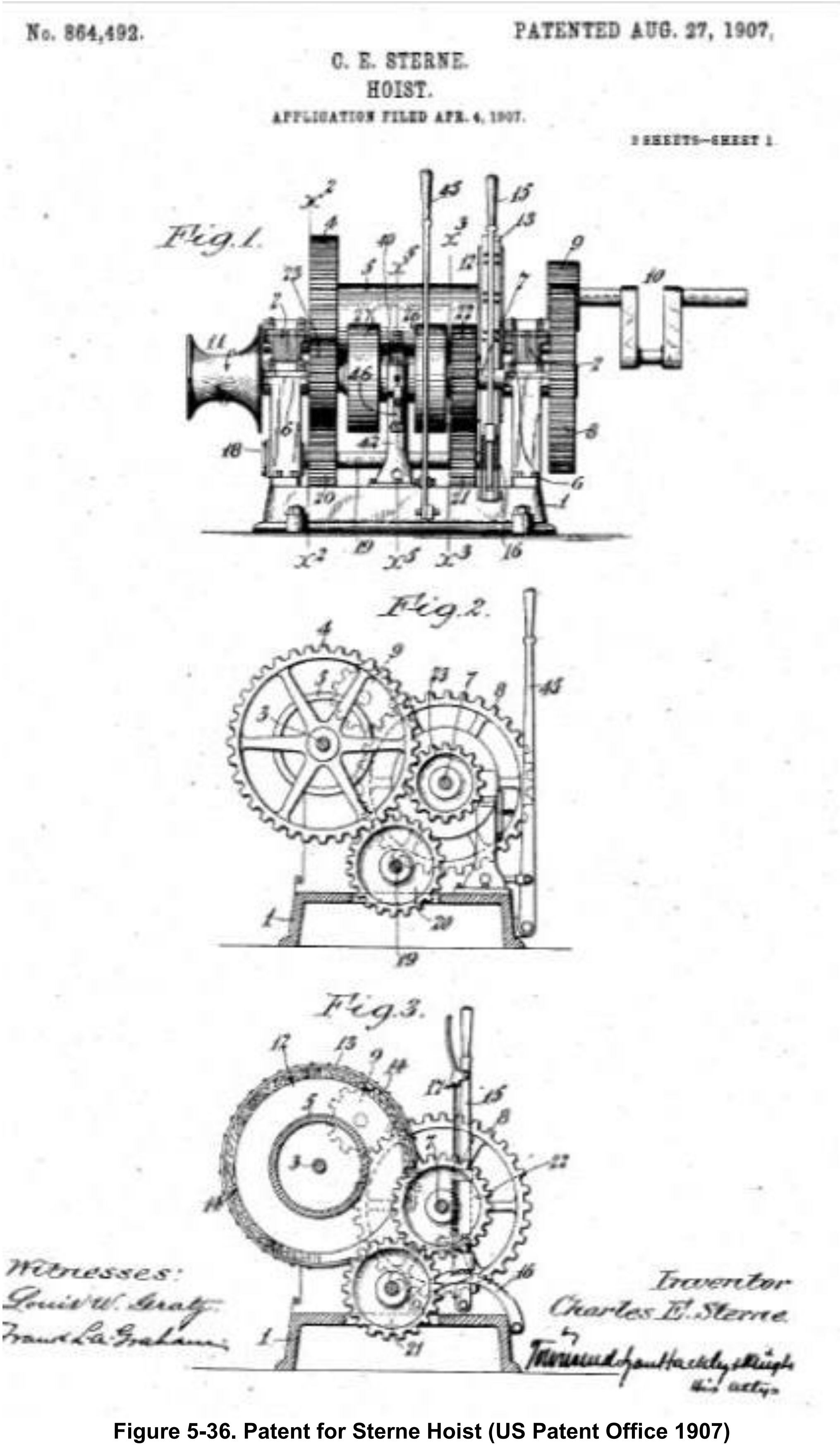

Figure 5-36. Patent for Sterne Hoist (US Patent Office 1907)


Figure 5-37. Sterne Hoist at King David Mine


Figure 5-38. Boiler, Lulu Mine

pounds of powder. Prior to 1866, black powder was utilised for mining, although some smaller mining ventures continued to use black powder until after 1900; by 1866, dynamite was utilised (Sagstetter 1998: 43-45).

A blasting cap can lid was noted at a large refuse deposit in the Grampian area. The lid is embossed with a standing lion and the faint wording, “California No. 6 Blasting Caps,” by the California Cap Company (Figure 5-39). William Letts Oliver, born in Valparaiso, Chile, was educated as a mining engineer in Edinburgh, Scotland. Between 1877 and 1880, Oliver and Freeborn Fletter formed the California Cap Company in the San Francisco Bay area of California. Fletter died in 1899. In 1918, Oliver died, leaving his son, Roland Oliver as president of the company. The company was the oldest manufacturer of blasting detonators in America and the major supplier of blasting caps for the western US (Waterhouse 1919:452). The company used mercury fulminate and produced ‘California’ brand blasting caps, electric detonators, waterproof electric blasting caps, delay action exploders, and other general blasting supplies (Waterhouse 1919: 452, US Department of Health and Human Services 2008, US Patent 422,257).

Figure 5-39. California Cap Company Blasting Cap Can Lid, Grampian

Copper ore and slag were observed throughout the SFMD, including dense concentrations adjacent to the Frisco Smelter, the Lulu Mine workings, the King David mine workings, and throughout the general refuse at Grampian and Frisco. Crucibles or cupels are a direct indication of the assaying process; both are used for either wet/chemical or dry/fire assaying (for gold, silver and lead). Based on Beth and Bill Sagstetter (1998: 113-131), the assay process involves a small sample of ore being broken by sledgehammer and then miniature jaw crusher; the ore is then ground with a bucking board and/or muller until it passes through a fine sieve as a power form. The sample is then placed into a splitter, weighed, and then rocked into a crucible. Fluxes are added before the crucible is placed into an assay furnace, where it is fired for a half hour. At this point, the lead oxide releases its oxygen, thereby forming lead slag. A molten drop of gold, silver, and lead sinks to the bottom of the crucible, which is then poured into a cone-shaped mould to cool. Once cooled, the slag is struck with a hammer to separate the slag from the gold, silver and lead (referred to as the metal tip). Next, the metal tip is placed in a cupel, which is made from a mixture of bone and ash, and heated in the assay furnace. The lead oxide is absorbed into the cupel, leaving a bead of silver or gold (dore); as a result, the cupel could only be used once (Sagstetter 1998: 125). The dore was removed from the cupel weighed; then flattened, placed in nitric acid to remove the silver, leaving only gold. The gold was weighed again to determine the quantity of gold or silver in the original ore sample. In some instances, blowpiping (Plattner's Blowpipe) could be used for scorification or other assaying tests (Sagstetter 1998: 113-131). One cupel was collected from the depot area (Figure 5-40). As indicated by Sagstetter (1998: 125), cupels were used once and then discarded. Based on the interior of the cupel, it was used during the assaying process. The base of the cupel contains the manufacturer’s mark “2 ¼ / BATTERSEA” and is attributed to the Battersea Works in South London, England.

According to information regarding the Morgan Crucible, most early crucibles had been

Figure 5-40. Battersea Cupel, Depot Area, SFMD

manufactured in Germany (http://www.morgancrucible.com/about_history.htm). The American Crucible design produced by Joseph Dixon and Company of New Jersey inspired the Morgan Brothers, who observed the crucibles at the Great Exhibition of 1851 in Hyde Park. In 1856, the Morgan Brothers bought the manufacturing rights to Dixon's American Crucibles, purchased a factory in Battersea, added a new kiln, and began operated under the name, "Patent Plumbago Crucible Company" in London, to sell crucibles and cupels in the UK. Within five years, Battersea crucibles and cupels were being used by mints in England, Australia, France, India, and Russia, as well as in the arsenals of Brest and Toulon and the Royal Arsenal of Woolwich (http://companies.jrank.org/pages/4300/Morgan-Crucible-

Company-Plc.html).   At least one unmarked crucible fragment and a fragment of a glass pipe that may relate to blowpiping were observed in TU1. The crucible fragment was observed in Visual Inventory 3. The glass piping was recovered from TU1 (Figure 5-41).

Figure 5-41. Glass Piping, TU1, Commercial District, Frisco

Based on information from the US Census and *Utah Gazetteers*, there were multiple assayers residing in Frisco between 1879 and 1930 (Graham and Company Printers 1880, 1883, Stenhouse and Company 1892, US Census 1880, 1885, 1900, 1910, 1920, 1930). In 1879-1880, F. Godbe, E. Simpson, N.L. Roht, and S.A. Hendrickson were listed as assayers (US Census 1880, Graham and Company Printers 1880). In 1883-1884, T.H. Latimer and William L. Raht were listed as assayers (Graham and Company Printers 1883). No assayers were listed from 1884 to 1910, likely due to the influx of miners and mining activity within the SFMD following the collapse of the Horn Silver shaft in 1885. In 1910, the US Census lists Harold Watson as the sole assayer for Frisco. In 1930, Roy E. Petty is listed as a chemist, but likely operated as an assayer (US Census 1930). Comparisons to historic Cadastral maps from 1900 do not reveal listings on any of the identified parcels that correspond to these assayers. It is likely that the assayers operated close to the Horn Silver workings at Grampian, although during the heyday of the mines (pre-1885) it is possible that the assayers also operated businesses within the commercial district of Frisco, or throughout the SFMD in conjunction with some of the more lucrative mine works (Cactus, Carbonate, etc.).

5.4.4 Functional Group: Personal

This functional group includes personal items such as accoutrements; clothing; footwear; grooming or health-related materials, social drugs (smoking or alcohol-related items), and children's toys. Artefacts representing this functional category include earrings, buttons, snaps, eyelets, shoe leather, medicinal products, perfumes, combs, alcohol, tobacco, and dolls. The majority of these personal items were found in relation to the commercial district of Frisco and near the residential areas of Grampian, as one would expect.

5.4.4.1 Accoutrements

A decorative shell flower, believed to be a brooch, was observed within the commercial district of Frisco (Figure 5-42); according to the 1904 Cadastral map, the parcel in which it was noted belonged to the Horn Silver Mining Company. Similar pieces of jewellery were available via mail order catalogue from Montgomery Ward & Company; Sears, Roebuck & Company, and others from the late 1800s and early 1900s.

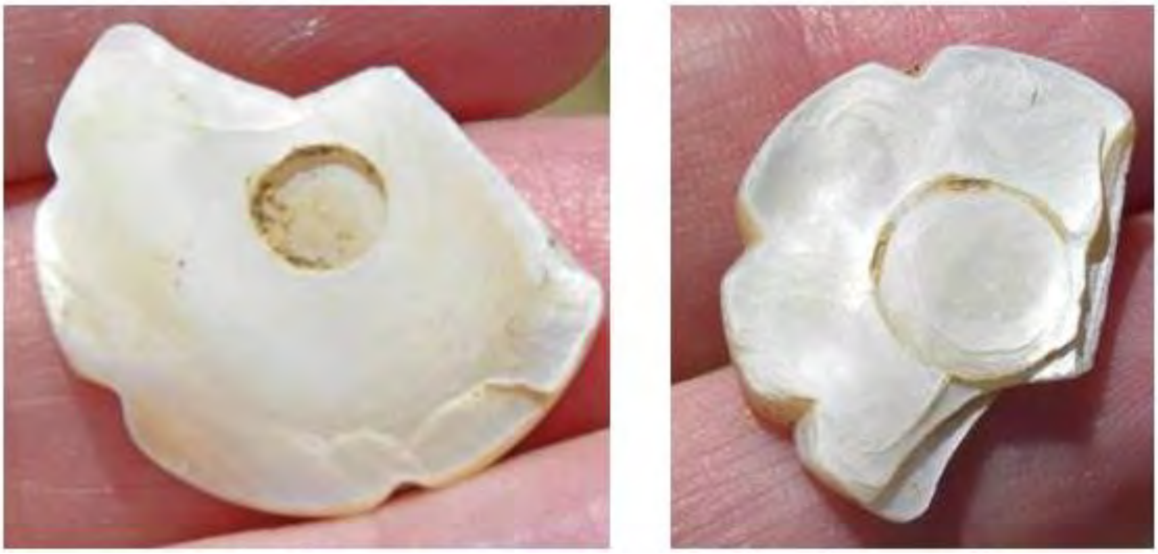

Figure 5-42. Brooch, Horn Silver Mining Company Property, Commercial District, Frisco

5.4.4.2 Clothing

The button materials represented in the SFMD excavations include fasteners made from shell, bone and glass, while metal grommets/eyelets and snaps also were present (Figure 5-43). The buttons are typical, four-holed, countersunk style, associated with both men and women's clothing. The grommets or eyelets could have been remnants from shoes or corsets (see Figure 5-43).

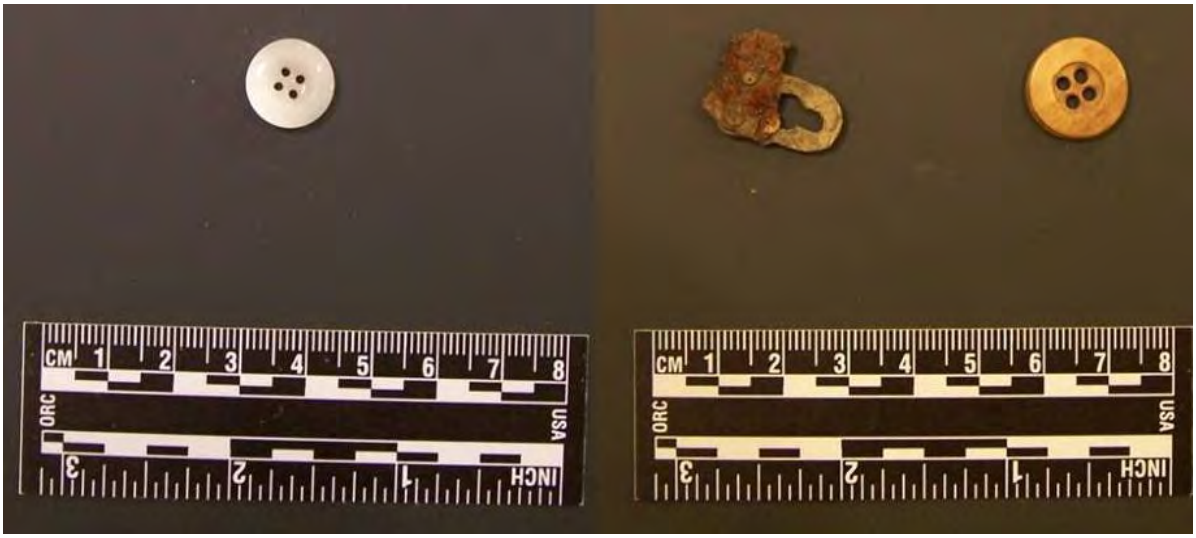

Figure 5-43. Glass, Bone Buttons and Metal Grommet, TU1, Commercial District, Frisco

5.4.4.3 Footwear

Shoe leathers were recovered from TU1, in the commercial district of Frisco (Figure 5-44). The soles are fragmented, but a portion of the insole indicates that nails were utilised to hold the shoe together. The shoe leather containing the nails consists of five layers of leather and appears to be from a left foot, possibly a boot. A smaller remnant features a heel with at least three layers of leather and appears to be from a right foot, and possibly relates to a woman's shoe. Dale Berge (1980: 275-285) provides an informative chronology for shoe improvements ranging from early shoemaking in the 1750s to 1937. Based on the presence of shoe nails, the shoes likely date after 1862 but prior to 1912 (Berge 1980: 277). The US Census and *Utah Gazetteer* list four shoemakers in Frisco between 1883 and 1884: C.

Schmitt; L. Christensen; George Hardy; and G. Holmes (Graham and Company Printers 1880, 1883, Stenhouse and Company 1892). Shoes also were available via mail order catalogue. The Montgomery Ward & Company's 1895 catalogue touted their line of boots and shoes, claiming that "over 200,000 pairs [were] sold in 1894." The line included shoes for ladies, children, misses, infants, and men (Montgomery Ward & Co. 1895: 508-524).

Figure 5-44. Shoe Leathers, TU1, Commercial District, Frisco

5.4.4.4 Grooming or Health-Related Materials

Grooming and health-related items include combs, toiletry items, and medicinal or hygiene bottles and products. A hard rubber dressing comb was recovered from TU1, and another double-sided "EXCELSIOR" comb was observed on the Horn Silver Mines property in the commercial district of Frisco (Figure 5-45). Mail order catalogues advertised combs such as this, produced from Atlantic India Rubber, also identified as 'celluloid' combs; the combs ranged in prices from £0.06 [$0.10] each or £0.71 [$1.10] per dozen (Montgomery Ward & Co. 1895: 105). Likewise, these types of products were readily available at the merchandising stores in Frisco.

An opaque (white or milkglass) glass jar, a sun-altered amethyst perfume bottle, and several fragmented zinc tubes also were noted. The perfume bottle is shaped like a shoe (Figure 5-46). The zinc tubes may have contained tooth paste, ointments, or other salves.

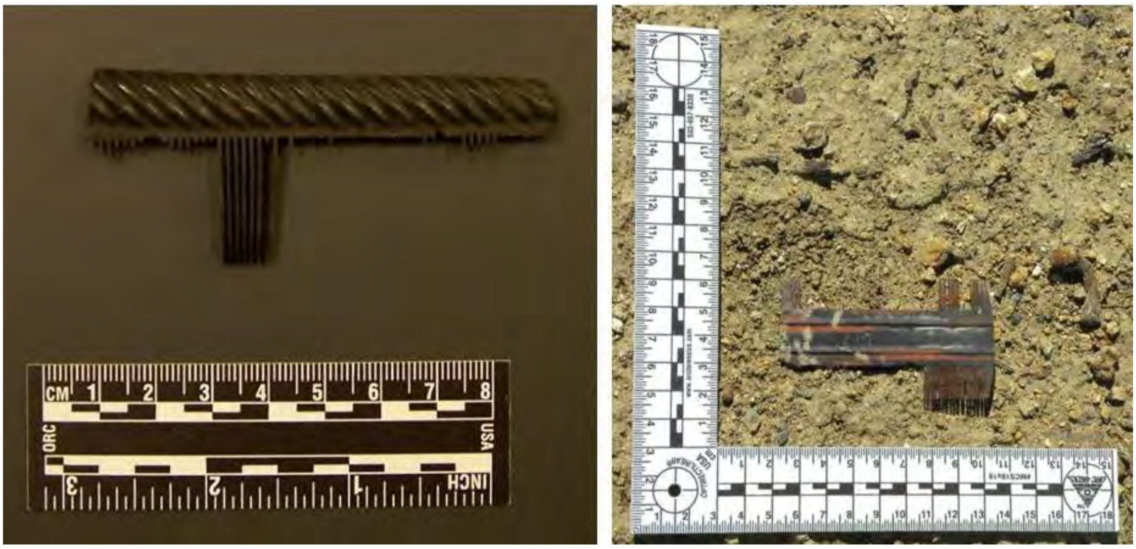

Figure 5-45. Combs, Commercial District, Frisco

Figure 5-46. Sun-Altered Amethyst Shoe Shaped Perfume Bottle, TU1, Commercial District, Frisco

Julie Schablitsky (2002: 160) notes that "cream jars held salve or cold cream that was used by both men and women. Cold creams were applied by women to their faces while salves were used for chapped and dry skin." Between 1879 and 1884, there were four hairdressers, barbers, or tonsorial artists living in Frisco: D.D. Vail (1879-1880, hairdresser); David Fordonski (1883-1884, tonsorial artist); A. Kennedy (1883-1884, tonsorial artist); and H.S. Ivy

(1883-1884, barber). According to a *New York Times* article from 1883, the tonsorial artist was considered a fashionable barber, providing hairdressings, lotions, dyes, shampooing, styling, and other services to patrons (*The New York Times*, 6 May 1883).

As early as 1871, there was an investigation in Cornwall and Devon regarding the mortality rate of miners and non-miners; the investigation revealed that miners over the age of 35 showed increased rates of respiratory diseases created from inhaled dust and bad hygienic conditions (Holman 1947). Toward the end of the 19th century, there was a slump in Cornish mining created from exhausted mines, drops in prices of copper and tin, matched with increased emigration to mines in California, South Africa, West Australia, and Spain (Holman 1947). Between 1851 and 1891, a total of 170,000 Cornish miners thus emigrated overseas, taking with them both the virtues and vices of Cornish mining; the study noted the Cornish had a disregard for the dangers of dust (Holman 1947). By 1892, the study revealed that the active life of a miner spanned 3 to 5 years and that after age 55, respiratory diseases took their toll (Holman 1947). Thus, the following policies helped diminish dust and increased the lifespan of miners: adding water to the mining process (wet boring); better ventilation in the mines; adding cages for worker access to/from the mines; company provided work clothes; and constructing a miner's dry adjacent to the mine workings (Holman 1947).

It is possible that the cough remedies associated with the commercial district of Frisco relate to miners treating silicosis. It also is known that dysentery ran through the town in September 1882 (*Southern Utonian*, 2 September 1882). Similar medicines, including the Boschee's German Syrup, were observed in Virginia City, Nevada (Schablitsky 2002: 160-161). Of course, as Richard Fike (1987: 3) notes,

> Products were advocated to cure from twenty to thirty ailments; one even claiming equal relief from both [diarrhoea] and constipation. Bottled as tonics, killers, bitters, and liniments, many of these cures and remedies consisted of nothing more than alcohol, sugar and water. Some cure-alls even contained narcotics. Opium, for example, was often added not only for its pain-numbing characteristics, but because heavy consumption could lead to addiction, and subsequently increased sales.

Thus, medicinal products identified in the SFMD could be associated with a number of health ailments. A zinc lid, embossed with the word “MENTHOLATUM,” was recovered from TU2 (Figure 5-47). The lid would have accompanied a small, opaque or milkglass jar. Mentholatum, produced by Albert Alexander Hyde since 1889, is a non-prescription health care product or salve made from a blend of menthol and petrolatum. Hyde’s company – The Yucca Company (1889), then Mentholatum Company – operated out of Wichita, Kansas in 1909, Buffalo, New York in 1919, and Wilmington, Delaware in 1937 (Fike 1987: 83).

Several glass fragments were identified as medicinal products, including the M. Dimmitt & Bro. cough balsam, Dr. A. Boschee’s German Syrup, Phillips Milk of Magnesia, the zinc tubes, and Mentholatum. Fragments from mineral waters and soda waters were touted as remedies for dyspepsia, dropsy, constipation, jaundice, and diuretic value (Bethard 2004:16). Historically, mining has been associated with chronic bronchitis (Black Lung) and pneumoconiosis (silicosis), which included shortness of breath, cold fever, cyanosis, and premature death. Based on information from the business directories, gazetteers and censuses, there was a physician (Thomas Norton) and a druggist (W.H. Meek) in Frisco in 1879-1880; in 1883-1884, there was a single drugstore in Frisco (R.H. Burke & Co); and in 1884, there was one druggist (C.S. King & Co) and a physician (Dr. A.M. Adsit). Archival research also suggests that local resident, Ms. Sebrina Grace, worked as a midwife.

Figure 5-47. Mentholatum Lid, TU2, Frisco

5.4.4.5 Social Drugs

Compulsions such as smoking and drinking are identified through the archaeological evidence based on the presence of tobacco tins (Figure 5-48) and alcoholic beverage containers (Figure 5-49). Flat or pocket tobacco tins with a hinged lid were patented in 1907, and although sold by numerous tobacco companies, are associated most commonly with the Prince Albert Company (Rock 1984). Few tobacco tins are noted near Grampian (VI14) and in the residential area at Frisco (VI19). More common are the numerous alcohol bottle fragments (bottle necks and bases) observed in the commercial district of Frisco. Business directories and gazetteers indicate the presence of more than 38 saloons in the heyday of the SFMD. As noted by Schablitsky (2002: 200), "wine was usually sold in light olive [coloured] bottles [whilst] stouts and champagne were bottled in black or dark olive glass.

Figure 5-48. Pocket Tobacco Tin, TU2, Residential Area, Frisco

Figure 5-49. Assorted Liquor Bottle Fragments, VI07, Commercial District, Frisco

5.4.4.6 Toys

A porcelain or bisque doll head fragment was recovered from TU1 at the commercial district of Frisco (Figure 5-450; a porcelain doll leg (Figure 5-51) was noted in a looter's pit, also in the commercial district. Mail order catalogues from the 1890s offered a variety of dolls of differing types, such as jointed dolls with bisque heads and chemise bodies, varying in prices from £0.26 [$0.40] to £1.23 [$1.90] each; they ranged in size from 39.37 cm [15-1/2 in] to 63.5 cm [25 in] tall (Montgomery Ward & Co. 1895: 233). According to Harvey Green (1983), toy dolls from the early to mid 19th century resembled little women rather than children or infants, whereas the childlike dolls were designed to allow the girls to practise activities resembling their mothers. Oftentimes, the dolls featured a bisque or papier mâché head and composition body (Green 1983: 52, n.31; 53, n.32).

The presence of the doll fragments suggests that children were active in the commercial district of Frisco, or may relate to the nearby school. Based on the US Census, there were a total of 13 children residing in Frisco in 1880; 180 children in 1900; 77 children in 1910; and 33 children in 1930 (US Census 1880, 1900, 1910, 1930).

Figure 5-50. Bisque Doll Face Fragment, TU1, Commercial District, Frisco


Figure 5-51. Porcelain Doll Leg, Looter's Pit, VI20, Commercial District, Frisco

5.4.5 Functional Group: Structural

This functional group includes items associated with structures, such as fixtures, hardware or construction materials. Examples of artefacts observed within this functional group include pipe, bolts, nails, washers, porcelain door knobs, hinges, ventilation grating, window glass, galvanized metal, plaster, stove pipe, wood/timber, and bricks.

Very little is known of the architecture of the SFMD, other than a few historical photographs of the commercial district, the smelter, and the mine working adjacent to the Horn Silver mine. Thus, archaeological evidence from this functional group, although relatively sparse, provides insight into the architectural styles utilised throughout the SFMD.

5.4.5.1 Fixtures

Curious to note is the presence of pipe in the cistern (VI19), as well as along the sidewalks of the commercial district of Frisco. Upon closer observation of the pipe along the sidewalks, it was noted that the pipe extends the length of the sidewalks, south along Main Street, where it meets the former well location and gate valve. Pipe also is noted in small cement cisterns along the west side of Main Street, suggesting that the residents and businesses collected water for either drinking purposes or for watering livestock and horses in the vicinity. Figure 5-52 depicts an overview of the sidewalk remnants and cistern at the Horn Silver Mines property (Parcel 15). Figure 5-53 provides a close-up view of the piping beneath the sidewalk. Figure 5-54 provides an overview of the former well head.

5.4.5.2 Hardware

Hardware observed and/or recovered includes bolts, hinges, machine cut and wire nails, washers, wire spike, register faces or grilles, and porcelain doorknobs. At least two porcelain doorknobs were observed; one was present near Grampian and the other in the commercial district of Frisco. Cast iron door butts or hinges and other miscellaneous hardware were photographed (Figure 5-55). All types of hardware were available via mail order catalogue (Montgomery Ward & Co. 1895: 380).

Figure 5-52 Overview of Sidewalk and Cistern, Horn Silver Mines (Parcel 15), Frisco, View West.

Figure 5-53. Overview of Piping Beneath Sidewalk, Main Street, Frisco, View West

Figure 5-54. Former Well Head, Main Street, Frisco, View South

Figure 5-55. Hardware, TU1, Commercial District, Frisco

5.4.5.3 Materials

Among the structural materials observed and/or recovered from investigations at the SFMD is evidence of the commercial and residential dwellings in Frisco, residential properties in Grampian, and the mining operations. These materials include flat or window glass, frog bricks, fire bricks, galvanized metal, plaster, stove pipe, burned wood and timber, and other material that was observed within the commercial district of Frisco.

Observed in conjunction with the beehive charcoal kilns at the Frisco Smelter are marked firebricks. The firebricks are pressed with the marks “M & E / UTAH” and are attributed to Morris & Evans. According to the 1885 US Census, Morris & Evans were the only firm in Utah producing firebricks. The company established its works in Salt Lake City around 1871-1872, employing approximately 10 to 15 men regularly. A similar firebrick was manufactured by an unnamed company that Morris & Evans acquired in 1880 (US Census 1885: 438). The bricks were manufactured of clay from the north side of Bingham Canyon and siliceous rock from two quarries north and east of Salt Lake City. Although the company produced two types of pressed firebrick, they were all brownish-red in colour, measured 9 by 4½ by 2¾ inches in size, and commonly were used for charcoal kiln construction. “They have been employed in the construction or lining of all reverberatory furnaces and fire-boxes of metallurgical works in Utah and have given satisfaction” (US Census 1885: 438).

5.4.6 Functional Group: Indefinite

This functional group includes items of indefinite attribution. These items may have been used for single or multiple uses, such as miscellaneous types of closures, containers, or metal items. Examples of these artefacts include chain looping, coil springs, metal strapping, wire, barrel hoops, metal boxes, and glass containers. Wire and two barrel hoops are present near the purported location of the former railroad depot.

5.4.7 Functional Group: Unidentified

This functional group includes items that could not be readily identified as to use or function. These artefacts include burned wood, ferrous metal, burned or melted glass, and a leather strap. One glass item, a clear glass straw or pipette, was identified but was discussed above in the industrial functional group.

5.4.8 Functional Group: Intrusive

This functional group includes items that were considered intrusive to the historical mining landscape, such as modern refuse and recently deceased wildlife. A bird skeleton and two mouse skeletons were noted within the open cistern adjacent to TU2. It is likely that the bird and rodents were trapped within the cistern and presumably left to die. The presence of aerosol cans and other modern refuse was noted within the cistern indicating the area has been utilised to discard unwanted refuse recently.

5.4.9 Functional Group: Prehistoric

This functional group includes items that are considered to be prehistoric in nature, associated with prehistoric peoples and not the historical mining activities at the SFMD. Whilst at least one prehistoric archaeological site has been identified within the SFMD boundaries, little evidence is present regarding use of the area prior to the establishment of the mining ventures. A granitic metate was noted within the commercial district of Frisco. Although the artefact may have been utilised prehistorically in this vicinity, it is likely that the metate was collected inadvertently for use in the construction of one of the stone structures in the town. It was measured and photographed (Figure 5-56), and a provenience collected with the GPS, but left *in situ*.

Figure 5-56. Metate, Commercial District, Frisco

5.5 Interpretations of the Artefact Assemblage

The collection and observation strategy for the field work was based on consultation with Dr. Roger White at the University of Birmingham, the areas selected for ground-truthing, and areas that would yield the greatest recovery in terms of artefactual material. Because the commercial district of Frisco has been disturbed so heavily by illicit collector activities, it was anticipated that a large quantity of the diagnostic artefacts had been collected previously or damaged through collector behaviour. As a result, several areas were visually inspected for artefacts rather than through further excavation.

The resulting inventory (see Appendix C) includes 326 artefacts, including those that were noted in the field observations and those that were retained for further analysis. When catalogued, the items were defined within a classification scheme based on works by South (1977), Nettles *et al.* (2003), Van Bueren (2004), Nettles (2006), Praetzellis and Praetzellis (2004), and Schulz and Gust (1983). Nine functional groups were identified: activities; domestic; industrial; personal; structural; indefinite; intrusive; unidentified; and prehistoric. Within the functional groups, artefacts were sub-defined as to type, use, portion present, quantity, and date range.

The diagnostic materials that were recovered or observed provide a dating sequence that is consistent with the archival record. The earliest TPQ date based on artefact manufacturer is 1818 and the TAQ date is 1925. Based on archival research, the earliest documented activity in the SFMD associated mining correlates to 1871, with the height of the Horn Silver mine and commercial district of Frisco taking place by the mid-1880s. The collapse of the Horn Silver mine in 1885 led to a rapid decline of the area, with most of the mining activity and businesses ceasing operation by the mid 1920s.

Regardless of the limited amount of diagnostic artefacts, the artefact assemblage provides additional information regarding the people who worked and resided in the SFMD boundaries. Interpretations can be made regarding choices made by consumers, socio-economic status, ethnicity, trade networks, transportation, market demands and product availability. That being said, it is difficult to discuss the trade networks and products available without looking at the proper context of the SFMD within a landscape perspective. Prior to the construction of the railroad, miners and settlers residing within the boundaries of the SFMD (Grampian, Frisco, Newhouse, and outlying areas), there was a reliance on items that could be transported via stage, wagon or horse, and ordered via mail-order catalogue, through one of the markets in Beaver, Milford, Minersville, or areas such as Pioche, and Silver Reef. The presence of horseshoes suggests a reliance on horses for transportation, as well as for use with the mining activities; the *Utah Gazetteer* lists at least one wheelwright in Frisco in 1879-1880 (Graham and Company Printers 1880). Likely, many of the earlier residents to the area brought items, such as furnishings, ceramics, etc., with them to the SFMD. After the construction of the railroad to Frisco in 1880 and Newhouse by 1905, market demands and product availability increased within the SFMD. As a result, it is presumed that a greater influx of products dating post 1880 would be noted in the artefact assemblage. Highway 21 was established and partially paved by the 1920s, fully paved by 1959, and would have provided a later means for transporting goods to and from the area.

The presence of the automobile chassis may reflect – albeit obliquely – the changes in transportation from stage to rail and ultimately to automobile. The railroad tracks were removed by the mid 1930s, and most of the town settlers relocated shortly thereafter.

Ceramics in the assemblage are a mixture of American produced and European imports from the early to mid 1800s. American-produced wares include those by popular potter Homer Laughlin, and other East Liverpool, Ohio, potters (Knowles, Taylor & Knowles, and Burford Brothers) date from as early as 1879 to the turn of the century, whilst European imports include a range of potters from Tunstall, Staffordshire (Thomas Furnival & Sons; Turner, Goddard & Company; Elsmore & Son; Charles Meakin) as well as the Johnson Brothers and Wedgwood & Company. The ceramic assemblage includes a diversity of restaurant and residential dinner wares, featuring a variety of patterns and motifs. Virtually all of the ceramics were available through mail order catalogues by the late 19th century.

Very few of the artefacts in the assemblage from the commercial district reflect distinct socio-economic indicators with regard to social class, financial or political status; rather, the assemblage reflects a flat social hierarchy, which would be consistent with that of the commercial area versus that of the more residential areas of Frisco or Grampian and outlying areas of individual mines. Most of this information may be best gleaned from archival records, which list the presence of barbers (hair dressers, tonsorial artists), butchers, legal professionals, a newspaper, livery and stables, mining companies, smelters and reduction works, precious stone purveyors, a pharmacist and doctor, tailors, watchmakers, saloon and restaurants, and numerous general merchandising businesses.

Whilst the food waste provides limited information regarding the cuts of beef that were eaten in the commercial district of Frisco, it does not address social status or affluence specifically. The cuts of beef eaten within the commercial district include all types of cuts from wholesale or primary cuts to standard or secondary cuts that would have been offered in any of the restaurants, saloons, or hotels in the vicinity. In the western US, indicators of affluence may be determined by the presence of oysters in the faunal assemblage, whereas in Victorian era Britain, oysters were a food for all classes. Other foods noted are hickory nuts and archival research indicates a large number of perishable commodities available in the mid 1880s.

The only indicator of entertainment was the presence of harmonica reeds. Whilst most mining communities featured entertainment in the saloons ranging from pianos, brass bands, and singing (Dixon 2002; Schablistsky 2002), the harmonica is the only remnant visible from the investigations in the commercial district (TU1).

Other signatures of the mining community and saloons are the presence of social drugs (alcohol and tobacco products). Few flat or pocket tobacco tins were noted within the commercial district, although these types of cans were noted in the Grampian area (VI14) and in a portion of the residential area of Frisco (VI19). It is possible that residents and miners utilised other types of social drugs that were not readily observed during the investigations due to looting, ground disturbance, and perishability. The flat or pocket tobacco cans were introduced to the American market by 1907, after the height of the mining activity in the SFMD, which also may contribute to the lack of a great abundance of these types of cans.

Diagnostic medicinal products were dominated by cough medicines or remedies for respiratory or digestive ailments. Whilst it is possible that the medicines reflect maladies associated with mining activities, they may relate to a host of other medical issues. Based on the business directories, gazetteers and censuses, several physicians, druggists, and a midwife were identified in association with the commercial district of Frisco; thus, medicinal products would have been available between 1879 and 1884.

Furnishings and hardware identified within the commercial district included patterned linoleum, decorative dentil moulding, decorative door butts or hinges, and register faces or grilles. As evidenced by historical photographs of the interior of the bank (Shipler 1918), and

Slaughter Store (USHS 1903) despite the isolated nature of the town and mining district, the residents and businesses of Frisco reflected the wealth of the Horn Silver Mine. Even interior buildings in the Grampian area retain canvas or papered walls and linoleum remnants.

Mining equipment was anticipated throughout the SFMD. Evidence of mining is present across the landscape in the form of prospects, cairns, shafts, adits, headframes, equipment, and structures. Smaller forms of evidence include crucibles, cupels, carbide and blasting powder cans, and blasting cap cans. Whilst the majority of the mining artefacts are found in context with the mining features, some of these smaller items were noted in the commercial district and near the depot, tying both the mining activity locations to the commercial and transportation properties.

What can be discerned from the artefact assemblage are indicators of demographics such as ethnicity, gender, and age. From the US Census and *Utah Gazetteers*, it is known that a small community of Chinese workers, including Sam Ning Hing, Charles Lue Ling, Hop Lee, and Wo Hing Ching, resided in the area (Graham and Company Printers 1880, 1883, Stenhouse and Company 1892, US Census 1880, 1885, 1900, 1910, 1920, 1930); at least one Chinese rice bowl was noted in the Grampian vicinity. The US Census, *Utah Gazetteers*, and Utah Directories provide listings of several women in the vicinity, including those operating legitimate businesses (sewing, notions, school, boarding houses, cooking, and laundry services) (Graham and Company Printers 1880, 1883, Stenhouse and Company 1892, US Census 1880, 1885, 1900, 1910, 1920, 1930). Although archival research infers that illegal activities, such as prostitution, occurred within the SFMD, none of the artefacts could specifically address such claims. Artefacts attributed to women and children include a single amethyst perfume bottle, a porcelain doll leg, a bisque doll face fragment, slate, and rubber erasers. One shoe leather fragment may be related to a child's shoe, but could be shrunken due to exposure to the elements, thus misconstruing the size of the foot.

In terms of the HLC, the artefact assemblage does fill in minor data gaps in terms of defining the commercial district of Frisco compared to more residential areas. The discrepancy, however, lies within the continued use of the area since the 1870s up to the 1930s, combined with today's tourists and illicit collectors. For instance, the original town layout was likely different from that illustrated ten to fifteen years later on the Beaver County Cadastral map (1904). Further, based on archival research, the population encompassed anywhere from 800 persons up to thousands in the 1880s, leading up to the collapse of the Horn Silver mine. The Cadastral only reflects settlement in certain portions of the Frisco commercial district, for a total of 78 persons or establishments, and offers no insight into the layout (or exact identification) of the properties at Grampian.

Historical photographs provide insight as to the construction techniques utilised within the SFMD (Figure 5-57). After abandonment of properties, some structures were relocated to nearby Milford (located at 900 South/200 West, Figure 5-58), or were dismantled for materials to be used elsewhere. The deconstruction of the structures, combined with the tourist exploration and illicit collection of artefacts not only disturbs the physical evidence of the site, but also alters or skews the archaeological record. This serves to create biases in the data due to a lack of materials that may have been recovered through looting, leaving one to make interpretations on the materials left behind.

Figure 5-57. Example of a House at Frisco

Figure 5-58. Structures Relocated to Milford, Utah

6.0 RESULTS

6.1 Application of the HLC Model

Prior to the inception of this study, little to no work had been completed within the SFMD with regard to the identification of archaeological features. Previous efforts revolved around the recording of individual features, but none examined the SFMD as a whole, or considered symbiotic relationships between the features. For instance, Bassett (2008, 2010) recorded a large volume of mining features on behalf of the UT AMRP, but the scope of work did not address the role of the mines in terms of the development of the district, or features associated with the settlements. Outlying sites had been recorded by the BLM (Dalley 1991a-d, 1994a-b, 2001a-c; Dalley and McEwen 2003a-c) and the Utah Department of Transportation (DOT) (Higgins 1997a-f). The BLM effort included charcoal kilns and postulated a relationship to the SFMD, but primarily focused on prehistoric sites within the SFMD boundaries. The DOT efforts addressed utility lines and portions of the transportation routes within the SFMD but failed to describe their roles within the greater operation of the mines or settlements. And whilst it is impossible to determine the significance or research potential of these individual sites – loci or features – without understanding their roles within the greater landscape, few previous studies considered any of these sites “significant” in terms of consideration for individual listing to the NRHP.

Previously, the English Heritage HLC model was applied in the US only at Fort Hood, Texas, but in a broader context, for a wide variety of sites. Following a discussion at the University of Birmingham’s Annual Institute of Archaeology and Antiquity Post Graduate Colloquium (2010), there was a concern or perception that the English HLC model could not be applied adequately to sites outside of the UK, especially those relating to mining sites in the US. The purpose of the present study was to examine a mining district with a series of interrelated themes, including the geology and mineralogy, hydrology, vegetation, and associated settlement patterns, with spatial and temporal depiction through GIS. The resulting study demonstrates that the HLC model is applied to industrial mining complexes easily, regardless of location, as the themes are interrelated so closely. Without the supporting geology and mineralogy, there would be no further development conducive to – or symbiotic with – the mining activities. Not only is this true for mining sites in Cornwall and Shropshire, UK, but also for locations throughout the US and New Zealand (see Appendix D3). Thus, the SFMD serves as the first documented historical mining landscape in the US utilising the methodology of the English Heritage HLC model.

In addition to the methodology of the UK model, the examination of the SFMD also incorporates the methodological approaches and guidance from the NPS regarding landscapes (Keller and Keller 1989; McClelland *et al*. 1999; HALS 2000) and historic mining sites (Noble and Spude 1997). The NPS methodology is similar to that applied in the UK, such as: the classification of the features and resources present; archival research to identify contextual themes; identification of attributes relating to the landscape; and incorporation into the GIS. Like Fort Hood (Barratt *et al.* 2007: 117), the English Heritage HLC model and that applied to the SFMD varied in terms of the data sources available for interpretation.

Previously, no accounting of the population, structural remains, archaeology, or claims within the SFMD had been made. The contributions of this information is vital in understanding the changes over time within the SFMD in terms of the types, quantities and extent of features present within the landscape boundaries; further, they aid in defining the boundaries themselves. Thus, the HLC model applied to the SFMD is similar to those applied in the UK and New Zealand in that landscapes – irrespective of their locations – reflect a continuous process of use or change over time; demonstrate a wider historic environment within which to examine heritage resources; involve inter- and trans-disciplinary collaboration; may be integrated with land use policies; and may be representative of technology which modifies the landscape's appearances on a larger scale. As such, the study performed at the SFMD serves as the basis for a new holistic approach to landscape studies in the US.

The development of the SFMD HLC model involves archival, cartographic, and iconographic research; development of a historic context for past and present land use; delineation of the landscape boundaries; identification of subthemes within the overall landscape; creation of a comprehensive geodatabase; compilation of spatial and temporal data into a GIS model; identification of patterns reflective of the subthemes and representative of change throughout time; and the identification of tools for future heritage research, valorisation, or areas requiring subsequent attention. The culmination of this research allows for the identification of the following physical characteristics at the SFMD:

- The geological setting of the SFMD, hydrology, soil, and other natural terrain contributed to the original decision to conduct mining in the area;
- The presence of waste piles, prospecting pits, shafts, headframes and other equipment demonstrate landscape modification associated with historic mining activity;
- The presence of 36 beehive shaped charcoal kilns (or ruins thereof) throughout the district are associated with the historical deforestation of piñon and juniper trees along higher elevations within the SFMD and neighbouring mountains (Wah Wah Mountains to the west);
- Deterioration of structures and mining features is noted due to vandalism, neglect, lack of use – as well as continued use – and natural erosion;
- Original and other historical machinery is still in place and reflects changes due to technology;
- Linear systems are present within the property such fences or property markers, railroad beds (ballast), roads (wagon, stage, automotive), telegraph or telephone lines, and water conveyance pipelines;
- Change over time is represented by both the archival record and corroborated by the physical evidence; prehistoric era archaeological sites, features and/or artefacts, as well as the presence of historical land use; and
- The HLC allows the ability to view the landscape in a wider context, through multiple disciplines, and allowing for integration of land use policies.

The current study not only addresses the HLC model, but also provides a wealth of genealogical information with regard to the settlers within the SFMD. A "People Database" incoporates information from the US Census, birth and death certificates, cemetery rosters, as well as information from marriages, newspapers, soldier's records, and company rosters in order to paint an accurate account of the population through the period of significance for the SFMD (Appendix D1). Supplemental to the population is an accounting of the structures based on historical maps and photographs in the form of a “Building Gazetteer” (Appendix D2). The gazetteer for the SFMD was based on work performed in Hayle, Cornwall (Buck and Smith 1995). Limited research was performed for several contemporary mining ventures throughout the US, UK and New Zealand, with the information being compiled into a Comparison Database (Appendix D3). An inventory was made compiling all of the previously recorded archaeological sites in the SFMD into a single database (Appendix D4). Likewise, information regarding individual mining claims was consolidated into a database for management of information (Appendix D5). Further, as a means to incorporate methodology from both the UK and US, a HLC Model checklist was made for the SFMD (Appendix D6). The added benefits of these databases includes the ability to tie spatial and temporal associations through the GIS. Considering the technology available to date, the application of the GIS allows for better management, interpretation and understanding of the SFMD that was not available previously.

6.2 Research Constraints

6.2.1 Development of a Historic Context

In order to ascertain the significance of each theme within the landscape, the data must be managed within a context identifying the history and establishment of Utah, the SFMD and its related mines, transportation (stage coach/wagon, railroad and automobiles), the smelters (charcoal kilns and mills), the timber and related vegetation, and the town sites (Frisco, Grampian, and Newhouse). Development of the historic context was considered vital to understanding and interpreting the landscape A myriad of records were accessed for the interpretation process, including newspapers, federal population census documents, mining company and employee records, maps, tax assessment rolls, city directories, cemetery records, marriage records, records of the Masonic Lodge, and archaeological site records. Note, however, there were several research constraints.

6.2.2 *Archaeological Features and Artefact Assemblages*

Unlike the Fort Hood HLC Model (Barrett *et al*. 2007), and as noted above, there had been little to no archaeological research performed within the project area previously. A total of 50 known archaeological sites have been recorded within the SFMD, ranging from beehive charcoal kiln locations; railroad related sites; wagon roads; mining features; a dam or reservoir; and telegraph/telephone lines. At least 11 of archaeological sites have prehistoric components. Through comparison of these previously recorded sites to data in the GIS, several activity locations were identified within the boundaries that have not been identified as archaeological sites to date, allowing for future field work opportunities.

The remoteness of the SFMD provided pros and cons for the research. Due to its isolation, many of the features and artefacts have been abandoned *in situ*. Bottle hunters and vandals have created disturbance to features associated with the settlements. In some instances, materials (bricks, lumber, and metal) have been removed and recycled for alternative use.

Artefacts that were retained from the sampling strategy have been properly packaged following curation standards[1] and retained for a teaching collection for the Milford Archaeological Research Institute (MARI), which operates in Milford, Utah; upon request, the artefacts may be submitted to the HSMC, which is the present land owner. The use of the teaching collection will benefit college-level students who actively participate in the MARI field schools in Beaver County, Utah. Collections recovered on BLM property should be curated by BLM requirements and in accordance with federal regulations.

Remnants of associated structural remains, building footprints, or placement of artefacts may be compared to historical maps and photographs to create a sense of setting noted through the historic context. Likewise, due to the remoteness of the SFMD, it is not in danger of urban development or commercialisation (like Tombstone, Arizona), nor has it

[1] In accordance with Title 36, Code of Federal Regulations, Part 79.

been preserved through arrested decay (like Bodie, California). Portions of the property are owned privately, whilst lands to the east, south, and southeast are owned by the State of Utah and BLM. Agricultural activities associated with free range cattle and sheep grazing continue in the vicinity but do not appear to have any adverse effects within the SFMD itself.

Based on the archival research and artefact assemblage, the history of the SFMD spans from the 1870s to the 1950s. Due to a lack of photographs or maps predating 1900, it is unclear how the collapse of the Horn Silver shaft (1885) affected the development of the area. Further, the failure to ensure a regular water supply may have been a key factor in the demise of the settlements. Comparisons to historical accounts suggest a much larger population than could be identified (Appendix D1). It is possible that there are areas of settlement dating between the 1870s and 1900 that are not readily identifiable as population centres. Incorporation of aerial photographs and historical maps to the GIS allows for better identification of such areas. Due to the large concentration of mining support infrastructure adjacent to the Horn Silver Mine, that area continued to be utilised following the collapse, and even reused during later mining events in the vicinity. Abandonment of the commercial district at Frisco is noted as early as the 1920s, due to the closure of businesses, and historical photographs demonstrating the decline of the commercial properties. Likewise, similar information is available for areas such as Newhouse.

Structural remains are present within the SFMD (Appendices D2 and E). The majority of these include rock outlined foundations, partially standing walls, fewer than ten nearly complete structures, and mining related features (headframes, cisterns, ore bins, or powder magazines). There are discrete areas for mining, a once-thriving commercial district at Frisco, railroad depots at Frisco and Newhouse, a stage stop at Squaw Springs, and scattered residential areas, which are associated with artefact assemblages. At Grampian, which is dominated by mining activity, there are smaller areas associated with residential and dining activities – mostly associated with boarding houses or small dwellings. Artefactual refuse is associated with most of the structural remains, but has been displaced due to vandalism. Based on the dense concentrations of refuse and artefacts, it has been deduced that most waste disposal was performed within privies, to the rear of structures, or along the edges of hills/slopes.

6.2.3 Boundaries

As indicated by Hardesty (2010: 8-10), boundaries of the mining landscape extend beyond the tangible physical remains at the SFMD. Locations outside Beaver County may contain added research potential, contextually or physically, such as forests in the surrounding areas being associated with charcoal processing and timber harvesting locations (Wah Wah Mountains); the former smelter operations in Murray (Francklyn Smelter); the Horn Silver Mine's refinery in Chicago, Illinois; and the New York and Salt Lake City administrative offices of the Horn Silver Mines. It is unclear whether features related to mining activities in the Wah Wah Mountains have been documented. Very little information was available regarding the refinery in Chicago or the offices in New York or Salt Lake City. Reports prepared for the former smelter operations in Murray, Utah (Francklyn Smelter) are no longer available from the USHS Archaeology Office. Site visits were made to the former location of the Francklyn Smelter; all but a few pieces of slag, copper ore, and a shovel, has been reclaimed in accordance with the Environmental Protection Agency Superfund requirements.

One must rely on archival records to ascertain the development of the supporting themes within the HLC. For instance, under the theme of transportation, the various networks – stage, railroad, and two-track/automobile – must be explored. For settlement, one must examine the residential and commercial properties, as well as the industrial and mining properties. The archaeological record helps supplement the archival information through the features, artefacts, and comparisons to mining claims, Census, and construction history.

6.2.4 Census and Population Studies

Demographic information such as the federal population census, tax assessment rolls, and city directories are useful for longer lasting settlements; however, short-lived settlements may be invisible through these resources (Hardesty 2010: 25). Even with the longevity of Frisco, Newhouse, and Grampian, there were constraints to using the census documents to discern the population of the SFMD in its period of significance.

Prior to 1880, records for Utah provide population statistics for the Utah Territory and do not give accurate estimations for the SFMD. Mineral discoveries at the SFMD came after the 1870 Census; thus the 1880 Census provides a glimpse of the burgeoning settlements within the SFMD as a single entity (Appendix D1). The collapse of the Main Shaft at the Horn Silver Mine in 1885 occurred just five years before the 1890 Census. As a result, the population shift associated with the collapse should have been well documented. Unfortunately the loss of the 1890 Census resulted in a loss of vital information on town demographics. Comparisons to employee rosters, City Directories, newspapers and other documents partially fill the gap in this information, as do later Census enumerations (US Census 1880, 1900, 1910, 1920 and 1940).

The primary issue the Census data gap presents is a muddled picture of the size of the settlements between 1880 and 1910. Many historical accounts provide discrepancies in the population size from 800 to upward of 8,000 people at the height of the mining period. It is not surprising the population decreased after the 1885 shaft collapse, although a meagre population continued to thrive during subsequent booms at the Horn Silver and neighbouring mines. Examination of mining company records between 1880 and 1917 provide some consistency in the employees of the Horn Silver Mine prior to and after the collapse. The Census, by 1940, shows the tapering off of settlement as businesses closed and settlers relocated elsewhere.

Cook (1972: 13-15, as cited by Hardesty 2010: 25) suggested that a population determination could be made based on the principal that "no more than six people will live in a house with less than 350 square feet [32.52 m^2] of floor space..." This estimation is based on most mining camp residences measuring between 300 and 400 sq ft [27.82 and 37.16 m^2]. Using this premise and comparing the structures on the 1911 topographic map for comparison, it was determined there were 323 structures within the SFMD by 1910-1911. Of these, at least 25 are identified through other sources as being commercial properties, mining structures (mills, assay buildings, etc.), or larger sized buildings. Assuming there were 298 structures associated with residential use in the SFMD at this time, and using Cook's (1972) calculations of six people per structure, one could assume there were 1,788 people residing in the SFMD in 1910-1911. Comparisons to the 1910 Grampian Precinct Census indicate a total of only 238 people residing in the SFMD at that time – in Frisco, Grampian and Newhouse, as well as outlying mines within the district boundaries, suggesting vacant dwellings throughout the area. Hardesty (2010: 135) notes that the household size also fluctuated with the time demands of mining and milling, bonanza periods and low productivity. The Horn Silver faced a major collapse (1885), had a bonanza (1908), and another collapse (1912). The 1940 Census demonstrates the rapid decline of the area through business closures, and a smaller much population (approximately 40 families).

"The 19th century mining camp in the American West, for example, emerges as a place mainly inhabited by adult males with high mobility, cosmopolitan origins, and a poorly developed sense of community dominated by laissez-faire individualism" (Hardesty 2010: 110). With regard to the SFMD, the population was dominated by adult males and was ethnically diverse.[2] Newspapers and other historical accounts provide insight into the local politics and religious nature of the community as well. In addition to an active Masonic

[2] Based on demographic information, approximately 2,000 people could be identified for the SFMD as a whole from 1870 to the present. Males account for 67% of the population; females account for 27% of the population; and the remaining 6% could not be identified as to gender. See Appendix D1 for additional information.

Lodge (St. John's No. 8), a baseball team, and a horseracing track, the commercial district of Frisco contained a wide array of amenities such as those associated with larger towns, – Macetown (New Zealand); Bodie (California); Tombstone (Arizona), etc., – a bank, meat markets, groceries, furniture stores, shoe stores, barbers, a newspaper, restaurants, saloons, physicians, a post master, an attorney, a judge, and a notary public.

One may ask, how do the demographic issues affect the HLC? The population and subsequent growth in terms of structures (residential or commercial), transportation networks, and size of the cemetery is reflected in terms of historical maps as well as the archaeological footprint of the physical remains.

Compilation of Census information (Appendix D1) allows several research questions to be addressed, including those regarding Frederick Jackson Turner's frontier thesis (1893) and the presence of women, children and minorities in the development of the American West. Frederick Jackson Turner announced his thesis in 1893, shortly after the collapse of the main shaft at the Horn Silver Mine; however, the mines of the SFMD continued to be profitable through the mid-1900s. Settlement of the area continued well after 1900, including the establishment of the Newhouse town site after 1900. Research also demonstrated that the population within the SFMD was diverse, although dominated by white/caucasian males (Figure 6-1). Likewise, historical photographs (black and white format) provide little insight into the ethnicity of the town, generally depicting males (presumably white/caucasian). Newspaper accounts relating to the SFMD address men, women and children equally, but few mention ethnicity. Thus, whilst one goal of the study was to examine the 'minorities' within the SFMD, little information was available to confirm or refute the thesis.

Further, the Census allows interpretation regarding the social order and community organizations (Costello et al. 2007: 95). Little evidence of social order is noted within Census records; however, families such as the Slaughter, Farnsworth, Jensen, Sackett, and Barrett families are noted frequently in newspaper accounts, maps, and photographs. Examination of Census, City Directories or Gazetteers, and employee rosters depict a population dominated by Caucasian/white males from the US, England or Ireland, although other ethnicities were present (Figure 6-2). Many of these included households with extended family.

The labour force, like the population, was dominated by Caucasian/white males (Figure 6-3). Chinese ceramics are present in the assemblages near Grampian, indicating that Chinese were associated with activities closer to the mines than at the commercial district. Census records indicate a change in ethnicities, possibly tied to political views of the era, with a switch from Chinese to Japanese, and later Mexican workers. Based on a lack of maps or other supporting information, it is unclear if there were segregated areas for varying ethnicities; this information only can be postulated.

Census records indicate several attorneys or lawyers and a Justice of the Peace within the SFMD, to aid in filing of the claims, prepare wills, and tend to other matters of the law. Historical accounts indicate the lawlessness of Frisco. Newspapers refer to robberies along the stage route and from teamsters. Several accounts refer to the hiring of Marshall James [John or Jim] Pearson, although little information has been identified to corroborate this mysterious man from Pioche, Nevada. A small rhyolite structure south of the railroad depot has been identified as a jail (Hickman 2006) but could not be readily identified through the ground-truthing efforts.

The study identified three population centres (Frisco, Grampian, and Newhouse) with smaller settlements scattered around some of the larger claims (Rattler-Carbonate, Blackbird group), or at transportation points (Squaw Springs or adjacent to the Frisco railroad depot). The Building Gazetteer (Appendix D2) provides a glimpse of the settlement patterns at the turn of the century.

The typical examination of mining towns focuses on the rise and fall, success or failure, or the boom/bust cycle of the mine/s and associated settlement/s. In the case of the SFMD, the town appeared to wane immediately following the collapse of the shaft at the Horn Silver in February 1885. That said, closer examination of mining company records show that the

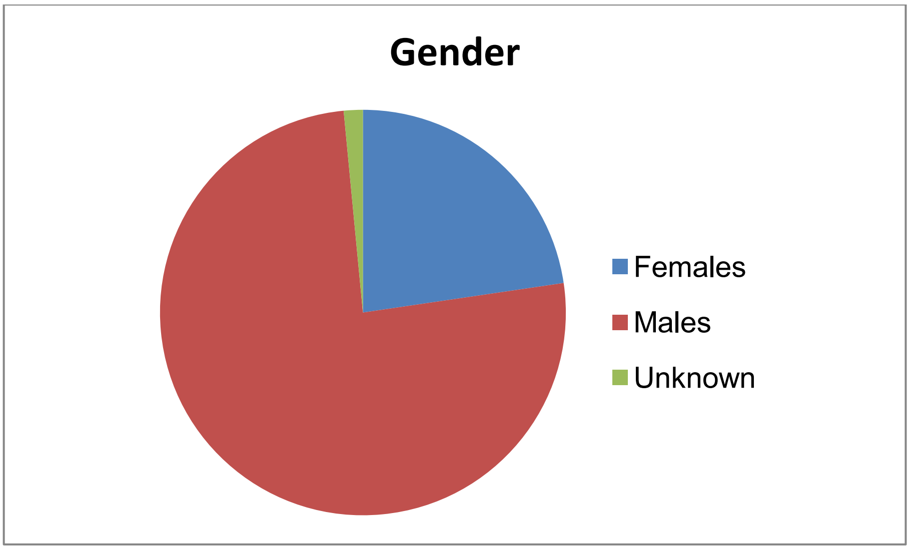

Figure 6-1. Gender at the San Francisco Mining District

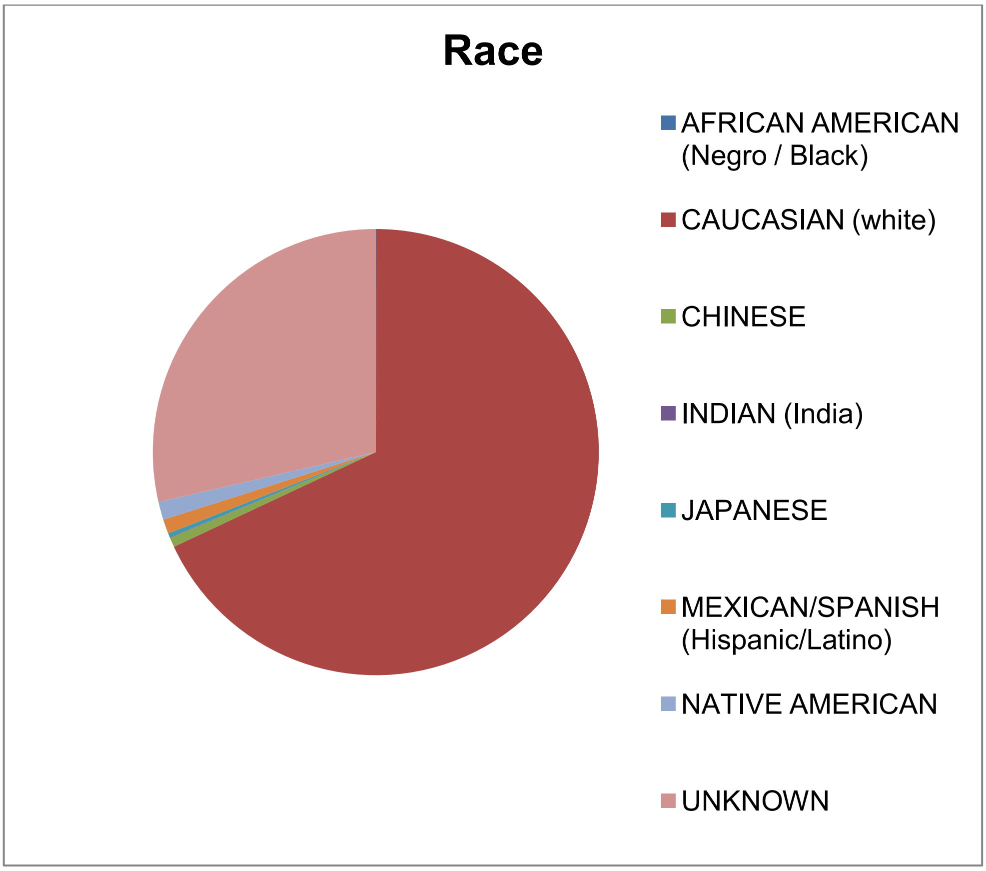

Figure 6-2. Race at the San Francisco Mining District

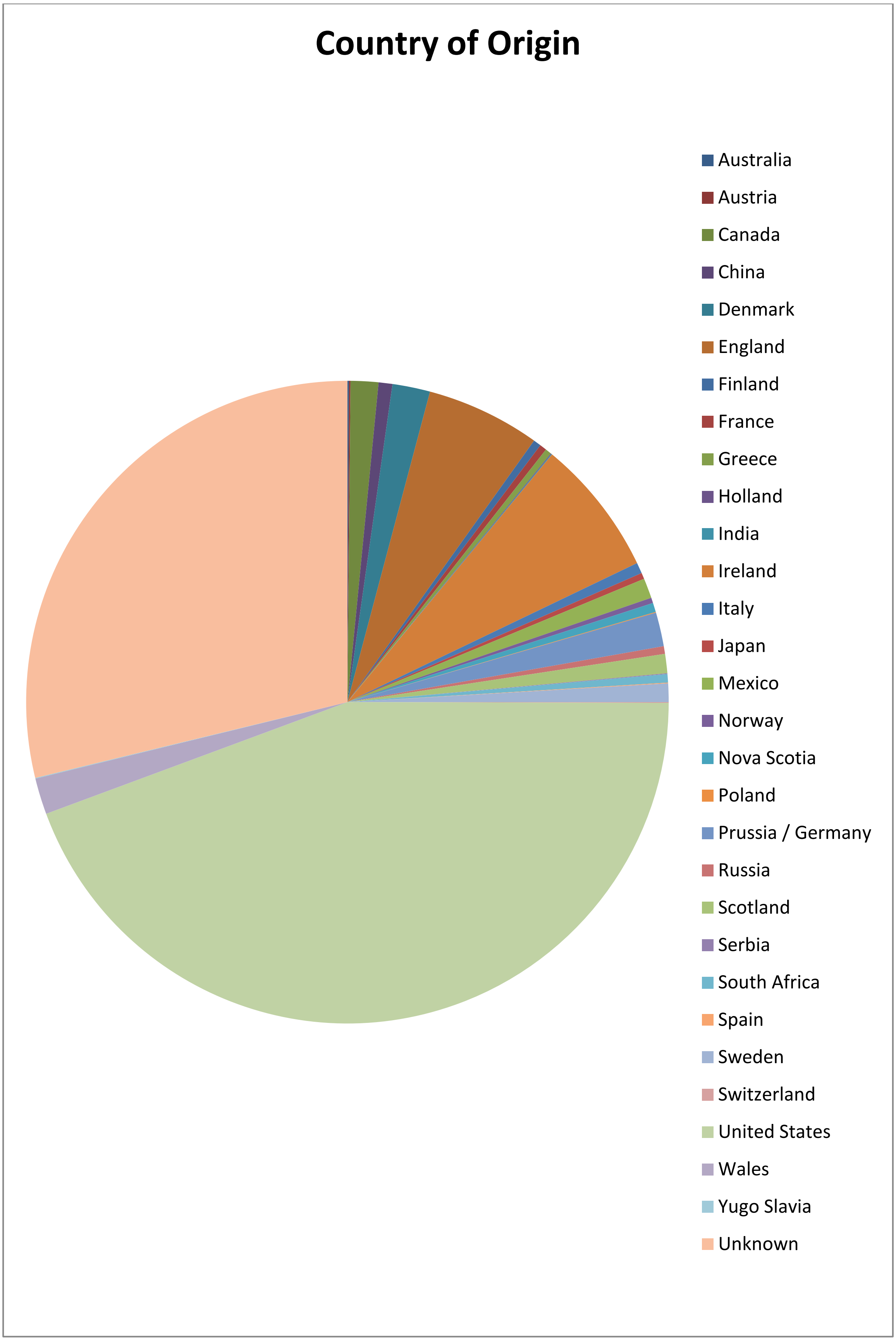

Figure 6-3. Country of Origin or Ethnicity at the San Francisco Mining District

period following the collapse was quite short; mining operations reconvened as early as May 1886 at the Horn Silver with little change in the names listed on employee rosters. This was approximately one year and three months after the Horn Silver Mine collapse. Further, mining activity was considered long term, stretching from the 1870s to the mid-1950s within the district.

Services associated with the commercial district at Frisco varied from residential properties (houses, boarding houses, hotels), to blacksmiths, drug stores/pharmacies, smelters and assay houses, saloons (at least 30), butcher shops, bakeries, restaurants, groceries, laundries, stables, and a school house. Whilst church services are mentioned, no church was constructed; rather, religious services were held in buildings offering multi-services.

Popular histories of the area suggest the presence of several brothels; no evidence of brothels or bordellos was noted in the US Census, newspapers, or other documentation. Rather, information suggested that women of ill-repute were considered unwelcome in the saloons or restaurants. This indicates, perhaps, that prostitution occurred within the SFMD, but no brothels or bordellos were identified as such, or that persons in the profession were not identified in the Census, newspapers or court records as prostitutes as they were in other mining communities (Butler 1985; Nichols 2002). Migrant frontier women – regardless of their ethnicities – were considered untrained or unable to perform many of the duties associated with western industries, such as mining, freighting, lumbering, cattle-driving, etc. (Butler 1985: 1-2; Nichols 2002: 49). Employment was limited to clerical, secretarial, school teaching, cooking, laundresses, waitresses, milliners, seamstresses, dressmakers, or as theatre girls. As a means to supplement their incomes, many women turned to prostitution. Generally, this included women, aged 15 to 30 (Butler 1985: 15). Butler (1985: xvii) notes, “prostitutes worked in one of four styles: brothel dweller, saloon and dance hall worker, crib woman, or streetwalker;” in addition, women may have rented a house to entertain customers. Nichols (2002: 45-47) indicates that brothels, cribs or other houses of ill repute often were situated along “the back side or underworld” of the business districts. Maps of the commercial district at Frisco depict a single row (Main Street) of store fronts; perhaps these smaller dwellings (cribs) were not depicted, were collocated within the saloons or boarding houses, or were located along the fringes of the commercial district or perhaps closer to the mines at Grampian (Appendix D2). Census istings of female professions identified within the SFMD ranged from clerical to school teaching, waitressing, and dressmaking (Chapter 2).

Ownership of businesses within the commercial district of Frisco reflect shared partnerships – or intermarriages – between families who settled the area, such as the Slaughter, Farnsworth, Jensen, Sackett, and Barrett families. Directories and City Gazetteers indicate that several of the businesses transferred ownership. That being said, most of these businesses were owned or managed by Caucasian/white males and operated by family members.

6.2.5 Mining Operations

The SFMD focused on silver and copper mining, although smaller quantities of lead, gold, garnets, marble and other minerals were mined (Butler 1913; Wray 2006). The shafts were lined in manners similar to workings at Virginia City, Nevada, or other comparable mine, and utilised a variety of equipment that likely was influenced by the technology available. There does not appear to be any distinct methodology utilised at the SFMD that may be attributed to any specific ethnicity.

At least four mills were present within the Frisco area, including two to the north of the commercial district and two closer to the mines at Grampian (see Appendix D2). The layouts of the mills to the north of Frisco are unknown, other than what may be discerned from historical photographs or lithographs of the outer structures. Beehive charcoal kilns are present adjacent to the remnants of one of the mills, and evidence of tailings are present at both mill locations.

At Grampian, a large mill was established adjacent to the Horn Silver Mine. Over the years, several modifications were made to the layout and equipment within the mill. The Peck Mill was added at a later date, including ore bins and access to the railroad. The layout of these mills is comparable to those depicted in Bunyak (1998).

The majority of the miners in the SFMD worked for the Horn Silver Mining Company, although several smaller mining companies were operating within the SFMD. The miners at the Horn Silver Mining Company were not organized within a labour union; however, many were members of the St. John's Lodge, Masonic organization within the town. Harry C. Hill, mine manager, served as the Grand Master of St. John's Lodge, and the group was organized and supported its members.

6.3 Implications for Future Research

The application of the HLC model to the SFMD poses a paradigm shift for the approach generally used in the US. Existing guidance from the NPS provides little information regarding the incorporation of GIS to the analysis of a landscape, but discussions with NPS personnel indicate a move toward application of GIS to future HALS projects in the future. Presently, documentation of heritage resources – or cultural resources – within the US focuses on individual resources without taking into account the "greater picture." For instance, studies generally focus upon a single resource, without taking into account the symbiotic relationship of the vegetation, transportation, geology, or other subthemes that may prove vital in understanding which elements of the landscape have the ability to convey the significance and integrity of a historic resource. Utilisation of the HLC model allows these relationships to be explored and depicted through a spatial and temporal database in the GIS. In this regard, the HLC model provides the most adequate method for examination of a mining district, irrespective of its location.

Cross-comparisons to mines in the UK, New Zealand, allows for further glimpses into the "greater picture" of industrial landscapes. The present study identified a series of mines with previously identified historic contexts, readily available research and historical photographs, similar sizes, and similar diversity. The mines were compared using the same themes identified for the SFMD to better understand the broader landscape; this relied upon the GIS, as well as the site's integrity, protection and public outreach opportunities (Table 6-1).

Table 6-1. Comparison Mines for HLC Modelling

Site	Periods of Significance	Protection Status	Integrity Constraint	Historic Landscape Characterisation Application
Snailbeach (Callow Hill-Bog District), Shropshire (UK)	Roman to 1955	Shropshire Mines Trust	limited protection	Applicable
Tombstone (Tombstone District), Cochise County, Arizona (USA)	1878-1931	National Historic Landscape	commercialised	Not Well Suited
Bisbee (Warren District), Cochise County, Arizona (USA)	1875-1975	National Historic Landscape	minor commercialisation	Applicable
Butte (Butte District), Silver Bow County, Montana (USA)	1874-1934	Historic District	modern development but retains integrity	Applicable
Virginia City (Comstock Lode), Storey / Lyon Counties, Nevada (USA)	1859-1882	Historic District	commercialised	Applicable
Pioche (Pioche District; Meadow Valley; Ely District; Highland District), Lincoln County, Nevada (USA)	1863-1933	National Register of Historic Places	modern development but retains integrity	Applicable
Frisco, Grampian, Newhouse (San Francisco Mining District), Beaver County, Utah (USA)	1871-1950	National Register of Historic Places	vandalisation but retains integrity	Applicable
Silver Reef (Harrisburg Mining District), Washington County, Utah (USA)	1866-1901	National Register of Historic Places	modern development	Not Well Suited
Bodie, Bridgeport (Bodie Mining District), Mono County, California (USA)	1859-1961	California State Park, National Historic Landmark	arrested decay; protected	Applicable
Leadville (Leadville Mining District), Lake County, Colorado (USA)	1859-1917	National Historic District	modern development	Not Well Suited
Diamond, Silver City, Mammoth, Eureka (Tintic Mining District), Juab County, Utah County, Utah (USA)	1869-1958	National Register of Historic Places	modern development	Not Well Suited
Macetown (Macetown Historic Reserve), Otago, New Zealand	1862-1910	Historic Reserve	recreational access	Applicable
Death Valley (Death Valley National Park), Inyo County, California (USA)	1860-1933	National Park	preserved due to National Park Status; recreational access	Applicable
Capitol Reef (Oyler Uranium Mine), Wayne County, Garfield County, Utah (USA)	1880-1956	National Park	preserved due to National Park Status; recreational access	Not Well Suited
St Just (Cornwall & West Devon Mining Landscape), Cornwall (UK)	1700-1914	Historic Mining Landscape	Recognised Historic Mining Landscape	Applicable
Hayle (Cornwall & West Devon Mining Landscape), Cornwall (UK)	1700-1914	Historic Mining Landscape	Recognised Historic Mining Landscape	Applicable
Tregonning and Gwinear (Cornwall & West Devon Mining Landscape), Cornwall (UK)	1700-1914	Historic Mining Landscape	Recognised Historic Mining Landscape	Applicable

Table 6-1. Comparison Mines for HLC Modelling (continued).

Site	Periods of Significance	Protection Status	Integrity Constraint	Historic Landscape Characterisation Application
Wendron (Cornwall & West Devon Mining Landscape), Cornwall (UK)	1700-1914	Historic Mining Landscape	Recognised Historic Mining Landscape	Applicable
Camborne-Redruth (Cornwall & West Devon Mining Landscape), Cornwall (UK)	1700-1914	Historic Mining Landscape	Recognised Historic Mining Landscape	Applicable
Gwennap (Cornwall & West Devon Mining Landscape), Cornwall (UK)	1700-1914	Historic Mining Landscape	Recognised Historic Mining Landscape	Applicable
St. Agnes (Cornwall & West Devon Mining Landscape), Cornwall (UK)	1700-1914	Historic Mining Landscape	Recognised Historic Mining Landscape	Applicable
Luxulyan Valley and Charlestown (Cornwall & West Devon Mining Landscape), Cornwall (UK)	1700-1914	Historic Mining Landscape	Recognised Historic Mining Landscape	Applicable
Caradon (Cornwall & West Devon Mining Landscape), Cornwall (UK)	1700-1914	Historic Mining Landscape	Recognised Historic Mining Landscape	Applicable
Tamar Valley, Tavistock (Cornwall & West Devon Mining Landscape), Cornwall (UK)	1700-1914	Historic Mining Landscape	Recognised Historic Mining Landscape	Applicable

The approaches used for the HLC model at the SFMD can be adapted easily to other landscapes in the US, such as military or battlefield locations, industrial complexes, or transportation networks. As previously demonstrated, the HLC model may be applied at military installations, such as Fort Hood (Barratt et al. 2007). Industrial complexes may include textile, armament, automotive, and food manufacturing plants. Examples of transportation networks include country roads, scenic parkways, cross-country routes (Route 66), or railroad routes. On a smaller scale, the HLC model may be applied to estates or homesteads (formally designed estate, plantations, farm complexes), educational complexes (universities, schoolyards), parks, cemeteries, and residential developments or suburbs. Ethnographic areas and battlefields (American Revolution, War of 1812, Civil War, etc.) also are suitable for HLC modelling.

In terms of future research for the SFMD, the focus will be on visiting activity locations that have not been identified as archaeological sites, but were identified through comparisons in the GIS data. Added research value is sought through examination of surrounding areas known to be associated with the SFMD, such as the Wah Wah Mountains, the Star District, and even in nearby Milford. Beginning in the summer of 2013, in coordination with the Milford Archaeological Research Institute and the BLM, research will commence on some of these previously unrecorded locations, as well as updating the documentation of kiln locations to the north of the Frisco town site on BLM land.

Information contained within Appendix D1 (People) will be produced into a user-friendly genealogical source. Much of the information is available through a variety of sources (FamilySearch©, Ancestry®, etc.), but no publication has summarised the birth, death, and marriage records for the entire SFMD to date. A genealogical publication would be beneficial to residents of the local area (Beaver County, Milford, Minersville), as well as people interested in mining history. Further, the study lends itself nicely to publications on a variety of topics, ranging from individual histories, to studies within each of the HLC model themes.

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APPENDICES A-E

The appendices were placed onto a series of two CDs.

Appendices A-D are contained on a single CD, as indicated at the end of the thesis. These files are best viewed in Excel and Microsoft PowerPoint. Minor edits were made during the rewrite to reflect changes made in the body of the thesis. The Appendix files that could be converted to PDF follow this sheet, whilst the remainder of the contents are available on the CD of the hard copy of the thesis.

Appendix E contains all of the GIS data and is viewable only by using ESRI ArcGIS 10.0. Substantial edits were made to maps between the previous iteration and the updated thesis. These are provided on the CD of the hard copy of the thesis.

APPENDIX A
GLOSSARY

This section was prepared through the course of the study from a variety of sources. The most helpful was “An Archaeologist’s Guide to Mining Terminology” by Neville A. Ritchie and Ray Hooker (1997), http://www.ashadocs.org/aha/15/15_04_Ritchie.pdf.

A

Adit: Level tunnel (usually driven into hillside or outcrop) or horizontal drift or passage created to give access to mine or the ore body; used for water drainage or hauling broken ore. AKA Drive, Drift, or Tunnel.

Adverse: To oppose the granting of a patent to a mining claim.

Aerial Ropeway: Large-capacity, economically means to convey ore from a mine to the processing facility via skips or buckets which are suspended by carriers on a steel rope, conveyed through the use of pulleys and pylons. AKA Aerial Tramways, Flying Fox.

Air Shaft: Shaft created to connect underground workings with ventilation.

Alloy: A combination of two or more metals that are fused together.

Alluvium: Loose, unconsolidated soil or sediment transported or deposited by water.

Amalgam: Adding mercury (quicksilver) to finely crushed quartz embedded with gold to create an amalgam or mixture of precious metals that may be separated by retorting.

Angle Bob: Simple lever-based device using which direction of a reciprocal motion (i.e. pump rods, flat rods) could be changed (i.e., horizontal to vertical).

Apex: Top or highest point of the vein.

Applied Lip: A ring of glass or finish applied or attached to the neck after a bottle has been formed.

Aquifer: Water-bearing bed of porous rock, such as sandstone.

Arrastra: A primitive form of ore crusher; rotary mill whereby rocks are dragged by horses or mules, to pulverise or crush ore along a circular bed. AKA *Arrastre*.

Argentiferous: Rocks or material containing silver.

Artefact Scatter or Dump: Spatially discrete scatter or concentration of mixed artefactual material recovered from the surface. Implies intentionally dumping of refuse, unassociated with other features.

Assay: A test to determine the quality and quantity of minerals.

Assay House: Mine laboratory, where samples or ore are analyzed for mineral content

Assessment: Required yearly work performed for a mining claim.

Attle: Cornish term to describe waste rock or mullock; usually associated with copper mining.

Auriferous: Rocks or mineral containing gold.

B

Bal or Ball: Cornish shovel, or a digging mine; generally applied to earlier mines. AKA Wheal.

Balance Bob: Large counterweighted lever attached to shaft pump rods to offset weight to ease work of a pumping engine.

Base Bullion: The lead combined with other metals after the smelting process that is cast into an ingot.

Battery: A set of four or five stamps for crushing ore.

Beam Engine: Steam-powered engine used for pumping, winding, providing power to crush ores prior to dressing; common in Cornish mines. AKA Bob Engine.

Bedstone: Granite slab which serves as a foundation for the cylinder of a Cornish engine. AKA Cylinder Plat.

Beneficiation: Treatment of mined material, making it more concentrated or richer.

Blacksmith: Place where a smith works iron. May be for small-scale local use, or located within a larger industrial complex.

Blasting Cap: Detonator containing a charge of detonating compound, which is ignited by electric current or the spark of a fuse; used for detonating explosives.

Blind Lode: A mineral bearing vein without an outcrop.

Blossom Rock: A detached rock or ore which indicates the presence of mineral veins.

Blowing-House: Early form of tin smelting furnace, small in scale and using charcoal as a fuel

Bob Wall: The front wall of a Cornish engine house on which the bob (beam) was hinged.

Boiler House: Generally lightly built structure attached to engine house to contain horizontal boilers for steam engine; often associated with a chimney stack

Bonanza: A rich deposit of high-grade ore or a mine that yields great profits. AKA Jeweller's Box.

Bond: A written conditional option on a mining claim.

Boom: A place of high activity or excitement based on a recent mineral find.

Borehole: Any deep or long drill-hole, usually associated with a diamond drill.

Bratticing: Timber partition work in a mine; AKA Lagging Boards, lining the upper section of a shaft where it runs through soft ground

Breast: The face on a tunnel or drift.

Bridge: Structure of wood, stone, iron, brick or concrete, etc., with one or more intervals under it to span a creek, river or other space.

British Thermal Unit (BTU): A measure of the energy required to raise the temperature of one pound of water one degree Fahrenheit.

Buddle: A device used for concentrating tin ores in the process of buddling, or separating ore by washing. According to Ritchie and Hooker (1997: 16), a buddle is the "name given to a range of devices which use a sloping surface to separate particles of different densities from a slurry. The most common form, known as a round buddle or round table, used the centrifuge principle and a circulating water flow in addition to gravity. The water sprays washed the finely ground metal residues and other impurities into launders, but the separation was achieved by gravity. They were often used for reprocessing the tailings discharged from battery sites. One buddle could concentrate the ore from ten stamps."

Building: Structure with a roof to provide shelter from the weather for occupants or contents. Extant, standing walls and roof.

Bullion: Ingots or bars of semi-refined silver or gold that are ready for transport to the mint.

Bumping Table: A concentrating table with a jolting motion. See also jig or shaking table.

Burial: Grave in which human remains or other associated materials were intentionally interred by Native Americans.

Bust: An area or town that has been abandoned in favour of another more promising location due to a vein being lost or exhausted, or a lack of profit/payouts.

<u>C</u>

Cage: In a mine shaft, a device used for hoisting personnel and materials.

Cairn: Piling of rocks generally associated with a claim marker.

Calcareous: A rock containing lime.

Calciner: Furnace and heating chamber in which ores are roasted to drive off impurities (i.e., sulphur, arsenic). AKA Burning Houses, Reverberatory, Brunton Pattern Calciner.

Capstan: Manually or steam operated winding drum, usually installed on a mine to raise pitwork from the shaft for maintenance or repair.

Carbonates: Ore containing a considerable portion of carbonate of lead or rich silver.

Cataract Pit: Subfloor area within the foundation level of an engine house between the cylinder plat and bob wall containing the regulating apparatus, giving access to cylinder hold-down bolts. AKA Cock Pit.

Cave: Naturally occurring cavity or subterranean feature entered from hillside, cliff face, etc., measuring at least 5 meters in length or depth. May be used for occupation, storage, burial, refuse or hide-away.

Cellar: A room or group of rooms usually below the ground level and usually under a building, often used for storing fuel, provisions, etc.

Cemetery: An area of ground set apart for the burial of the dead. Often marked by the presence of gravestones or headstones.

Chimney: Channel, built from brick or stone, which carries off smoke from an internal domestic fire. In mining, a chimney also relates to the richer parts of the lode versus the poorer parts.

Chlorides: Ore containing chloride of silver.

Church: A building used for public Christian worship.

Cistern: Covered or open tank in which rainwater is stored for use when required.

Claim: Marker depicting boundary or corner of a mining claim. May include a post, can, glass, or other container for maintaining claim documents. AKA Cairn.

Cobbing: Breaking ore for sorting.

Coffin: AKA Goffen, Gunnis, Stope, Openwork. Narrow excavation resulting from stoping on a lode being carried to or from surface on part or all of a load.

Coke: A preferred fuel for base metal smelting. In situations where coke was in limited supply, coal, firewood or charcoal may be used in smelters.

Colliery: British name for a coal mine.

Concentrator: Machine for removing waste matter from the mineral.

Condenser: Cast-iron cylinder set in a tank of cold water immediately in front of the bob wall of an engine house in which the exhaust steam was condensed, creating a vacuum, increasing efficiency of steam engine.

Contact: The line, plane, or junction of two different types of rock or rock formations meet.

Coolies: Chinese workers typically were referred to as ‘coolies’ or ‘John’ (Conley n.d.).

Cord: Such as wood, weighing eight tons.

Count House: AKA Account House. Mine office, sometimes incorporating accommodation.

Cremation: Human remains that are not contained within a grave, but have been intentionally burned.

Crevice: A narrow opening or fissure created from a split or crack in the rock.

Crib: A roof support of prop timbers or ties, laid in alternate cross-layers, log-cabin style, which may or may not contain debris. AKA chock, cog.

Cribbing: Timbers used to confine the wall rock, line the walls of an adit or shaft, or to hold the waste rock around tailings or mine dumps. Construction of cribs or timbers laid at right angles to each other; sometimes filled with earth as roof support or support for machinery.

Cropping-Out: Mineral or rock that rises to the surface.

Cross-Cut: Level driven across the course of a vein.

Crucible: A ceramic pot used for melting or smelting a substance in a furnace.

Culvert: Drainage structure that extends across and beneath roadways, canals or embankments. Small tunnel constructed to carry a channel of water.

Cupel: A small bowl made of a special heat-resistant clay used for refining gold during the cupellation process of assaying.

Cyanidation: The method using weak cyanide solution to extract gold or silver from ore.

D

Dam: Barrier of concrete or earth, etc., built across a river to create a reservoir of water for domestic, agricultural or industrial use.

Demolished Structure: Site/location where a building or structure once stood as identified by a level area of ground or structural remnants, such as brick, concrete, stone, window glass, etc.

Development: Work completed which opens the mine for access.

Diluvium: Surface deposit of sand, gravel or loam.

Dip: Slope or pitch of a vein or a mine.

Ditch: Long and narrow hollow or trench dug in the ground, often used to carry water though it may be dry for much of the year.

Domestic Vegetation: Flowers, herbs, vegetables, bushes, fruit, or trees grown in a domestic environment. Non-native vegetation. May include flower bed or garden features.

Drainpipe: Pipe used for carrying off surplus water.

Dressing: Concentration of tin (copper or other ore) contained in the rock excavated from the stopes of a mine.

Dressing Floors: Area at surface of a mine where the various processes of concentration of ore takes place, including crushing, stamping, sizing, separation, concentration, etc.

Drift: Tunnel or horizontal passage underground.

Drive: Tunnel excavated on the line of a lode as the first stage or development of a stope. AKA Lode Drive or Heading

Dry/Change House: AKA Moor House. Building within which miners changed clothes before and after going underground. May include showers.

Dyke: Wall-like mass of mineral that is foreign to the formation. AKA Dike, Hard Bar.

E

Electrical Power: Cable and wooden poles used to support overhead electricity cables and provide electricity.

Engine House: Building designed to contain steam, gas, oil or electric engines on a mine or other works.

F

Fault: Displacement of a vein or stratum.

Faunal Ethnicity: Manner in which cultural traditions (based on ethnicity) are determined by the cuts of meat present in the artefact assemblage. As defined by Goodman (2006:2):

> In Anglo-American cultural traditions superior meat cuts associated with wealthy groups often contain an abundance of discarded lumbar vertebrae sections from the short loin area ('T'-bone and porterhouse steak refuse bones) sacra and ilia pieces from the sirloin area ('wedge' and 'flat' bones from sirloin steaks) and other areas that have select/high meat-to-bone ratios. Inferior cuts associated with subordinate groups often consist of numerous cranial parts, cervical vertebrae, distal long bones, podials, and soup bones. In general, when lower-status groups purchase butchered meat from the same source as the higher-status groups, the former predominantly have access to the cuts less-esteemed by the dominant group. This dichotomy becomes clouded; however, since higher-status groups used many poor-quality bones to make soups, broths, stews, and gravies.

Fence: Fence line, post, or other construction used to enclose an area of land, a building, etc., made of wood, wire, stone, rock or metal.

Field: Area of land, often enclosed, used for cultivation or grazing of livestock. Delineated. Possibly furrowed or terraced areas.

Finger Dump: Linear dump of waste material from a mine or quarry, flat topped to allow material to be barrowed or trammed along it, often equipped with a temporary tramway track.

Fissure Vein: A crack or cleft in the earth's crust that is filled with mineral matter and is distinguished from other veins as it cuts off formations instead of yielding to them.

Float: Loose ore or rock that is detached from its original formation.

Flotation: A method of mineral separation by which finely crushed minerals sink, are skimmed, or are drained off of water and reagent floats.

Flue: Masonry-constructed tunnel or conduit connecting a furnace to a chimney stack.

Flume: A pipe or trough used to convey water.

Flux: A substance used to promote the fusion of ores.

Foot-wall: A layer of rock that lies beneath the vein.

Free-Milling: Ores that separate by simple methods.

G

Gangue: Non-metallic, low-value metallic waste material in an ore.

Gas pipe: Conduit for conveying gas.

Grizzly: Course screening or scalping device that prevents oversized bulk material from entering a material transfer system; constructed of rails, bars, beams, etc.

H

Hammer and Tap: Rock-drilling process in which two men rotate a hand-held percussion steel drill, striking it with a heavy hammer to mimic drilling.

Hanging Wall: A mass of rock over a lode or vein of ore. AKA Footwall.

Headframe: Tall construction set over a winding shaft which carried the sheave wheels over the winding ropes ran. Headframes usually contain ore bins/chutes to allow broken rock in the skips or kibbles to be tipped into trams at the surface. May be constructed of wood or steel framework. AKA Poppet Head.

Heading: A vein of ore above a drift.

Hearth / Roasting Pit (Prehistoric): Accumulation of fire-cracked stones relating to cooking/processing plant/animal remains. Variable associated artefacts.

Hearth (Historical): Slab or ring of stone or concrete on which a fire is made.

Historical Graffiti: Casual scribbles, drawings or carvings on walls, stones, or other surfaces.

Hopper: Ore holding bin used above or below ground. AKA Paddocks.

Horse: A body of rock that is the same character as the wall-rock occurring in the course of the vein.

Horse Whim: Similar to a capstan, but powered by horse walking around a circular platform, applied to an overhead winding drum; typically used with smaller mines

I

Incinerator: Apparatus for burning refuse to ashes.

In Place: An ore or vein in its original position.

Insulator: Material that is a poor conductor of electricity or a device made for such material and used for separating or supporting conductors to prevent undesired flow of electricity.

Intaglio: Large figures produced on desert pavement surfaces in the form of animal, human or geometric designs.

J

Jig: Large mechanically or hand-operated sieve set in a tank of water using which ore could be separated by waste; may be constructed in groups within a jigging house. AKA Shaking Table or Bumping Table.

K

Kibble: Wood or steel barrel container used ot haul ore up from a mine. AKA Kibbal, Kubel.

L

Leaching: The chemical process for extracting valuable minerals from ore.

Leat: Artificial water course, built to carry a supply of water to a mine.

Level: A horizontal passage or drift into a mine from a shaft in an underground mine. Levels usually are numbered from the surface down.

Lithic Debatage: Flaked rock or stone, which is created through the working of stone for the manufacture of tools, weapons or other objects.

Lithic Procurement Area: Site which has produced evidence of in situ working of stone for the manufacture of tools, weapons, or other objects. Usually located where natural outcrops of chert are exposed. The lithic source can be primary outcrops or secondary deposits.

Lithic Scatter: A surface scatter of lithic artefacts found in areas where no natural cherts crop out. Burned rock features are absent. Differs from camp in that it exhibits a small range of activities relating only to manufacture or use of chipped stone tools.

Little Giant: A jointed iron nozzle used for hydraulic mining activities.

Livestock Feature: Food or water tanks, troughs, dip tanks, loading chute, corrals or pen enclosures for domestic animals such as cattle, sheep, hogs, horses, poultry, etc. May include stock pens, ponds, tanks.

Lode: Linear area of mineralization underground; a body of ore. Generally vertical or near-vertical, often extending for considerable distances along its strike. AKA Reef, Vein, Seam, Lead, or Ledge.

Long Tom: A trough or sluice box used for washing gold from auriferous gravels. First used in 1850 in California, the Long Tom was operated by two men and included a series of riffles used for separating ore from waste material by means of water.

M

Magazine: Small strongly built store containing explosives (e.g., gunpowder, dynamite); often circular, sometimes with additional enclosing walls to contain the blast of an accidental explosion. Generally secure and ventilated.

Metate: A stone used traditionally by Native Americans for grinding of grains, grasses, seeds, nuts, or minerals for consumption or adornment. Also known as grinding stone, ground stone.

Mill Dam: Dam constructed across a stream to raise its water-level and make it available to power a mill wheel.

Mill Pond: Area of water retained above a mill dam for driving a mill.

Mill Run: A test of the value of a given quantity of ore.

Milling Station: Manos, metates, mortars, pestles associated with procurement and/or processing of hard and/or soft seeds and other food items. Generally associated with prehistoric sites.

Mine Dump: AKA Spoil Dump, Spoil Tip, Burrow, Tailings. Pile of waste material, usually from a mine or quarry, containing primary waste or waste from various stages of the dressing process.

Moonshine Still: Distillery location associated with the illegal production of alcohol.

Mullock: Cornish term to describe waste rock from mining. AKA Attle, Waste Rock.

Multi-component Site: An archaeological site comprising both prehistoric and historical era artefact assemblages and/or features.

O

Open Campsite / Village: Occupation site, excluding occupations of caves and rock shelters. Contains artefact diversity along with burned rock features/fire affected rock indicative of heating/cooking activities.

Open Pit: A mine entirely on the surface. AKA Open-Cut, Open-Cast.

Ore: A natural mineral deposit containing various elements; a compound of metal with oxygen, sulphur, arsenic or other mineral compound.

Outcrop: A portion of the vein that extends above and is visible at the surface. Where a lode, reef or stratum is exposed at the surface.

Oven: Brick, stone or iron receptacle for baking bread or other food.

P

Panning: Using a fossicking dish or gold pan in order to separate gold from waste material, gange, or gravel by means of washing. AKA ‘panning for gold.’

Pay Streak: Richest streak found in a vein.

Patent: Deed from the Government denoting ownership of land or a mineral claim.

Piling: Column of wood, steel or concrete driven into the ground to support a structure.

Pinch: Contraction of a vein.

Pitch: A slope or dip in the vein.

Placer: A surface mine.

Plat: In the United States, a plat map – or cadastral map – is a map drawn to scale, showing subdivisions of land such as a subdivision, block, streets, alleys, and corresponding numbering, usually prepared prior to a town or city incorporating under the US legal system.

Pocket: A rich spot contained within a deposit or vein.

Powerhouse: A building at a mine or battery where the main switchgear and controls are housed.

Privy: Small building housing a lavatory.

Prospecting: The act of searching for mineral veins.

Prospecting Pit: Small pit dug in search of minerals, almost always found in linear groups, often arranged cross-contour or at right angles to the projected strike of known lodes or deposits of shoad. AKA Fossicking Pit, Costeaning Pit.

Pump House: Small building where machine is used to raise water from underground sources.

Q

Quarry / Lithic Source: Location where natural lithic material has been extracted from a primary or secondary source for the purpose of tool manufacture.

Quartz: Hard dense form of silica commonly occurring in veins of naturally occurring rock formations. Generally the source material for gold, silver and copper.

R

Railroad Grade: A line or track consisting of iron or steel rails, on which passenger carriages or goods wagons are moved, usually by a locomotive engine.

Railroad Stop: Depot, or other stop along a railroad to allow for loading/unloading of passengers or goods.
Railroad, Other Feature: May include railroad bed, lighting, signal boxes or other equipment associated with the railroad.

Raise: Excavating or tunnelling a shaft upwards from an existing level. AKA Upraise.

Reclamation: Restoration of land and environmental values to a surface mine.

Reserves: Minerals contained in mines between shafts and levels that will pay upon extraction.

Retort: Amalgam after distillation or gold combined with other metals.

Road: Transportation corridor for vehicular, foot, or horse traffic. May be paved or unpaved.

Rock Alignment: Alignments of cobbles and boulders ranging from simple lines and walls to complex abstract or geometric designs or rock rings.

Rock Art: Locations where an image was carved (petroglyphs) or painted (pictographs) onto rock surfaces by Native Americans.

Rock Shelter: Area beneath a natural overhang at the base of a cliff or crag that may have been used for occupation, burial, etc. Rock shelters contain cultural materials and features buried in sediment.

S

Salting: Placing foreign ore into the crevices of a vein.

Sampling Mill or Sampling Works: Mine workings used for sampling and determining the values obtained in ores where ores are brought and then sold.

Schist or Schistose: Granite rock having a slaty structure.

School: An establishment in which people, primarily children, are taught or educated.

Septic Tank: Watertight reservoir or tank that receives sewage, and by sedimentation and bacterial action affects a process of partial purification.

Sett: Legal boundary within which a mine could extract minerals; a series of stone supports for a tramway; a component of timber framing of an adit.

Shaft: Vertical or near-vertical tunnel sunk to give access to the extractive areas of a mine.

Shift: A miner's work per day.

Shoad / Shode: Ore weathered from the load and moved geologically downslope under the force of gravity; such material in riverbeds could be exploited as placer deposits.

Sinkhole: Solution cavity or depression in ground surface formed by solution process. May be used for occupation, storage, refuse or as a hide-away.
Skip: A small rail-mounted, side or end-tipping ore cart used for transporting ore from the working level to the surface of the mine.
Slag: Waste product of the smelting process.

Sluice: Dam that can be raised or lowered to regulate the flow of water; or a trough in which ore may be washed.

Sluicegate: Gate of a sluice that can be opened or shut to let out or retain water.

Solder: Metal or metallic alloy used when melted to join metallic surfaces.

Spillway: Passage for surplus water from a dam.

Spit: To light a fuse.

Spreader: Timber stretched across a shaft or a slope.

Spring: Point where water issues naturally from the rock or soil onto the ground or into a body of surface water.

Spur: In mining, a branch of a vein. In railroading, a branch of track that extends off the main line.

Stable: Building in which horses and other animals are accommodated.

Stamp-Mill: A mill used for crushing ores through the use of stamps.

Stamps: Mechanical device for crushing ore-bearing rock to fine sand.

Stationary Engine: Any type of steam engine mounted on a foundation to provide fixed energy for pumping, winding or driving machinery.

Stope: Excavated area produced during the extraction of ore-bearing rock; excavating the ore from the roof or floor of a drift. Often narrow, deep and elongated, reflecting the former position of the lode. Where open to the surface, they form Gunnises or Coffens.

Survey Monuments: Monuments indicating township, range, section or other survey locations

T

Tailings: Waste sand and slime from mine dressing floor, not containing workable quantities of mineral. AKA Waste dump, heap, pile, tip, spoil pile, skimps.

Telegraph Power: Cable and wooden poles used to support overhead telegraph cables and provide telegraphic services.

Timber Bearers: Horizontal beams, hitched into the rock walls of a mine shaft every 30 feet to support the timbering. AKA Bearers.

Trails: Faint linear impressions or clearings in desert pavement or slight shelves along hillsides or canyon slopes. A route of travel linking various activity areas and sites of aboriginal populations; generally 35 cm wide.

Tributer: A miner working as a lessee.

U

Upraise: A shaft or winze excavated upwards.

W

Wash: Loose rock and dirt.

Waste Rock: Rock and material discarded from ore. AKA mullock.

Well: Shaft or pit dug in the ground over a supply of spring-water. May be covered or topped with a structure to draw up the water or contained within a small building/well house.

Whim: Winding gear used for hauling from a shaft; includes a power source and winding drum (generally powered by a horse walking around it). A machine used for raising ore or refuse.

Whip: An apparatus for hoisting ore from a shaft. Included a pulley attached to a horse which pulled suspended loads up from the shaft as the horse was led away from the shaft.

Winch: Used to hoist material and sinking a winze. Powered by a small, reciprocating, compressed-air engine.

Windlass: A wooden roller with a crank at one end mounted over a shaft.

Winze: An interior shaft sunk from one level to another.

APPENDIX B
PERSONS CONTACTED AND PLACES VISITED

United States

Mr. Everett J. Bassett, Transcon Environmental, Inc., 3740 East Southern Avenue, Suite 218, Mesa, Arizona 85206, (480) 807-0095, everettarch@aol.com

Bisbee Mining & Historical Museum, Post Office Box 14, Bisbee, Arizona 85603, (520) 432-7071

Bureau of Land Management, Mr. Gardiner Dalley, District Archaeologist, Cedar City District Office, 176 East D.L. Sargent Drive, Post Office Box 724, Cedar City, Utah 84720, (435) 865-3037, fax (435) 865-3058, gardiner_dalley@blm.gov

The Comstock Archaeology Center & Museums, Reno, Nevada

County Tax Assessor, Mr. Trent Brown, Beaver County Court House, Post Office Box 352, 105 East Center, Beaver, Utah 84713 (435) 438-6400, http://www.beaver.state.ut.us/assessor.htm

County Recorder, Mr. Bruce Brown, Beaver County Court House, Post Office Box 431, 105 East Center, Beaver, Utah 84713 (435) 438-6480, http://www.beaver.state.ut.us/recorder.htm

Environmental Data Resources, Inc., Aerial Photo Decade Package, Inquiry 2312434.1, covering the San Francisco Mining District, near Milford, Utah 84751 (dated 15 September 2008), including aerial photographs from 1983 to 2006

Franconia Minerals Corporation, Mr. Brian Gavin, President & CEO, 111 East Magnesium Road, Suite A, Spokane, Washington 99208 (509) 340-1328, info@franconiaminerals.com

Mr. Eugene Halverson, 587 West 1460 North, Clinton, Utah, (801) 779-0247, genehalvorsen@centurylink.net or genehalvor@gmail.com

Horn Silver Mines, Inc., 701 Clift Building, 10 West Broadway, Salt Lake City, Utah 84111 / 4444 South 700 East, Suite 204, Salt Lake City, Utah 84107 (IRS No. 87-0299832), Chairman of the Board, Mr. John P. Bogdanich; Secretary and Director, Mr. Melvin E. Leslie; Vice President and Director, Mr. Murray C. Godbe

Iron Mission State Park Museum, 585 North Main, Cedar City, Utah 84720-1079, (435) 586-9290, http://www.utah.com/stateparks/iron_mission.htm

J. Willard Marriott Library and Quinney Law, University of Utah, 155 S 1425 E, Salt Lake City, Utah, 84102, (801) 581-8558

Lincoln County Historical Museum, Pioche, Nevada 89043

Lincoln County Recorder/Auditor, Leslie Boucher, Post Office Box 218, Pioche, Nevada 89043 (775) 962-5495 / fax (775) 962-5180

Lincoln County Juvenile Court Clerk, Lorena A. Stever, Post Office Box 36, Pioche, Nevada 89043 (775) 962-5140

Mr. Montie Moore, 4911 Old Canton Road, Apartment 201, Jackson, Mississippi 39211, (601) 985-9457

Ms. Mari Pritchard Parker, Pasadena City College / Milford Archaeological Research Institute, 5905 El Mio Drive, Los Angeles, California, 90042, (213) 309-8854, mari_utah@hotmail.com

National Register of Historic Places, National Park Service, 1201 Eye Street NW, 8th Floor (MS 2280), Washington, D.C. 20005 (202) 354-2213, http://www.nps.gov/nr/research/index.htm

Nevada State Historic Preservation Office, 100 North Stewart Street, Carson City, Nevada 89701, (775) 684-3448

Dr. Paige Peyton, 541 Golden West Drive, Redlands, California 92373, (909) 307-8547, paige.peyton@roadrunner.com

Mr. Russell C. Taylor, L. Tom Perry Special Collections, Harold B. Lee Library, Brigham Young University, Post Office Box 26800, Provo, Utah, 84602-6800, (801) 422-2927

Dr. Tim Scarlett, Michigan Technological University, Academic Building 1400 Townsend Drive, Houghton, Michigan 49931, (906) 487-2359, scarlett@mtu.edu

Southern Utah University, Gerald R. Sherratt Library, Special Collections, Ms. Janet Seegmiller, 351 West Center Street, Cedar City, Utah 84720, (435) 586-7700

Southern Utah University, Archaeological Repository, Ms. Barbara Frank, 351 West University Boulevard, Cedar City, Utah 84720, (435) 586-7870, (435) 586-0776, frankb@suu.edu

Stewart Library, Weber State University, 2901 University Circle, Ogden, Utah 84408-2901, (801) 626-6403

Utah Abandoned Mine Reclamation Program, Chris Rohrer, Senior Reclamation Specialist, Abandoned Mine Reclamation Program (San Francisco Project Manager), Utah Division of Oil, Gas & Mining, 1594 West North Temple Street, Suite 1210, PO Box 145801, Salt Lake City, Utah 84114-5801, (801) 538-5322, chrisrohrer@utah.gov

Utah State Historic Preservation Office, Ms. Renae Weder, archaeological assistant, Utah Division of State History, 300 South Rio Grande Street, Salt Lake City, Utah 84101 (801) 533-3500, fax (801) 533-3503, rweder@utah.gov

Utah State Historic Preservation Office, Mr. J. Cory Jensen, Architectural Historian/National Register & Architectural Survey Coordinator, Utah Division of State History, 300 Rio Grande Street, Salt Lake City, Utah 84101, (801) 533-3559, fax (801) 533-3503, coryjensen@utah.gov

Utah State Historic Preservation Office, Mr. Arie Leeflang, Archaeology Records, Utah Division of State History, 300 Rio Grande Street, Salt Lake City, Utah 84101, (801) 533-3528, fax (801) 533-3503, aleeflang@utah.gov

Utah State Historical Society, Mr. Greg Walz, librarian, Research & Collections, Utah State Historical Society, 300 South Rio Grande Street, Salt Lake City, Utah 84101 (801) 533-3504

Wells Fargo Silver Reef Museum, Washington County Historical Society, Post Office Box 461143, Leeds, Utah 84746, (435) 879-2254

World Museum of Mining, 155 Museum Way, PO Box 33, Butte, Montana

United Kingdom

Dr. Ivor J. Brown, Shropshire Caving and Mining Club, 95 Manygates Lane, Sandal, Wakefield, West Yorkshire, WF2 7DL, United Kingdom
Cornwall County Council, County Hall, Treyew Road, Truro, Cornwall, United Kingdom

Ms. Harriet Devlin, Lecturer in Historic Environment Conservation. Ironbridge Institute, Ironbridge Gorge Museum, Coalbrookdale, Telford, Shropshire TF8 7DX, +(44) (0) 1952 432751

Geevor Tin Mine, Pendeen, Penzance, Cornwall, TR19 7EW, United Kingdom

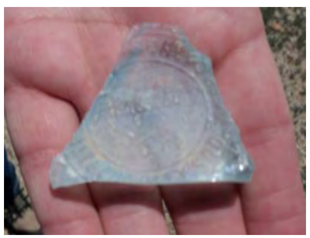
Dr. Roger White, Academic Director, Senior Lecturer, Institute of Archaeology and Antiquity. Ironbridge Institute, Ironbridge Gorge Museum, Coalbrookdale, Telford, Shropshire TF8 7DX, +(44) (0) 1952 432751

APPENDIX C

Artefact Catalog, San Francisco Mining District, Beaver County, Utah

Heather R. Puckett

May 2013



Artefact Catalogues

A digital copy of the catalogue of the artefacts recovered from investigations at the SFMD is provided on the enclosed Compact Disc (CD). This appendix serves as a supplement to Chapter 4, Artefacts. The catalogue includes 326 items observed and inventoried from the site visits.

Due to the complexity of the site and high degree of vandalism (i.e., illicit collector behaviour or looting), a sampling strategy was defined in coordination with Dr. Roger White of the University of Birmingham. Seven survey areas were defined to include the commercial district of Frisco, the mining activity/residential area adjacent to Grampian, the Frisco Smelter and charcoal kilns, an area near the purported San Pedro railroad depot, an area adjacent to the commercial district of Frisco, the Lulu Mine, and the King David Mine. Note that the mining activity/residential area at Grampian extend to include the Horn Silver Mine, Assay Building, and other associated mining infrastructure. Subsequent investigations were made along Marble Gulch, Newhouse, and to the north of the commercial district of Frisco.

The sampling goal was to identify artefacts and features to address research questions posed with regard to mineralogy, mining and settlement practices and technology, and demographics such as ethnicity, socioeconomic factors, and policy. Two formal one- by one- m TUs (TU1 and TU2) were placed at the SFMD: one at the commercial district of Frisco and one to the north of Frisco, in a residential area. A five- by five-m SU (SU1) was placed at the Frisco Smelter and charcoal kilns. The remaining areas were investigated through judgmental transects and VIs (VI01 through VI51). Minor artefact collection was performed in conjunction with the field work to include diagnostic materials that would be of interest for illicit collection and resale by looters, such as glass bottles, toys, ceramics, etc.

Microsoft Excel - AppC_Catalogue1.xlsx

	A	G	H	M	N	O	P	Q	R	S	T	U	V	W	X	Y	AB	AJ
1	*Accession Number*	*Feature Description*	*Feature*	*Artefact Group*	*Artefact Type*	*Artefact Condition*	*Artefact Category*	*Artefact Description*	*Artefact Material*	*Mark*	*Maker*	*Origin*	*Begin Date*	*End Date*	*Marked / Datable*	*Reference*	*MNI*	
2	42Be3180-01	Smelter	SU1	structural	brick	complete	materials	firebrick	clay	M & E / UTAH	Morris & Evans	Utah	1871		Brick	US Census 1885: 438	1	
3	42Be3180-02	Depot	VI22	domestic	insulator	fragment	heating/lighting	insulator base	aqua glass	...NTED / 1893			1893		Insulator		1	
4	42Be3180-03	Depot	VI23	industrial	cupel	fragment	mining	cupel	clay	2 1/4 / BATTERSEA	Morgan Crucible, South London	Battersea Works, South London, England	1856	1920	Cupel	www.morgancrucible.com/about_history.htm or http://companies.jrank.org/pages/4300/Morgan-Crucible-Company-Plc.html	1	
5	42Be3180-04	ISO	ISO	industrial	turbine pump	fragment	machinery	turbine pump part	metal	JACKSON-CHURCH	Jackson-Church Company	Los Angeles, CA	1910	1916	Pump	Lundy 1968: 14	1	
6	42Be3180-05	ISO	ISO	indefinite	wire	fragment	misc metal items	wire	metal	none							1	
7	42Be3180-06	ISO	ISO	indefinite	barrel hoop	complete	misc. containers	barrel hoops	metal	none							2	
8	42Be3180-07	Depot	VI09	domestic	bottle	fragment	food storage	soda bottle frag	clear glass	PERFECTLY PURE SODA WATER	Syphon Arrated Water Company, Limited	Sydney, Australia [and London]	1880s	post 1914	Bottle	The Sydney Morning Herald, October 26, 1889: 10; Council of the City of Sydney 2006	1	
9	42Be3180-08	Depot	VI09	domestic	bottle	fragment	food storage	mineral water bottle frag	green glass	none							1	
10	42Be3180-09	Depot	VI09	personal	bottle	fragment	social drugs	liquor bottle frag	brown	none							1	
11	42Be3180-10	Depot	VI09	unidentified	metal	fragment		ferrous metal	metal	none							1	
12	42Be3180-11	Depot	VI09	personal	bottle	fragment	grooming/health	medicine bottle frag	cobalt glass	[milk of magnesia]	Chas. H. Phillips Co	Connecticut	1924	1976	Bottle	Fike 1987: 141	1	
13	42Be3180-12	Depot	VI09	domestic	bottle	fragment	food storage	bottle fragment	amethyst	none			1880	1925		Fike 2002: 14	1	
14	42Be3180-13	Depot	VI09	domestic	bone	fragment	food	steak bone	bone	none						Schulz and Gust 1983	1	
15	42Be3180-14	Depot	VI09	indefinite	wire	fragment	misc metal items	wire	metal	none							1	
16	42Be3180-15	Depot	VI09	domestic	ceramic	fragment	food prep/consumption	ceramics	earthenware	none							1	
17	42Be3180-16	Depot	VI09	domestic	can	fragment	food storage	meat tin lid	metal	none							1	
18	42Be3180-17	Depot	VI09	domestic	jar lid	complete	food storage	zinc canning jar	canning jar	none							1	
19	42Be3180-18	Depot	VI09	personal	shoe	fragment	footware	shoe leather	shoe	none							1	
20	42Be3180-19	Depot	VI10	domestic	can	complete	food storage	sanitary can	metal	none							1	
21	42Be3180-20	Depot	VI10	domestic	can	complete	food storage	hole in top cans	metal	none							1	
22	42Be3180-21	Depot	VI10	personal	can	complete	social drugs	tobacco cans	metal	none							1	
23	42Be3180-22	Depot	VI10	structural	vent	fragment	hardware	vent grating	metal	none							1	
24	42Be3180-23	Depot	VI10	indefinite	barrel hoop	complete	misc. containers	barrel hoops	metal	none							1	
25	42Be3180-24	by depot	VI11	structural	door knob	fragment	hardware	door knob	porcelain	none							1	
26	42Be3180-25	by depot	VI11	domestic	coal	fragment	heating/lighting	coal	coal	none							1	
27	42Be3180-26	by depot	VI11	structural	window glass	fragment	materials	window glass	clear glass	none							1	
28	42Be3180-27	by depot	VI11	personal	bottle	fragment	social drugs	wine bottle base	green glass	none							1	
29	42Be3180-28	by depot	VI11	personal	bottle	fragment	grooming/health	medicine bottle frag	clear glass	none							1	
30	42Be3180-29		VI27	domestic	insulator	fragment	heating/lighting	glass insulator	green glass	none							1	
		small																

SFMD-Catalog / Murray / ACTIVITIES / DOMESTIC / INDUSTRIAL / PERSONAL / STRUCTURAL / INDEFINITE / INTRUSIVE / UNI

Microsoft Excel - AppC_Catalogue1.xlsx

	A	G	H	M	N	O	P	Q	R	S	T	U	V	W	X	Y	AB	AJ
1	Accession Number	Feature Description	Feature	Artefact Group	Artefact Type	Artefact Condition	Artefact Category	Artefact Description	Artefact Material	Mark	Maker	Origin	Begin Date	End Date	Marked / Datable	Reference	MNI	
31	42Be3180-30	small structure by road	VI13	domestic	bottle	fragment	food storage	bottle fragment	amethyst glass	none			1880	1925		Fike 2002: 14	1	
32	42Be3180-31	small structure by road	VI13	domestic	can	complete	food storage	fuel can	metal	none							1	
33	42Be3180-32	small structure by road	VI13	domestic	can	complete	food storage	sanitary can	metal	none							1	
34	42Be3180-33	Rhyolite Structure (2)	VI12	domestic	bottle	fragment	food storage	bottle fragment	amethyst glass	none			1880	1925		Fike 2002: 14	1	
35	42Be3180-34	looter pit	VI24	industrial	can	complete	mining	carbide can	metal	none							1	
36	42Be3180-35	looter pit	VI24	domestic	pail	complete	food prep/consumption	enamelware	metal	none							1	
37	42Be3180-36	looter pit	VI24	Activities	pail	complete	tools	galvanized pail	metal	none							1	
38	42Be3180-37	looter pit	VI24	domestic	pail	complete	food storage	lard/peanut butter pails	metal	none							1	
39	42Be3180-38	looter pit	VI24	domestic	can	complete	food storage	sanitary can	metal	none							1	
40	42Be3180-39	looter pit	VI24	domestic	jar lid	complete	food storage	zinc canning jar	canning jar	none							1	
41	42Be3180-40	looter pit	VI24	indefinite	barrel hoop	complete	misc. containers	barrel hoops	metal	none							1	
42	42Be3180-41	looter pit	VI24	domestic	can	complete	food storage	hole in top cans	metal	none							1	
43	42Be3180-42		VI16	domestic	stove	fragment	furnishings	cast iron stove	cast iron	none							1	
44	42Be3180-43		VI16	personal	button	complete	clothing	button	button	none							1	
45	42Be3180-44	King David Mine	VI26	industrial	hoist	complete	machinery	hoist	cast iron hoist	THE WEST COAST / SAN DIEGO CAL / PATENTED NO 864492	Chas. Sterne	San Diego, California	1907		hoist	US Patent 864,492	1	
46	42Be3180-45	Lulu Mine	VI25	industrial	boiler	complete	machinery	tubular steam boiler	boiler	unknown							1	
47	42Be3180-46		VI17	domestic	bone	fragment	food	bone	bone	none							1	
48	42Be3180-47		VI17	domestic	plate	fragment	food prep/consumption	ceramics	earthenware	ROYAL PATENT / IRONSTONE / - R GODDARD & Co	Turner Goddard & Co	England	1867	1874	ceramic		1	
49	42Be3180-48		VI17	structural	wood	fragment	materials	lumber with metal decoration	wood	none							1	
50	42Be3180-49		VI17	domestic	bowl	fragment	food prep/consumption	rim, bowl fragment	earthenware	"J S -"							1	
51	42Be3180-50		VI17	personal	bottle	fragment	grooming/health	medicine bottle frag	cobalt glass	[milk of magnesia]	Chas. H. Phillips Co	Connecticut	1924	1976	Bottle	Fike 1987: 141	1	
52	42Be3180-51		VI17	personal	shoe	fragment	footware	shoe leather	leather	none							1	

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53	42Be3180-52		VI17	domestic	insulator	fragment	heating/lighting	insulator base frag	green glass	none							1	
54	42Be3180-53		VI17	domestic	plate	fragment	food prep/consumption	ceramics	earthenware	mm							1	
55	42Be3180-54		VI17	domestic	plate	fragment	food prep/consumption	scalloped rim fragment	earthenware	decalcomania							1	
56	42Be3180-55		VI17	domestic	teacup	fragment	food prep/consumption	rim fragment	earthenware	gilded edge?							1	
57	42Be3180-56		VI17	domestic	plate	fragment	food prep/consumption	dark blue plate fragment	earthenware	none							1	
58	42Be3180-57		VI17	personal	bottle	fragment	social drugs	liquor bottle frag	clear glass	KENN- [flask]							1	
59	42Be3180-58		VI17	domestic	crock	fragment	food storage	creamware crock base	crockery	none							1	
60	42Be3180-59		VI17	domestic	plate	fragment	food prep/consumption	ceramics	earthenware	partial eagle wing	Homer Laughlin?		1900				1	
61	42Be3180-60	Lulu Mine	VI25	domestic	bottle	fragment	food storage	bottle fragment	amethyst	none			1880	1925		Fike 2002: 14	1	
62	42Be3180-61	Lulu Mine	VI25	domestic	can	complete	food storage	kerosene can	metal	none							1	
63	42Be3180-62	Lulu Mine	VI25	domestic	can	complete	food storage	condensed milk	metal	none							1	
64	42Be3180-63	Lulu Mine	VI25	personal	can	complete	social drugs	tobacco cans	metal	none							1	
65	42Be3180-64	Lulu Mine	VI25	domestic	can	complete	food storage	sanitary can	metal	none							1	
66	42Be3180-65	Lulu Mine	VI25	structural	stove pipe	fragment	materials	stove pipe	metal	none							1	
67	42Be3180-66	Lulu Mine	VI25	industrial	crucible	fragment	mining	crucibles	crucibles	none							2	
68	42Be3180-67	Lulu Mine	VI25	personal	bottle	fragment	social drugs	liquor bottle frag	brown	none							1	
69	42Be3180-68	Lulu Mine	VI25	domestic	can	complete	food storage	paint can	metal	none							1	
70	42Be3180-69	Smelter	SU1	domestic	bottle	fragment	food storage	bottle fragment	aqua glass	none							1	
71	42Be3180-70	Smelter	SU1	domestic	personal	fragment	social drugs	bottle fragment	brown	none							1	
72	42Be3180-71	Smelter	SU1	domestic	bottle	fragment	food storage	bottle fragment	amethyst	none			1880	1925		Fike 2002: 14	1	
73	42Be3180-72	Smelter	SU1	domestic	bottle	fragment	food storage	bottle fragment	light olive	none							1	
74	42Be3180-73	Smelter	SU1	personal	bottle	fragment	social drugs	bottle fragment	modern beer brown	none							1	
75	42Be3180-74	Smelter	SU1	structural	window glass	fragment	food storage	window glass	flat glass, slightly	none			1880	1925		Fike 2002: 14	1	
76	42Be3180-75	Smelter	SU1	unidentified	ferrous metal	fragment		ferrous metal	ferrous metal	none							1	
77	42Be3180-76	Smelter	SU1	industrial	slag	fragment	mining	slag	slag	none							1	
78	42Be3180-77	Smelter	SU1	structural	nail	complete		square nail	metal	none							1	
								ferrous metal										

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79	42Be3180-78	Smelter	SU1	indefinite	strap	fragment	misc metal items	ferrous metal strap	metal	none							1	
80	42Be3180-79	Smelter	SU1	industrial	ore	fragment	mining	ore	ore	none							1	
81	42Be3180-80	Smelter	SU1	INTRUSIVE	plastic bottle	complete	food storage	plastic bottle	plastic	none						intrusive	1	
82	42Be3180-81	Smelter	SU1	structural	brick	complete	materials	firebrick	brick	none							1	
83	42Be3180-82	Smelter	SU1	structural	nail	complete	hardware	wire nail	metal	none							1	
84	42Be3180-83	Smelter	SU1	unidentified	glass	fragment		burned glass	glass	none							1	
85	42Be3180-84	Smelter	SU1	structural	nail	complete	hardware	machine cut nail	metal	none							1	
86	42Be3180-85	Smelter	SU1	structural	wood	fragment	materials	burned wood	wood	none							1	
87	42Be3180-86	Smelter	SU1	personal	bottle	fragment	social drugs	applied finish / stopper top bottle neck	brown glass	none							1	
88	42Be3180-87	Smelter	SU1	personal	bottle	fragment	social drugs	light aqua bottle base with kickup	aqua glass	none							1	
89	42Be3180-88	Smelter	SU1	structural	brick	fragment	materials	frog brick	clay	none							1	
90	42Be3180-89	Smelter	SU1	domestic	ceramic	fragment	food prep/consumption	yellow glazed ceramic	earthenware	none							1	
91	42Be3180-90	Smelter	SU1	structural	nail	complete	hardware	machine cut nail	nail	none							1	
92	42Be3180-91	Smelter	SU1	domestic	bottle	fragment	food storage	bottle fragment	neck	none							1	
93	42Be3180-92	Smelter	SU1	domestic	bottle	fragment	food storage	bottle fragment	base	none							1	
94	42Be3180-93	Smelter	SU1	Activities	wash basin	complete	tools	galvanized metal wash	galvanized metal	none							1	
95	42Be3180-94	Smelter	SU1	structural	brick	complete	materials	firebrick	clay	M & E / UTAH	Morris & Evans	Utah	1871		Brick	US Census 1885: 438	1	
96	42Be3180-95	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	porcelain ceramic fragment	porcelain	none								
97	42Be3180-96	IG02 TU1	TU1	domestic	crock	fragment	food prep/consumption	stoneware ceramic fragment	stoneware	none								
98	42Be3180-97	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	whiteware ceramic fragment	earthenware	none								
99	42Be3180-98	IG02 TU1	TU1	structural	door knob	fragment	hardware	porcelain door knob	porcelain	none								
100	42Be3180-99	IG02 TU1	TU1	domestic	platter	fragment	food prep/consumption	restaurantware ceramic (platter)	vitreous ceramic	none								
101	42Be3180-100	IG02 TU1	TU1	domestic	soup tureen	fragment	food prep/consumption	whiteware ceramic fragment	earthenware	none								
102	42Be3180-101	IG02 TU1	TU1	domestic	crock	fragment	food prep/consumption	stoneware ceramic fragment	stoneware	none								
103	42Be3180-102	IG02 TU1	TU1	domestic	plates	fragment	food prep/consumption	whiteware ceramic fragment	earthenware	none								
104	42Be3180-103	IG02 TU1	TU1	domestic	cups	fragment	food prep/consumption	whiteware ceramic fragment	earthenware	none								

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105	42Be3180-104	IG02 TU1	TU1	domestic	teacup	fragment	food prep/consumptio n	porcelain ceramic fragment	porcelain	none								
106	42Be3180-105	IG02 TU1	TU1	personal	shoe	fragment	footware	shoe leather	leather	none							2+	
107	42Be3180-106	IG02 TU1	TU1	Activities	eraser	complete	writing	rubber eraser	rubber	none							1	
108	42Be3180-107	IG02 TU1	TU1	Activities	slate	fragment	writing	slate	slate	none							1	
109	42Be3180-108	IG02 TU1	TU1	domestic	linoleum	fragment	furnishings	linoleum	cork/oil	[pattern]							1	
110	42Be3180-109	IG02 TU1	TU1	domestic	cutlery handle	fragment	food prep/consumptio n	cutlery handle	wood	none							1	
111	42Be3180-110	IG02 TU1	TU1	personal	comb	fragment	grooming/health	comb	hard rubber or	none							1	
112	42Be3180-111	IG02 TU1	TU1	domestic	clothes pin	fragment	clothing maintenance	clothes pin spring	metal	none							1	
113	42Be3180-112	IG02 TU1	TU1	indefinite	coil spring	fragment	misc metal items	coil spring	metal	none							1	
114	42Be3180-113	IG02 TU1	TU1	personal	button	complete	clothing	button	bone?	none							1	
115	42Be3180-114	IG02 TU1	TU1	domestic	bottle stopper	fragment	food storage	marble or pie weight / bottle stopper	metal	none							1	
116	42Be3180-115	IG02 TU1	TU1	Activities	harmonica	fragment	entertainment	harmonica	metal	none							1	
117	42Be3180-116	IG02 TU1	TU1	personal	zinc tubes	fragment	grooming/health	zinc tubes	zinc	none							1+	
118	42Be3180-117	IG02 TU1	TU1	personal	eyelet	complete	footware	hook from corset or shoe	metal	none							1	
119	42Be3180-118	IG02 TU1	TU1	domestic	can key	complete	food storage	sardine can key	metal	none							1	
120	42Be3180-119	IG02 TU1	TU1	structural	washer	complete	hardware	washer	metal	none							1	
121	42Be3180-120	IG02 TU1	TU1	domestic	sewing hook	fragment	clothing maintenance	hook, possibly sewing related	metal	none							1	
122	42Be3180-121	IG02 TU1	TU1	structural	plaster	fragment	materials	plaster	plaster	none							1	
123	42Be3180-122	IG02 TU1	TU1	structural	wood	fragment	materials	lumber or wood	wood	none							1	
124	42Be3180-123	IG02 TU1	TU1	industrial	copper ore	fragment	mining	copper ore	copper ore	none							1	
125	42Be3180-124	IG02 TU1	TU1	unidentified	charcoal	fragment		charcoal / burned wood	wood	none							1	
126	42Be3180-125	IG02 TU1	TU1	unidentified	ferrous metal	fragment		ferrous metal	metal	none							1+	
127	42Be3180-126	IG02 TU1	TU1	structural	hinge	fragment	hardware	hinge	cast iron	decorative style							2	
128	42Be3180-127	IG02 TU1	TU1	indefinite	chain loop	fragment	misc metal items	chain loop	metal	none							1	
129	42Be3180-128	IG02 TU1	TU1	structural	bolt	complete	hardware	bolts	metal	decorative style							2	
130	42Be3180-129	IG02 TU1	TU1	structural	nail	complete	hardware	machine cut nail	metal	none							3	
131	42Be3180-130	IG02 TU1	TU1	indefinite	wire	fragment	misc metal items	wire	metal	none							9	
132	42Be3180-131	IG02 TU1	TU1	structural	wire spike	complete	hardware	wire spike	cast iron	none							1	
133	42Be3180-132	IG02 TU1	TU1	indefinite	glass	fragment	misc. containers	misc container glass	misc container	none								
134	42Be3180-133	IG02 TU1	TU1	unidentified	glass	fragment		melted glass	melted	none								
135	42Be3180-134	IG02 TU1	TU1	structural	glass	fragment	materials	flat glass	flat glass	none								
136	42Be3180-135	IG02 TU1	TU1	personal	doll	fragment	toys	porcelain doll head fragment	porcelain	none							1	
137	42Be3180-136	IG02 TU1	TU1	domestic	bone	fragment	food	rib	bone	beef								
138	42Be3180-137	IG02 TU1	TU1	domestic	bone	fragment	food	phalange	bone	beef								

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139	42Be3180-138	IG02 TU1	TU1	domestic	bone	fragment	food	tarsal	bone	beef								
140	42Be3180-139	IG02 TU1	TU1	domestic	bone	fragment	food	long bone /	bone	beef								
141	42Be3180-140	IG02 TU1	TU1	domestic	bone	fragment	food	shoulder blades / scapula	bone	beef								
142	42Be3180-141	IG02 TU1	TU1	domestic	bone	fragment	food	t-bone	bone	beef								
143	42Be3180-142	IG02 TU1	TU1	domestic	bone	fragment	food	mandible	bone	beef								
144	42Be3180-143	IG02 TU1	TU1	domestic	bone	fragment	food	vertebrae	bone	beef								
145	42Be3180-144	IG02 TU1	TU1	domestic	bone	fragment	food	undifferentiated mammal, possibly rib?	bone	undifferentiated mammal								
146	42Be3180-145	ISO	ISO	personal	button	complete	clothing	button	glass	none								
147	42Be3180-146		VI02	personal	shoe	fragment	footware	shoe leather	leather	none								
148	42Be3180-147		VI02	domestic	bottle	fragment	food storage	bottle fragment	aqua glass	none								
149	42Be3180-148		VI02	personal	bottle	fragment	social drugs	torpedo shaped bottle bases	aqua glass	"- AND - / - NTRES // HA- / COO- // BELFAST / DUBLIN"							2	
150	42Be3180-149		VI02	domestic	clock	fragment	furnishings	clock works	metal	none								
151	42Be3180-150		VI02	personal	bottle	fragment	social drugs	alcohol bottle or mineral water bottle fragment	olive green glass	none								
152	42Be3180-151		VI02	domestic	teacup	fragment	food prep/consumption	ceramic teacup handle	earthenware	none								
153	42Be3180-152		VI02	domestic	bone	fragment	food	rib	bone	none								
154	42Be3180-153		VI03	personal	shoe	fragment	footware	shoe leather	leather	none								
155	42Be3180-154		VI03	industrial	crucible	fragment	mining	crucibles	crucibles	none								
156	42Be3180-155		VI03	domestic	bone	fragment	food	cut bone	bone	none								
157	42Be3180-156		VI03	domestic	plate	fragment	food prep/consumption	porcelain fragment	porcelain	none								
158	42Be3180-157		VI03	Activities	harmonica	fragment	entertainment	harmonica	metal	none								
159	42Be3180-158		VI03	personal	button	complete	clothing	button	shell	none								
160	42Be3180-159		VI03	industrial	copper ore	fragment	mining	copper ore	copper ore	none								
161	42Be3180-160		VI03	personal	comb	fragment	grooming/health	comb	hard rubber or	none								
162	42Be3180-161		VI03	personal	bottle	fragment	social drugs	amethyst glass fragment	amethyst glass	none			1880	1925		Fike 2002: 14		
163	42Be3180-162		VI03	personal	bottle	fragment	social drugs	aqua glass fragment	aqua glass	none								
164	42Be3180-163		VI03	personal	bottle	fragment	social drugs	brown glass fragment	brown glass	none								
165	42Be3180-164		VI03	personal	bottle	fragment	social drugs	patenated glass fragments	patenated glass	none								
166	42Be3180-165		VI04	domestic	bone	fragment	food	cut bone	bone	none								
167	42Be3180-166		VI04	personal	shoe	fragment	footware	shoe leather	leather	none								
168	42Be3180-167		VI04	domestic	canning jar	fragment	food storage	aqua canning jar fragment	aqua glass	none								
169	42Be3180-168		VI04	domestic	canning jar insert	complete	food storage	porcelain jar insert	porcelain	none								
170	42Be3180-169		VI05	domestic	tumbler	fragment	food prep/consumption	glass tumbler base	amethyst glass	none			1880	1925		Fike 2002: 14		

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171	42Be3180-170		VI05	personal	bottle	fragment	social drugs	bottle base	aqua glass	CCC CO							1	
172	42Be3180-171		VI05	domestic	bone	fragment	food	cut bone	bone	none								
173	42Be3180-172		VI05	domestic	lantern wick base	fragment	heating/lighting	lantern wick base	brass	none							1	
174	42Be3180-173		VI05	personal	shoe	fragment	footware	shoe leather	leather	none							1	
175	42Be3180-174		VI05	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	1. [Royal patent mark w/ lion]; 2. TPC; 3. flow blue circle and line motif topped with white floral; 4. Genese							4	
176	42Be3180-175		VI05	personal	eyelet	complete	footware	hook from corset or shoe	metal	none							1	
177	42Be3180-176		VI05	Activities	horseshoe	fragment	transportation	horseshoe fragment	metal	none							1	
178	42Be3180-177		VI05	indefinite	barrel hoop	complete	misc. containers	barrel hoops	metal	none							1	
179	42Be3180-178		VI05	structural	galvanized metal	fragment	materials	galvanized metal	metal	none							1	
180	42Be3180-179		VI05	domestic	can	complete	food storage	sanitary can	metal	none							1	
181	42Be3180-180	ISO	ISO	prehistoric	metate	fragment	food processing	metate	granitic	none							1	
182	42Be3180-181		VI06	domestic	canning jar lid	fragment	food storage	zinc canning jar lid	zinc	none							1	
183	42Be3180-182		VI06	domestic	cutlery	complete	food prep/consumption	fork	sterling silver	[tipped]							1	
184	42Be3180-183		VI06	Activities	horseshoe	complete	transportation	horseshoe	cast iron	none							1	
185	42Be3180-184		VI06	domestic	teacup	fragment	food prep/consumption	ceramics	earthenware	[flow blue and winter scene]							2	
186	42Be3180-185		VI06	personal	bottle	fragment	social drugs	clear bottle	clear glass	none							1	
187	42Be3180-186		VI06	personal	bottle	fragment	social drugs	brown glass fragment	brown glass	none							1	
188	42Be3180-187		VI06	personal	bottle	fragment	grooming/health	amethyst glass fragment	amethyst glass	none			1880	1925		Fike 2002: 14		
189	42Be3180-188		VI06	domestic	metal pail	complete	food storage	metal pail	metal	none							1	
190	42Be3180-189		VI06	domestic	metal pail	complete	food storage	metal pail bail	metal	none							1	
191	42Be3180-190		VI06	domestic	can	complete	food storage	sanitary can lid	metal	none							1	
192	42Be3180-191		VI06	personal	lid	complete	grooming/health	zinc medicine container lid	zinc	MENTHOLATUM							1	
193	42Be3180-192	IG03 - Cistern	VI19	domestic	crock	fragment	food storage	stoneware crock rim	stoneware	none							1	
194	42Be3180-193	IG03 - Cistern	VI19	Activities	pail	complete	tools	galvanized pail	galvanized metal	none							1	
195	42Be3180-194	IG03 - Cistern	VI19	structural	pipe	fragment	fixtures	pipe	metal	none							1	
196	42Be3180-195	IG03 - Cistern	VI19	structural	hardware	fragment	hardware	metal hardware	metal	none							1	
197	42Be3180-196	IG03 - Cistern	VI19	INTRUSIVE	bone	complete		bird skeleton	bone	bird							1	
198	42Be3180-197	IG03 - Cistern	VI19	structural	wood	fragment	materials	wood / lumber	wood	none							1	
199	42Be3180-198	IG03 - Cistern	VI19	indefinite	box	complete	misc. metal items	metal box with handles	metal	none							1	

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1	Accession Number	Feature Description	Feature	Artefact Group	Artefact Type	Artefact Condition	Artefact Category	Artefact Description	Artefact Material	Mark	Maker	Origin	Begin Date	End Date	Marked / Datable	Reference	MNI	
200	42Be3180-199	IG03 - Cistern	VI19	INTRUSIVE	can	complete	misc. containers	aerosol cans	metal	none							1	
201	42Be3180-200	IG03 - Cistern	VI19	personal	cosmetic jar	complete	grooming/health	cosmetic jar	milkglass	none							1	
202	42Be3180-201	IG03 - Cistern	VI19	domestic	can	complete	food storage	sanitary milk can	metal	none							1	
203	42Be3180-202	IG03 - Cistern	VI19	INTRUSIVE	bone	complete		mouse	bone	rodent							2	
204	42Be3180-203	IG03 TU2	TU2	personal	snap	complete	clothing	snap	metal	none							1	
205	42Be3180-204	IG03 TU2	TU2	domestic	chimney	fragment	heating/lighting	lantern chimney (rim)	clear glass	none							1	
206	42Be3180-205	IG03 TU2	TU2	personal	bottle	fragment	social drugs	amethyst glass fragment	amethyst glass	none			1880	1925		Fike 2002: 14	1	
207	42Be3180-206	IG03 TU2	TU2	personal	bottle	fragment	social drugs	amethyst glass fragment	amethyst glass	none			1880	1925		Fike 2002: 14	1	
208	42Be3180-207	IG03 TU2	TU2	personal	bottle	fragment	social drugs	bottle fragment	aqua glass	none							1+	
209	42Be3180-208	IG03 TU2	TU2	personal	bottle	fragment	social drugs	bottle fragment	brown	none							1	
210	42Be3180-209	IG03 TU2	TU2	personal	bottle	fragment	social drugs	bottle fragment	olive green	none							1	
211	42Be3180-210	IG03 TU2	TU2	structural	window glass	fragment	materials	flat glass	clear glass	none							1	
212	42Be3180-211	IG03 TU2	TU2	domestic	nuts	fragment	food	charcoal / burned wood /	wood	juglandacea (hickory or walnut)								
213	42Be3180-212	IG03 TU2	TU2	domestic	plate	fragment	food prep/consumption	whiteware ceramic fragment	earthenware	none								
214	42Be3180-213	IG03 TU2	TU2	domestic	teacup	fragment	food prep/consumption	porcelain ceramic fragment	porcelain	[decorated]							2	
215	42Be3180-214	IG03 TU2	TU2	domestic	can	fragment	food storage	key-opened rectangular meat can	metal	none							1	
216	42Be3180-215		VI07	personal	bottle	fragment	social drugs	amethyst glass fragment	amethyst glass	none			1880	1925		Fike 2002: 14	1	
217	42Be3180-216		VI07	personal	bottle	fragment	social drugs	olive glass fragment	olive green glass	none							12	
218	42Be3180-217		VI07	personal	bottle	fragment	social drugs	brown glass fragment	brown glass	none							2	
219	42Be3180-218		VI07	personal	bottle	fragment	social drugs	brown glass fragment	brown glass	R & CO / R							1	
220	42Be3180-219		VI07	structural	brick	fragment	materials	brick	brick	none							3	
221	42Be3180-220		VI07	structural	wood	fragment	materials	timber	wood	none							1	
222	42Be3180-221		VI07	domestic	wood	fragment	furnishings	decorative wood	wood	like dental molding							1	
223	42Be3180-222		VI08	structural	pipe	fragment	fixtures	pipe	metal	none								
224	42Be3180-223		VI08	personal	bottle	fragment	social drugs	olive glass fragment	olive green glass	none								
225	42Be3180-224		VI08	personal	bottle	fragment	social drugs	brown glass fragment	brown glass	none								
226	42Be3180-225		VI08	domestic	bone	fragment	food	cut bone	bone	beef								

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227	42Be3180-226		VI08	domestic	platter	fragment	food prep/consumption	restaurantware ceramic (platter)	vitreous ceramic	none								
228	42Be3180-227		VI09	Activities	wire	fragment	pets	hog wire	metal	none								
229	42Be3180-228	ISO	ISO	personal	earring	fragment	accoutrements	mother of pearl? Earring front	mother of pearl?	none								
230	42Be3180-229	Looter Pit	VI20	domestic	cups	fragment	food prep/consumption	KTK ceramic fragment	vitreous ceramic	KTK Vitreous	Knowles Taylor & Knowles		1890			Lage 2004: 170		
231	42Be3180-230	Looter Pit	VI20	personal	bottle	fragment	social drugs	amethyst glass fragment	amethyst glass	none			1880	1925		Fike 2002: 14		
232	42Be3180-231	Looter Pit	VI20	personal	bottle	fragment	social drugs	aqua bottle fragment	aqua glass	none								
233	42Be3180-232	Looter Pit	VI20	domestic	crock	fragment	food storage	stoneware crock fragment	stoneware	none								
234	42Be3180-233	Looter Pit	VI20	personal	cold cream jar	fragment	grooming/health	cold cream jar	milkglass	none								
235	42Be3180-234	Looter Pit	VI20	domestic	bowl	fragment	furnishings	amethyst glass fragment	amethyst glass	none			1880	1925		Fike 2002: 14		
236	42Be3180-235	Looter Pit	VI20	personal	doll	fragment	toys	porcelain doll	porcelain	none								
237	42Be3180-236	Looter Pit	VI20	personal	bottle	fragment	social drugs	liquor bottle frag	brown	WF & S MIL / 35	William Franzen & Sons	Milwaukee						
238	42Be3180-237	Looter Pit	VI20	domestic	soup tureen	fragment	food prep/consumption	serving bowl or soup tureen	earthenware	[royal patent mark with lion and unicorn]								
239	42Be3180-238	Looter Pit	VI20	personal	shoe	fragment	footware	shoe leather	leather	none								
240	42Be3180-239	Looter Pit	VI20	domestic	clock	fragment	furnishings	clock works	metal	none								
241	42Be3180-240	Looter Pit	VI20	domestic	crock	fragment	food storage	stoneware crock (yellow)	stoneware	none								
242	42Be3180-241	Looter Pit	VI20	personal	bottle	fragment	social drugs	aqua bottle fragment	aqua glass	none								
243	42Be3180-242	Looter Pit	VI20	personal	comb	fragment	grooming/health	comb	hard rubber or	none								
244	42Be3180-243	large dump	VI21	domestic	can	fragment	food storage	condensed milk	metal	none								
245	42Be3180-244	large dump	VI21	domestic	bone	fragment	food	cut bone (shank)	bone	beef								
246	42Be3180-245	large dump	VI21	domestic	platter	fragment	food prep/consumption	restaurantware ceramic (platter)	vitreous ceramic	none								
247	42Be3180-246	large dump	VI21	domestic	can	fragment	food storage	square powder	metal	none								
248	42Be3180-247	large dump	VI21	domestic	can	fragment	food storage	round baking powder can lid	metal	"-NIA -- BAKING POWDER [lion]"								
249	42Be3180-248	large dump	VI21	domestic	platter	fragment	food prep/consumption	restaurantware ceramic (platter)	vitreous ceramic	"- BURSON / HOTEL CHINA"								
250	42Be3180-249	large dump	VI21	domestic	platter	fragment	food prep/consumption	restaurantware ceramic (platter)	vitreous ceramic	" - NI / -OUD / CS"								
251	42Be3180-250	large dump	VI21	domestic	bone	fragment	food	cut bone (roast)	bone	beef								
252	42Be3180-251	large dump	VI21	domestic	ceramic	fragment	food prep/consumption	ceramic fragment	earthenware	HOMER LAUGHLIN / HOTEL / CHINA	Homer Laughlin		1901	1915		Lage 2004: 174		
253	42Be3180-252	large dump	VI21	indefinite	barrel hoop	complete	misc. containers	barrel hoops	metal	none							1	

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254	42Be3180-253	large dump	VI21	personal	bottle	fragment	social drugs	amethyst glass fragment	amethyst glass	none			1880	1925		Fike 2002: 14		
255	42Be3180-254	large dump	VI21	domestic	ceramic	fragment	food prep/consumption	Chinese rice bowl	vitreous ceramic(?)	[Chinese]			19th c			Lage 2004		
256	42Be3180-255	large dump	VI21	domestic	can	complete	food storage	key-opened rectangular meat can	metal	TANG								
257	42Be3180-256	IG02 TU1	TU1	domestic	oyster shell	fragment	food	oyster shell	oyster	none								
258	42Be3180-257		VI07	unidentified	leather	fragment		leather strap?	leather	none								
259	42Be3180-258	IG02 TU1	TU1	unidentified	glass tube	fragment		clear glass tube or pipette	clear glass	none							1	
260	42Be3180-259	IG03 TU2	TU2	industrial	slag	fragment	mining	slag	slag	none							1	
261	42Be3180-260	ISO	ISO	domestic	teacup	fragment	food prep/consumption	teacup with floral decal (rose, gilding)	earthenware	[floral rose pattern on front; gilded floral pattern on back]							1	
262	42Be3180-261		VI02	personal	bottle	fragment	grooming/health	perfume bottle shaped like shoe	amethyst glass	shaped like a shoe			1880	1925		Fike 2002: 14	1	
263	42Be3180-262		VI02	personal	button	complete	clothing	glass button	milkglass	none							1	
264	42Be3180-263		VI02	domestic	plate	fragment	food prep/consumption	ceramic fragment with brown leaf decal	earthenware	brown leaf decal [Wild Rose pattern]	Cartwright & Edwards		1870	1890		Lage 2004: 58	1	
265	42Be3180-264	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	"IRONSTONE CHINA / [crown and unicorn]"	Johnson Brothers	England	1904			Lage 2004: 159	1	
266	42Be3180-265	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	" - E CHINA / [shield & unicorn] / [Johns]on BROS / - URST & CO"	Johnson Brothers	England	1904			Lage 2004: 159	1	
267	42Be3180-266	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	Homer Laughlin / HUDSON	Homer Laughlin		1900			Lage 2004: 174	1	
268	42Be3180-267	IG02 TU1	TU1	domestic	teacup	fragment	food prep/consumption	ceramic fragment	earthenware	"FURNIVAL"	Thomas Furnival & Sons	England	1818	1890		Lage 2004: 111	1	
269	42Be3180-268	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	"IRONSTONE - RA" [on ribbon]							1	
270	42Be3180-269	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	faint mark with ribbon							1	
271	42Be3180-270	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	faint mark with ribbon and IMPRESSED MARK							1	
272	42Be3180-271	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	MADE -							1	
273	42Be3180-272	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	floral with ribbon							1	
							food											

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274	42Be3180-273	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	IMPRESSED MARK							1	
275	42Be3180-274	IG02 TU1	TU1	domestic	teacup	fragment	food prep/consumption	ceramic fragment	vitreous ceramic	floral design							1	
276	42Be3180-275	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	green wash color on ceramic							1	
277	42Be3180-276	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	porcelain	white with faint floral pattern							1	
278	42Be3180-277	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	white with blue lines							1	
279	42Be3180-278	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	porcelain	white with blue and gilded lines							1	
280	42Be3180-279	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	porcelain	white with blue and black rim							1	
281	42Be3180-280	IG02 TU1	TU1	domestic	bowl	fragment	food prep/consumption	ceramic fragment	earthenware	blue pattern on edge of interior and exterior							1	
282	42Be3180-281	IG02 TU1	TU1	domestic	teacup	fragment	food prep/consumption	ceramic fragment	porcelain	gilding and rose	possibly Syracuse China		1893	1898		Lage 2004: 329	1	
283	42Be3180-282	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	faint pink and gilding	possibly Ernst Teichert		1884			Lage 2004: 334	1	
284	42Be3180-283	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	brown and white, pineapple?							1	
285	42Be3180-284	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	blue and white							1	
286	42Be3180-285	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	scalloped rim							1	
287	42Be3180-286	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	earthenware	scalloped rim							1	
288	42Be3180-287	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	porcelain	slightly scalloped rim with floral decal							1	
289	42Be3180-288	IG02 TU1	TU1	domestic	plate	fragment	food prep/consumption	ceramic fragment	vitreous ceramic	floral pattern							1	
290	42Be3180-289	IG02 TU1	TU1	domestic	defuser	fragment	food prep/consumption	porcelain defuser or decoration	porcelain	has four small holes like a defuser for tea							1	

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291	42Be3180-290	IG02 TU1	TU1	domestic	jar	fragment	food storage	screw top type container	bisque	none							1	
292	42Be3180-291	IG02 TU1	TU1	domestic	pitcher	fragment	food prep/consumption	restaurantware ceramic (pitcher)	vitreous ceramic	none							1	
293	42Be3180-292	IG02 TU1	TU1	domestic	container lid	fragment	food storage	container or vessel lid for	earthenware	black and white " - OT / SERVIN-"							1	
294	42Be3180-293	IG02 TU1	TU1	domestic	crock	fragment	food storage	yellow ware mixing bowl	earthenware	none							1	
295	42Be3180-294	IG02 TU1	TU1	domestic	crock	fragment	food storage	stoneware crock	stoneware	none							1	
296	42Be3180-295	IG02 TU1	TU1	domestic	crock	fragment	food storage	burned? Stoneware	stoneware	none							1	
297	42Be3180-296	IG02 TU1	TU1	domestic	crock	fragment	food storage	yellow ware mixing bowl	earthenware	none							1	
298	42Be3180-297	IG02 TU1	TU1	domestic	crock	fragment	food storage	brown and cream crock	stoneware	none							1	
299	42Be3180-298	IG02 TU1	TU1	domestic	crock	fragment	food storage	black and brown crock	stoneware	none							1	
300	42Be3180-299	IG02 TU1	TU1	personal	bottle	fragment	social drugs	double ring aqua neck	aqua glass	none							2	
301	42Be3180-300	IG02 TU1	TU1	personal	bottle	fragment	social drugs	double oil or mineral aqua	aqua glass	none							1	
302	42Be3180-301	IG02 TU1	TU1	personal	bottle	fragment	social drugs	flat or patent aqua bottle neck	aqua glass	none							2	
303	42Be3180-302	IG02 TU1	TU1	personal	bottle	fragment	social drugs	brandy or wine bottle neck	amethyst glass	none			1880	1925		Fike 2002: 14	2	
304	42Be3180-303	IG02 TU1	TU1	personal	bottle	fragment	social drugs	bead bottle neck	amethyst	none			1880	1925		Fike 2002: 14	1	
305	42Be3180-304	IG02 TU1	TU1	personal	bottle	fragment	grooming/health	prescription bottle neck	amethyst glass	none			1880	1925		Fike 2002: 14	3	
306	42Be3180-305	IG02 TU1	TU1	personal	bottle	fragment	social drugs	brandy or wine bottle neck	green glass	none							1	
307	42Be3180-306	IG02 TU1	TU1	personal	bottle	fragment	social drugs	crown bottle	green glass	none							1	
308	42Be3180-307	IG02 TU1	TU1	personal	bottle	fragment	social drugs	ring / oil bottle neck	green glass	none							1	
309	42Be3180-308	IG02 TU1	TU1	personal	bottle	fragment	social drugs	stacked ring brown neck	brown glass	none							1	
310	42Be3180-309	IG02 TU1	TU1	personal	bottle	fragment	social drugs	crown bottle	brown	none							2	
311	42Be3180-310	IG02 TU1	TU1	personal	bottle	fragment	social drugs	brandy or wine bottle neck	brown glass	none							3	
312	42Be3180-311	IG02 TU1	TU1	personal	bottle	fragment	social drugs	unknown style bottle neck	brown glass	none							1	
313	42Be3180-312	IG02 TU1	TU1	personal	bottle	fragment	social drugs	small or wide mouth external thread	clear glass	none							1	
314	42Be3180-313	IG02 TU1	TU1	domestic	goblet / stemware	fragment	food prep/consumption	clear glass goblet or stemware	clear glass	none							1	
315	42Be3180-314	IG02 TU1	TU1	personal	bottle	fragment	social drugs	shoulder from liquor bottle	brown / patenated bottle	none							1	
									brown /									

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316	42Be3180-315	IG02 TU1	TU1	personal	bottle	fragment	social drugs	base with pontil mark	brown / patenated bottle	pontil mark							1	
317	42Be3180-316	IG02 TU1	TU1	personal	bottle	fragment	social drugs	base with kick up	brown / patenated bottle	kickup							1	
318	42Be3180-317	IG02 TU1	TU1	personal	bottle	fragment	social drugs	brown base from liquor bottle	brown / patenated bottle	none							1	
319	42Be3180-318	IG02 TU1	TU1	personal	bottle	fragment	social drugs	side wall from bottle	amber bottle	none							1	
320	42Be3180-319	IG02 TU1	TU1	personal	bottle	fragment	social drugs	rim and side wall from liquor	green glass	none							2	
321	42Be3180-320	IG02 TU1	TU1	personal	bottle	fragment	grooming/health	prescription bottle base	cobalt glass	[milk of magnesia]	Chas. H. Phillips Co	Connecticut	1924	1976	Bottle	Fike 1987: 141	1	
322	42Be3180-321	IG02 TU1	TU1	domestic	bottle	fragment	furnishings	clear with line decorated glassware	clear glass	decorative lines							1	
323	42Be3180-322	IG02 TU1	TU1	domestic	bottle	fragment	furnishings	clear with floral decorated glassware	clear glass	decorative floral litho							1	
324	42Be3180-323	IG02 TU1	TU1	personal	bottle	fragment	grooming/health	panel bottle	aqua glass	" - ETOR // - TT / LOUIS"							2	
325	42Be3180-324	IG02 TU1	TU1	personal	bottle	fragment	social drugs	torpedo shaped bottle bases	aqua glass	"- AND - / - NTRES // HA- / COO- // BELFAST / DUBLIN"	Contrell & Cochrane? Medicated aerated water?	Belfast / Dublin	1870				1	
326	42Be3180-325	IG02 TU1	TU1	personal	bottle	fragment	social drugs	bottle fragments	aqua glass	none							4	
327	42Be3180-326	IG02 TU1	TU1	personal	bottle	fragment	social drugs	bottle fragments	amethyst	none			1880	1925		Fike 2002: 14	3	

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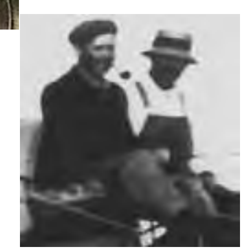
APPENDIX D1

San Francisco Mining District, Beaver County, Utah: People Database

Heather R. Puckett

May 2023



Photographs on cover:

1. Walter Slaughter
2. Unknown
3. Unknown
4. William S. Godbe
5. Unidentified Miners at the Horn Silver
6. Jay Gould
7. Daisy Hartman Nicholls
8. Unidentified Railroad Workers, Frisco
9. Towns people, Frisco Commercial District
10. Philip Henry Emerson
11. Jay Cooke
12. Unidentified shoppers, Slaughter Store, Frisco
13. Ella Slaughter
14. Walter Slaughter, Jr.
15. William H. Slaughter
16. Bally Sacket and unidentified man

The information contained within this Supporting Material includes the biographical information for identified residents within the San Francisco Mining District (SFMD). The SFMD has a period of significance from 1871 to 1952, with more than 33 businesses. The population changed dramatically following the collapse of the Horn Silver Mine's main shaft in February 1885. Along the eastern side of the San Francisco Mountains, a commercial district in Frisco flourished; a suburb – Grampian (or Dog-town) – formed closer to the mines; and the Newhouse town site formed on the western flanks of the San Francisco Mountains. By the 1920s, however, most of the settlement at Frisco and Grampian relocated as the mines waned.

The following slides correspond to the Excel table, *ApD1a_People-SFMD.xlsx*, which includes a detailed roster of the residents of the SFMD by name; gender; race; occupation; membership to the St. John's Lodge (Masonic Order); location; claim name [or Mine Employer]; birth place; father; mother; spouse; birth date; death date; age at death; cemetery or place of death; type of marker [primarily for the Frisco Cemetery]; references; and other notes/comments. The corresponding Excel table, *ApD1b_People-SFMD.xlsx*, contains supplemental information such as listings for the Frisco Cemetery; Claimants; a roster of the Horn Silver Mine employees (1880-1917); and a listing from the Bureau of Land Management's government Land Office (BLM-GLO) regarding land ownership. Both files are contained on the enclosed Compact Disc (CD).

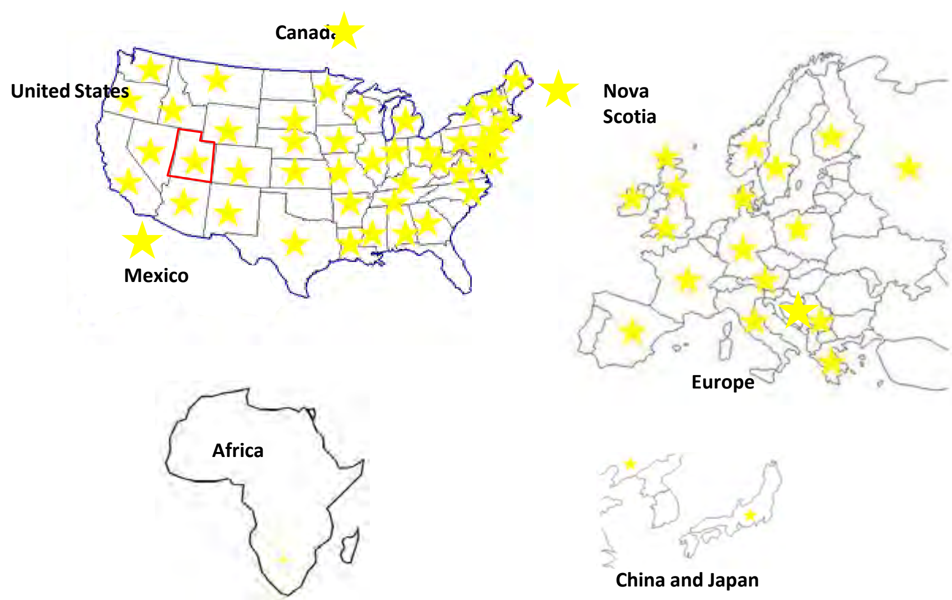
The information is the culmination of the archival records, review of the United States Census (1880, 1900, 1910, 1920, 1930 and 1940), including death and marriage records; listings from the City Directories or Gazetteers for businesses; newspapers; records from St. John's Lodge; employee rosters from the Horn Silver Mine; and records from the Department of Animal Husbandry. The largest source of this data was retrieved from the Church of Jesus Christ of Latter-Day Saints' webpage, http://www.FamilySearch.org. Newspapers are available in digital form from the University of Utah, J. Willard Marriott Library's Utah Digital Newspapers, http://digitalnewspapers.org/. Employee records for the Horn Silver Mine were provided from the L. Tom Perry Special Collections, Harold B. Lee Library, Brigham Young University, Provo, Utah.

Findings

Whilst the Historic Landscape Characterisation (HLC) focuses upon the extent of the physical remains and change over time, the database provides a glimpse at the human legacy within the landscape of the SFMD. Historic maps reflect the structures – residential or commercial – as well as the utility and transportation networks, and mining features, and how each of these attributes relate to the landscape as a whole. The biographical side, however, provides further insight as to how broad these networks span, through regional, continental and international routes.

Settlers to the SFMD arrived from 43 states, two territories and the District of Columbia, and 25 countries. Note the only states not represented at the SFMD were North Dakota, Oklahoma, South Carolina and Florida. Utah is shown in red. The table below summarizes the locations whilst the maps show the general locations.

Continental United States	Other Countries
Alabama	Australia
Arizona	Austria
Arkansas	Canada
California	China
Colorado	Denmark
Connecticut	England / Wales / South Wales / Isle of Man
Delaware	Finland
Georgia	France
Idaho	Germany / Prussia
Illinois	Greece
Indiana	Ireland
Iowa	Italy
Kansas	Japan
Kentucky	Mexico
Louisiana	Norway
Maine	Nova Scotia / Cape Breton
Maryland	Poland
Massachusetts	Russia
Michigan	Scotland
Minnesota	Serbia
Mississippi	Spain
Missouri	South Africa
Montana	Sweden
Nebraska	Switzerland
Nevada	Yugoslavia
New Hampshire	
New Jersey	
New Mexico	
New York	
North Carolina	
Ohio	
Oregon	
Pennsylvania	
Rhode Island	
South Dakota	
Tennessee	
Texas	
Utah / Utah Territory	
Vermont	
Virginia	
West Virginia	
Wisconsin	
Wyoming	
District of Columbia	
Washington Territory	



A myriad of occupations are noted amongst the residents of the SFMD. The majority of these occupations reflected labour associated with mining activities, such as assayers, blacksmiths, breaker man, cage rider, brick mason, carpenter, car man, cartman, charcoal burners and coal burners, charge wheelers, chemists, Civil Engineers, wood chopper, fireman, foreman, furnace feeder / helper, machinist, sawyer, messenger boy, and millman. Few of the positions suggested the affluence of the District, such as the presence of a jeweller, photographer, painter, and tonsorial artist (i.e., barber). Necessary positions, such as boarding house keepers, attorneys, bankers, butchers, clerks, cooks, laundry, grocer and general merchandise are well represented and likely are associated with the commercial district.

Interestingly, none of the female settlers were identified in the US Censuses as prostitutes. The archival record held very little information regarding the "red light" district often associated with mining ventures. Rather, there was little supporting evidence for women being occupied within saloons or other establishments, except in the role of waitress, cook, milliner, midwife, or laundress. The majority of the women noted in the Censuses within the SFMD are listed as housekeepers.

Many of the families intermarried; continued to reside in the Frisco and Grampian areas over a decade; and supported a variety of family businesses.

Archival records suggest a booming Chinese population at Frisco. Whilst there were Chinese represented in the US Censuses, the only occupations listed for these individuals included laundry, cook, and hotel waiters.

In addition to mining ventures, there were several individuals associated with cattle and sheep ranching activities in the SFMD.

Further, the current study revealed several additional individuals as being buried at the Frisco Cemetery than had been noted previously. The increased listing of burials supports the theory that the current boundaries of the cemetery fencing may be smaller than the extent of the original cemetery. It is possible that some of the burials were exhumed and relocated elsewhere as the town diminished and residents moved away.

Army veteran
Assayers
Attorneys / Lawyers
Baker
Banker
Barber / Tonsorial Artist
Blacksmith
Butcher
Boarding House keeper
Book keeper
Breaker man
Brewery
Brick Mason
Cage Rider
Carman / Labourer
Carpenter
Cart man
Cattle Dealer / Herder /
Dairyman / Stockman / Stock
Raiser
Charcoal Burner / Coal
Burner
Charge Wheeler
Chemist
Civil Engineer
Clerk in Store
Constable
Cook
Copyist
Dentist
Deputy Post Master / Post
Master
Domestic
Dressmaker
Druggist
Engineer
Farmer
Fireman
Mine Foreman
Freighter
Furnace feeder / helper
General Merchandise
Grocer / Notions
Hairdresser
Harness Maker
Hostler
Hotel clerk / keeper / waitress
Housekeeper
Ice dealer
Jeweller

Job Printer
Journalist
Judge
Justice of the Peace
Labourer
Laundry
Livery
Livestock Owner
Lodging Housekeeper
Lumber dealer
Machinist
Mailer
Mine Owner
Mechanic
Messenger boy
Midwife
Milliner
Millman
Miner
Musician
Notary Public
Notions
Painter
Photographer
Physician / Surgeon
Restaurant Owner
Rancher
Retail Grocer
Student
Saloon Owner
Shoe shop
Sawyer
School Teacher
Stone Mason
Smelter hand
Sculptor
Servant
Sheep Owner
Stage Driver
Tailor
Telephone Operator
Teamster
US Federal Judge
Wagon maker
Waiter / Waitress
Washing
Watchmaker
Welder
Weigh master
Wood chopper

Appendix D1a: People Database

NOTE: Due to the large volume of information contained within this Excel database, the following provides an example excerpt.

Microsoft Excel - ApD1a_PEOPLE-SFMD.xlsx

	A	B	C	D	E	F	G	H	I	J	K	L
1	NAME	GENDER	RACE	OCCUPATION	MASON / ST. JOHN'S LODGE	LOCATION	CLAIM NAME [or Mine Employer]	BIRTH PLACE	FATHER	MOTHER	SPOUSE [or Marital Status]	BIRTH DA
2	[Unknown], Carby	F	NA	[unknown]	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	[Unknown]	[Unknown]	Tom	1862
3	[Unknown], Elizabeth	F	NA	[unknown]	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	[Utah]	[Utah]	Frank	
4	[Unknown], Jake	M	NA	[unknown]	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	[Utah]	[Utah]	married	
5	[Unknown], Joseph	M	NA	[unknown]	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	[Utah]	[Utah]	single	
6	[Unknown], Lizzie	F	NA	daughter/child	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	Tom	Carby		
7	[Unknown], Lucy	F	NA	[unknown]	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	[Utah]	[Utah]	Poke, Shite	
8	[Unknown], Milford	M	NA	son/child	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	Tom	Carby		
9	[Unknown], Minnie	F	NA	daughter/child	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	Tom	Carby		
10	[Unknown], Pete	M	NA	son/child	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	Tom	Carby		
11	[Unknown], Schney	M	NA	son/child	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	Tom	Carby		
12	[Unknown], Tena	F	NA	[unknown]	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	[Utah]	[Utah]	single	
13	[Unknown], Tom	M	NA	[unknown]	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	[Utah]	[Nevada]	Carby	
14	[Unknown], Topsy	F	NA	[unknown]	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	[Utah]	[Utah]	married	
15	[Unknown], unnamed	F	NA	daughter/child	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	Tom	Carby		
16	[Unknown], unnamed	M	NA	son/child	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	Tom	Carby		
17	[Unkowm], Frank	M	NA	[unknown]	no	Indian Peak, Frisco, Utah	[unknown]	Utah / Utah Territory	[Utah]	[Utah]	Elizabeth	
18	Abeling, Allen Page	M	W	[unknown]	no	Newhouse, Utah (1917); Burke, Idaho	[unknown]	Troy, Idaho	Abeling, Howard V.	Page, Lila	single	4-Oct-07
19	Abraham [Abram], David	M	W	son/child	no	Frisco, Utah	[unknown]	Caerphilly, Mnmths, S-WI [Wales]	Abraham [Abram], Griffith J.	Abraham [Abram], Maria [Mara] Morgan	Thomas, Sarah	1867
20	Abraham [Abram], Elizabeth Ann	F	W	daughter/child	no	Frisco, Utah	[unknown]	Plymouth, Luzerne, Pennsylvania	Abraham [Abram], Griffith J.	Abraham [Abram], Maria [Mara] Morgan	Dickey, James H	28 Nov 18
21	Abraham [Abram], Griffith J.	M	W	Laborer / Night Watchman	no	Frisco, Utah	Horn Silver Mine	Abersychan, Trevethan, Monmouth, England	Abraham, John	Davies, Elizabeth	(1) Hannah Richards; (2) Abraham [Abram], Maria [Mara] Morgan	20 Jun 18
22	Abraham [Abram], John Morgan	M	W	son/child	no	Frisco, Utah	[unknown]	Merthyr, Tidwell, Glamorgan, Wales	Abraham [Abram], Griffith J.	Abraham [Abram], Maria [Mara] Morgan	Young, Catherine	30 May 18
23	Abraham [Abram], Maria [Mara] Morgan	F	W	housekeeper	no	Frisco, Utah	[unknown]	Merthyr, Tidfil, Glamorgan, Wales	[Wales]	[Wales]	Abraham [Abram], Griffith J.	1843
24	Abraham [Abram], Maria A.	F	W	daughter/child	no	Frisco, Utah	[unknown]	Grand Tunnel, Pennsylvania	Abraham [Abram], Griffith J.	Abraham [Abram], Maria [Mara] Morgan	King, Arthur M.	12 May 18
25	Abraham [Abram], Sarah	F	W	daughter/child	no	Frisco, Utah	[unknown]	Rock Springs, Wyoming	Abraham [Abram], Griffith J.	Abraham [Abram], Maria [Mara] Morgan	(1) Theodor/Theodore Anderson; (2) John N. Holmes	11 Aug 18
26	Achtermann, Charles [Chas]	M	W	Laborer / Miner	no	Frisco, Utah	Horn Silver Mine	Germany	[Germany]	[Germany]	single	1850
27	Acosta, John W.	M	M	Laborer	no	Beaver County, Utah	[unknown]	Mexico	[Mexico]	[Mexico]	single	1893
28	Adams, Moses J.	M	W	Miner	no	Frisco, Utah	Horn Silver Mine	Kentucky, USA	[Pennsylvania]	[Virginia]	single	1832
29	Adamson, David	M	W	Laborer	no	Frisco, Utah	Horn Silver Mine	[Unknown]	[Unknown]	[Unknown]		
						Frisco, Utah (resided in Hastings,						

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Microsoft Excel - ApD1a_PEOPLE-SFMD.xlsx

	NAME	BIRTH DATE	DEATH DATE	AGE AT DEATH	CEMETERY or PLACE OF DEATH	TYPE OF MARKER	REFERENCE	OTHER NOTES / COMMENTS
2	[Unknown], Carby	1862					US Census (1900)	household included Tom, Carby, Schney, Milford, Lizzie, Minnie, Pete (Native American)
3	[Unknown], Elizabeth						US Census (1900)	household included Frank and Elizabeth (Native American)
4	[Unknown], Jake						US Census (1900)	(Native American)
5	[Unknown], Joseph						US Census (1900)	(Native American)
6	[Unknown], Lizzie						US Census (1900)	household included Tom, Carby, Schney, Milford, Lizzie, Minnie, Pete (Native American)
7	[Unknown], Lucy						US Census (1900)	household included Shite Poke and Lucy (Native American)
8	[Unknown], Milford						US Census (1900)	household included Tom, Carby, Schney, Milford, Lizzie, Minnie, Pete (Native American)
9	[Unknown], Minnie						US Census (1900)	household included Tom, Carby, Schney, Milford, Lizzie, Minnie, Pete (Native American)
10	[Unknown], Pete						US Census (1900)	household included Tom, Carby, Schney, Milford, Lizzie, Minnie, Pete (Native American)
11	[Unknown], Schney						US Census (1900)	household included Tom, Carby, Schney, Milford, Lizzie, Minnie, Pete (Native American)
12	[Unknown], Tena						US Census (1900)	household included Topsy and Tena (Native American)
13	[Unknown], Tom						US Census (1900)	household included Tom, Carby, Schney, Milford, Lizzie, Minnie, Pete (Native American)
14	[Unknown], Topsy						US Census (1900)	household included Topsy and Tena (Native American)
15	[Unknown], unnamed						US Census (1900)	household included Tom, Carby, Schney, Milford, Lizzie, Minnie, Pete (Native American)
16	[Unknown], unnamed						US Census (1900)	household included Tom, Carby, Schney, Milford, Lizzie, Minnie, Pete (Native American)
17	[Unkown], Frank						US Census (1900)	household included Frank and Elizabeth (Native American)
18	Abeling, Allen Page	4-Oct-07	9-Oct-17	5 days	Salt Lake City			
19	Abraham [Abram], David	1867	5-Dec-43	76	Rock springs, Wyoming		US Census (1880)	household included Griffith Abraham, Maria Abraham, David Abraham, EA Abraham, John Abraham, MA Abraham
20	Abraham [Abram], Elizabeth Ann	28 Nov 1869	15-Sep-43	74			US Census (1880)	household included Griffith Abraham, Maria Abraham, David Abraham, EA Abraham, John Abraham, MA Abraham
21	Abraham [Abram], Griffith J.	20 Jun 1834	10 Sep 1882	48	Rock Springs, Wyoming		US Census (1880); Horn Silver Mining Company Records, 1880-1917 (MSS 872, LTP Special Collections, HBLL, BYU)	household included Griffith Abraham, Maria Abraham, David Abraham, EA Abraham, John Abraham, MA Abraham. October 1880 listing; December 1880 listing
22	Abraham [Abram], John Morgan	30 May 1865	25-Apr-48	83	Byron, Big Horn, Wyoming		US Census (1880)	household included Griffith Abraham, Maria Abraham, David Abraham, EA Abraham, John Abraham, MA Abraham
23	Abraham [Abram], Maria [Mara] Morgan	1843					US Census (1880)	household included Griffith Abraham, Maria Abraham, David Abraham, EA Abraham, John Abraham, MA Abraham. Previous children included Moses Abraham (b 4 Apr 1872 in Plymouth, Luzern PA, died 1877 in PA); Mary Abraham (b. 3 Nov 1874 in Plymouth, Luzerne, PA; died 1877 in Wyoming)
24	Abraham [Abram], Maria A.	12 May 1878	15-Aug-48	70			US Census (1880)	household included Griffith Abraham, Maria Abraham, David Abraham, EA Abraham, John Abraham, MA Abraham
25	Abraham [Abram], Sarah	11 Aug 1882	24-May-53	71				Daughter of Griffith & Maria Abraham. Implies family left Frisco by 1882 for Wyoming or that Maria Abraham gave birth to Sarah in Wyoming.
26	Achtermann, Charles [Chas]	1850					US Census (1880); Horn Silver Mining Company Records, 1880-1917 (MSS 872, LTP Special Collections, HBLL, BYU)	September 1881 listing
27	Acosta, John W.	1893					US Census (1920)	household included John W. Acosta, John William Smith, Tom Caselle, George A Wait, Octigo Nukes,
28	Adams, Moses J.	1832					US Census (1880); Horn Silver Mining Company Records, 1880-1917 (MSS 872, LTP Special Collections, HBLL, BYU)	September 1881 listing only. Boarded with FW Littlejohn, Frank Gallagher and WH Dare
29	Adamson, David						Horn Silver Mining Company Records, 1880-1917 (MSS 872, LTP Special Collections, HBLL, BYU)	July/September 1881 listing
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		Directory (1884-1884); US Census (1910, Minnesota); http://fultonhistory.com/Newspaper%2	Only listed in Utah in Directory/Gazetteer for 1883-1884. Does not appear in the Census before or after in Utah. Adsit family listed in NY newspaper in 1853-1855 in Hammondsport, NY, as AM Adsit & Co Proprietors (New York State Digital Library), associated with shipping industry. AM Adsit, physician appears as AM Adcit, Alfred M. Adsit, and Alfred M. Adset. In 1885, married Susan F. Adsit and

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Appendix D1b: Frisco Cemetery

Microsoft Excel - ApD1b_PEOPLE-SFMD.xlsx

	Deceased	Occupation	Birth Place	Father	Mother	Birth Date	Death Date	Age at Death	Cemetery	Other
2	Bailie, Samuel	miner	County Down, Ireland			5/17/1866	9/27/1894	28	Frisco/Grampian, Beaver County, Utah	
3	Barrett, Burton	son/child	Frisco, Utah	Barrett, William Henry	Turlie, Elsie Elizabeth	5/7/1896	5/10/1896	3 days	Frisco/Grampian, Beaver County, Utah	
4	Barrett, George E.	son/child	Frisco, Utah	Barrett, William Henry	Turlie, Elsie Elizabeth	4/8/1902	4/22/1902	14 days	Frisco/Grampian, Beaver County, Utah	
5	Barrett, Gladys	daughter/child	Frisco, Utah	Barrett, William Henry	Turlie, Elsie Elizabeth	12/8/1897	1/28/1898	51 days	Frisco/Grampian, Beaver County, Utah	
6	Barrett, Henry J.	son/child	Frisco, Utah	Barrett, James	Barrett, Mattie	1/31/1883	1/19/1884	19 days	Frisco/Grampian, Beaver County, Utah	
7	Baudino, Peter Tony	son/child	Scofield, Utah	Baudino, Martin	Yano, Mary	7/30/1902	5/13/1918	16	Frisco/Grampian, Beaver County, Utah	
8	Belingheri, Bortolo	millman	Colere, Italy	Belingheri, Paolo	Belingheri, Bortolamea	3/8/1878	1/8/1914	35	Frisco/Grampian, Beaver County, Utah	grave not relocated
9	Blackner, James Henry	[NONE IDENTIFIED]							Frisco/Grampian, Beaver County, Utah	married Jane Allen, Mary Ann Jones (1868); grave not relocated
10	Blakemore, Mr. Page	mine owner	Tennessee	Blakemore, Page Blanton	Sights, Virginia		2008		Frisco/Grampian, Beaver County, Utah	
11	Blakemore, Mrs. Ella Harriet	spouse of mine owner					2008		Frisco/Grampian, Beaver County, Utah	
12	Cavellini, Severino Pietro	miner	Italy	Cavellini, Giovanni [Italy]	Pasqualetti, Caroline [Italy]	9/25/1881	7/3/1914	32 years, 9 months 8 days	Frisco/Grampian, Beaver County, Utah	grave not relocated
13	Cotter, Daniel P.	miner	Ireland	[Ireland]	[Ireland]	1840?	9/28/1895	58	Frisco/Grampian, Beaver County, Utah	died in Butte, Montana; grave not relocated
14	Crowley, Patrick	miner	Ireland	[Ireland]	[Ireland]	ca 1880	1/19/1913	about 32	Frisco/Grampian, Beaver County, Utah	grave not relocated
15	English, William	coal burner	Missouri	[Kentucky]	[Kentucky]	1830	10/1885	55	UNKNOWN	died in Frisco, Utah
16	Erickson, John	hotel keeper	Finland	[Finland]	[Finland]	ca. 1881	8/7/1908	27	Frisco/Grampian, Beaver County, Utah	grave not relocated
17	Dalton [Eyre], Thelma	[NONE IDENTIFIED]	Frisco, Utah	Eyre, William	Eyre, Nany	3/3/1900	Jul-81	81	UNKNOWN	born Frisco, Utah; parents married in Frisco, 1/25/1899
18	Farwell Wife and Children								Frisco/Grampian, Beaver County, Utah	graves not relocated
19	Giacomo, Abati	miner	Colere, Italy	Giacomo, Giovanni Antonio	Sazzarani, Caterina	3/15/1885	6/11/1913	28	Frisco/Grampian, Beaver County, Utah	grave not relocated
20	Godsey, Ralph	son/child	Salt Lake City, Utah	Godsey, Edward R	Nelson, Maude	8/29/1908	12/1/1908	2 mo	Frisco/Grampian, Beaver County, Utah	grave not relocated
21	Griffith(s), Walter David	son/child	Frisco, Utah	Griffiths, James Lloyd	Slaughter, Clara Elizabeth	2/14/1904	11/2/1972	68	UNKNOWN	born Frisco, Utah; married Juanita Laverne Hickman, 12/17/1922
22	Griffiths, Earl E.	son/child	Adamsville, Utah	Griffiths, James Lloyd	Slaughter, Clara Elizabeth	1/28/1895	2/22/1898	3	Frisco/Grampian, Beaver County, Utah	
23	Hall, Arlin Thomas	son/child	Unknown	Hall, Edgar	Stringer, Helen A.	1908	29-Dec-17	9 years, 3 months, 20 days	Frisco/Grampian, Beaver County, Utah	
24	Helsten, Hilga	daughter/child	Utah / Utah Territory	Helsten, Moses	Kunebula / Watson, Henrika	1/15/1906	8/21/1906	6 mo, 6 days	Frisco/Grampian, Beaver County, Utah	grave not relocated
25	Hopkins, Roswell Whitney		San Bernardino, California	Hopkins, Richard Rockwell	Crandell, Ruth	7/9/1852	6/5/1879	27	Frisco/Grampian, Beaver County, Utah	
26	Hultgreen, Andrew	miner				1852	27-Sep-16	64	Frisco/Grampian, Beaver County, Utah	grave not relcoated
27	Jacometti, Pete	miner	Italy	Jacometti, Luigi	Mariaua, Ruggironi	Dec 1866	4/16/1910	44	Frisco/Grampian, Beaver County, Utah	grave not relcoated
28	James, Rachel	daughter/child	Port Wine, California	James, William	Powell, Ann	12/17/187	3/6/1883	11	Frisco/Grampian, Beaver County, Utah	
29	James, Tommy	son/child	Frisco, Utah	James, Thomas	Phillips, Ann	6/2/1882	4/12/1883	1	Frisco/Grampian, Beaver County, Utah	
30	Johansen, Christian	miner	Denmark			1834	27-Jul-14	80	Frisco/Grampian, Beaver County, Utah	
31	Johansen, Christie Alvira	daughter/child	Newhouse, Utah	Johansen, Ola Pete	Thompson, Anna M	4/28/1912	6/7/1912	1 mo, 15 days	Frisco/Grampian, Beaver County, Utah	grave not relcoated; Southern Utonian, 6/14/1912
32	Jones, Edna	daughter/child	Frisco, Utah	Jones, Evan E.	Jones, Lucretia Walters			7 years	Frisco/Grampian, Beaver County, Utah	
33	Jones, Eliza	daughter/child	Frisco, Utah	Jones, Evan E.	Jones, Lucretia Walters	1890			UNKNOWN	born Frisco, Utah
34	Jones, Leroy	son/child	Frisco, Utah	Jones, Evan E.	Jones, Lucretia Walters			14 months	Frisco/Grampian, Beaver County, Utah	
35	Jones, Owen	son/child	Frisco, Utah	Jones, Evan E.	Jones, Lucretia Walters				UNKNOWN	born Frisco, Utah
36	Julius, Frederick Richard	Civil War Veteran							Frisco/Grampian, Beaver County, Utah	[partial stone]
37	Lucci, Lorenzo	Miner	Italy	[Italy]	[Italy]	circa 1883	4/24/1907	approx 24	Frisco/Grampian, Beaver County, Utah	grave not relcoated
38	McAulay, Christy Belle	daughter/child	Frisco, Utah	McAulay, John	Osborn, Thomascene	3/27/1896	1/11/1897	1	Frisco/Grampian, Beaver County, Utah	
39	McAulay, Ernest W.	son/child	Frisco, Utah	McAulay, Alexander D.	Watkins, Elizabeth A.	8/27/1901	8/29/1904	3	Frisco/Grampian, Beaver County, Utah	
40	McKeon, Bourke Maron (possibly Aaron)	son/child	Frisco, Utah ?	McKeon, P.B.	McKeon, Mary A.	5/11/1880	1881	1	Frisco/Grampian, Beaver County, Utah	

Frisco_Cemetery

Microsoft Excel - ApD1b_PEOPLE-SFMD.xlsx

	A	B	C	D	E	F	G	H	I	J
1	Deceased	Occupation	Birth Place	Father	Mother	Birth Date	Death Date	Age at Death	Cemetery	Other
41	McKeon, James	son/child	Frisco, Utah	McKeon, P.B.	McKeon, Mary A.			infant	Frisco/Grampian, Beaver County, Utah	
42	Miller, Johanna	housekeeper	Finland	Hazzblon, John	Madeline	9/14/1866	1/23/1912	45	Frisco/Grampian, Beaver County, Utah	grave not relocated
43	Nelson, Mike	ore miner	Finland	Nelson, Oscar	Nelson, Eusteva	2/3/1878	3/25/1912	34	Frisco/Grampian, Beaver County, Utah	grave not relocated
44	Norvald, Myrtle C.	daughter/child				12/9/1899	2/10/1900	32 days	Frisco/Grampian, Beaver County, Utah	
45	Oates [Oats], William	miner	New York			1854	1/28/1882	28	Frisco/Grampian, Beaver County, Utah	grave not relocated
46	O'Dell, Charles K.	miner?	Poughkeepsy [sic], New York			10/19/1841	11/21/1898	57	Frisco/Grampian, Beaver County, Utah	
47	Osborn, Gerald Samuel	son/child	Frisco, Utah	Osborn, Frank Lorin	Slaughter, Edith Ellen	4/4/1906	12/17/1906	9 months	Frisco/Grampian, Beaver County, Utah	
48	Peterson, Magnus	son/child	Beaver, Utah	Peterson, Mont. [from Stockholm, Sweden]	Peterson, Datie [from Scipio, UT]	1888 or 1891	22 Apr 1905	17 yrs, 5 mo, 11 days	Frisco/Grampian, Beaver County, Utah	grave not relocated
49	Pierce, Chas [Charles] H	tin / coppersmith	England	[England]	[England]	1833 [1876]	4/24/1906	30	Frisco/Grampian, Beaver County, Utah	grave not relocated
50	Pietro, Bendotti	mining; ore machine man	Italy	Bendotti, Emilio	Bettineaelli, Filomena	8/5/1885	10/25/1913	28	Frisco/Grampian, Beaver County, Utah	grave not relocated
51	Petty, Lillian Anderson Walker	housekeeper	Frisco, Utah	Anderson, Oliver	Walker, Lillian	8/18/1918	2/5/2000	81	Utah	Married Clair H. Petty, 4 SEPT 1937, Beaver, UT; Salt Lake Tribune, 2/8/2000
52	Rees, Alice		Adamsville, Beaver Co., Utah	Rees, Edwin	Rees, Mary Elizabeth Limb	4/25/1900	9/30/1901	1 yr 5 mo 5 days	UNKNOWN	died in Frisco, Utah
53	Reese, George M.	son/child	Frisco, Utah	Reese, Matthew Leyshon	Denton, Annie Marie	9/4/1881	8/12/1882	1	Frisco/Grampian, Beaver County, Utah	
54	Reeves, Bishop Bennet	son/child	Frisco, Utah				9/30/1881		Frisco/Grampian, Beaver County, Utah	grave not relocated
55	Rehnstrom, August Fredrick	son/child	Frisco, Utah	Rehnstrom, Johan August	Nielsen, Boletta Sophia	1882	1/1885	3	Frisco/Grampian, Beaver County, Utah	
56	Rehnstrom, Charlotte	daughter/child	Salt Lake City, Utah	Rehnstrom, Johan August	Nielsen, Boletta Sophia	1875	1/1885	10	Frisco/Grampian, Beaver County, Utah	
57	Rehnstrom, Gundra	daughter/child	Frisco, Utah	Rehnstrom, Johan August	Nielsen, Boletta Sophia	1884	1888	4	Frisco/Grampian, Beaver County, Utah	
58	Rehnstrom, Hilda	daughter/child	Salt Lake City, Utah	Rehnstrom, Johan August	Nielsen, Boletta Sophia	1877	1/1885	8	Frisco/Grampian, Beaver County, Utah	
59	Rehnstrom, John Barnhart	son/child	Salt Lake City, Utah	Rehnstrom, Johan August	Nielsen, Boletta Sophia	1871	1/1885	14	Frisco/Grampian, Beaver County, Utah	
60	Rosich, Steve	miner	Austria	[Austria]	[Austria]	circa 1886	1/2/1907	21	Frisco/Grampian, Beaver County, Utah	grave not relcoated
61	Roth, Ann [Ane]	daughter/child	New Jersey	Roth, Hans Jensen	Roth, Anna Marie Fynsk	1891			Frisco/Grampian, Beaver County, Utah	Inscription carved on back of Hans Roth gravestone
62	Roth, Hans	miner	Lojt Kirkeby, Aa-Sndr, Denmark	Roth, Johannes Jensen	Fynsk, Anna Andersen	6/12/1866	8/27/1905	39	Frisco/Grampian, Beaver County, Utah	
63	Roth, Thora	daughter/child	Frisco, Utah	Roth, Hans Jensen	Roth, Anna Marie Fynsk	1895	1890s	<5 yrs	Frisco/Grampian, Beaver County, Utah	Inscription carved on back of Hans Roth gravestone
64	Sackett, Clyde Milton	son/child	Frisco, Utah	Sackett, Frank Edwin	Ellison, Ettie May	2/21/1909	11/14/1915	6	Frisco/Grampian, Beaver County, Utah	
65	Sackett, Hugh J.	son/child	Frisco, Utah	Sackett, Hugh B.	Slaughter, Annie	1/29/1901	7/7/1901	7 months	Frisco/Grampian, Beaver County, Utah	
66	Sackett, LeRoy S.	son/child	Frisco, Utah	Sackett, Hugh B.	Slaughter, Annie	6/13/1905	12/27/1906	18 months	Frisco/Grampian, Beaver County, Utah	
67	Sackett, Willie	son/child	Frisco, Utah	Sackett, Theodore N.	Sackett, P.E.	10/22/1881	3/23/1882	5 months	Frisco/Grampian, Beaver County, Utah	
68	Smith, Mary	housekeeper	New York	Riley, Jim	[Unknown]	1865	1930	65 years	MILFORD	married to C.G. Smith, who murdered her in 1930 at Squaw Springs. C.G. Smith aka Cy Perkns. Formerly residents of Newhouse.
69	Smyth, John A.	ranchman	Ireland	[Ireland]	[Ireland]	12/28/1904	1882	58	Frisco/Grampian, Beaver County, Utah	
70	Smyth, Susanna	housekeeper	Ireland	[Ireland]	[Ireland]	12/30/1904	1882	56	Frisco/Grampian, Beaver County, Utah	
71	Staples, —y [Infant]	n/a		Staples, JR	Staples, JR	1880	27 December 1881	1 yr 4 mo 27 days	Frisco/Grampian, Beaver County, Utah	
72	Stone, Charles	n/a	Denver, Colorado	COL Stone			Feb 1882		Frisco/Grampian, Beaver County, Utah	grave not relocated
73	Swenson, Issac	miner	Sweden	[Sweden]	[Sweden]	circa 1863	5/20/1908	45	Frisco/Grampian, Beaver County, Utah	grave not relocated
74	Taylor, Mary Jane (Blackner) Morgan	[NONE IDENTIFIED]		Blackner, James Henry	Blackner, Jane Allen		12/28/1905		Frisco/Grampian, Beaver County, Utah	married Joseph Hyrum Morgan and John Taylor; buried 1/1/1906
75	Thompson, Carrie Emma	daughter/child	Frisco, Utah	Thompson, Charles Christian	Jensen, Ingre Marie	3/9/1891	6/9/1891	3 months	Frisco/Grampian, Beaver County, Utah	
76	Thompson, Joseph Claude		Frisco, Utah	Thompson, Claude M.	Thompson, Elfreda Tanner	3/14/1917	Oct-82	65	UNKNOWN	married Helen Leavitt
		[NONE								

Frisco_Cemetery

Microsoft Excel - ApD1b_PEOPLE-SFMD.xlsx

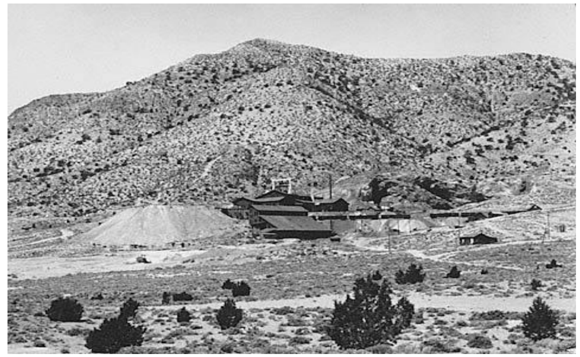
	A	B	C	D	E	F	G	H	I	J
1	Deceased	Occupation	Birth Place	Father	Mother	Birth Date	Death Date	Age at Death	Cemetery	Other
70	Smyth, Susanna	housekeeper	Ireland	[Ireland]	[Ireland]	12/30/1904	1882	56	Frisco/Grampian, Beaver County, Utah	
71	Staples, —y [Infant]	n/a		Staples, JR	Staples, JR	1880	27 December 1881	1 yr 4 mo 27 days	Frisco/Grampian, Beaver County, Utah	
72	Stone, Charles	n/a	Denver, Colorado	COL Stone			Feb 1882		Frisco/Grampian, Beaver County, Utah	grave not relocated
73	Swenson, Issac	miner	Sweden	[Sweden]	[Sweden]	circa 1863	5/20/1908	45	Frisco/Grampian, Beaver County, Utah	grave not relocated
74	Taylor, Mary Jane (Blackner) Morgan	[NONE IDENTIFIED]		Blackner, James Henry	Blackner, Jane Allen		12/28/1905		Frisco/Grampian, Beaver County, Utah	married Joseph Hyrum Morgan and John Taylor; buried 1/1/1906
75	Thompson, Carrie Emma	daughter/child	Frisco, Utah	Thompson, Charles Christian	Jensen, Ingre Marie	3/9/1891	6/9/1891	3 months	Frisco/Grampian, Beaver County, Utah	
76	Thompson, Joseph Claude		Frisco, Utah	Thompson, Claude M.	Thompson, Elfreda Tanner	3/14/1917	Oct-82	65	UNKNOWN	married Helen Leavitt
77	Wiece, Weslyn P.	[NONE IDENTIFIED]	Frisco, Utah	Wiece, Frank	Wiece, Mildred	2-Feb-17	28-Apr-00	83	Salt Lake?	resided in Salt Lake
78										
79										
80										
81										
82										
83										
84										
85										
86										

APPENDIX D2

San Francisco Mining District, Beaver County, Utah: Structural Gazetteer

Heather R. Puckett

May 2013



The information contained within this Supporting Material includes graphic representations of the structural locations throughout the San Francisco Mining District (SFMD). The SFMD has a period of significance from 1871 to 1952. Between 1879 and 1880, there were 33 businesses. By 1882, the most lucrative mine in the SFMD, the Horn Silver, was touted as the "largest mine on earth" (*Southern Utonian*, 3 June 1882). The Horn Silver provided the bulk of the jobs until February 1885, when the main shaft collapsed. The population changed dramatically following the collapse, but proved successful again after exploration in the King David again allowed access to the Horn Silver. As a result, on the eastern side of the San Francisco Mountains, a commercial district in Frisco flourished; a suburb – Grampian – formed closer to the mines; and the Newhouse town site formed on the western flanks of the San Francisco Mountains. By the 1920s, however, most of the settlement at Frisco and Grampian had relocated as the mines waned. In 1928, only one business – a used automotive dealer – was located in Frisco.

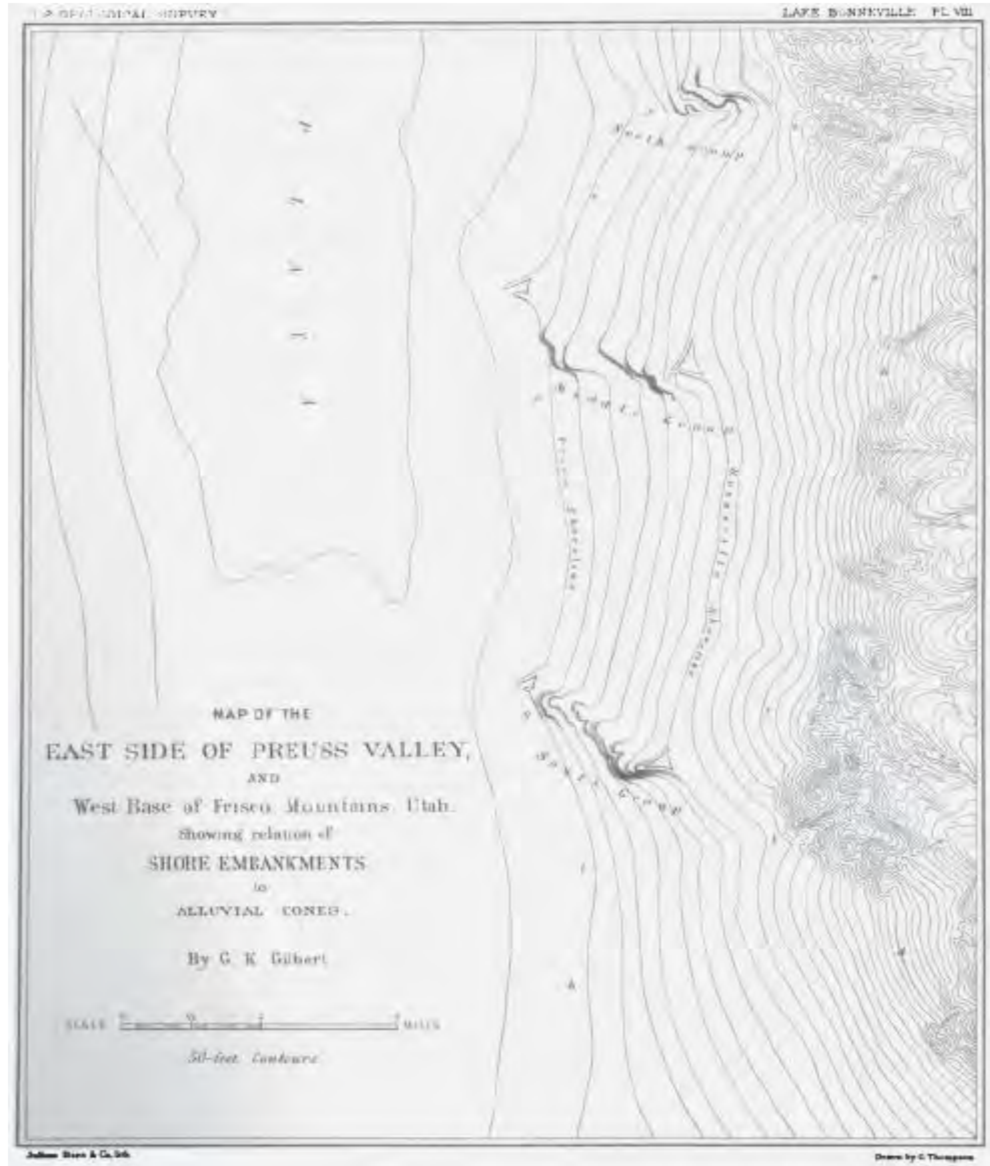
The following slides correspond to the Excel table, *ApD2_Buildings-SFMD.xlsx*, a detailed roster of the structures, associations, and references. The file is provided as a digital copy on the enclosed Compact Disc (CD). Fields on the table include the Gazetteer/Feature number, location, name, reference, property type, preservation state, and description of each property. The Gazetteer/Feature numbers were assigned based on locations on historical maps and other archival documentation and references. Location refers to location within the SFMD, such as the commercial district of Frisco, Grampian Hill, Squaw Springs, Newhouse, the Frisco Railroad Depot, King David Mine, etc. The names shown are those corresponding with the archival documentation. The property type refers to the classification of use, such as industrial, commercial, transportation, agricultural, residential, recreation, cemetery, or unknown. The preservation state refers to how the feature appeared during the field visit (i.e., in ruins, destroyed, extant, or not relocated). The description provides additional information regarding the feature, such as the materials present, or the location where the feature appears on the Beaver County Assessor's Office Plat [Cadastral] Map (Tolton 1904).

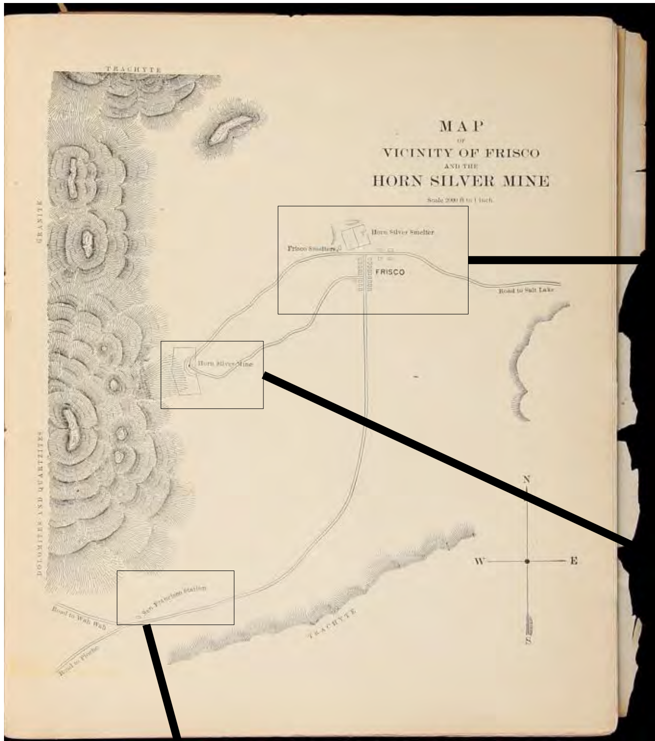
Photographs on cover (L-R): Horn Silver Mine, 1879 (Hooker); Horn Silver Mine, 1920s (Wray); Horn Silver Mine, 2010 (author); E.N. Smyth Residence (Hickman); Frisco Residence (Findagrave.com); Assay Building, 2010 (author); Grant/Slaughter Store (Hickman); Main Street, Frisco commercial district (Hickman); Main Street, Frisco commercial district (Hickman).
Above: Mine Office, Grampian area, 2010 (author).

One of the earliest maps of the San Francisco Mountains, contained within G.K. Gilbert's 1890 examination of Lake Bonneville.

This plate depicts the Bonneville shore lines on the western flanks of the San Francisco Mountains, just north of Newhouse, on the western side of the SFMD.

See: Gilbert (1890) Lake Bonneville. United States Geological Survey. Plate VIII.



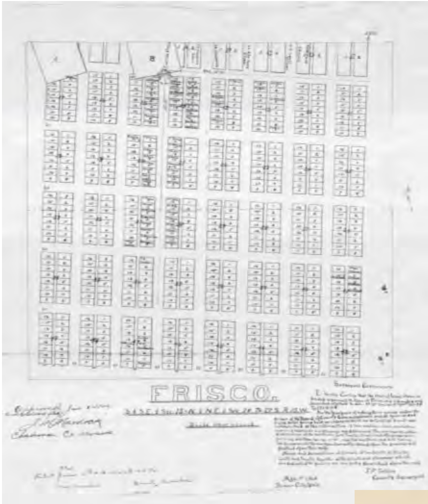


Horn Silver Mine, 1879
#26

The earliest representation of structures at the Frisco town site is depicted in W. A. Hooker's (1879) *Report on the Horn Silver Mine*. The map was cropped, with feature numbers (1-24) being assigned to each of the structures as they appear on the Hooker (1879) plat /cadastral map of Frisco.

Additional structures at the Horn Silver Mine (Grampian Hill) and south near (or possibly at) Squaw Springs were assigned feature numbers 25 and 26, respectively.

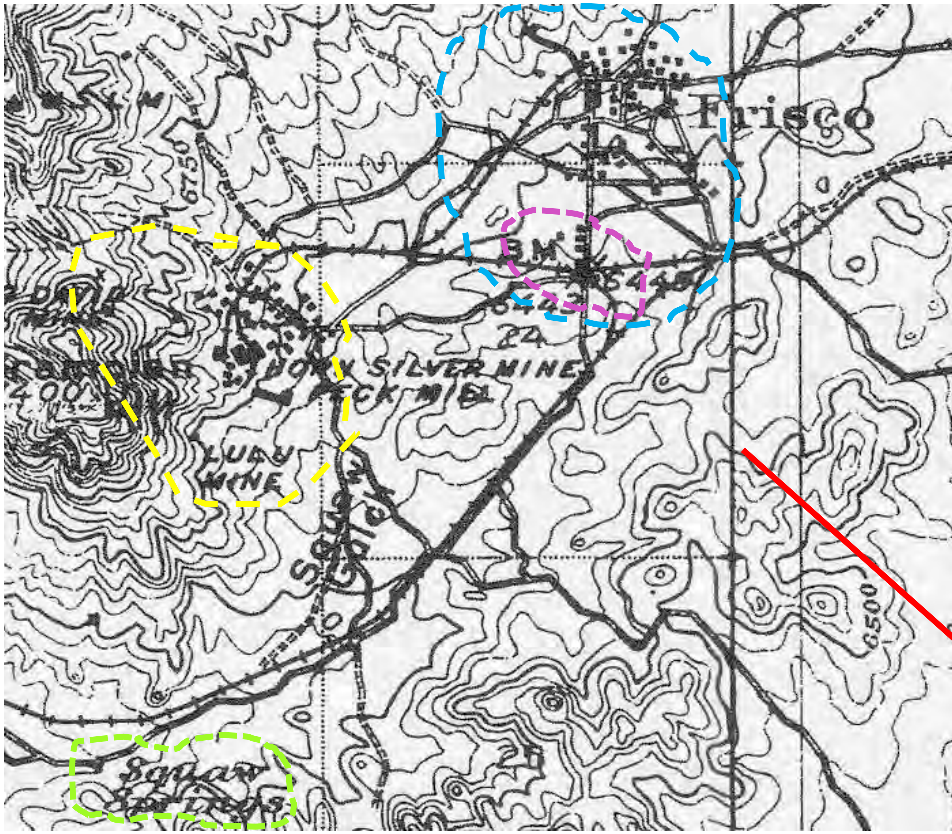
See: Hooker (1879); photograph, see Wray, William B. (2006). "Mines and Geology of the San Francisco District, Beaver County, Utah," in R.L. Bon, R.W. Gloyn, and G.M. Park, editors, *Mining Districts of Utah*. Utah Geological Association Publication 32 (UGA-32). Salt Lake City, Utah, pp. 286-457.



In 1904, the Beaver County Assessor's Office produced a map of Frisco, drawn by J.P. Tolton, County Surveyor. The map depicts the commercial district on a block grid pattern, extending from the smelters, southward to the "San Pedro" railroad depot (Utah Southern Railroad Extension of the Union Pacific line). During Tolton's survey, parcel numbers were assigned, as were individual lots within the parcels.

Feature numbers 1-24 appear on the Hooker (1879) plat or cadastral map of Frisco and were matched to the Beaver County cadastral map (Tolton 1904). An attempt was made to georeference these maps in the GIS data; however, due to scale and stretching, neither of the raster images displayed properly. Thus, in order to complete the comparison, the two maps were merged in Photoshop for best placement.

See: Tolton, J.P. (1904), Frisco. S ½, SE ½, Sec. 13, N ½, NE ½, Sec. 24, T 27S, R13W. County Surveyor, Beaver County Assessor's Office. See also Hooker, W.A. (1879), Report of the Horn Silver Mine.



The United States Geological Survey (USGS) topographic map (USGS 1911) was incorporated into the GIS model for the SFMD. The image was georeferenced into ArcMap but is off as much as 30 metres (west) at the Horn Silver Mine and 80 metres (northwest) at the commercial district at Frisco. As a result, the image was combined with earlier maps through Photoshop.

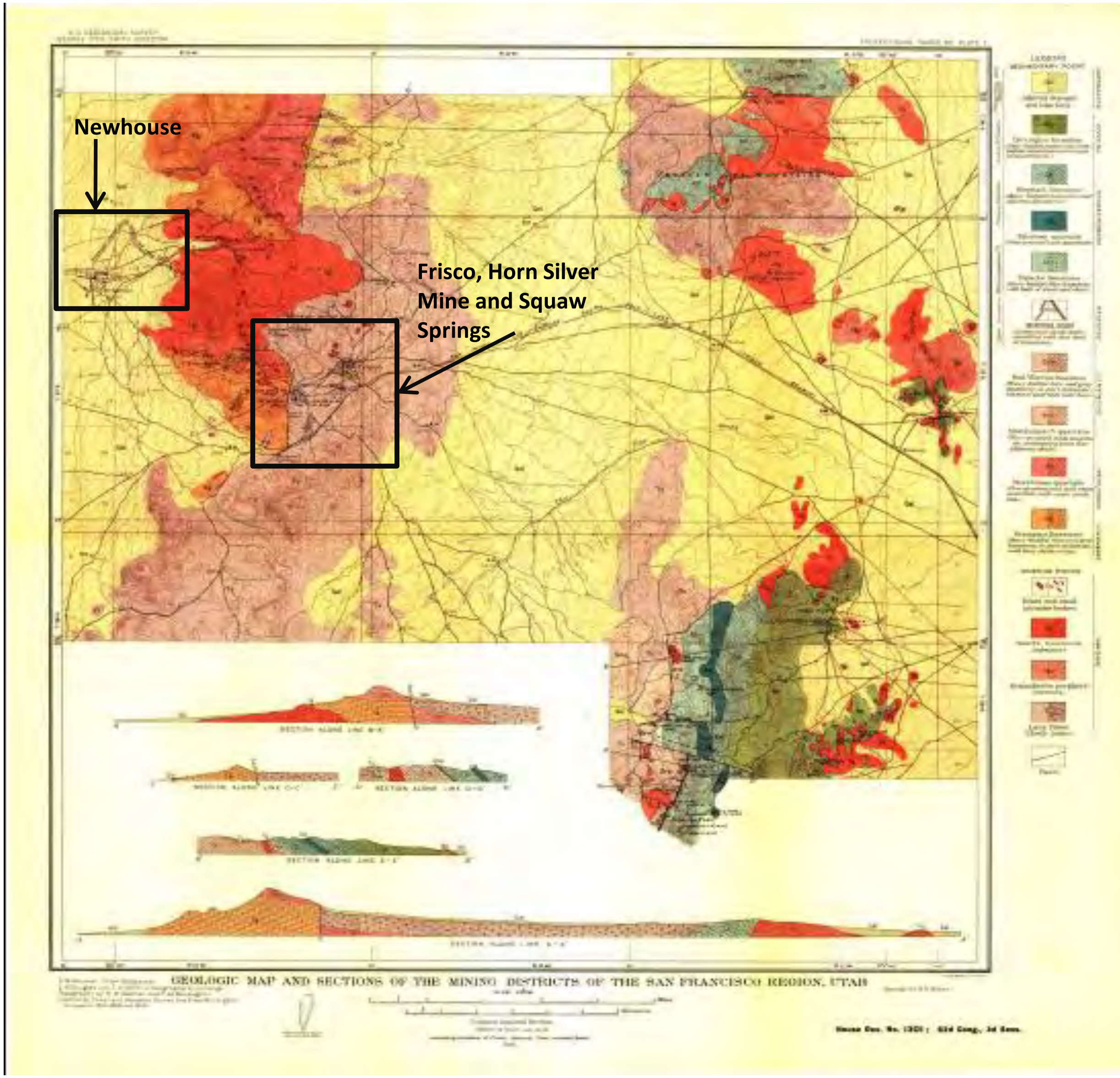
See: United States Geological Survey (1911). *Utah, Frisco Special Map*. 1:62,500. Interval, 50 ft. (38˚ 32’-38˚ 23’ [21’] N., 113˚ 21’-113˚ 3’ W.).

Grampian

Frisco / Commercial District

Frisco / Railroad Depot Area

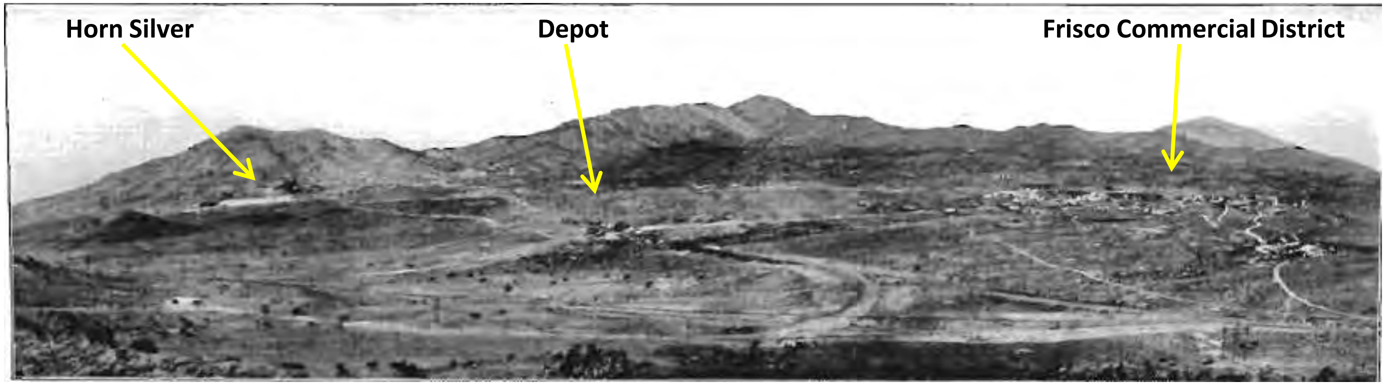
Squaw Springs



Butler's (1913) "Geology and Ore Deposits of the San Francisco and Adjacent Districts" provided a geologic map depicting the property at Frisco, the Horn Silver/Grampian, Newhouse, and Squaw Springs. The structures at these population centers correlate with those identified on the 1911 USGS.

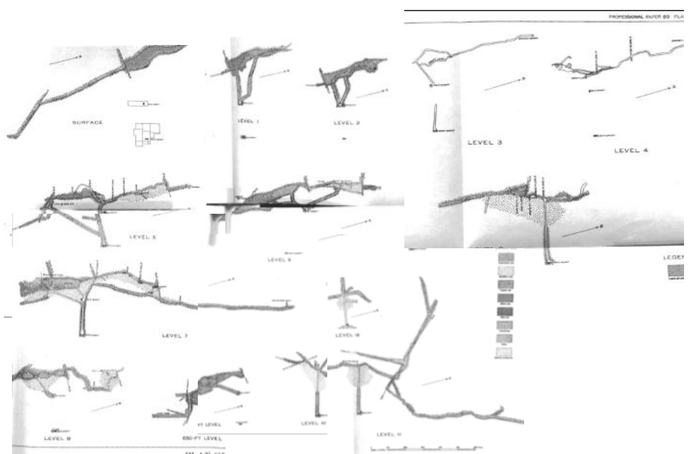
Butler's (1913) map also provides a glimpse at the geological cross sections of the San Francisco Mining District.

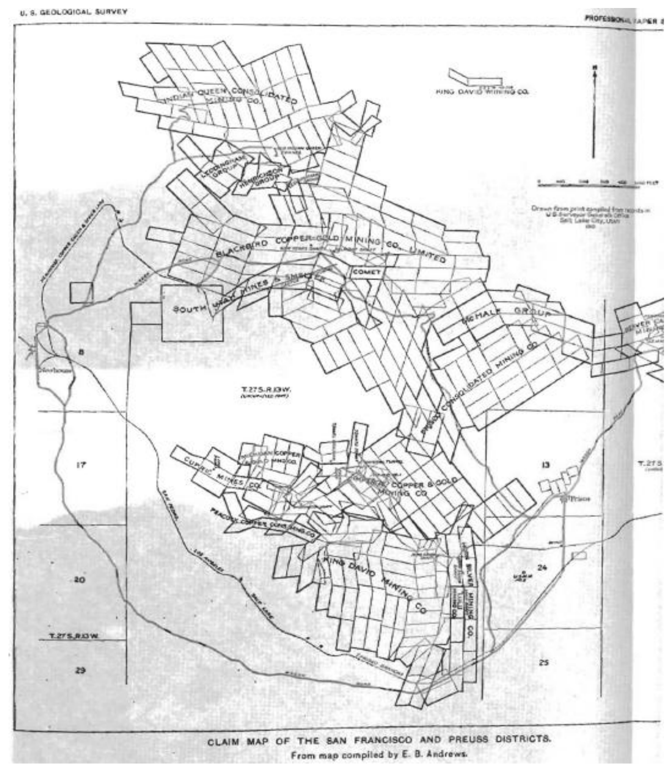
For more information, see Butler, B.S. (1913). "Geology and Ore Deposits of the San Francisco and Adjacent Districts, Utah." Department of Interior, *United States Geological Survey Professional Paper* 80. Government Printing Office, Washington, District of Columbia.

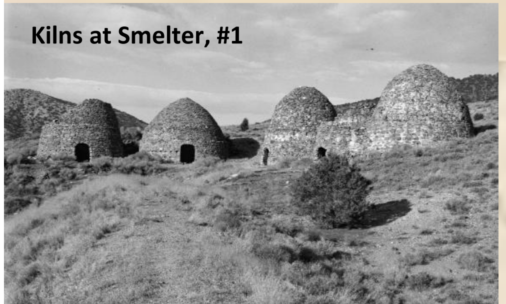


In addition to the geologic map, Butler (1913) provides an overview of Frisco from the east, including a distant view of the Horn Silver Mine, the railroad depot, and the commercial district. The claims within the SFMD and plan views of each level of the Horn Silver are included as well.

See Butler (1913)







Using Photoshop, the Hooker (1879) map was merged with the USGS Utah, Frisco Special Map (1911) in order to ascertain which structures were present on both maps.

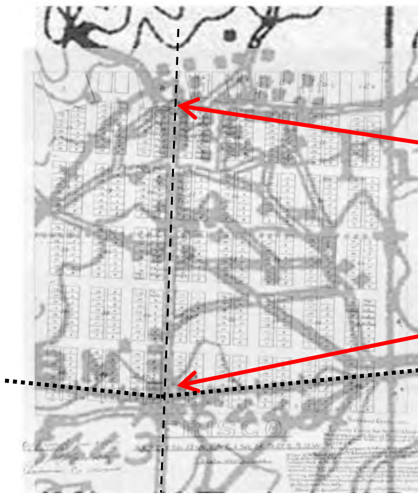
Due to the scale of the Hooker (1879) map, the placement of the structures did not correspond in all locations. As a result, features, such as roads, were utilized to best correlate the structures to the landscape.

Features, then, were compared to historical photographs for further identification.

See: Hooker 1879; USGS 1911; photograph: HAER #UT-25-2 (NPS 1981)

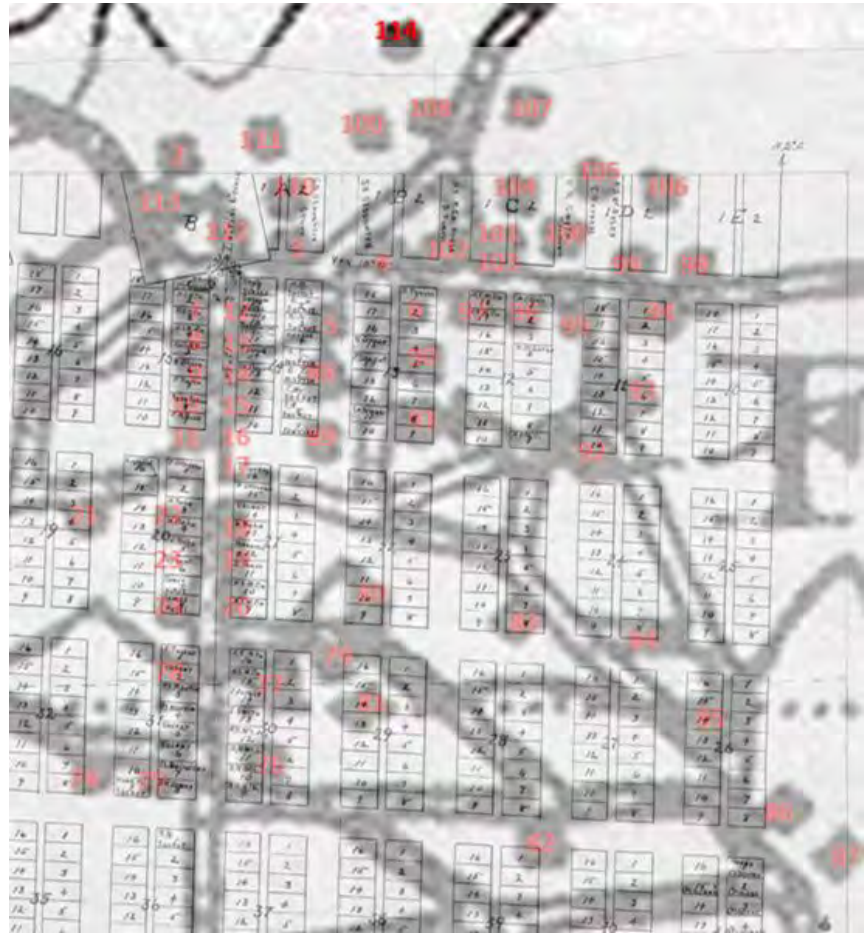
The Beaver County cadastral or plat map (Tolton 1904) was superimposed on the USGS (1911) for comparison in Photoshop. As can be seen from the image on the right, the locations of several structures do correspond, whilst some of the intersecting road patterns do not.

One constraint of the Beaver County cadastral map (Tolton 1904) is that is depicts Frisco on a grid pattern. As noted from the USGS (1911) map, very few of the road networks actually were set on a grid pattern.



The “Initial Point” shown on Tolton (1904) and the alignment for Main Street were used to line up the roads and structures on the USGS (1911).

To the south, the San Pedro depot location shown on Tolton (1904) was matched to the railroad intersection on the USGS (1911).



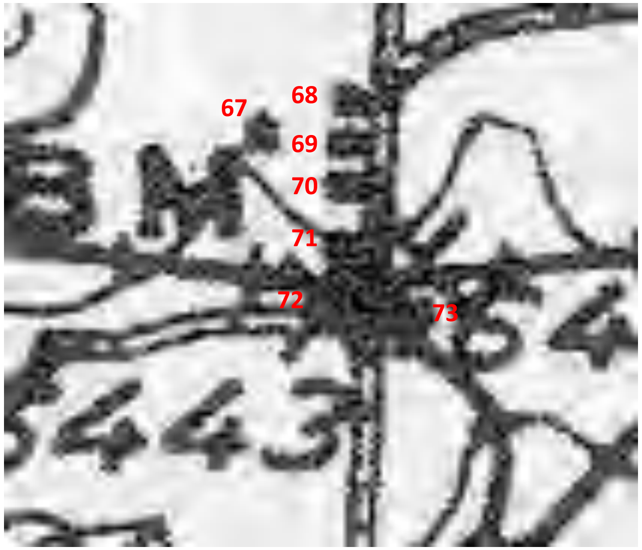
A majority of the structures depicted on the USGS (1911) and Beaver County Assessor’s Cadastral or Plat map (Tolton 1904) were identified readily. Few structures did not correspond with the locations of named parcels.

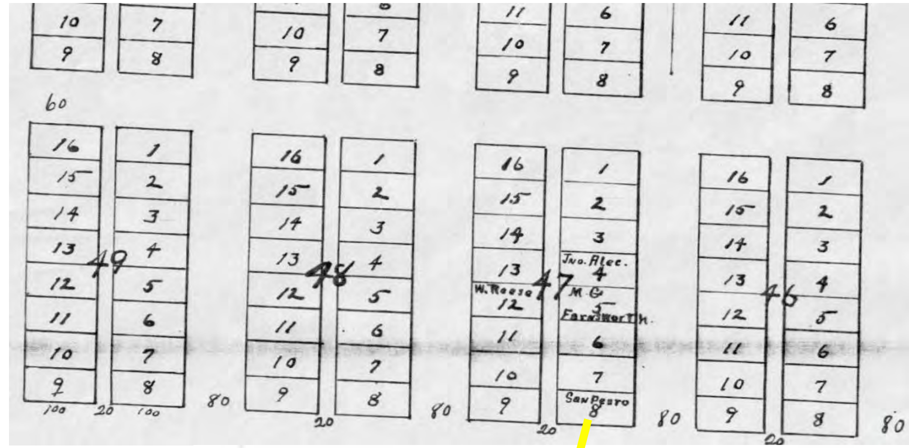
See: Tolton (1904); USGS (1911)

Feature numbers were assigned to all structures in the commercial district of Frisco as they appeared on the topographic map (USGS 1911).

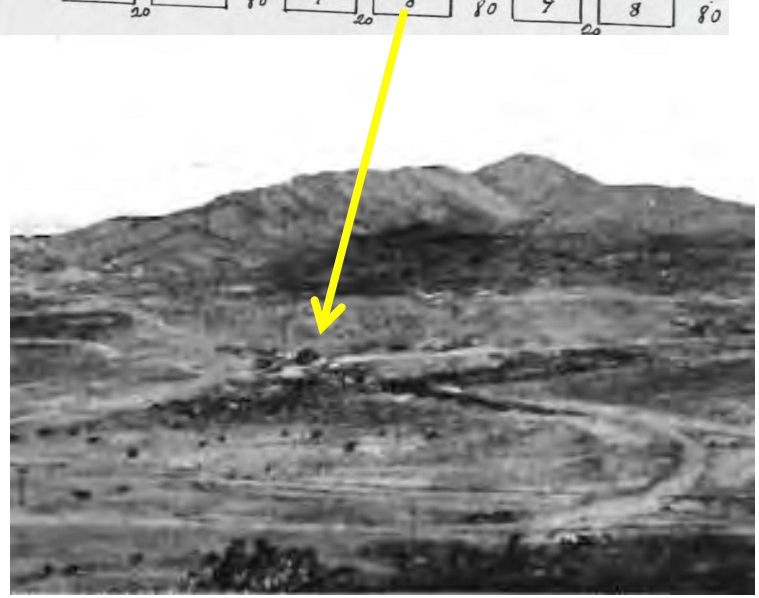
Comparisons were to historical photographs, the Beaver County Assessor's Map (Tolton 1904), and the features located physically on the landscape.

See: USGS (1911); photographs see Wray (2006)





Tolton (1904) and the USGS (1911) aided in the identification of the railroad depot to the south of Frisco. Based on historical photographs, it was known that the line had at least 2-3 sets of tracks at the depot. The depot (71) was situated to the north of the tracks, and at least one structure was situated to the northwest of the depot (67). Three additional structures were north (68-70), and two to the south (not platted).



See: Tolton (1904), USGS (1911); photograph (L) from Athearn, Robert G. (1971), *Union Pacific Country*. University of Nebraska Press, Lincoln, page382; photograph (A) from Butler (1913).

Forty one structures were noted at Grampian on the USGS (1911). Several of these undoubtedly served as mining infrastructure, such as the Horn Silver surface plant (32-33), Peck Mill (31), assay (29) and mine offices (35).

Note, the USGS (1911) reflects the layout of the Grampian area 26 years after the collapse of the main shaft at the Horn Silver. Photographs from Wray (2006) provide a glimpse of the types of structures denoted on the maps.

See USGS (1911); photographs see Wray (2006)

The cemetery was assigned Feature #115.

Based on cemetery rosters, death certificates, genealogical research, and field observations, there are approximately 54 people known individuals buried at the cemetery at Frisco.

Of these, only 47 have tombstones. Stonemasons for the tombstones included J. Boyter of Beaver City, and W. Brotan of Salt Lake City.

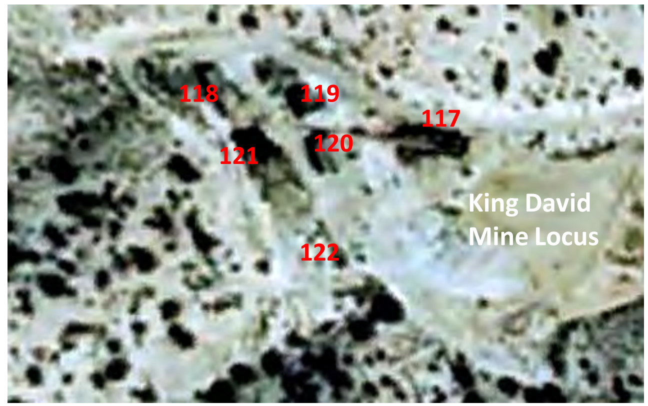
Comparisons of the cemetery were made between historical photographs and the modern landscape.

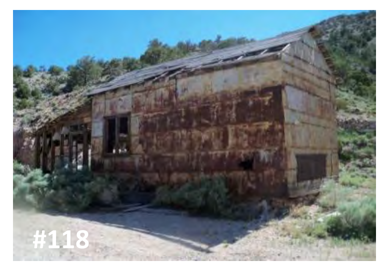
Historical photograph, see: Bradley, Martha Sonntag (1999). *A History of Beaver County.* Utah Centennial County History Series. Utah State Historical Society, Beaver County Commission.

Whilst the location of the King David mine is shown, features at the King David Mine are not depicted on the USGS (1911) or any earlier maps. Based on field observations, there are six structures at the King David Mine. These were assigned feature numbers (117-122).

Source: Photographs from Field Visit, June 2010; base map, Google Earth, 2010

#117






#123


#127


#130


Collapsed headframe, #34


#34

Historical maps show only one structure at the Lulu Mine. Field observations noted the presence of multiple structures (Features # 34, 123-132).

Structures at the Lulu mine include at least three powder magazine storage buildings (127-129), four mining buildings (dry, storage, boiler/engine house, possible surface plant - #123-125), a collapsed headframe and mine shaft (#34), and a small office or miner's residence (132). Slightly up hill to the west is a cistern (130) and a wood support tower for a water tank (131).

Source: Photographs from Field Visit, October 2010


#125, 126

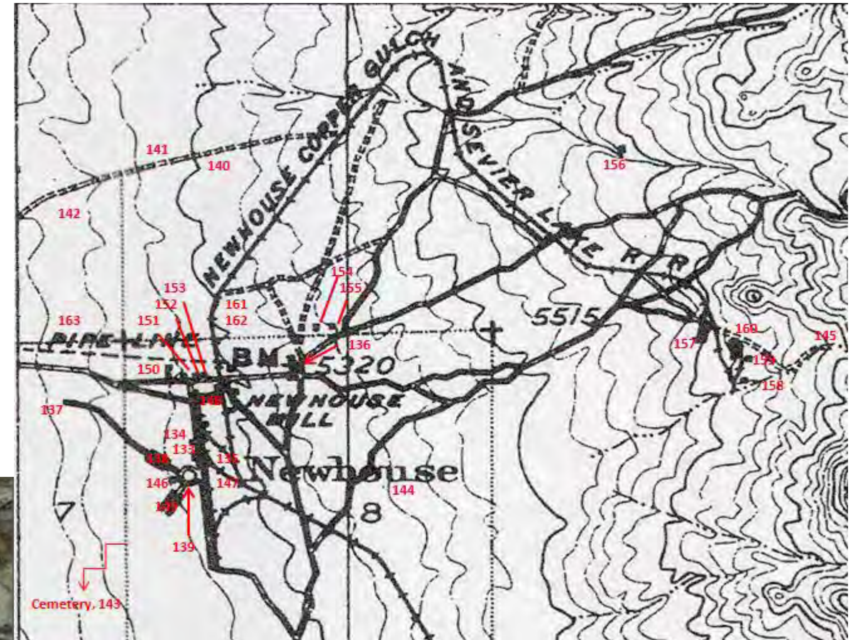

#126

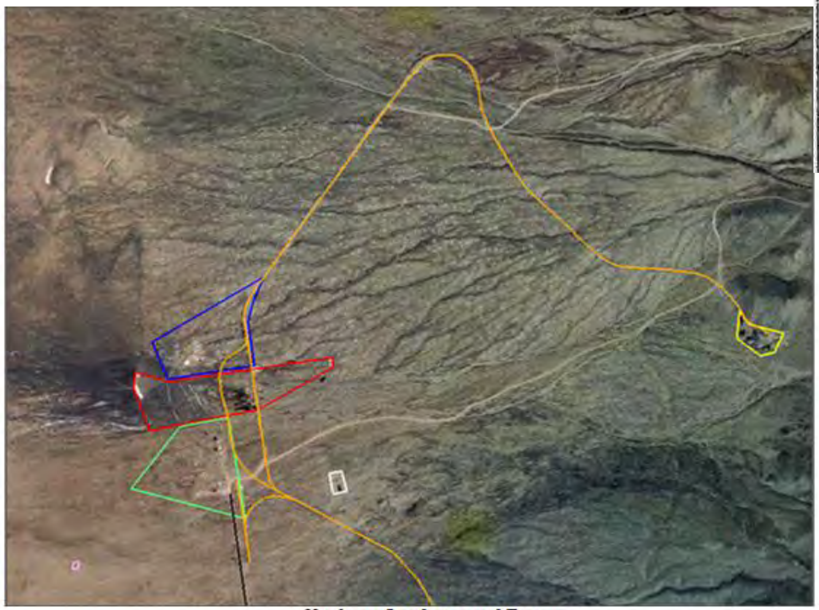

#132

The USGS (1911) was compared to physical remains at the Newhouse town site on the western flanks of the San Francisco Mountains. A total of 30 features (Features #133-163) were noted on the landscape.

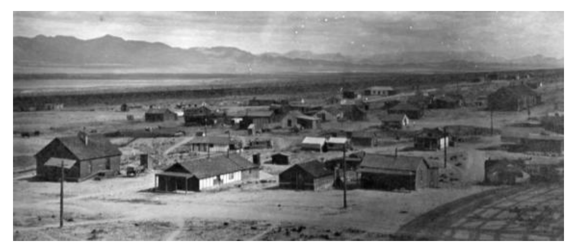
Peyton (2011) provides outlines for the industrial areas, the company town, the residential areas, the mining features, and sheep shearing features associated with Newhouse and the Cactus Mine. In addition to the mining community, the Newhouse area included a settlement of Piute Indians.

Source: USGS (1911); aerial map provided by Peyton (2011), based on Google Earth (2010); photographs *Salt Lake Herald* (1 Jan 1905: 25)

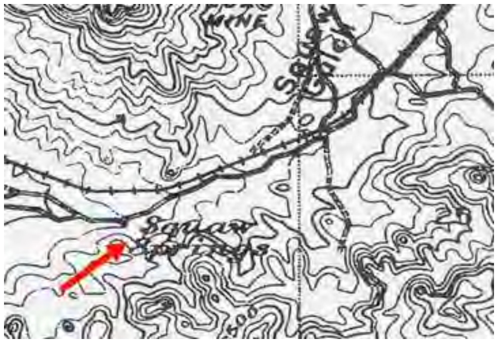




Newhouse Landscape and Features
Blue – North Newhouse; Red – Industrial Area; Green – Company Town; Pink – Cemetery; White – Sheep Shearing Area; Yellow: Cactus Mine/Crusher House; Orange – Railroad Network; Black – Road to Highway 21
Base Map Google Earth 2010



Hooker (1879) showed a stage stop to the north of a "Y" intersection at the southern end of the SFMD. Topographic maps (USGS 1911) depict the stage stop just south of the road.



The Squaw Springs stage stop is situated to the south of Utah State Highway 21 and consists of the remains of a small wood frame structure, stables, and a concrete watering trough. Cottonwood trees are located adjacent to the springhead.

Source: Hooker (1879), USGS (1911); Google Earth (2009); Photographs from Field Visit, October 2010

FRISCO & OSCEOLA

Stage and Express Line.

The only Direct Line connecting the towns of OSCEOLA, TAYLOR, WARD, HAMILTON, SILVER PARK, and Eastern Nevada generally, via the Utah Central Railway at Frisco.

Stages Leave Frisco TUESDAY, THURSDAY and SATURDAY, and arrive in Frisco alternate days, making close connections with the trains.

J. F. BEERS & CO.,

Frisco, Utah.

Everett Bassett (2008, 2010) documented the locations of structures at several locations throughout the SFMD as part of the Abandoned Mine Reclamation Program.

These features include a variety of inclined mine rails, ore chutes or bins, powder magazines, rock and wood frame buildings, loading platforms, electrical power facility, machine mounts, windlasses, tent and earthen platforms, retaining walls, headframes, forges, surface plants, cabins, utility poles, water tanks, camp sites, and engine/boiler houses.

These included features at the King David, Lulu, Horn Silver, Bonanza, Americus, Emporia, Rattler/Carbonate, U-Bet, Triumphant, Ruby Mine, Excelsior # 4, Lookout # 2, Burlington Mining # 2, Hesperides, Selma # 5, Midvale Placer, Cupric, and Harrison claims.

The features were assigned numbers in the gazetteer as part of the SFMD.

Source: Bassett (2008, 2010)

References

Anonymous (1905). “Realization of a Miner’s Dream.” *Salt Lake Herald*, 1 January 1905: 25.

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Additional: Photographs from Field Visit, October 2010

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Gazetteer / Feature No.	Location	Name	Reference	Property Type	Preservation State	Description
1	Commercial District, Frisco	Frisco Mines & Smelter Company	Hooker (1879); Tolton (1904)	Industrial	Ruins	Located on Plat (A). Remains include rock, brick, and slag.
2	Commercial District, Frisco	Horn Silver Smelter	Hooker (1879); Tolton (1904)	Industrial	Destroyed	Located on Plat (B). Remains include rock, brick, and slag.
3	Commercial District, Frisco	S.N. Slaughter Store [Grant Store]	Hooker (1879); Tolton (1904)	Commercial	Destroyed	Located on Plat (A1-2).
4	Commercial District, Frisco	S.N. Slaughter	Hooker (1879); Tolton (1904)	Commercial	Destroyed	Located on Plat (B1-2).
5	Commercial District, Frisco	C.N. Sacket	Hooker (1879); Tolton (1904)	Commercial	Destroyed	Located on Plat (14/3).
6	Commercial District, Frisco	R. Grace	Hooker (1879); Tolton (1904)	Commercial	Ruins	Located on Plat (13/15). Remains include rock and brick.
7	Commercial District, Frisco	Horn Silver Mine Company (Company Store)	Hooker (1879); Tolton (1904)	Commercial	Ruins	Located on Plat (15/3). Remains include rock and brick.
8	Commercial District, Frisco	Kelly N. Burk	Hooker (1879); Tolton (1904)	Commercial	Ruins	Located on Plat (15/5). Remains include rock and brick.
9	Commercial District, Frisco	J. Burke	Hooker (1879); Tolton (1904)	Commercial	Ruins	Located on Plat (15/7). Remains include rock and brick.
10	Commercial District, Frisco	Ryan Saloon	Hooker (1879); Tolton (1904)	Commercial	Ruins	Located on Plat (15/8). Remains include rock.
11	Commercial District, Frisco	C.R. Bush	Hooker (1879); Tolton (1904)	Commercial	Ruins	Located on Plat (15/9). Remains include rock.
12	Commercial District, Frisco	Country Restaurant	Hooker (1879); Tolton (1904)	Commercial	Ruins	Located on Plat (14/16). Remains include rock. Heavily looted.
13	Commercial District, Frisco	T. James	Hooker (1879); Tolton (1904)	Commercial	Ruins	Located on Plat (14/14). Remains include rock.
14	Commercial District, Frisco	S.N. Slaughter	Hooker (1879); Tolton (1904)	Commercial	Ruins	Located on Plat (14/13). Remains include rock.
15	Commercial District, Frisco	unnamed	Hooker (1879); Tolton (1904)	Unknown	Not relocated	Located on Plat (14/12).
16	Commercial District, Frisco	unnamed	Hooker (1879); Tolton (1904)	Unknown	Not relocated	Located on Plat (14/11).
17	Commercial District, Frisco	unnamed	Hooker (1879); Tolton (1904)	Unknown	Not relocated	Located on Plat (14/10).
18	Commercial District, Frisco	J. Turley	Hooker (1879); Tolton (1904)	Residential	Not relocated	Located on Plat (21/16).
19	Commercial District, Frisco	H. Osborne	Hooker (1879); Tolton (1904)	Residential	Not relocated	Located on Plat (21/15).
20	Commercial District, Frisco	vacant	Hooker (1879); Tolton (1904)	Unknown	Not relocated	Located on Plat (21/14).
21	Commercial District, Frisco	Royal Saloon	Hooker (1879); Tolton (1904); USGS (1911)	Commercial	Destroyed	Located on Plat (20/16). Remains include rock, lumber, and fragmented glass bottles. Heavily looted.
22	Commercial District, Frisco	J. Osborne	Hooker (1879); Tolton (1904)	Commercial	Not relocated	Located on Plat (20/1).
23	Commercial District, Frisco	unnamed	Hooker (1879); Tolton (1904)	Unknown	Not relocated	Located on Plat (20/2).
24	Commercial District, Frisco	H. Bohn	Hooker (1879); Tolton (1904)	Residential	Not relocated	Located on Plat (20/3).
25	Near Squaw Springs	San Francisco Station	Hooker (1879)	Transportation	Not relocated	Possibly relates to Squaw Springs (see #164, #165).
26	Grampian Hill	Horn Silver Mine (lean-to, with donkey whim)	Hooker (1879); Tolton (1904)	Industrial	Destroyed	Likely destroyed with 1885 main shaft collapse. Since then, shaft opened to open pit, with surface works being placed to the east.
27	Grampian Hill	unnamed	USGS (1911)	Industrial	Ruins	Surface works associated with Horn Silver, including wood/timber, rock, and hardware.
28	Grampian Hill	unnamed	USGS (1911)	Industrial	Ruins	Surface works associated with Horn Silver, including wood/timber, rock, and hardware.
29	Grampian Hill	Assay building	USGS (1911)	Industrial	Ruins	Partially extant structure, comprised of rhyolite rock, timber, railroad rails, and equipped with electrical. One of more prominent structures remaining at Horn Silver Mine.
30	Grampian Hill	unnamed	USGS (1911)	Industrial	Ruins	Surface works associated with Horn Silver, including wood/timber, rock, and hardware.
31	Grampian Hill	Horn Silver Mine, Peck Mill	USGS (1911)	Industrial	Ruins	Surface works associated with Horn Silver, including wood/timber, rock, and hardware.
32	Grampian Hill	Horn Silver Mine Mill/Surface Plant	USGS (1911)	Industrial	Ruins	Surface works associated with Horn Silver, including wood/timber, rock, and hardware.
33	Grampian Hill	Horn Silver Mine Mill/Surface Plant	USGS (1911)	Industrial	Ruins	Surface works associated with Horn Silver, including wood/timber, rock, and hardware.
34	Grampian Hill	Lulu Mine (shaft); headframe has fallen to the east	USGS (1911)	Industrial	Ruins	Located on USGS (1911) as small structure (headframe). Headframe has fallen to the east and shaft is enclosed within a fence.
35	Grampian Hill	Mine office	USGS (1911)	Industrial	Ruins	Partially extant, multi-bayed structure. Interior contains wood lathe and linoelum. Sits along side slope offering view of all mine workings.

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Gazetteer / Feature No.	Location	Name	Reference	Property Type	Preservation State	Description
36	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
37	Grampian Hill	unnamed	USGS (1911)	Unknown	Ruins	Primarily rhyolite rocks.
38	Grampian Hill	unnamed	USGS (1911)	Unknown	Ruins	Primarily rhyolite rocks.
39	Grampian Hill	unnamed	USGS (1911)	Unknown	Ruins	Primarily rhyolite rocks.
40	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
41	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
42	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
43	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
44	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
45	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
46	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
47	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
48	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
49	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
50	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
51	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
52	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
53	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
54	Grampian Hill	boarding house/restaurant	USGS (1911)	Residential	Ruins	Wood frame foundation with cast iron stove.
55	Grampian Hill	boarding house/restaurant	USGS (1911)	Residential	Not relocated	
56	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
57	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
58	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
59	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
60	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
61	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
62	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
63	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
64	Grampian Hill	unnamed	USGS (1911)	Unknown	Ruins	Wood miner's cabin or engine house; adjacent to mine shaft.
65	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
66	Grampian Hill	unnamed	USGS (1911)	Unknown	Not relocated	
67	Railroad Depot Area, Frisco	W. Reese	Tolton (1904); USGS (1911)	Residential	Ruins	Located on Plat (47/12). Remains include rock and domestic refuse.
68	Railroad Depot Area, Frisco	unnamed	Tolton (1904); USGS (1911)	Unknown	Ruins	Located on Plat (47/3). Remains include rock and domestic refuse.
69	Railroad Depot Area, Frisco	Jno. Alee.	Tolton (1904); USGS (1911)	Residential	Ruins	Located on Plat (47/4). Remains include rock and domestic refuse.
70	Railroad Depot Area, Frisco	M.G. Farnsworth	Tolton (1904); USGS (1911)	Residential	Ruins	Located on Plat (47/5). Remains include rock and domestic refuse.
71	Railroad Depot Area, Frisco	San Pedro (Railroad Depot)	Tolton (1904); USGS (1911)	Transportation	Not relocated	Located on Plat (47/8). Possibly destroyed by construction of picnic pavilion and DUP marker.
72	Railroad Depot Area, Frisco	unknown, possibly railroad related	USGS (1911)	Transportation	Not relocated	Possibly destroyed by construction of picnic pavilion and DUP marker.
73	Railroad Depot Area, Frisco	unknown, possibly railroad related	USGS (1911)	Transportation	Not relocated	Possibly destroyed by construction of picnic pavilion and DUP marker.
74	Commercial District, Frisco	Hugh Sacket	USGS (1911)	Residential	Ruins	Located on Plat (31/9).
75	Commercial District, Frisco	D.W. James	USGS (1911)	Residential	Ruins	Located on Plat (31/8).
76	Commercial District, Frisco	A.D. McAuley(?)	USGS (1911)	Residential	Ruins	Located on Plat (30/10-11).
77	Commercial District, Frisco	Horn Silver Mining Company	USGS (1911)	Residential	Ruins	Located on Plat (30/15).
78	Commercial District, Frisco	J. Taylor	USGS (1911)	Residential	Ruins	Located on Plat (31/1).
79	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (29/16). Based on scale discrepancies, could refer to HSM (30/1).

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	A	B	C	D	E	F	G	H
1	Gazetteer / Feature No.	Location	Name	Reference	Property Type	Preservation State	Description	
81	80	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (22/10).	
82	81	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (29/14).	
83	82	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (39/1). Based on scale discrepancies, could refer to Osborne (41).	
84	83	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (23/8).	
85	84	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (24/8).	
86	85	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (26/14). Based on scale discrepancies, could refer to Osborne (41/1).	
87	86	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (26/8). Based on scale discrepancies, could refer to Osborne (41/2-4).	
88	87	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (26/8). Based on scale discrepancies, could refer to Osborne (41/2-4).	
89	88	Commercial District, Frisco	C.T. Martin	USGS (1911)	Residential	Ruins	Located on Plat (14/5-6).	
90	89	Commercial District, Frisco	Jenkins	USGS (1911)	Residential	Ruins	Located on Plat (14/9).	
91	90	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (13/4-5). Based on scale discrepancies, could refer to adjacent parcels, R. Grace and T. Sacket (13/14-15).	
92	91	Commercial District, Frisco	unnamed	USGS (1911)	Education?	Not relocated	Located on Plat (13/8). Based on scale discrepancies, could refer to school in adjacent parcel.	
93	92	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (11/4).	
94	93	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (11/6).	
95	94	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (11/1).	
96	95	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (11/17).	
97	96	Commercial District, Frisco	Horn Silver Mine Company	USGS (1911)	Residential	Ruins	Located on Plat (12/1).	
98	97	Commercial District, Frisco	Horn Silver Mine Company	USGS (1911)	Residential	Ruins	Located on Plat (12/17-18).	
99	98	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Destroyed	Located on Plat (E1).	
100	99	Commercial District, Frisco	A.D. McAuley/T. Norwell	USGS (1911)	Residential	Destroyed	Located on Plat (D1-2).	
101	100	Commercial District, Frisco	E.N. Smyth	USGS (1911)	Commercial	Destroyed	Located on Plat (C2).	
102	101	Commercial District, Frisco	E.N. Smyth	USGS (1911)	Residential	Destroyed	Located on Plat (C1).	
103	102	Commercial District, Frisco	D. Powell / Horn Silver Mining Company House	USGS (1911)	Residential	Destroyed	Located on Plat (B2).	
104	103	Commercial District, Frisco	E.N. Smyth(?)	USGS (1911)	Residential	Destroyed	Located on Plat (C1).	
105	104	Commercial District, Frisco	E.N. Smyth(?)	USGS (1911)	Residential	Destroyed	Located on Plat (C2).	
106	105	Commercial District, Frisco	A.D. McAuley/T. Norwell	USGS (1911)	Residential	Destroyed	Located on Plat (D1).	
107	106	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Destroyed	Located on Plat (D2).	
108	107	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located north of the commercial district.	
109	108	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located north of the commercial district.	
110	109	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located north of the commercial district.	
111	110	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located on Plat (1A), behind the S.N. Slaughter Store.	
112	111	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located north of the commercial district.	
113	112	Commercial District, Frisco	unnamed, possibly associated with Horn Silver Smelter	USGS (1911)	Industrial	Ruins	Located on Plat (B). Wood structural remains.	
114	113	Commercial District, Frisco	unnamed, possibly associated with Horn Silver Smelter	USGS (1911)	Industrial	Ruins	Located on Plat (B). Cisterns.	
115	114	Commercial District, Frisco	unnamed	USGS (1911)	Unknown	Not relocated	Located north of the commercial district.	
116	115	Cemetery, Frisco	Frisco cemetery	USGS (1911)	Cemetery	Extant	Cemetery containing approximately 47 marked graves; 54 known individuals buried at cemetery based on historical documents.	
117	116	Frisco, Sheep	Frisco Sheep Shearing Shed		Agricultural	Extant	Sheep Shearing Shed, northeast of the commercial district.	
118	117	King David Mine	Ore Bins/Chutes		Industrial	Extant	Wood frame construction; in good condition.	
119	118	King David Mine	Miner's Dry		Industrial	Extant	Wood frame, clad in corrugated metal.	

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	Gazetteer / Feature No.	Location	Name	Reference	Property Type	Preservation State	Description
120	119	King David Mine	Blacksmith/Machine Shop		Industrial	Extant	Wood frame, clad in corrugated metal.
121	120	King David Mine	Other Support Shop/Machine Shop, Surface Shop		Industrial	Extant	Wood frame, clad in corrugated metal.
122	121	King David Mine	King David Shaft and Headframe	USGS (1911)	Industrial	Extant	Wood frame construction; in good condition.
123	122	King David Mine	Engine House / Foundation (pump mounts)		Industrial	Ruins	Concrete slabs for engine, pump and machinery.
124	123	Lulu Mine	Miner's Dry		Industrial	Ruins	Consists of a foundation (wood, recycled railroad timbers).
125	124	Lulu Mine	unnamed, associated with Lulu Mine (possible surface plant)		Industrial	Ruins	Consists of a foundation (rock wall at south end, topped with collapsed wood and corrugated metal roofing).
126	125	Lulu Mine	Boiler/Engine House		Industrial	Ruins	Consists of collapsed brick, rock and wood structure with boiler to the southwest of the mine shaft.
127	126	Lulu Mine	unnamed, associated with Lulu Mine (possible surface plant)		Industrial	Ruins	Consists of wood frame structure.
128	127	Lulu Mine	powder magazine		Industrial	Extant	Wood frame construction; the magazine is in good condition.
129	128	Lulu Mine	powder magazine		Industrial	Ruins	Similar to #127, but mostly collapsed.
130	129	Lulu Mine	powder magazine		Industrial	Destroyed	Similar to #127; possibly destroyed from blast.
131	130	Lulu Mine	cistern		Industrial	Extant	Concrete cistern with tar or rubber-like lining, situated upslope (west) of mining complex, but east of wood tower support for water tank.
132	131	Lulu Mine	Supports for an above ground water tank		Industrial	Ruins	Wood tower support for above ground water tank, situated west of the mining complex.
133	132	Lulu Mine	miner's residence		Residential	Ruins	Consists of wood frame structural remains to NW of the mining complex. Area includes a small retaining wall and windbreak.
134	133	Newhouse	Newhouse Bank	USGS (1911)	Commercial	Ruins	Concrete and rock structural remains.
135	134	Newhouse	Newhouse Cactus Inn	USGS (1911)	Commercial	Destroyed	
136	135	Newhouse	Newhouse Train Depot		Transportation	Destroyed	Depot relocated to Winch ranch; original location destroyed.
137	136	Newhouse	Newhouse Reservoir and Pump Station		Industrial	Extant	Consists of berms for reservoir.
138	137	Newhouse	Newhouse town center dwelling		Residential	Destroyed	
139	138	Newhouse	Newhouse Cactus Café	USGS (1911)	Commercial	Ruins	Rock, concrete and brick structural remains.
140	139	Newhouse	Newhouse Park [Plaza]	USGS (1911)	Recreation	Destroyed	Slightly visible on landscape; circular plaza once irrigated.
141	140	Newhouse	Newhouse miner's cabins		Residential	Ruins	Rock, concrete and brick structural remains.
142	141	Newhouse	Newhouse rock house		Residential	Ruins	Rock, concrete and brick structural remains.
143	142	Newhouse	Newhouse north Newhouse dwelling (doghouse)		Unknown	Ruins	Wood frame construction.
144	143	Cemetery, Newhouse	Newhouse cemetery		Cemetery	Extant	Slightly visible on landscape; few posts and strand of barbed wire. At least three graves, but no tombstones.
145	144	Newhouse	Sheep Shearing Shed		Agricultural	Ruins	Wood frame construction, clad with corrugated metal roofing.
146	145	Newhouse	Newhouse/Cactus Kiln	USGS (1911)	Industrial	Extant	Rock construction, similar to those at Frisco Smelter.
147	146	Newhouse	Newhouse Opera House		Recreation	Ruins	Rock, concrete and brick structural remains.
148	147	Newhouse	Newhouse railroad depot bathroom	USGS (1911)	Transportation	Destroyed	Slight depression, refuse.
149	148	Newhouse	Newhouse Mill	USGS (1911)	Industrial	Ruins	Concrete structural remains, including visible machine mounts, furnace, and other industrial pads.
150	149	Newhouse	Newhouse Unknown	USGS (1911)	Unknown	Not relocated	
151	150	Newhouse	Newhouse Unknown	USGS (1911)	Unknown	Not relocated	
152	151	Newhouse	Newhouse Unknown	USGS (1911)	Unknown	Not relocated	
153	152	Newhouse	Newhouse Unknown	USGS (1911)	Unknown	Not relocated	
154	153	Newhouse	Newhouse Unknown	USGS (1911)	Unknown	Not relocated	
155	154	Newhouse	Newhouse Unknown	USGS (1911)	Unknown	Not relocated	
156	155	Newhouse	Newhouse Unknown	USGS (1911)	Unknown	Not relocated	
157	156	Newhouse	Newhouse Unknown	USGS (1911)	Industrial	Not relocated	
158	157	Newhouse	Newhouse mining property by Cactus Mine	USGS (1911)	Industrial	Not relocated	

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	A	B	C	D	E	F	G
1	Gazetteer / Feature No.	Location	Name	Reference	Property Type	Preservation State	Description
159	158	Newhouse	Newhouse mining property by Cactus Mine	USGS (1911)	Industrial	Not relocated	
160	159	Newhouse	Newhouse mining property by Cactus Mine	USGS (1911)	Industrial	Not relocated	
161	160	Newhouse	Newhouse mining property by Cactus Mine	USGS (1911)	Industrial	Not relocated	
162	161	Newhouse	Newhouse Powerhouse		Industrial	Ruins	Concrete structural remains.
163	162	Newhouse	Newhouse Concentrator Building		Industrial	Ruins	Concrete, wood, rock and brick structural remains.
164	163	Newhouse	Newhouse Pipeline		Utility	Ruins	Pipeline is visible on ground surface; extends west/southwest to Wah Wah Springs. Portions of the pipe are visible at Wah Wah Springs (riveted steel).
165	164	Squaw Springs	Springhead		Transportation	Extant	Location of springhead to east of structural remains. Still contains water, intermittently.
166	165	Squaw Springs	Squaw Springs Stage Stop	USGS (1911)	Transportation	Ruins	Consists of wood frame structure, stable, concrete watering trough, metal piping, and cottonwood trees.
167	166	Commercial District, Frisco	R. Grace and J.D. McAuley	Tolton (1904)	Commercial	Ruins	Located on Plat (15/1). Remains include rock structural debris.
168	167	Commercial District, Frisco	Horn Silver Mining Company	Tolton (1904)	Commercial	Ruins	Located on Plat (15/2). Remains include rock structural debris.
169	168	Commercial District, Frisco	R. Grace	Tolton (1904)	Commercial	Ruins	Located on Plat (17/2). Remains include rock structural debris.
170	169	Commercial District, Frisco	M. Olsen	Tolton (1904)	Commercial	Ruins	Located on Plat (15/6). Remains include rock structural debris.
171	170	Commercial District, Frisco	Sholb Stable	Tolton (1904)	Commercial	Ruins	Located on Plat (14/18). Remains include rock structural debris.
172	171	Commercial District, Frisco	Saloon/Hotel	Tolton (1904)	Commercial	Ruins	Located on Plat (14/17). Remains include rock structural debris.
173	172	Commercial District, Frisco	C.T. Martin	Tolton (1904)	Commercial	Ruins	Located on Plat (14/15). Remains include rock structural debris.
174	173	Commercial District, Frisco	H.B. Sacket	Tolton (1904)	Commercial	Ruins	Located on Plat (14/1). Remains include rock structural debris.
175	174	Commercial District, Frisco	C.N. Sacket	Tolton (1904)	Commercial	Ruins	Located on Plat (14/2). Remains include rock structural debris.
176	175	Commercial District, Frisco	Kessel	Tolton (1904)	Commercial	Ruins	Located on Plat (14/4). Remains include rock structural debris.
177	176	Commercial District, Frisco	T.N. Sacket	Tolton (1904)	Commercial	Ruins	Located on Plat (14/7). Remains include rock structural debris.
178	177	Commercial District, Frisco	T.N. Sacket	Tolton (1904)	Commercial	Ruins	Located on Plat (14/8). Remains include rock structural debris.
179	178	Commercial District, Frisco	D. Powell	Tolton (1904)	Commercial	Ruins	Located on Plat (13/1). Remains include rock structural debris.
180	179	Commercial District, Frisco	F. Sacket	Tolton (1904)	Commercial	Ruins	Located on Plat (13/14). Remains include rock structural debris.
181	180	Commercial District, Frisco	School	Tolton (1904)	Education	Not relocated	Located on Plat (13/11).
182	181	Commercial District, Frisco	H. Osborne	Tolton (1904)	Residential	Ruins	Located on Plat (12/4). Remains include rock structural debris.
183	182	Commercial District, Frisco	Horn Silver Mining Company	Tolton (1904)	Residential	Ruins	Located on Plat (12/1). Remains include rock structural debris.
184	183	Commercial District, Frisco	H. Bohn	Tolton (1904)	Residential	Ruins	Located on Plat (20/4). Remains include rock structural debris.
185	184	Commercial District, Frisco	H. Bohn	Tolton (1904)	Residential	Ruins	Located on Plat (20/5). Remains include rock structural debris.
186	185	Commercial District, Frisco	Vacant	Tolton (1904)	Unknown	Not relocated	Located on Plat (20/6).
187	186	Commercial District, Frisco	James Hotel	Tolton (1904)	Commercial	Ruins	Located on Plat (20/7). Remains include rock structural debris.
188	187	Commercial District, Frisco	James Hotel	Tolton (1904)	Commercial	Ruins	Located on Plat (20/8). Remains include rock structural debris.
189	188	Commercial District, Frisco	Horn Silver Mining Company	Tolton (1904)	Residential	Ruins	Located on Plat (21/9). Remains include rock structural debris.
190	189	Commercial District, Frisco	Horn Silver Mining Company	Tolton (1904)	Residential	Ruins	Located on Plat (21/10). Remains include rock structural debris.
191	190	Commercial District, Frisco	D. James	Tolton (1904)	Residential	Ruins	Located on Plat (21/11). Remains include rock structural debris.
192	191	Commercial District, Frisco	P. Johansen	Tolton (1904)	Residential	Ruins	Located on Plat (21/12). Remains include rock structural debris.
193	192	Commercial District, Frisco	H. Bohn	Tolton (1904)	Residential	Ruins	Located on Plat (21/13). Remains include rock structural debris.
194	193	Commercial District, Frisco	A.N. McLeod	Tolton (1904)	Residential	Ruins	Located on Plat (30/12). Remains include rock structural debris.
195	194	Commercial District, Frisco	J. Smith	Tolton (1904)	Residential	Ruins	Located on Plat (30/13). Remains include rock structural debris.
196	195	Commercial District, Frisco	J. Forgie	Tolton (1904)	Residential	Ruins	Located on Plat (30/14). Remains include rock structural debris.
197	196	Commercial District, Frisco	Horn Silver Mining Company	Tolton (1904)	Residential	Ruins	Located on Plat (30/16). Remains include rock structural debris.
198	197	Commercial District, Frisco	Vacant	Tolton (1904)	Unknown	Not relocated	Located on Plat (31/2).
199	198	Commercial District, Frisco	P.S. Martin	Tolton (1904)	Residential	Ruins	Located on Plat (31/3). Remains include rock structural debris.
200	199	Commercial District, Frisco	P.S. Martin	Tolton (1904)	Residential	Ruins	Located on Plat (31/4). Remains include rock structural debris.
201	200	Commercial District, Frisco	Vacant	Tolton (1904)	Unknown	Not relocated	Located on Plat (31/5).
202	201	Commercial District, Frisco	Vacant	Tolton (1904)	Unknown	Not relocated	Located on Plat (31/6).

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	Gazetteer / Feature No.	Location	Name	Reference	Property Type	Preservation State	Description
203	202	Commercial District, Frisco	J.L. Griffiths	Tolton (1904)	Residential	Ruins	Located on Plat (31/7). Remains include rock structural debris.
204	203	Commercial District, Frisco	T.N. Sacket	Tolton (1904)	Residential	Ruins	Located on Plat (36/1). Remains include rock structural debris.
205	204	Commercial District, Frisco	Henry Osborne	Tolton (1904)	Residential	Ruins	Located on Plat (41/1). Remains include rock structural debris.
206	205	Commercial District, Frisco	Osborne	Tolton (1904)	Residential	Ruins	Located on Plat (41/2). Remains include rock structural debris.
207	206	Commercial District, Frisco	Osborne	Tolton (1904)	Residential	Ruins	Located on Plat (41/3). Remains include rock structural debris.
208	207	Commercial District, Frisco	Osborne	Tolton (1904)	Residential	Ruins	Located on Plat (41/4). Remains include rock structural debris.
209	208	Commercial District, Frisco	Osborne	Tolton (1904)	Residential	Ruins	Located on Plat (41/15). Remains include rock structural debris.
210	209	42Be3107	Mine Rail	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3107.
211	210	42Be3107	Ore Bins/Chutes	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3107.
212	211	42Be3107	Powder magazine	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3107.
213	212	42Be3107	Rock Building	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3107.
214	213	42Be3108	Frame building	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3108.
215	214	42Be3108	Frame building	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3108.
216	215	42Be3108	Boiler/Engine House	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3108.
217	216	42Be3109	Powder magazine	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3109.
218	217	42Be3110	Rock Building	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3110.
219	218	42Be3110	Rock Building	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3110.
220	219	42Be3110	Inclined Rail	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3110.
221	220	42Be3111	Shaft House	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3111.
222	221	42Be3111	Wood frame building	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3111.
223	222	42Be3111	Wood frame building	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3111.
224	223	42Be3111	Rock Building	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3111.
225	224	42Be3111	Powder magazine	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3111.
226	225	42Be3111	Loading Platform	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3111.
227	226	42Be3112	Ore Bins/Chutes	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3112.
228	227	42Be3113	Building foundation	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3113.
229	228	42Be3113	Building foundation	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3113.
230	229	42Be3113	Building foundation	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3113.
231	230	42Be3113	Frame building	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3113.
232	231	42Be3113	Outhouse	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3113.
233	232	42Be3113	Headframe	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3113.
234	233	42Be3113	Electrical Power Facility	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3113.
235	234	42Be3113	Machine Mounts	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3113.
236	235	42Be3114	Inclined Rail	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3114.
237	236	42Be3114	Inclined Rail	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3114.
238	237	42Be3114	Inclined Rail	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3114.
239	238	42Be3114	Collapsed Frame Building	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3114.
240	239	42Be3114	Rock Building	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3114.
241	240	42Be3117	Forge Stand	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3117.
242	241	42Be3117	Windbreak	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3117.
243	242	42Be3121	Rock building with utility pole	Bassett (2008)	Industrial	Ruins	Located in Site 42Be3121.
244	243	42Be3246	Windlass	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3246. Associated with U-Bet and Triumphant Mines.
245	244	42Be3246	Earthen Platform	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3246. Associated with U-Bet and Triumphant Mines.
246	245	42Be3246	Small Building	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3246. Associated with U-Bet and Triumphant Mines.
							Located in Site 42Be3246. Associated with U-Bet and Triumphant

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Gazetteer / Feature No.	Location	Name	Reference	Property Type	Preservation State	Description
246	42Be3246	Retaining Wall	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3246. Associated with U-Bet and Triumphant Mines.
247	42Be3248	Machine Mounts	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3248. Associated with Ruby Mine, Excelsior #4, Lookout #2, Burlington Mining #2, and Hesperides.
248	42Be3248	Building	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3248. Associated with Ruby Mine, Excelsior #4, Lookout #2, Burlington Mining #2, and Hesperides.
249	42Be3248	Building	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3248. Associated with Ruby Mine, Excelsior #4, Lookout #2, Burlington Mining #2, and Hesperides.
250	42Be3248	Earthen Platform	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3248. Associated with Ruby Mine, Excelsior #4, Lookout #2, Burlington Mining #2, and Hesperides.
251	42Be3248	Retaining Wall	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3248. Associated with Ruby Mine, Excelsior #4, Lookout #2, Burlington Mining #2, and Hesperides.
252	42Be3248	Water Tank	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3248. Associated with Ruby Mine, Excelsior #4, Lookout #2, Burlington Mining #2, and Hesperides.
253	42Be3249	Tent Platform	Bassett (2010)	Residential	Ruins	Located in Site 42Be3249. Associated with Selma #5.
254	42Be3249	Camp Site	Bassett (2010)	Residential	Ruins	Located in Site 42Be3249. Associated with Selma #5.
255	42Be3250	Residence	Bassett (2010)	Residential	Ruins	Located in Site 42Be3250.
256	42Be3250	Wood Platform	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3250.
257	42Be3250	Mine Building	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3250.
258	42Be3252	Residence	Bassett (2010)	Residential	Ruins	Located in Site 42Be3252. Associated with Midvale Placer (McHale Group).
259	42Be3252	Machine Mounts	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3252. Associated with Midvale Placer (McHale Group).
260	42Be3252	Water Line	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3252. Associated with Midvale Placer (McHale Group).
261	42Be3253	Mine Building	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3253. Associated with Cupric and Harrison Mines.
262	42Be3253	Residence	Bassett (2010)	Residential	Ruins	Located in Site 42Be3253. Associated with Cupric and Harrison Mines.
263	42Be3253	Residence	Bassett (2010)	Residential	Ruins	Located in Site 42Be3253. Associated with Cupric and Harrison Mines.
264	42Be3253	Residence	Bassett (2010)	Residential	Ruins	Located in Site 42Be3253. Associated with Cupric and Harrison Mines.
265	42Be3253	Earthen Platform	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3253. Associated with Cupric and Harrison Mines.
266	42Be3253	Retaining Wall	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3253. Associated with Cupric and Harrison Mines.
267	42Be3254	Windlass	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3254.
268	42Be3254	Windlass	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3254.
269	42Be3254	Tent Platform	Bassett (2010)	Residential	Ruins	Located in Site 42Be3254.
270	42Be3255	Frame House	Bassett (2010)	Residential	Ruins	Located in Site 42Be3255. Associated with Rattler and Carbonate Mines.
271	42Be3255	Frame House	Bassett (2010)	Residential	Ruins	Located in Site 42Be3255. Associated with Rattler and Carbonate Mines.
272	42Be3255	Frame House	Bassett (2010)	Residential	Ruins	Located in Site 42Be3255. Associated with Rattler and Carbonate Mines.
273	42Be3255	Frame House	Bassett (2010)	Residential	Ruins	Located in Site 42Be3255. Associated with Rattler and Carbonate Mines.

Microsoft Excel - AppD2_BUILDINGS-SFMD.xlsx

	A	B	C	D	E	F	G
1	Gazetteer / Feature No.	Location	Name	Reference	Property Type	Preservation State	Description
275	274	42Be3255	Frame House	Bassett (2010)	Residential	Ruins	Located in Site 42Be3255. Associated with Rattler and Carbonate Mines.
276	275	42Be3255	Frame House	Bassett (2010)	Residential	Ruins	Located in Site 42Be3255. Associated with Rattler and Carbonate Mines.
277	276	42Be3255	Office	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3255. Associated with Rattler and Carbonate Mines.
278	277	42Be3255	Boarding House	Bassett (2010)	Residential	Ruins	Located in Site 42Be3255. Associated with Rattler and Carbonate Mines.
279	278	42Be3255	Dwelling House	Bassett (2010)	Residential	Ruins	Located in Site 42Be3255. Associated with Rattler and Carbonate Mines.
280	279	42Be3255	Sleeping House	Bassett (2010)	Residential	Ruins	Located in Site 42Be3255. Associated with Rattler and Carbonate Mines.
281	280	42Be3255	Engine/Boiler House	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3255. Associated with Rattler and Carbonate Mines.
282	281	42Be3255	Machine Shop	Bassett (2010)	Industrial	Ruins	Located in Site 42Be3255. Associated with Rattler and Carbonate Mines.

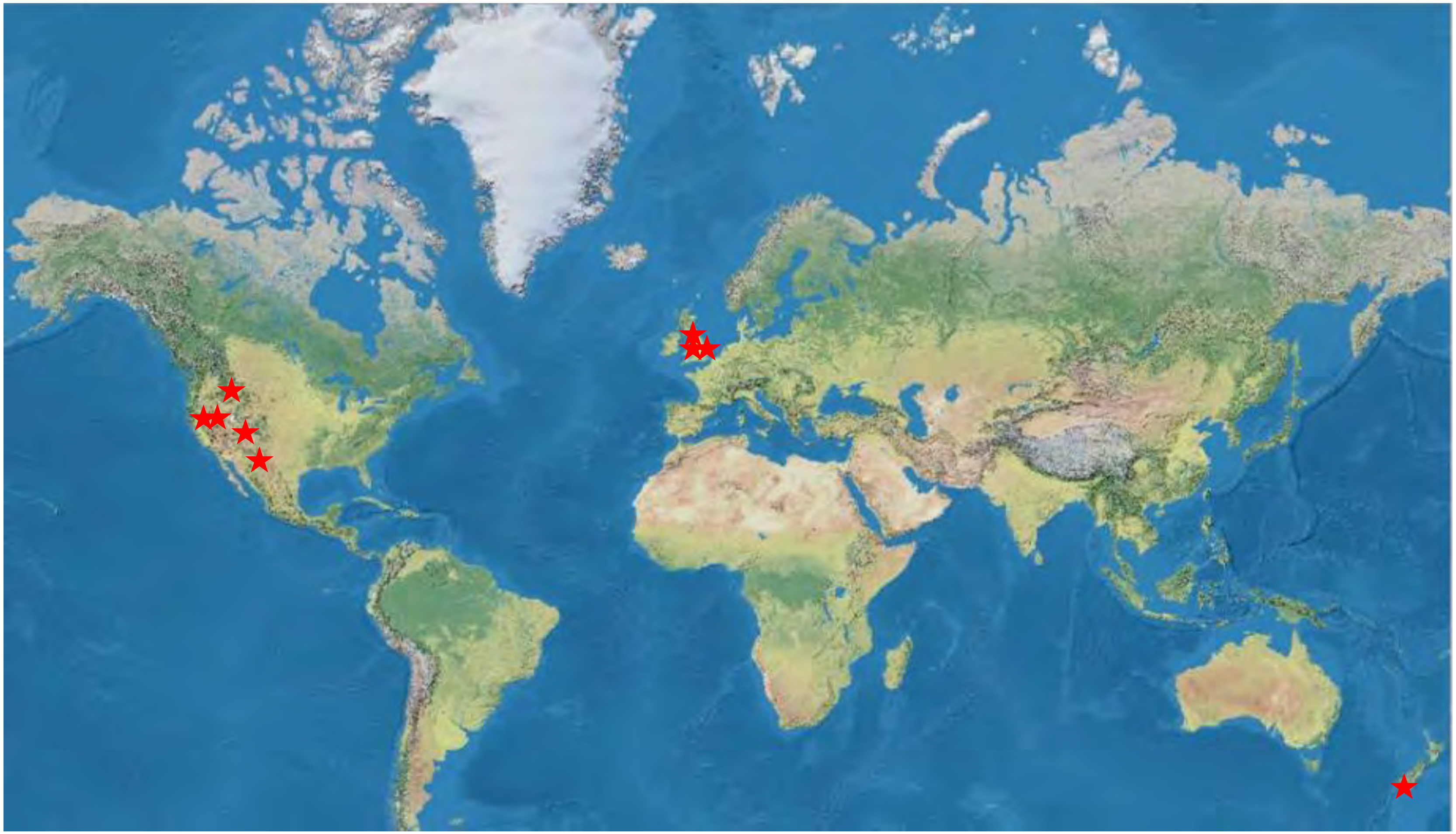
Sheet1 Sheet2 Sheet3

APPENDIX D3

San Francisco Mining District, Beaver County, Utah: Comparative Mining Sites

Heather R. Puckett

May 2013



Introduction

Several various mining locations in the United States, United Kingdom, and New Zealand were selected for comparison to the San Francisco Mining District (SFMD). Comparisons were made to each of the locations using the same themes identified for the SFMD, such as geology, vegetation, hydrology, transportation, settlement, and utilities. Information was gleaned from a variety of resources primarily available through online references or readily available literature, including historical maps, historical and/or aerial photographs, archaeological data, and land use. In conclusion, a summary is provided regarding how the locations would be suitable for HLC modelling.

Case Studies from the United States

Whilst mining was widespread throughout various regions of the United States, sites in the western United States provide ready comparisons to the SFMD. Among these are the mining communities of Tombstone and Bisbee, Arizona; Bodie, California; Leadville, Colorado; Butte, Montana; Pioche and Virginia City, Nevada; the Tintic Mining District, Capitol Reef and Silver Reef, Utah. Separated by 37 kilometres, the mining communities of Tombstone and Bisbee, Arizona, provide unique glimpses of silver and copper mining. Portions of the commercial district of Tombstone and Bisbee have been regarded as National Historic Landmarks. In California, mining districts associated with the Mother Lode, Bodie, and Death Valley National Park are examples of the rich mining heritage of the state. Bodie has been designated as a California State Historic Park and a National Historic Landmark. In Colorado, Leadville is a National Historic District. The Butte-Anaconda Historic District encompasses Walkerville, Anaconda and Butte. Many of the miners from Nevada migrated into the mining camps in Utah. Miners at Pioche and Virginia City had an influence on mining activities at the SFMD. Portions of Pioche are listed on the National Register of Historic Places. The Virginia City Historic District includes Virginia City, Gold Hill, Dayton and Silver City. In Utah, many contemporary mining camps competed against the SFMD for resources, such as transportation and smelters. And, like the miners in Nevada, those in Utah often moved from camp to camp within the Utah Territory. Portions of the Tintic Mining District are included in the National Register of Historic Places, such as the Tintic Standard Reduction Mill. Capitol Reef has been designated as a National Park, administered by the National Park Service. Portions of Silver Reef are listed on the National Register of Historic Places.

Case Studies from the United Kingdom

World Heritage Sites in Cornwall and Devon provide a baseline example to the formation of the SFMD HLC model. As a result, limited comparisons are provided in this Appendix for these areas. The project involved a comparison to mines in the Callow Bog-Hill District, which encompasses the Snailbeach Mine, Shropshire. The Shropshire Mines Trust manages the Snailbeach Mine on behalf of the Shropshire Council.

Case Studies from New Zealand

Macetown in the Otago Region of New Zealand is known as the Otago Goldfields Park, Otago Goldfields Trust, and the Otago Goldfields Heritage Trail. The trail, managed by the Department of Conservation, is comprised of 22 sites representing mining activities from the 1860s. The site has been designated as the Macetown Historic Reserve.

***Front:** World Map from ESRI, 2011*

United States: Bisbee, Arizona

United States: Bisbee, Arizona

Overview: Silver and copper were noted in the Mule Mountains as early as 1875 by Hugh Jones. In 1877, Army Scout John Dunn staked a claim, grubstaked by George Warren, a prospector. Warren quickly established the Copper Queen and helped form the surrounding Warren District. By the 1880s, a copper and gold mining camp developed as Bisbee, named for Judge DeWitt Bisbee. In 1908, a fire destroyed much of the residential area but the town quickly rebuilt, featuring Victorian architecture nestled in the foothills of the Mule Mountains; a red-light district formed in Brewery Gulch, whilst a railroad and a smelter were added in the nearby vicinity. The community of Bisbee claimed a population of over 20,000 at its height. By 1881, James Douglas arrived on behalf of Phelps Dodge, and bought into the Copper Queen Mining Company. In 1901 a rival company, Calumet and Arizona Company developed along with towns Lowell and Jiggerville. In 1907, the Copper Queen Consolidated and Calumet and Arizona merged, forming the Warren Company. Mining continued through 1975, with some minor work on claims to date.

Geology: The geology of the Warren District includes rocks from the Paleozoic and Precambrian to the Quaternary, including granite, sandstone, gneiss, quartzite, schist, and limestone. Early Cretaceous age fossils and limestone are noted as are Tertiary age dikes and rhyolite porphyry. Minerals recovered from the Warren District included gold, silver, copper, and lead.

Vegetation: Vegetation present within the Warren District includes pygmy conifer-oak scrub (*Cupressus pigmaea*), open oak woodland, desert grassland, and creosote (*Larrea tridentata*). Historically the Mule Mountains were dominated by Rocky Mountain Douglas fir (*Pseudotsuga menziesii* var. glauca), which was removed for the smelter operations.

Hydrology: The San Pedro River is situated west-northwest of Bisbee. Additional water sources include Brewery Gulch and numerous drainages throughout the surrounding hills.

Transportation: The railroad was added from Fairbank to Bisbee in 1889. Additional transportation was provided by wagon, stagecoach; by 1920, the town included trolley service, and later, automobile.

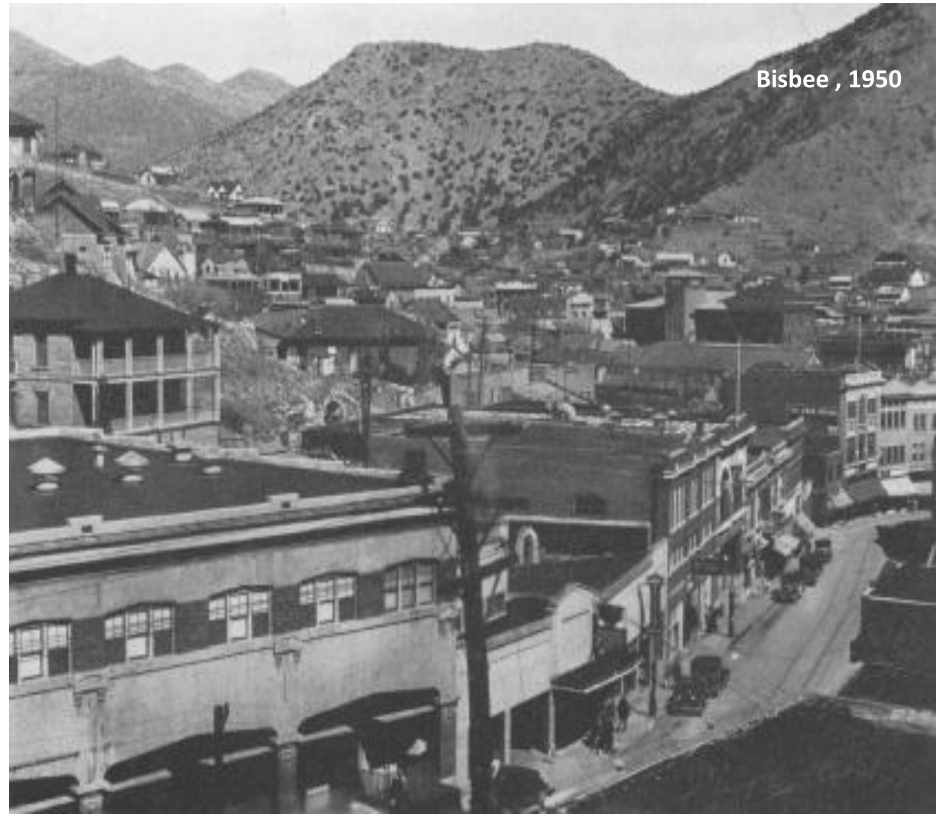
Settlement: Numerous mining features are noted from the 1870s to the present among the Mule Mountains. The local Mule Mountains were denuded of forests for the smelting operations. Homes were built on the hillsides whilst a redlight district emerged along Brewery Gulch. The addition of the railroad in 1889 and 1901 added to the development of the town. Despite fires in 1907-1908, Bisbee redeveloped. Other activities in the area included cattle shipping and ranching.

Utilities: Electricity arrived to Bisbee in 1902.

Bisbee, 1909

Bisbee, 1917

United States: Bisbee, Arizona



United States: Tombstone, Arizona

United States: Tombstone, Arizona

Overview: The Tombstone Mining District established in 1878 in the Tombstone Hills by Richard Gird, Ed Schieffelin, Albert Schieffelin, Hank Williams, Oliver Boyer, and Thomas E. Walker. The first mill opened in 1879. By 1883, Cornish pumps were installed in the Grand Central and Contention mines to drain water over 400 feet deep. The town of Tombstone is most known for its association with the Gunfight at the O.K. Corral between Wyatt, Virgil and Morgan Earp, John Henry "Doc" Holliday, Ike and Billy Clanton, Tom and Frank McLaury, on October 26, 1881 and sensationalised by the *Tombstone Epitaph* and *Tombstone Daily Nugget* newspapers. In addition to the two newspapers, Tombstone included a telegraph, running water, and refrigeration. Mining was conducted by Cornish, Irish and German miners, with commercial properties being run by Chinese and other immigrants. In 2005, the Arizona State Historic Preservation Office, in conjunction with the National Park Service's Heritage Partnerships Program began work on a long-range restoration and rehabilitation plan for the town. Today it is located within the Tombstone Historic District and is recognized as a National Historic Landmark District.

Geology: The geology of the Tombstone Hills includes rocks from the Precambrian to the Quaternary. Most noted are Paleozoic quartzite and limestone; Mississippian Escabrosa; Pennsylvanian and Permian Naco limestone; and Mesozoic series of conglomerate, thick-bedded quartzites, shales, limestone, intruded by quartz monzonite, quartz monzonite-porphyry, and diorite-porphyry. Minerals recovered from the Tombstone Hills included gold, silver, copper, lead, manganese, and zinc.

Vegetation: Vegetation present within the Tombstone Mining District includes mesquite (*Prosopis* sp.), whitethorn (*Acacia constricta*), catclaw (*Acacia greggii*), creosote (*Larrea tridentata*), and tarbush (*Flourensia cernua*).

Hydrology: The San Pedro River is situated west of Tombstone. Additional water sources include Walnut Gulch, Tombstone Gulch, and numerous drainages throughout the Tombstone Hills. In 1883, the Tombstone Municipal Swimming Pool was established at the north end of Fifth Street in Tombstone as a public bath and swimming pool.

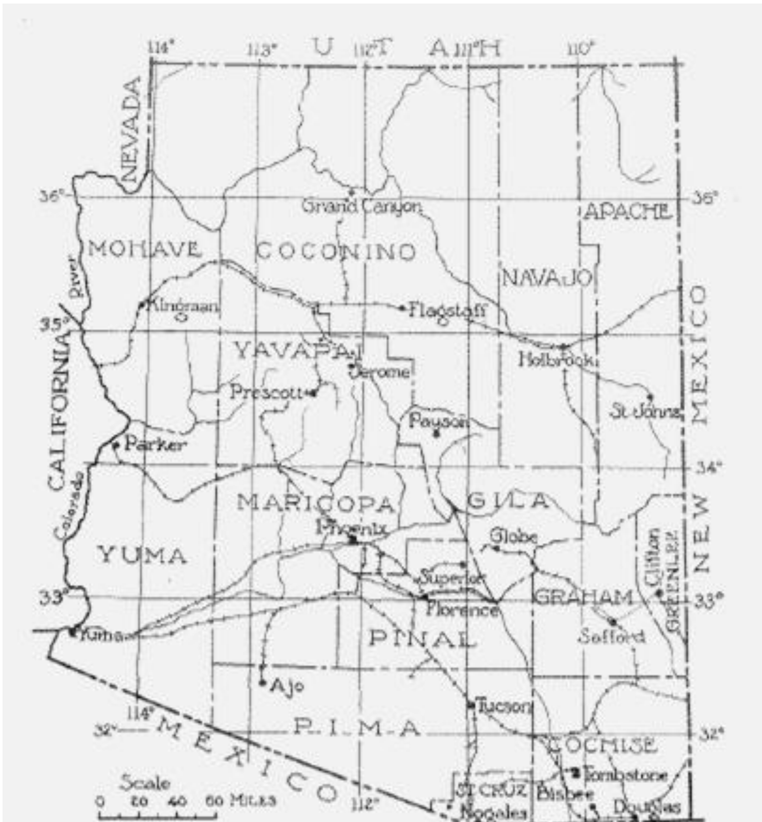
Transportation: The first stage line (Tucson and Tombstone Express) operated in 1878. The Arizona and South Eastern Railroad provided service to Fairbank and Bisbee in 1889; visitors arrived in Fairbank, transferred to stagecoach, and arrived in Tombstone. Railroad arrived in Tombstone by 1903. Also in the early 1900s, automobiles arrived in the areas surrounding the Tombstone Hills.

Settlement: Domesticated livestock, introduced in the 1500s, utilised the area for grazing. Fort Huachuca (Army installation) was established in the vicinity by 1877. The Tombstone Mining District organized in 1878. Fires in June 1881 and May 1882 destroyed the commercial district of Tombstone, with the town being rebuilt and associated with mining until 1931. At the end of 1878, there were approximately 350 miners operating in a dry camp, comprised of adobes, dugouts and tents. Other settlements established as Gird Camp (or Upper Town), Millville (or Milltown), Charleston, Contention City, Watervale, Merrimack, Hog-em, Richmond, Gleeson, Fairbank, Courtland, Pearce, Goose Flats, and a settlement operated by the Tombstone Townsite Company. By World War II, portions of the Tombstone Hills (such as that near Charleston) were utilised by Fort Huachuca as a gunnery range.

Utilities: Telephone service and electricity were installed in Tombstone by January 1902.

Tombstone, 1909

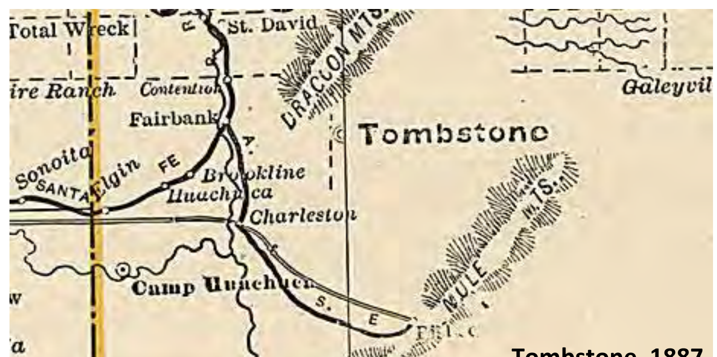
United States: Tombstone, Arizona



Butler et al. 1938

Figure 1.—Index map showing location of Tombstone district, Arizona.

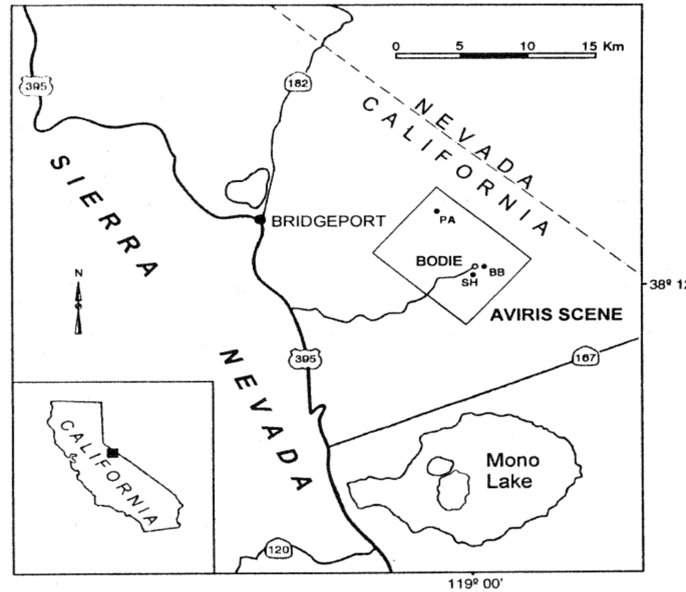
Tombstone, 1880



Tombstone, 1887

United States: Bodie, California

United States: Bodie, California



Overview: William Waterman S. Bodey discovered gold in Mono County, California, in 1859 and by 1879, miners flocked to the area from the Mother Lode claims. By 1868, two stamp mills operated in the area. By 1876, the Standard Company developed the isolated camp into a fledgling town and within four years, the town included a population of 5-7,000 people and over 2,000 buildings. In addition to the red-light district, the town included a Chinatown, three breweries, saloons, a French restaurant, and a main street of false-front buildings. A telegraph line was added between 1877 and 1880. At the same time, nine stamp mills were in operation, with ore being transported via rail from Bodie to Carson City, Nevada, and then on to San Francisco, California. By the 1880s, however, the town began to decline as miners relocated to bustling areas in Butte, Montana; Tombstone, Arizona; and Utah. In 1893, a hydroelectric plant was constructed. The town began to decline by 1913; was defined as a ghost town by 1915; and most of the support infrastructure (i.e., Post Office) closed by 1942. In 1961, Bodie was declared a National Historic Landmark; the following year, it was named as a California State Park. Today, it is preserved in arrested decay.

Geology: The Bodie Hills contains late Tertiary rocks including lava flows, tuff breccia, intrusive dikes, plugs and volcanic domes, with pre-Cretaceous underlying rock. Minerals recovered included gold with smaller amounts of silver.

Vegetation: The vegetation of the Bodie Hills is similar to that of the Great Basin including shrubs such as sagebrush and bitterbrush on lower levels, and pinyon-juniper on upland slopes. Deeper drainages contain aspen.

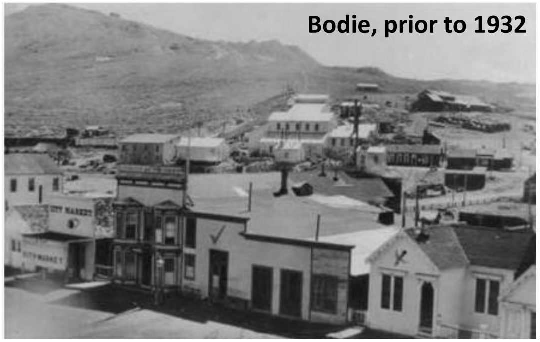
Hydrology: Perennial creeks are noted throughout the Bodie Hills. Larger drainages include the Atastra and Rough Creek drainages.

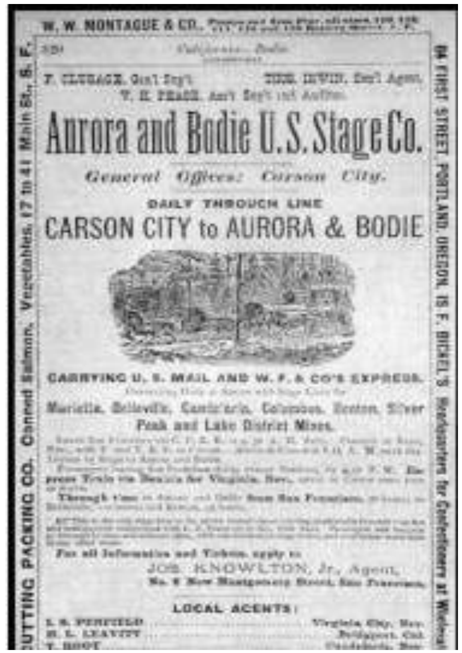
Transportation: Bodie is accessed via a long haul road, which was utilised by wagon and coach. Railroad (i.e., the Bodie Railway and Lumber Company Locomotive) was added to transport ore to Carson City, Nevada.

Settlement: The town of Bodie primarily included an isolated mining camp between 1859 and 1876. After that time, the Standard Company established a company town. The town included a red-light district, a Chinatown, and a commercial district.

Utilities: The telegraph line was established between 1877 and 1880. In 1893, the Standard Company constructed a hydroelectric plant near Bridgeport, California, offering long distance power.

United States: Bodie, California


Bodie, prior to 1932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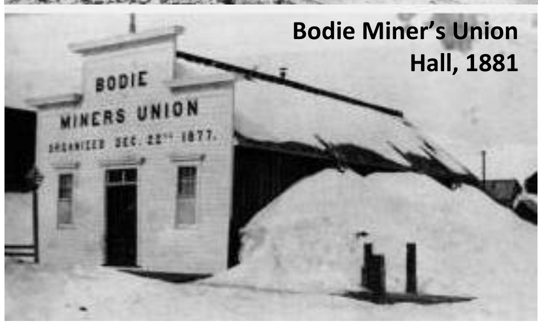
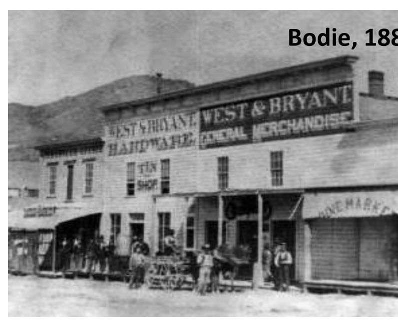
1880s Stage Ad


Bodie, 1890

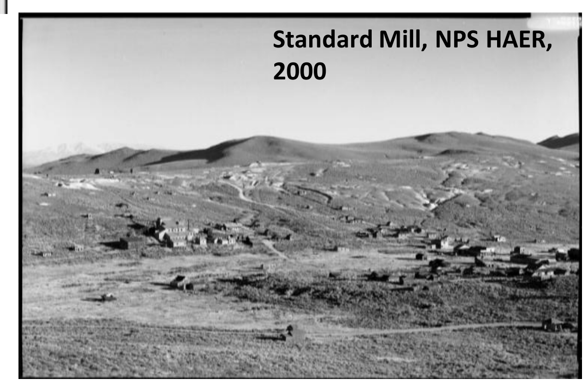

Bodie Railway and Lumber Company Locomotive, undated



Bodie Miner's Union Hall, 1881



Bodie, 1880


Standard Mill, NPS HAER, 2000

United States: Death Valley, California

United States: Death Valley, California

Overview: Established as a National Park in February 1933, Death Valley encompasses more than 3,000 square miles. The mining districts are described in detail by Linda W. Greene and John A Latschar in a three-volume study titled Death Valley National Monument: Historic Resource Study: A History of Mining (March 1981), available online at http://www.nps.gov/history/online_books/deva/index.htm (accessed 2008). The period of significance extends from 1860 to 1933 and includes the Coso, Russ, Telescope Peak, Argus Mining Districts; Lone Pine Mining District; Panamint Mining District; New Coso Mining District; and Lookout and Modoc Mining Districts. Among the prominent individuals associated with Death Valley are Darwin French and S.G. George . Today, the area is administered by the Department of Interior's National Park Service as Death Valley National Park.

Geology: The earliest geologic context of Death Valley dates from the Precambrian and spans through the Jurassic (volcanic rock). Borates, salt and talc have been mined primarily from playas, whilst copper, gold, silver and lead were recovered from hard rock mines in the Death Valley.

Vegetation: The majority of Death Valley is comprised with clay and 'desert pavement;' no plants grow within the central salt flats area. Along the edges of the playas grow pickleweed, saltgrass, buckwheat, arrowweed, shadscale, and mesquite. Creosote bush, desert holly and burrobush extend along a wider zone, and vegetation including sagebrush, blackbrush, and rabbitbush are present along the alluvial fans. Higher elevations include pinyon pine and juniper.

Hydrology: Death Valley lacks surface water today. During the Pleistocene, the valley was filled by Lake Manly. Receding of Lake Manly resulted in the formation of two large playas: Badwater and Racetrack. Flash flooding events create shallow ephemeral lakes as well. Two other water sources in Death Valley include Salt Creek and Cottonball Marsh.

Transportation: The main route traversing Death Valley is known as California Highway 190. Established between 1849 and 1950 by the Death Valley '49ers, it served as a primitive road for wagons, mule teams, and horses. In 1881, borax miners utilised the road for twenty-mule teams to transport borates to mills. Between 1933 and 1937, the road was paved by the Division of Highways and National Park Service.

Settlement: Few settlements are located within the boundaries of the Death Valley National Park. Settlements associated with mining include the Coso, Russ, Telescope Peak, Argus Mining Districts; Lone Pine Mining District; Panamint Mining District; New Coso Mining District; and Lookout and Modoc Mining Districts.

Utilities: Very little utilities are present within Death Valley. A small power plant was built in Rhyolite prior to 1905. The springs at Grapevine Canyon contain enough water to power a Generator for electricity at Scotty's Castle. In 1940, the Amargosa Power Company provided Reliable electricity to Beatty and surrounding communities.

Keane Wonder Mill

Skidoo, 1906

Wildrose Charcoal Kilns

Twenty Mule Team

United States: Leadville Mining District, Colorado

United States: Leadville Mining District, Colorado

Overview: The Leadville Mining District in Lake County, Colorado, is one of the richest mineral regions in the world, with gold, silver, lead, zinc, manganese, and molybdenum; it is located in the heart of the Rocky Mountains. There were more than 67 mines in the town of Leadville alone. Among the prominent mines were the Matchless Mine, Climax Mine, Black Cloud Mine, Ibex Mining Company, and Mineral Belt Trail. Prominent individuals associated with Leadville Mining District are Abe Lee; Meyer Guggenheim; August Meyer; and Horace Tabor. Doc Holliday moved to Leadville after the O.K. Corral gunfight at Tombstone, Arizona. The period of significance spans from 1859 to 1917, although mining continued until 1986. In the 1880s, the town amassed 40,000 people. Today, 67 mines within the district, as well as a portion of Leadville predating 1917, are included in the Leadville Historic District (established 1961).

Geology: The geology of the Leadville Mining District includes Tertiary quartz monzonite porphyries, Mississippian Leadville limestone (i.e., dolomite), as well as Devonian and Ordovician rock. Minerals mined in the district include silver, gold, lead, zinc, copper and molybdenum. Note that the Environmental Protection Agency declared much of Leadville as a Superfund site.

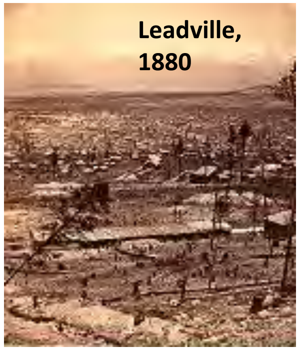
Vegetation: Vegetation in the Leadville Mining Districts included coniferous forests including Douglas-fir (*Pseudotsuga menziesii*), Spruce (*Picea* sp.), Pine (*Pinus* sp.), Cottonwood (*Populus* sp.), Alder Fruit (*Alnus tenuifolia*), Gambrel Oak (*Quercus gambelii*), Dogwood (*Cornus* sp.).

Hydrology: The Leadville Mining District is located in the Arkansas River Basin. Several drainage tunnels are associated with the mines, including the Yak Tunnel and the Leadville Tunnel.

Transportation: In 1879 most of the travel within the Leadville Mining District relied upon stagecoaches. In 1880, the Denver and Rio Grand; and the Denver, South Park and Pacific Railroads were constructed in the vicinity. Additional railroads included the High Line (Union Pacific) in 1882 and the Colorado Midland in 1887.

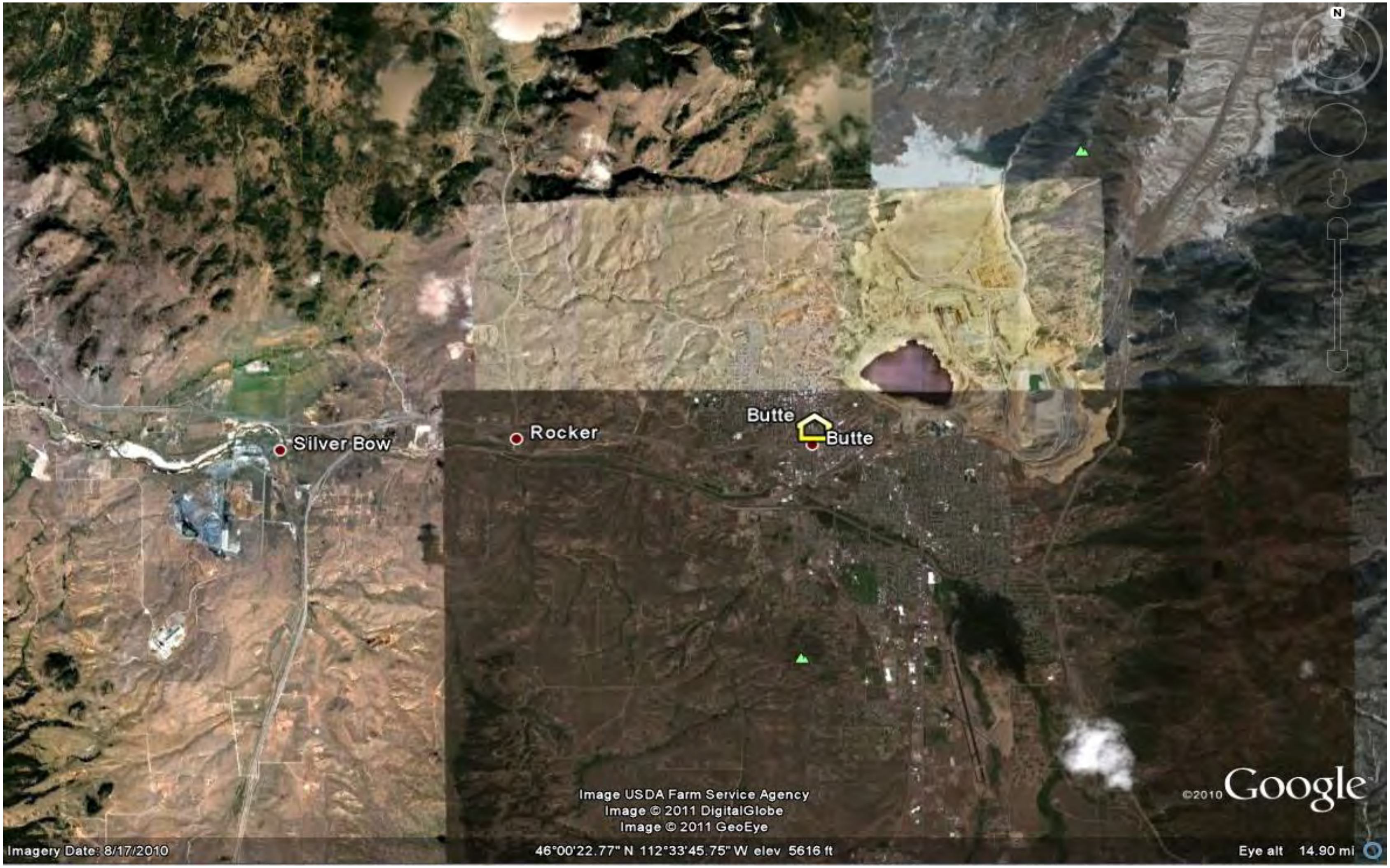
Settlement: Among the settlements within the Leadville Mining District were Leadville, Stumptown, Chicken Hill, Fryer Hill, Oro City, and Malta.

Utilities: Coal was utilised primarily for electrical power. In 1892, electric haulage equipment was added to the mines. Between 1910 and 1916, hydroelectric power stations were added to the District. With regard to telegraph and telephone, the Denver Telephone Dispatch Company formed in 1879. It was followed shortly by the Colorado Edison Telephone Company. In 1880 American Bell sold to Horace Tabor in Leadville, and between 1881 and 1888, the Colorado Telephone Company merged with American Bell.



United States: Leadville Mining District, Colorado

United States: Butte, Montana



United States: Butte, Montana

Overview: First developed during the silver boom (1874), Butte Hill amassed more than 300 stamps in 1887. Between 1864 and 1870, gold was mined as well. By 1890, the economy shifted to copper. The period of significance for Butte is 1874 to 1934. The town included a central business district, mining landscapes, a smelter district, and residential areas. The Northern Pacific Railroad led to further development and settlement. Immigrants from Cornwall, England, Ireland, and China established settlements within the area. By 1893, gambling halls and brothels formed a large Red Light District that operated until the 1980s. At the same time, skyscrapers were constructed. Today, the town maintains its mining landscape complete with iron gallus headframes.

Geology: The Butte Mining District includes Butte Quartz Monzonite, Rhyolitic volcanic rocks, Andestic, basaltic, Granodioritic, and sedimentary rocks from the Proterozoic to the Pliocene.

Vegetation: Vegetation of the Butte Mining District includes sagebrush, conifers, and riparian vegetation. Smelter operations destroyed much of the natural vegetation. Most noted are lodgepole and ponderosa pines, Douglass fir, larch, spruce, aspen, birch, red cedar, hemlock, ash, alder, rocky mountain maple, and cottonwood.

Hydrology: Several major creeks are noted within the Butte Mining District including Silver Bow Creek, Blacktail Creek, and Warm Springs Creek.

Transportation: First transportation included horses, followed by two-wheel Red River-style cards in 1820. In the 1880s, steam locomotives arrived. Among the railroads were the Utah Northern (1881), the Great Northern Railway (1887), the Butte, Anaconda and Pacific Railroad (1892), and the Butte, Anaconda and Pacific (electric) railroad (1913). The Butte Electric Railway Company was an electric street car service in Butte. In the 1920s, highways and road networks were established through much of Montana and in 1939, Wyoming Street was the first asphalt paved road in Butte. Other transportation was provided by riverboat along the Missouri River to Fort Benton, Montana, which allowed for ground transportation to Butte. An overland trail was established from Fort Benton on the Missouri River to Walla Walla in the Washington Territory.

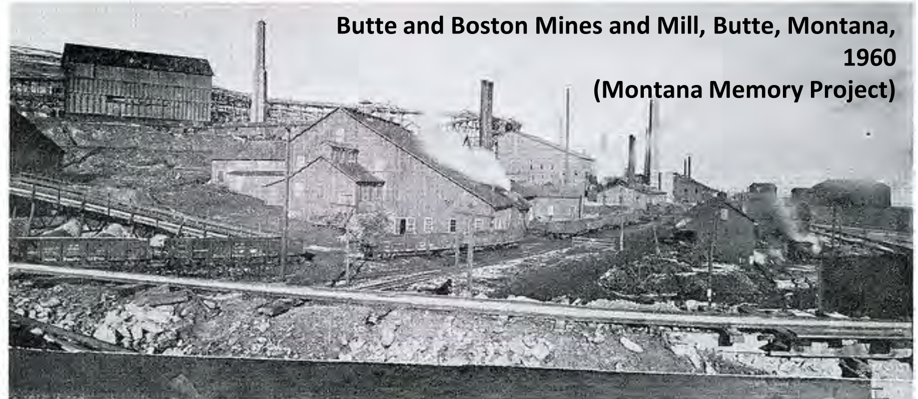
Settlement: Among the settlements in the Butte Mining District were Butte City, Deer Lodge and Silver Bow.

Utilities: In 1882, the Rocky Mountain Bell Telephone Company became the first telephone exchange in Butte. Between 1905 and 1908, the Milltown Dam was constructed and supplied electricity when the Montana Power Company (1912) arrived, offering telephone, telegraph and electric light to Butte.

East Broadway Street, Butte, Montana, 1896 (Montana Memory Project)

Butte's East Side, 1891 Showing (L-R) Pacific Hotel, Parrott Pond, Great Northern Railroad, Coal Hopper, Parrot Smelter, Round House, Old Sacred Heart School

United States: Butte, Montana


Butte and Boston Mines and Mill, Butte, Montana, 1960
(Montana Memory Project)

United States: Pioche, Nevada

United States: Pioche, Nevada

Overview: The period of significance for the Pioche District extends from 1863 to 1933. A. William Hamblin made the first discoveries in 1863 and the district organized in 1864 as the Meadow Valley Mining District. The name later changed to the Pioche District (ca. 1869). François Louis Alfred Pioche, a stage actor from California and financier of San Francisco, Santa Barbara and Monterey, is the namesake for Pioche, Nevada. Born in St. Dizier, France, in 1818, Pioche lived briefly in Chile, South America, working as a clerk in the French Consulate. Following the California Gold Rush, he moved to California where he operated a mercantile store offering French liquors. In 1852, he returned to France where he gained financial backing to purchase the San Miguel Rancho in the San Francisco area. Later dabbling in mining investments, the town Pioche (Pioche City) was named in his honor in 1862. In 1872, Mr. Pioche, for unknown reasons, committed suicide. In September 1871, a fire erupted from a boarding house, burning nearly the entire town of Pioche and killing several men in a saloon. Among the mines associated with Pioche are the Ely Valley Mines, Bristol, Prince Mines, Pioche Number One, Combined Metals, Pan American Mines, Comet, Pacific Tunnel, Boston Pioche, Pioche-Salt Lake, Poor Man, Wide Awake, Consolidated Mines, Menda, and Atlanta Gold Mines. Mines located on Treasure Hill produced a large quantity of ore from the 1920s and 1930s. The Pioche Aerial Tramway transferred the ore from the mine to the Godbe Mill at a cost of six cents per ton using gravity and a 5-horsepower motor.

Geology: Anticlinal movement occurred in the Paleozoic. No strata than the Upper Cambric is noted. Eocene deposits are present at the south end of the Pioche Mountains. Rock includes Teritary deposits, Pliocene beds, igneous rocks and sedimentary rocks including quartzite, limestone, shale, and alluvium., all of which were considered mid-Cambrian in age. In 1871, Cambrian trilobites were found in limestone, just above the quartzite strata in Pioche.

Vegetation: Vegetation is sparse but includes desert sage and scrub cedar. Following the establishment of Pioche in 1869, settlers planted locust trees in the area.

Hydrology: No streams flow from the mountains. The nearest water supply for Pioche was provided from a spring in the nearby Highland Range. Minor ephemeral drainages included the Half Moon Gulch. Other noted drainages include Raws Coyote Wash, Meadow Valley Wash, Horsethief Gulch, and the Eagle Valley Reservoir (Spring Valley).

Transportation: Transportation in Pioche included stage; the San Pedro, Los Angeles and Salt Lake Railroad; the Pioche and Bullionville Railroad, and later paved roads. An aerial tramway was utilised to transport ore from the mines to the Godbe Mill.

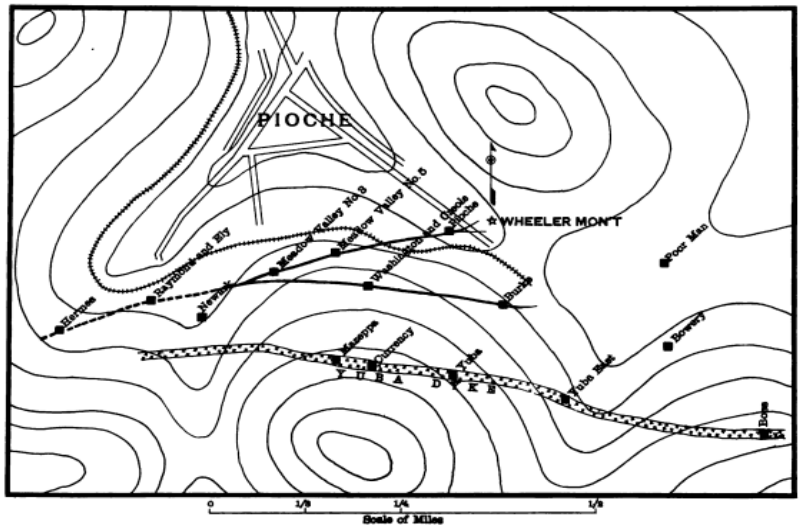
Settlement: Native American Paiutes brought William Hamblin (Latter Day Saints missionary) to the silver deposits in present-day Pioche. The area was mined between 1863 and 1933 for silver, lead and zinc. In 1876, several leading mines closed, leading to a stampede of miners to other locations. Pioche was also known as Newland and Pioche's City. Neighbouring settlements included Panaca. Pioche was associated with the Ely Mining District, the Highland Mining District, the Meadow Valley Mining Company, and the Raymond and Ely Mining Company.

Utilities: Electricity was extended to the town by the Lincoln County Power District via Hoover Dam.

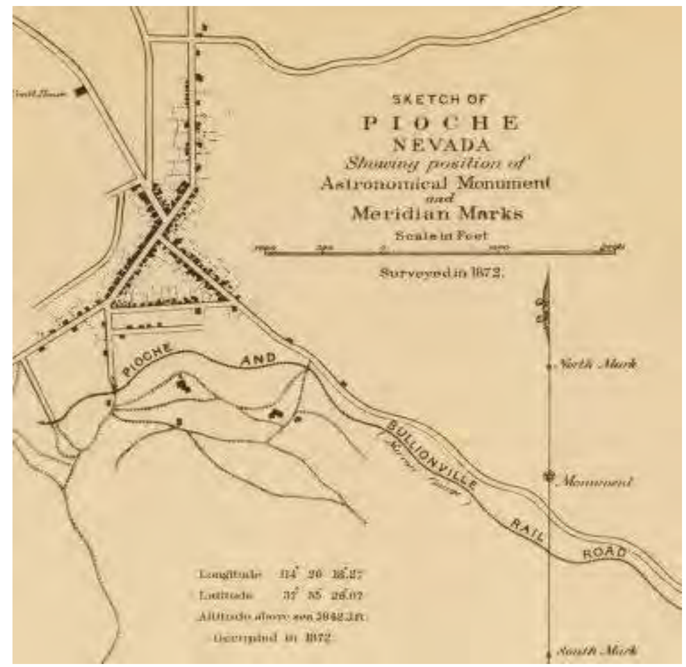
Note that a Cornish Pump was added to the Lightner Shaft in 1874. Shortly thereafter, in 1890, W.S. Godbe had the shaft retimbered and the winze raised.

United States: Pioche, Nevada

GEOLOGY OF PIOCHE, NEVADA, AND VICINITY.—PACK. Plate VI.



Map of Pioche and immediate vicinity. (Showing the relative positions of the chief mines.)



United States: Pioche, Nevada

Aerial Tramway System

United States: Virginia City, Nevada

United States: Virginia City, Nevada

Overview: James Finney arrived in 1851, soon establishing Johntown and discovering the Gold Hill mines. Nicknamed “Old Virginny,” Finney staked the Virginia Lead claim and became the namesake for Virginia City. The town was constructed on the eastern slope of Mount Davidson on the Virginia Range. Miners Patrick McLaughlin and Peter O’Riley worked claims such as the Ophir mine in Six Mile Canyon in 1858. In 1859, Henry Tompkins Paige Comstock also worked claims in the Gold Hill mines; he staked a 160-acre claim - the Comstock Lode in the Cortez Mining District - over the entire area, offering partnerships in the mine with the early claimants. The period of significance extends from 1859 to 1882.

Geology: The geology of the Virginia City area includes Quaternary lake deposits, alluvium, talus and basalt, Triassic volcanic, andesitic, rhyolitic and dioritic rocks, as well as granitic and granodiorite.

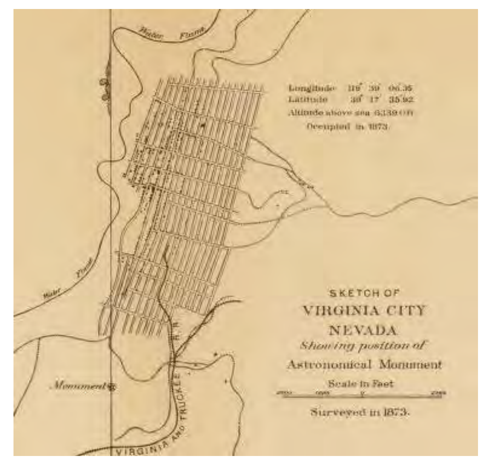
Vegetation: The lower elevations of the Virginia City area are dominated by sagebrush.

Hydrology: Much of the Cortez Mining District received water from natural springs, wells and tunnels. To manage water rights, the Virginia City and Gold Hill Water Company was established. A pipeline was constructed from Washoe Valle and Cherokee Flat to Virginia City in three phases between 1873 and 1877. Carson River, Washoe Lake, Little Washoe Lake, Hobart Creek Reservoir, Flume/Siphon, Marlette Lake, drainages and springs.

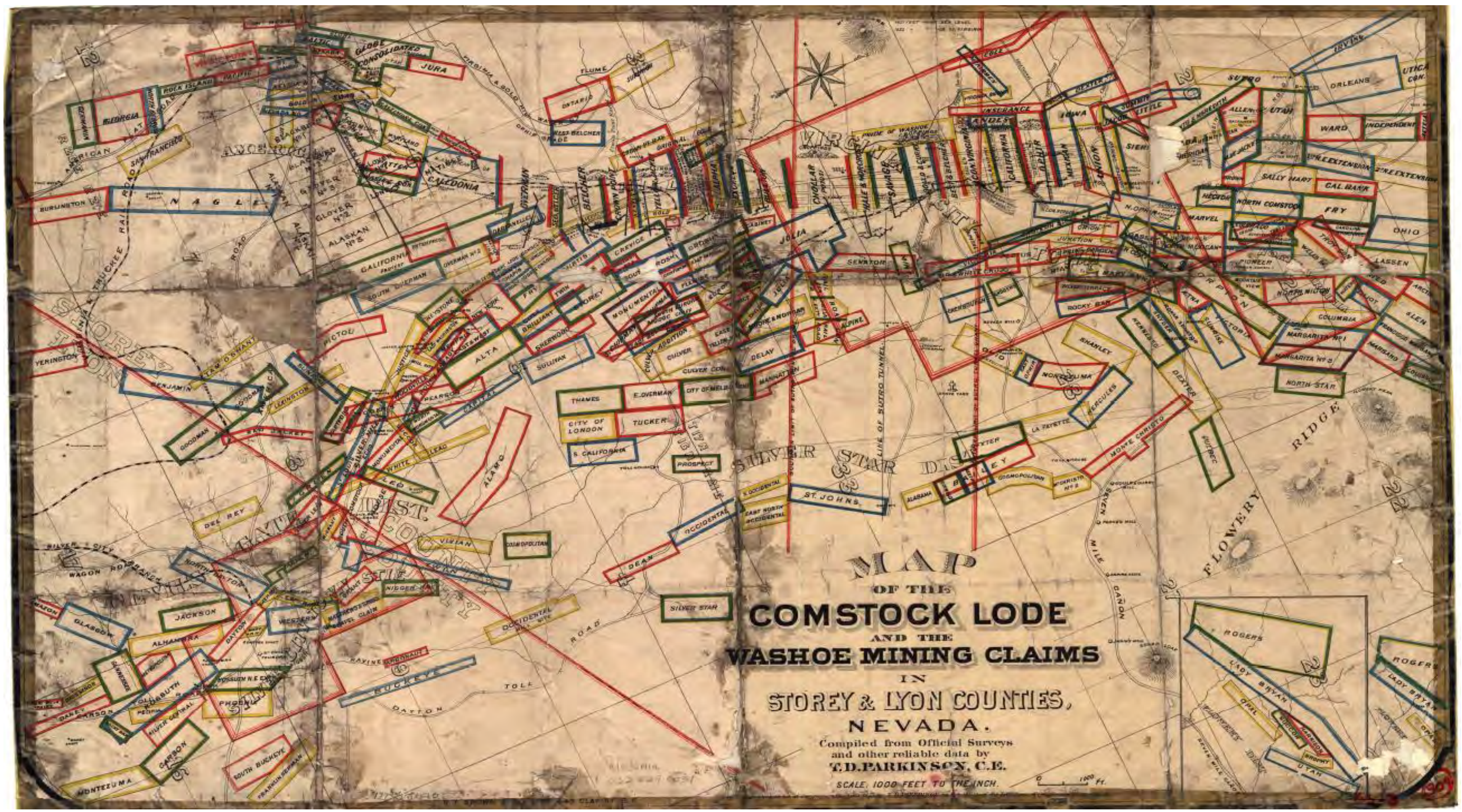
Transportation: Like most mining towns, transportation networks began with horse and wagon, stage access, followed by railroad and then automobile. Among the railroads in the Virginia City area were the Carson & Colorado Railroad Narrow Gauge, and the Virginia & Truckee Railroad.

Settlements: Among the settlements associated with the Comstock Lode are the following: Virginia City, Ophir, Carson City, Gold Hill (1859-1943), American City (1864-1868), Silver City (1859-present), Devil’s Gate (1850-1900), Dayton (1850-1909), Divide (1870s), Dutch Nick’s (1855-1860), Empire City (1860-1910), Five Mile House (1863), Flowery (1858-1860s, 1918), Johntown (1851-1859), Jumbo (1907-1921), Maiden Bar (1850s), Lousetown (1860s-1870), Mineral Rapids (1860-1861), Mound House (1860s-1938), Summit House (1861-1936), Sutro (1860s-1920), Washoe City (1861-1894), White Horse Station (1863-1936), and Comstock (1920-1927).

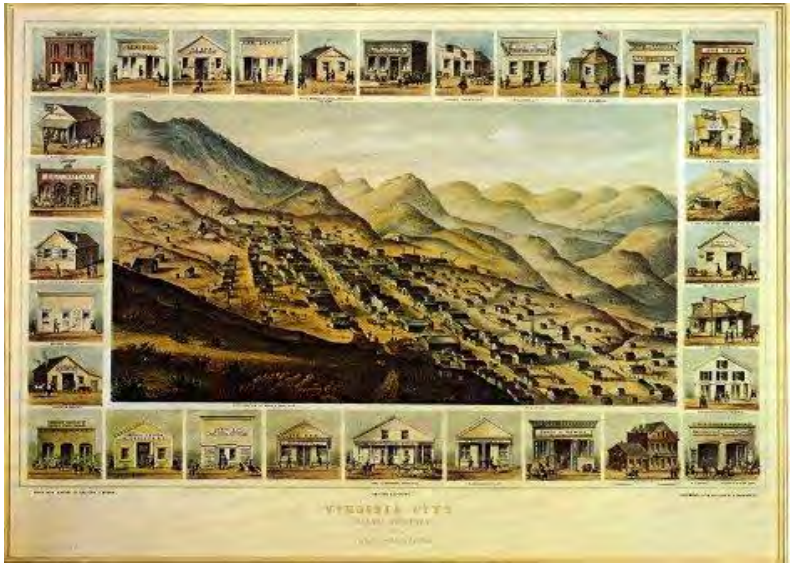
Utilities: As early as 1884-1886, pumping plants erected at the Comstock provided electricity to the area. Electric hoists were added to the shafts. The Truckee River General Electric Company provided additional power via the Hale and Norcross Tunnel.



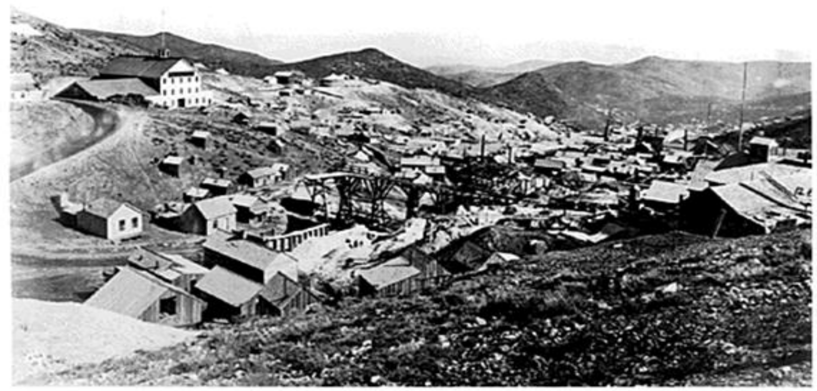
United States: Virginia City, Nevada



United States: Virginia City, Nevada



Gould & Curry reduction works



United States: San Francisco Mining District, Utah

United States: San Francisco Mining District, Utah

Overview: The San Francisco Mining District (SFMD) encompasses over 2428.113 hectares to include the mine workings, several hundred mining claims, and the historic boomtowns of Grampian, Frisco and Newhouse. Between August 1871 and February 1879, the SFMD formed and the Horn Silver Mining Company (HSMC) was organized. In February 1885, due to increased snows, the Horn Silver Mine collapsed between shifts; no one was injured or killed during the incident. Work in the immediate area ceased temporarily until a new shaft could be extended to the rich silver ore body. Between 1886 and 1920, the Horn Silver Mine, the largest of the district, became the territory and nation's leading producer of both silver and lead, with a total output worth more than £35 million. The period of significance extends from 1871 to 1952.

Geology: The geology of San Francisco Mountains is comprised of rocks from the Cambrian to the Quaternary .

Vegetation: Dominant vegetation for the SFMD includes Utah Juniper/conifer (*Juniperus osteosperma*); sagebrush/wormwood (*Artemisia* sp.); greasewood (*Sarcobatus vermiculatus*); shadscale (*Atriplex confertifolia*); rabbitbrush (*Chrysothamrus* sp.).

Hydrology: Attempts to gain water for domestic purposes at the Frisco town site proved futile, despite the presence of springs in the vicinity. Water was provided via wagon from Milford and the Wah Wah springs until 1880, and then afterward via train. Between 1904 and 1908, small quantities of potable water were acquired via a pipeline extended from Morehouse Spring to Frisco, and then onward to the King David Mine.

Transportation: Stage service was noted as early as the Wheeler survey in 1874, but also is depicted on maps from the 1870s and 1880s. A stage, offering service between Osceola and Frisco operated in the 1880s. The railroad was constructed and operated between 1880 and 1943. In 1952, portions of the old railroad grade were paved as part of Utah Highway 21.

Settlements: Frisco was the first of a series of settlements within the SFMD, followed by the Grampian precinct, and then Newhouse. The Squaw Springs settlement is associated with a stage stop, originally identified as the San Francisco Station. By 1885, the community of Frisco was well-established along the southeast slope of the mountains. A small "suburb" of Frisco developed on the south east slope of Grampian Hill under the community name of "Grampian." Additional mining settlements were noted on the western slope of the San Francisco Mountains near the Cactus Mine as early as 1870, with a smelter being constructed there by 1892; the Newhouse town site formed there by 1900. At the Frisco town site, numerous structures, including housing, saloons, hotels, churches, schools, stores, and brothels were constructed; between 1879 and 1890, at least thirty-three active businesses – including eight saloons – operated in the fledgling boomtown. Utah City Directories from 1883 to 1893 provide listings for the active businesses; among these are a bakery, three blacksmiths, nine boarding houses and hotels, five butchers, two drug stores/pharmacies, two smelter or assay houses, four restaurants, twelve general merchandising or groceries, four laundries, five stables, and thirty saloons. The town also sponsored a physician, Justice of Peace, attorney at law, and three tonsorial artists (i.e., barbers, hairdressers). Due to the high crime rate, a cemetery was located between the town and mine workings. At least two smelters, the Frisco Smelter and the Horn Silver Smelter, were located adjacent to the town site. The Frisco Mining and Smelting Company also constructed a series of beehive-shaped charcoal kilns to the northeast of the mine for the smelting process. Smelting operations ceased in 1882 when costs became too prohibitive to continue smelting at the mine itself and ore was shipped via rail (Utah Southern Railroad Extension) to smelters located near Salt Lake City (i.e., Francklyn Smelter). Additional kilns were placed near the Cactus Mine by 1892.

Utilities: The Church of Jesus Christ of Latter-Day Saints (LDS, Mormons) owned the Desert Telegraph, and established lines throughout the state from 1865/1867 to 1900. At that time, Western Union Telegraph assumed ownership of the lines. The lines in the SFMD operated between 1880 and at least up to 1922.

United States: San Francisco Mining District, Utah

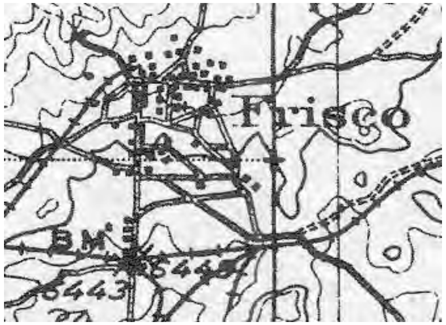
United States: San Francisco Mining District, Utah

Frisco, 1879

Frisco Bank Interior, 1918

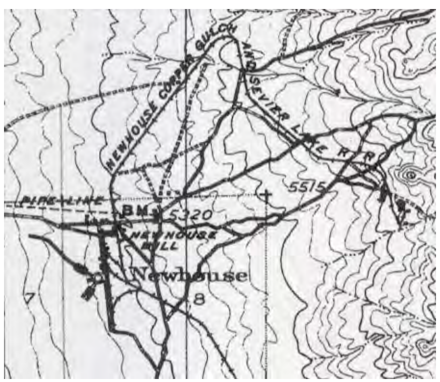
Horn Silver Mine, circa 1920s

United States: San Francisco Mining District, Utah



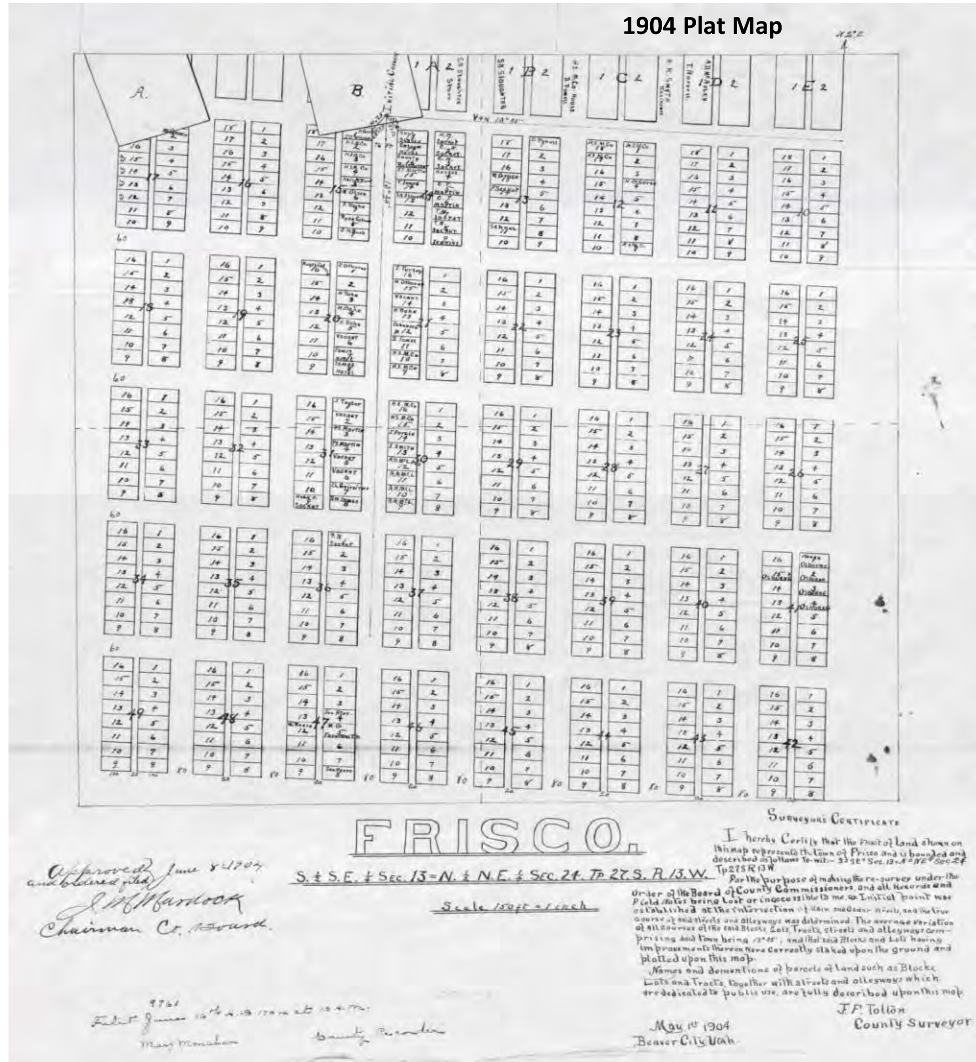
Frisco, 1911

Grampian, 1911



Newhouse, 1911

1904 Plat Map



United States: Tintic Mining District, Utah

United States: Tintic Mining District, Utah

Overview: The Tintic Mining District was one of the largest in Utah (883,703 hectares) and included gold, silver and lead mines, established in December 1869. The four big mines included the Bullion Beck and Champion; Centennial Eureka; Eureka Hill; and Gemini. Later, the Chief Consolidated Mining Company formed within the district. The financial centre of the Tintic Mining District was Eureka, originally established as Ruby Hollow in Juab County in 1892. Most of the mines closed by 1958, although some claims are worked sporadically. Several portions of the Tintic Mining District have been documented as part of a Multiple Resource Area by the National Park Service.

Geology: The geology of the Tintic Mining District centres on an area of a Precambrian rift, sedimentary dolomite, limestone, shale, sandstone, followed by an uplift and collapse of the Farallon tectonic plate and volcanism. As a result, many ore bearing materials are present, including enargite, tetrahedrite, galena, sphalerite, pyrite, marcasite, arsenic, native gold, silver and copper.

Vegetation: Vegetation surrounding the wasterock piles or tailings, is sparse, with many surfaces being devoid of vegetation. Noted on hillslopes are sage, pinyon and juniper, thick mountain scrublands, and wooded areas of deciduous and coniferous trees.

Hydrology: The topography of the Tintic Mining District includes deep gullies and drainages. Within the district are Eureka Gulch, Tanner Creek, numerous springs, private wells, and the Knight's Spring Pond.

Transportation: Like other mining towns, the Tintic Mining District included horse/wagon, stage, and railroad transportation. One of the earliest planned but never constructed railroads was the Lehi and Tintic Railroad, planned in 1872. With the completion of the transcontinental railroad in 1870, several lines were constructed in the vicinity. The Utah Southern reached the Tintic Mining District between 1872 and 1882 (Oregon Short Line and Utah Northern Railway). In 1892, a standard gauge known as the Tintic Range Railway was constructed and operated along with the Rio Grande Western lines. Mammoth also constructed an aerial tramway to connect to the Grand Central Railway. By 1896, the aerial tramway joined the [New] East Tintic Railway. Additional lines included the Salt Lake and Western Railway, and the Eureka Hill Railway which was a narrow gauge line.

Settlement: Initially the silver mines in the Eureka area had been mined by Native Americans. In 1869, George Rust made the first claim within the district, known as the Sunbeam Lode. As noted above, Eureka served as the financial centre of the district. It included stores, theatres, hotels, schools, churches, and the Andrew Carnegie Library. Eureka was home to the second J.C. Penney store, known as the Golden Rule Store. Other towns in the vicinity included Mammoth/Mammoth Hollow, Silver City, Diamond/Diamond Gulch, Knightsville, Homansville, Treasure Hill, and Nephi. The Tintic name originated from the adjacent valley and a Ute Native American Chief who died there in the 1856 Tintic War.

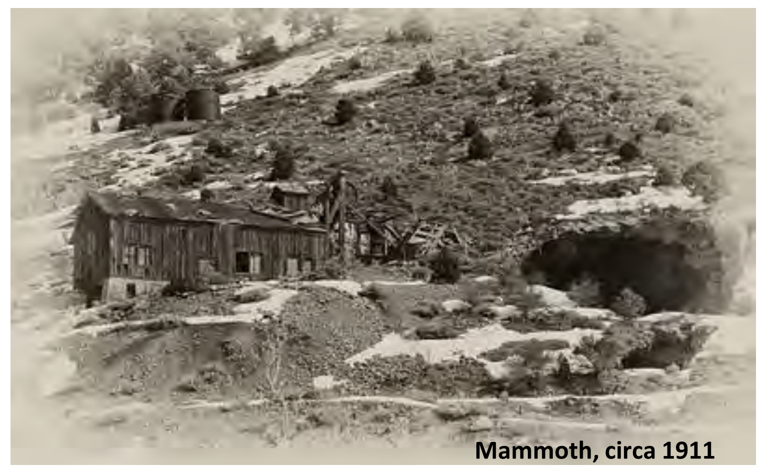
Utilities: The telegraph arrived in Juab County in 1866. Telephone service was added by the mid-1800s. In 1907, Jesse Knights constructed a power plant.

Eureka, 1900

United States: Tintic Mining District, Utah

Eureka, 1911

Eureka, 1921



Mammoth, circa 1911

United States: Silver Reef, Washington County, Utah

United States: Silver Reef, Washington County, Utah

Overview: Also known as Barbee's Town, Bonanza City, or Rockpile, the town of Silver Reef was settled by miners primarily from Cornwall and Pioche, Nevada. The mines were discovered as early as 1866 with the collapse of the town by 1884/1901. The last mine closed in 1891, although work continued in the Harrisburg Mining District up to 1950 on some claims. A Wells Fargo office remains at the centre of the once flourishing town.

Geology: The Silver Reef area is distinct in that silver was found in sandstone. Minerals contained in the rock in the Harrisburg Mining District include silver, copper, gold, lead, iron oxide and uranium oxide. The geological context of the area includes Quaternary basalt flows and cinder cones, Triassic formations containing petrified forest and sandstone, Jurassic sandstones, and Quaternary alluvium. Note: Dinosaur tracks dating from the Jurassic period are present in the Silver Reef area.

Vegetation: Vegetation in the Silver Reef area includes ponderosa pine, pinyon, coniferous, sage, and mountain brush.

Hydrology: Silver Reef and the Harrisburg Mining District are situated in the Virgin River Watershed. The Toquerville Springs and Quail Creek are noted within the vicinity. Several ditches are noted in the vicinity, including the Leeds Ditch and the Harrisburg Ditch. After 1881 when the silver prices dropped, many of the mines were allowed to fill with water.

Transportation: Transportation in Silver Reef included horse and wagon and stage coach. Today, US Interstate 15 is located just south of the former mining town.

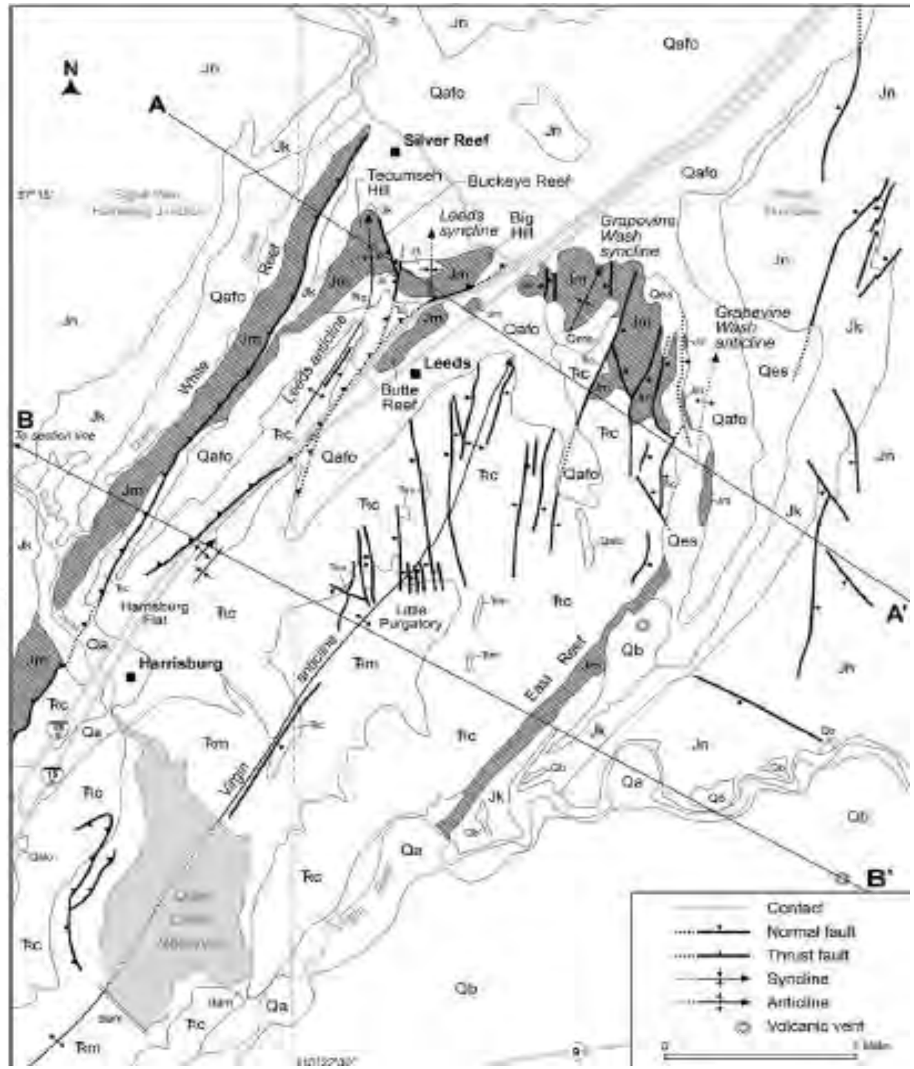
Settlement: Evidence of prehistoric land use associated with the Virgin Anasazi (200 AD-1300 AD) is noted in this portion of Utah. Activity associated with mining is attributed to John Kemple, who established the Union Mining District in 1866-1871. By 1874, the district had been renamed as the Harrisburg Mining District. A silver rush – the Pioche Silver Stampede – followed in 1875 with the arrival of William T. Barbee. Silver was transported by wagon to Pioche for smelting. Shortly thereafter, the town was platted with 37 mines, 5 stamp mills, 9 groceries, 6 saloons, 5 restaurants, a newspaper, the Rice Bank, a Wells Fargo building, a Catholic Church, and a Chinatown. Among the settlements in the Harrisburg Mining District were Barbee’s Town/Bonanza City/Rockpile/Silver Reef; Leeds; Toquerville; Harrisburg; and Buckeye Reef.

Utilities: Water from the Toquerville Springs operated stamp mills at Silver Reef. In 1867, telegraph was added to the town. Much of the district had folded by 1901, whilst electrical lights were added to neighbouring towns by 1917.

Wells Fargo Building, NPS

Silver Reef, 1880s

United States: Silver Reef, Utah



United States: Capitol Reef, Utah

United States: Capitol Reef, Utah

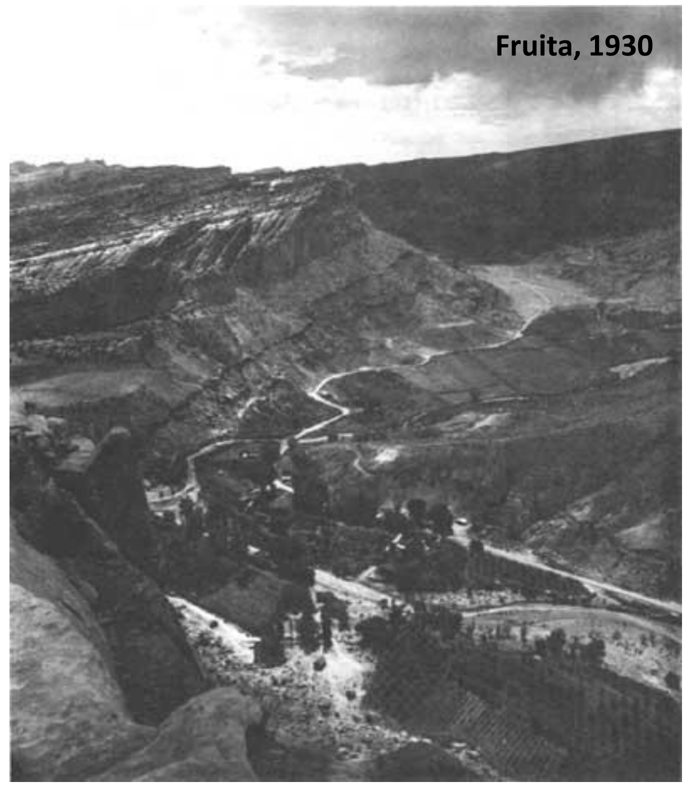
Overview: The boundaries established for the mining districts within Capitol Reef National Park primarily are associated with uranium boom from 1880 to 1956. Towns within the district included Junction, Fruita, Capitol Reef, while prominent mines included the Oyler Mine [Nightingale Claim] and Little Jonnie. Among the prominent individuals associated with the mine were Thomas Pritchett; HJ McClellan; Willard Pace; James and Allen Russell; John C Jack Sumner; and Thomas E Nixon.

Geology: The Capitol Reef National Park is situated along the edge of an ancient shallow sea from the Permian. During the Triassic, stream deposits and volcanic ash covered the sea bed. During the Cretaceous, sandstones, shales and mountain building formed the Rocky Mountains and Colorado Plateaus present in the park boundaries. Erosion continued through the Pleistocene. Among the minerals present are copper malachite, manganese, iron, selenite, and gypsum.

Vegetation: Vegetation ranges from ponderosa pine, pinyon and juniper to prickly pear, sego lilly, cottonwoods and willows. Planted fruit trees include pear, apple, apricot, cherry and plum.

Hydrology: The most dominant water sources in Capitol Reef National Park is the Fremont River. Additional drainages are noted around the Colorado River and Green River.

Transportation: Prehistoric trails were the first roads through Capitol Reef, followed by the Old Halls Crossing Road. Between 1950 and 1953, there was an increase in the road building, such as UT Highway 24, and the bridge at the Fremont River. In 1952, the road was gravelled between Twin Rocks and Chimney Rock, and roads between Green River and Hanksville were oiled. In 1952, the Atomic Energy Commission constructed a road up the old Burr Trail and a road was added, widened and improved over Boulder Mountain.


Fruita, 1930

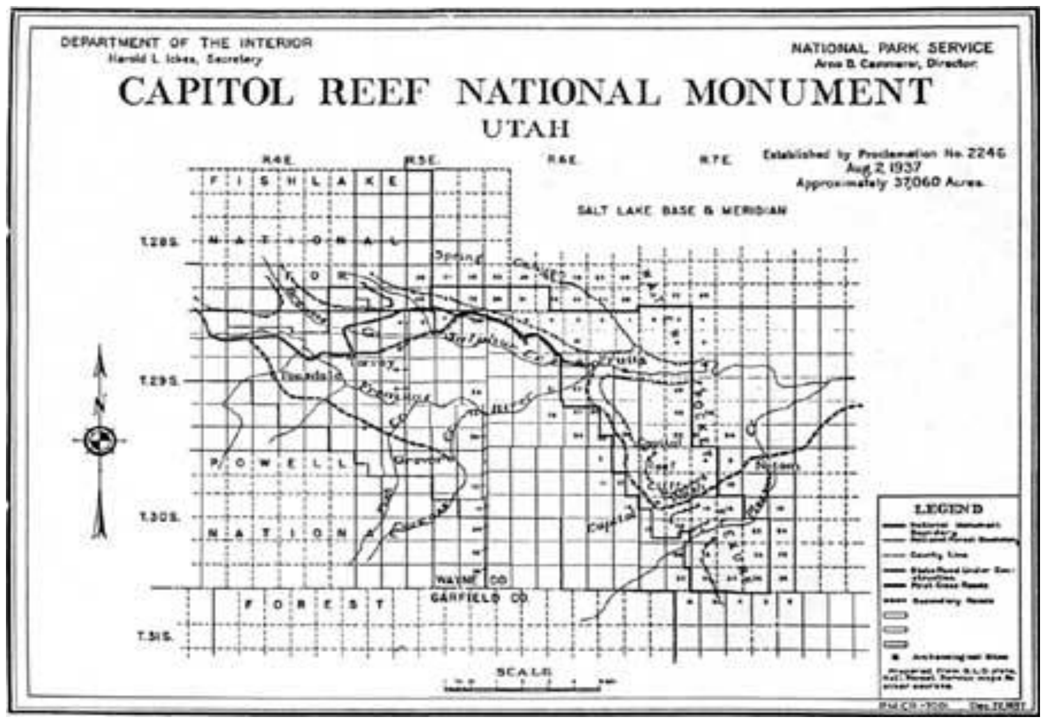
United States: Capitol Reef, Utah

Settlement: Paleo-Indian (12000 years BP) artefacts have been noted at Waterpocket Fold and rock art representing the Archaic (ca. 2000-8000 BP) is present in Capitol Reef. Additional artefacts attributed to the Fremont and Ancestral Puebloans, up to the protohistoric, have been identified within the park boundaries. In 1866, Captain James Andrus led a campaign from Kaibab Plateau to Green River. Adjutant Franklin B. Woolley's journal included the first map of Capitol Reef. In the 1870s, the US Geological Survey began examining the area, followed by Mormon settlement at Hole-in-the-Rock, Halls Crossing, Rabbit Valley, and Fruita (Junction) and miners. The first homesteader to the area, Elijah Cutler Behunin, constructed the Blue Dugway, a road from Fruita to Capitol Gorge. In 1883, miners established the Henry Mountain Mining District. Additional work continued throughout the 1890s. By 1908, coal and uranium miners established the Oyler mine.

Utilities: By 1915, telephone lines extended to the Green River from Colorado. Electricity was present in certain settlements, such as Fruita, before the 1950s.


Rock Art Panel, Capitol Reef


Fruita School House



United Kingdom: Cornwall and Devon

United Kingdom: Cornwall and Devon Mining Landscapes

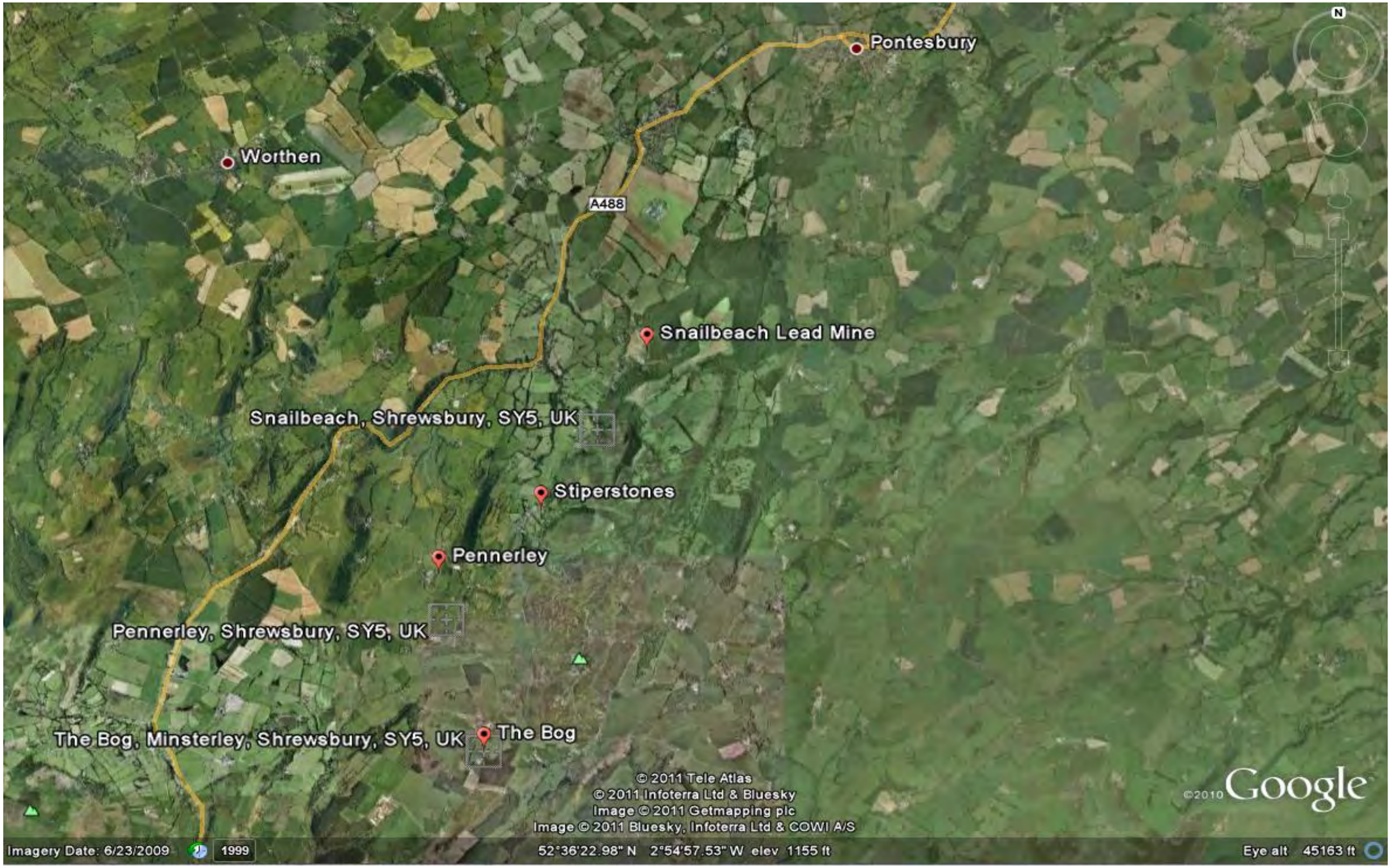
Locations within the Cornwall and Devon Mining Landscapes date between 1700 and 1914. They include the following locations: St. Just, Hayle, Tregonning, Gwinear, Wendron, Camborne-Redruth, Gwennap, St. Agnes, Luxulyan Valley and Charlestown, Caradon, Tamar Valley and Tavistock, Cornwall. The Mining Landscapes in Cornwall and Devon have been well-defined by English Heritage; thus, comparative information may be provided from the World Heritage Site Management Plan, 2005-2010, available from www.cornishmining.org.uk.

Charlestown, 2009

Cornish Engine House, 2009

www.cornishmining.org.uk

United Kingdom: Snailbeach, Shropshire



United Kingdom: Snailbeach, Shropshire

Overview: Romans likely discovered the mineral deposits in the Rea Brook Valley of Shrewsbury, but quickly abandoned the mine after initial workings (i.e., Roman Level) at Snailbeach Lead Mine. Starting in 1552, several leasees held mines in the Snailbeach area, until 1783, when Thomas Lovett and others formed the Snailbeach Company. By the 1850s, the Snailbeach Company workings encompassed a colliery, two smelt mills, a water wheel, a Lordshill engine, and a railway. At its height, the population at Snailbeach reached 500 people. The Snailbeach Company, also known as Snailbeach Mine Company, Ltd., continued operation until 1884, when the prices of lead dropped, forcing the company into liquidation. By the turn of the century, the mines at Snailbeach continued under the auspices of the Halvans Lime Spar and Concentrating Company, which worked waste tips (tailings) into the 1930s. From the 1930s until 1955, the mines operated under Joe Roberts' Snailbeach Barytes Company. The land is owned by the Marquis of Bath. Today, the Snailbeach property is managed by the Shropshire Mines Trust and contains the remains of the Black Tom Shaft, Perkins Level (i.e., Roberts Level or Lordshill Mine), the Chapel Shaft (Lordshill Shaft), the Old Shaft (Ladder Shaft), an underground flue, a compressor house, a winding house, a forge, an engine shed, and engine shaft (Georges Shaft), the chimney associated with the engine house, the Yew Tree Level, the Scutt [Scott] Level, a magazine, a candle house, a lower engine house, a smelt house and associated works, one to two reservoirs and a drainage adit, a mine office, a crusher house, a Barytes Mill, a waterwheel (Cliffdale Mill), a tramway, a miners' dry, and the mineral railway. The COST A27 study incorporated Snailbeach into one of the Cultural Parks and Cultural Landscapes studies in the UK. It extends through portions of the Stiperstones and Hope Valley and is associated with the Pennerley Mine, Tankerville Mine, and Pontesford smelt mill.

Geology: Mines within the Shropshire Mine Fields are situated along Ordovician period flags, shales and ashes separated by a Shelve anticline and Preambrian sandstones, grits, and mudstones, along the Pontesford Linley Fault. The mines are located within the Callow Hill-Bog District and include: Bog Mine, Pontesbury (Callow Hill Quarry), Pulverbatch (Cothercott Mine, Huglith Vein, Westcott Mine, Wilderley Mine, Wrentnall Mine), Snailbeach. NOTE: Other districts in Shropshire include: (1) Buxton Hill-Cefn Gwynlle District; (2) Callow Hill-Bog; (3) Chirbury; (4) Clive; (5) Hope-Shelve; (6) Oswestry; and (7) Shrewsbury. At its height, Snailbeach was touted as one of the most productive lead mines in the UK, producing galena, barytes, calcite, fluorspar, silver and zinc.

Vegetation: Vegetation includes heathland and acidic grassland including algae, lichens, Sheep's Fescue, Heather, Gorse, bryophytes, Broom, Birch, willows, oaks, hay meadows, Spurge Laurel and Woodruff.

Hydrology: Multiple springs are noted throughout the Snailbeach, Minsterley and Pontesburgy area. Rea Brook, Asterley Brook, and the Shelve Pool are present within the Shropshire Mine Fields. To prevent flooding in the mines at Snailbeach, the Boat Level and Wood Level were dug, draining the Pennerley Mine, the Bog, Tankerville, Roundhill, Potter's Pit, Burgam mines, (Roman) Gravels Mine and the Grit Mine. Pumping engines, hydraulic engines, and animal powered windlasses were added later to aid in draining the mine workings.


Snailbeach, 1926

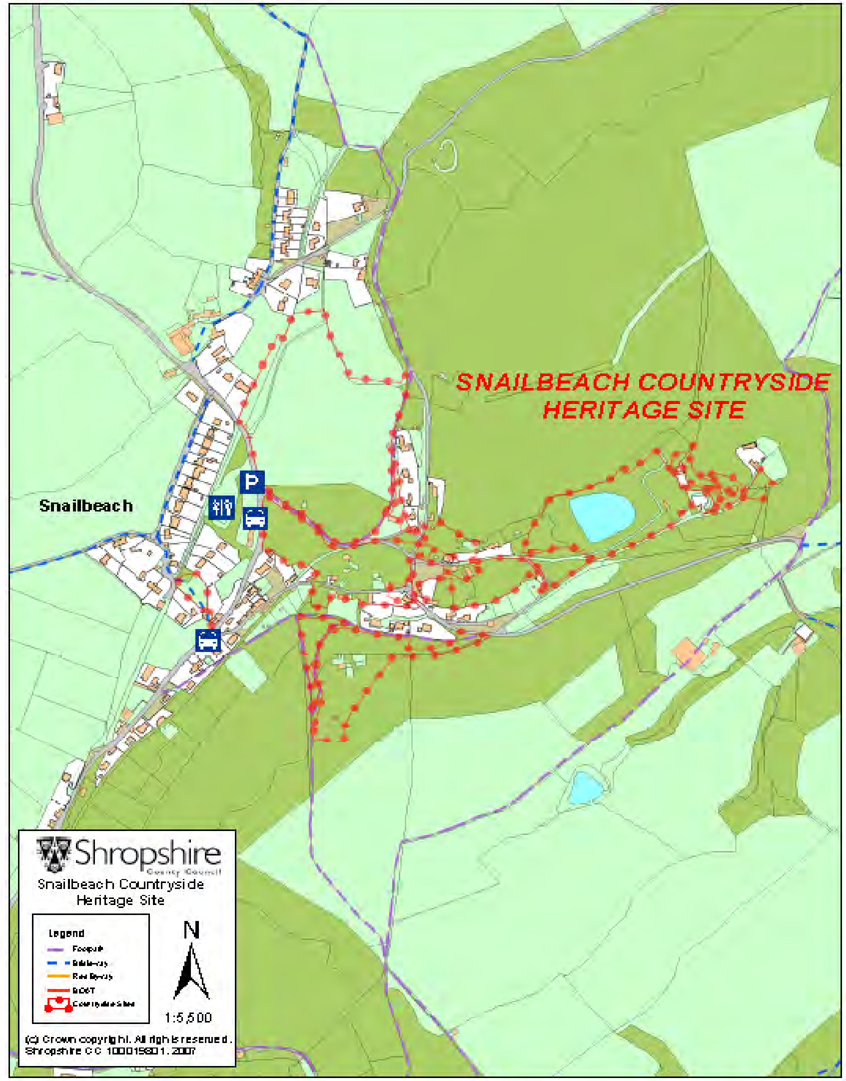
Transportation: The Shropshire Mineral Railway extended from Snailbeach to Minsterley, Pontesbury, and on to Shrewsbury, for a distance of 5.63 km. Portions of the dismantled railway are noted to the north and west of Snailbeach. Access between Pontesbury, Minsterley, Snailbeach, the Stiperstones, and Pennerley is provided via A-488 and smaller branching roads, now accessible by automobile or motor lorries; many of these roads were utilised historically by horse and cart , packhorses, and traction engines. In the 1920s, ore from the barytes mine was transported along the Huglith Mine Ropeway (an aerial tramway) to Pontesbury.

Settlement: Among the settlements of the Shropshire Mine fields were Snailbeach, Minsterley, Pontesburgy, the Bog, Tankerville, Roundhill, Potter's Pit, Burgam mines, (Roman) Gravels Mine, the Grit Mine, the Stiperstones, and Shrewsbury.

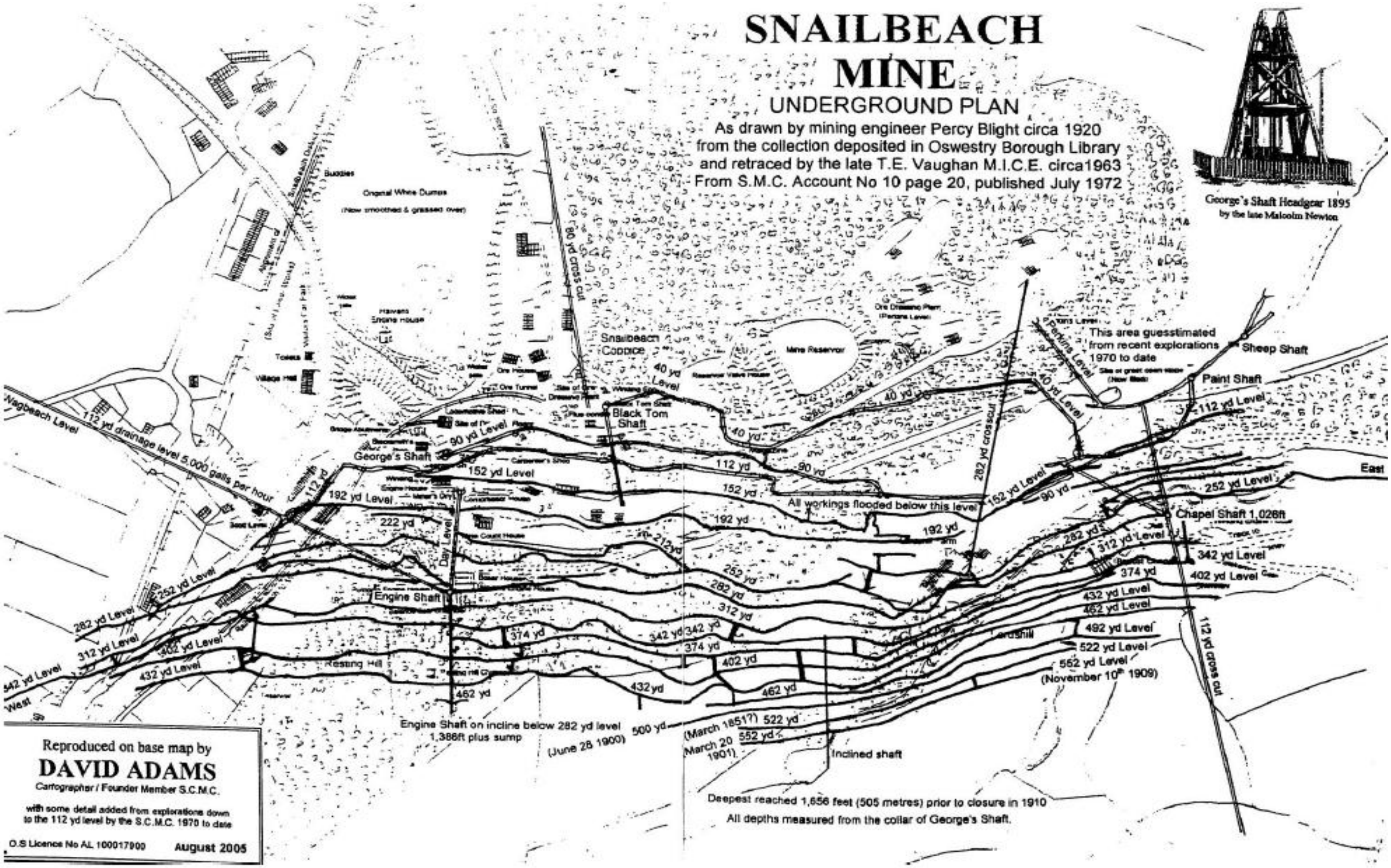
Utilities: The presence of a candle house indicates the use of candles throughout the interior of the mines.

United Kingdom: Snailbeach, Shropshire

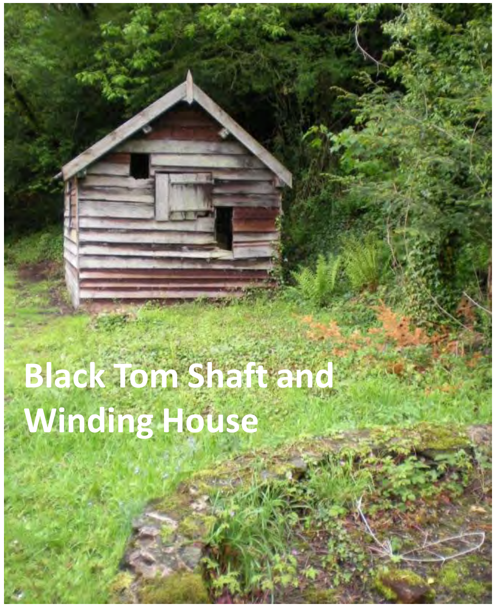
Excerpt from 1870 Shropshire County Map

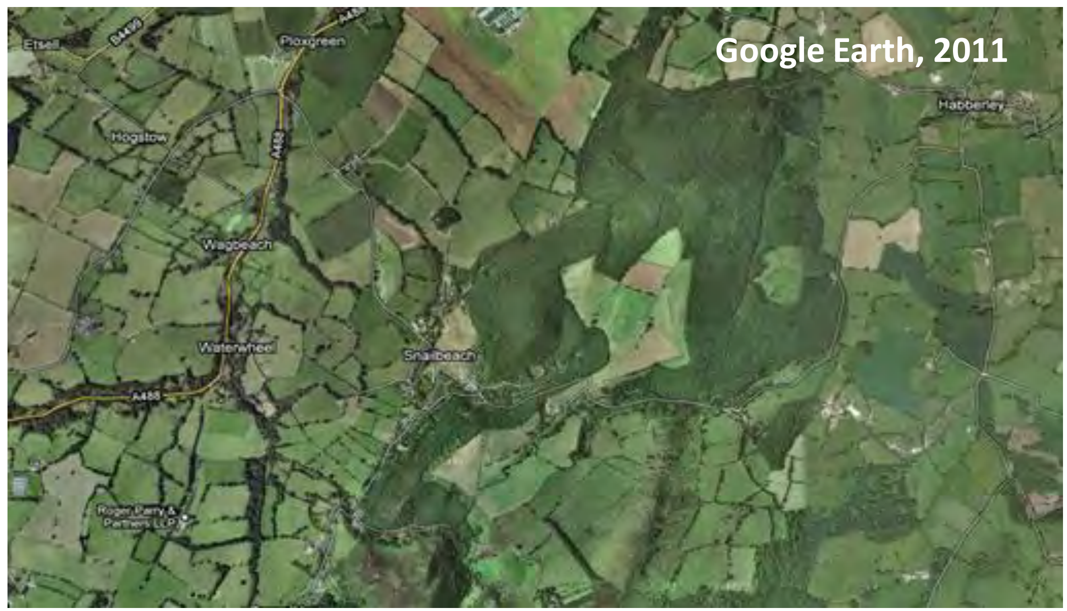


United Kingdom: Snailbeach, Shropshire



United Kingdom: Snailbeach, Shropshire





United Kingdom: Snailbeach, Shropshire


1848 Shaft

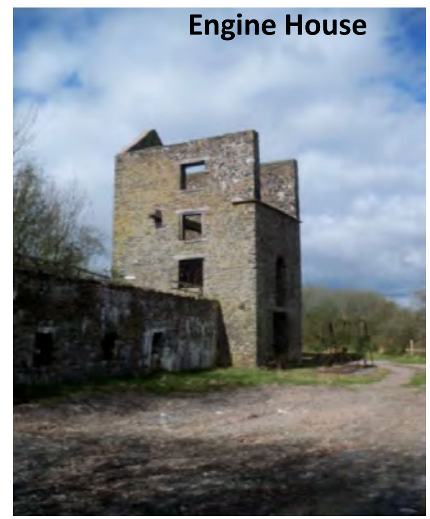

Locomotive Shed


Ore Bins at Engine House


Candle House


Engine House


Headframe


Engine House

New Zealand: Macetown, Otago Region

New Zealand: Macetown, Otago Region

Macetown in the Otago Region of New Zealand is known as the Otago Goldfields Park, Otago Goldfields Trust, and the Otago Goldfields Heritage Trail. http://goldfieldstrust.org.nz/the-trust/. The trail, managed by the Department of Conservation, is comprised of 22 sites representing mining activities from the 1860s (Cunningham 2008). See also http://www.wildflowerwalks.co.nz/wildflowerwalks/map.html; http://www.nzsouth.co.nz/goldfields/map_big.html

Additional towns or locations associated with the Otago Gold fields include:

- Alexandra/Alexandra South/Manuherikia
- Arrowtown
- Arthur's Point
- Bannockburn Terrace Diggings / Stewart Town
- Bendigo Quartz Mining
- Bullendale
- Cambrian
- Cardrona
- Carrick Range Quartz Mines
- Clyde / The Dunstan
- Criffle Diggings
- Cromwell / Junction
- Dansey's Pass
- Doctor's Point
- Dunedin
- Fruitlands / Bald Hill Flat
- George Creek
- Gibbston Valley
- Glenorchy
- Hamilton's Diggings
- Hayes Engineering Works
- Hills Creek / Blackstone Hill
- Hyde Diggings
- Kawarua Gorge
- Lawrence
- Lindis Diggings
- Lonely Grave
- Macetown
- Macrae's Flat / Murphy's Flat
- Matakanui / Tinkers
- Moke Creek Diggings
- Moonlight Valley
- Naseby / Hogburn
- Nevis Valley
- Ophir / Blacks
- Oturehua / Rough Ridge
- Patearora / Sowburn Rush
- Potter's No. 2/Campbell's Diggings
- Quartz Reef Point / Northburn
- Queenstown / The Camp
- Roxburgh
- Serpentine
- Skippers
- St. Bathans / Dunstan Creek
- Thomson Gorge Road
- Waipori
- Wetherstones

González-Tennant's New Zealand study (2009: 20-37) relied upon GIS to create site inventories at the basic level, but also allowed for various types of analyses. Comparisons of the four gold mining communities in the Otago Region provided a means to apply a viewshed analysis to examine a hypothesis that settlement or habitation areas were established in areas where the physical environmental created geographical buffers for noise. For instance, the town of Nenthorn was established to the west-northwest of the two associated stamp mills, at a location where water, mine entrances and land features were more suitable for construction. González-Tennant (2009: 34) notes: "While the placement of the town itself was possibly the result of other factors, there is no other apparent reason why miners would not have placed their own huts closer to their work sites."

Peter Petchey (2002) also examined mining sites in the Otago Region of New Zealand, including sites along the Arrow River and the Macetown Historic Reserve. Whilst Petchey (2002) does not share any of the databases created with the Macetown study, he did utilise GIS to analyse the archaeological features within a landscape study. In this case, Petchey (2002) compared low-level aerial photographs to commercial high-altitude photographs, created a series of map overlays, conducted field checking of the features, and re-mapping locations with a Garmin 12 handheld GPS receiver. Historically, Macetown served as a boomtown associated with alluvial and hard rock mining ventures between 1862 and World War II; the claims were held by a succession of owners and transportation was added to the area in 1884 (Petchey 2002). Macetown comprised numerous residences, stores, a school, post office, several hotels, a hall, a bakehouse, a cemetery, stone walls, orchards and other domestic plantings, and road. Additional features, including mining loci, batteries (i.e., stamp mills or surface plants) such as the Public Battery, Anderson's Battery, Homeward Bound Battery and Tipperary Battery; numerous concrete foundations, huts, furnaces, and aerial cableways were identified through the examination of the area (Petchey 2002). As a result, the Macetown study yields information on the progression of technology in terms of mining that may be best viewed through a landscape approach.

New Zealand: Macetown

Overview: The period of mining at Twelve Mile, or Macetown, extends from 1862 to 1910. It was named for the Mace brothers (John, Charles and Harry Mace), who mined the area. Other leading settlers to the area included the Beale brothers, Jack Tewa, and William Fox. Mining in the area included placer or alluvial mining in the 1860s and lode mining from the 1870s. By the 1900s, most of the miners migrated to Queenstown, with a decline in the population most notable by the 1920s. Today, the mining district is operated as the Macetown Historic Reserve.

Geology: New Zealand is situated on the Australian and Pacific Plates. It is highly volcanic and geothermal fields, and is earthquake prone. The Alpine Fault extends through Otago, which is also dotted with Miocene volcanic centres and basaltic intraplate eruptions. Rocks date from the Paleozoic, along with Mesozoic schists.

Vegetation: Vegetation in the Macetown area includes Matagouri and sweet briar, beech, tussock, sycamores, broom, speargrass, daffodils, bluebells, exotic trees including fruit trees.

Hydrology: The Arrow River, Gale Burn, Bush Creek, Sylvia Creek, Sawyers Creek (or Gully), Scanlan Gully, Twelve Mile Creek, and Coronet (Eight Mile Creek) all flow through Macetown.

Transportation: Transportation was provided in the area via horse and wagon, aerial cable way, and roads.

Settlement: The Macetown area of Otago represents themes of engineering, gold mining and agricultural activities. Settlements include Arrowtown, Macetown, and Cardrona. Other, smaller settlements, formed along mining camps at Sawyer's Gully, Scanlan's Gully, the Premier Mine, the Homeward Bound Mine, Eight Mile Creek, and the batteries. Additional mining features are present at Anderson's battery, the Premier Mine, the Twelve Apostles, the Public Battery (Macetown Crushing Company), Lady Fayer, Sunrise Battery, Tipperary Mine, Balch's Reef Mine (New Caledonia), Mt. Verde Mine, Maryborough Mine, Gladstone Mine, General Havelock Mine, Advance Peak, All Nations Battery, United Goldfields Battery, and Germania Mine.

Utilities: Water provided early sources of power throughout Otago. The telegraph and telephone office, which opened in 1886, closed in 1916. Electrical power was provided via generator, offered by the Reefton Electrical Transmission and Lighting Company, Ltd.

New Zealand: Macetown

Summary

Locations known to be associated with historical mining activities were selected for comparison to the SFMD. Among these were locations in the United States, such as Bisbee and Tombstone, Arizona; Bodie and Death Valley, California; Leadville, Colorado; Butte, Montana; Pioche and Virginia City, Nevada; and Tintic/Eureka, Silver Reef and Capitol Reef, Utah. Locations outside of the United States included Snailbeach, Shropshire, United Kingdom; the Cornwall and Devon Mining Landscapes, United Kingdom; and Macetown, Otago, New Zealand. These mining locations were selected based a series of criteria:

- Identified historical contexts;
- Readily available research and historical photographs;
- Size; and
- Diversity.

Comparisons were made to each of the locations using the same themes identified for the SFMD: geology, vegetation, hydrology, transportation, settlement, and utilities. These themes were considered as a means to better understand the broader landscapes. Geographic Information Systems (GIS) data may be incorporated for each of these sites to discern the boundaries of the Historic Landscape.

In the United States, the National Park Service offers guidance regarding the seven aspects of integrity for historic properties; these include:

- Location;
- Design;
- Setting;
- Materials;
- Workmanship;
- Feeling; and
- Association (National Register Bulletin 15).

Locations at Bisbee, Tombstone, Bodie, Death Valley, Butte, Pioche, Virginia City, and Silver Reef are accessible to the public. The mining districts at each of these locations provide educational information to the general public and many include museums, dioramas, signage, or re-enactments. That being said, Bodie and Death Valley are offered further protection due to their status as State or National Parks; likewise, features situated within Capitol Reef National Park are afforded certain protections. In the United Kingdom, sites situated within the mining landscapes of Cornwall and Devon, as well as certain locations within Shropshire, also lend educational opportunities to the public through the use of signage and tours. The Macetown property in New Zealand is noted within the Otago Goldfields Park and Goldfield Heritage Trail, also providing information to the public regarding its history.

Several of the locations selected for comparison have been subject to modern development, vandalism, commercialisation, or are protected by nature of their historical significance or ownership. These factors, along with the location's ability to convey its historical significance and integrity, were considered in ascertaining which locations would be best suited to Historic Landscape Characterisation. The results of the study are summarised in the following table.

Comparison Table

Site	Location	Associated Boomtown/s	Dates of Significance	Protection Status	Integrity Constraints	Historic Landscape Characterisation Application
San Francisco Mining District	Beaver County, Utah, United States	Frisco, Grampian, Newhouse	1871-1950	National Register of Historic Places	Vandalisation but retains integrity	**Applicable**
Warren District	Cochise County, Arizona, United States	Bisbee	1875-1975	National Historic Landmark Status	Minor commercialisation	**Applicable**
Tombstone District	Cochise County, Arizona, United States	Tombstone	1878-1931	National Historic Landmark	Commercialisation	Not Well Suited
Bodie Mining District	Mono County, California, United States	Bodie, Bridgeport	1859-1961	California State Park, National Historic Landmark	Arrested Decay; protection as a California State Park	**Applicable**
Death Valley National Park	Inyo County, California, United States	Death Valley	1860-1933	National Park	Protection due to National Park Status; recreational access	**Applicable**
Leadville Mining District	Lake County, Colorado, United States	Leadville	1859-1917	National Historic District	Modern Development	Not Well Suited
Butte District	Silver Bow County, Montana, United States	Butte	1874-1934	Historic District	Modern Development but retains integrity	**Applicable**
Pioche District, Meadow Valley District, Ely District, Highland District	Lincoln County, Nevada, United States	Pioche	1863-1933	National Register of Historic Places	Modern Development but retains integrity	**Applicable**
Comstock Lode	Storey/Lyon Counties, Nevada, United States	Virginia City	1859-1882	Historic District	Commercialised	**Applicable**
Tintic Mining District	Juab County, Utah, United States	Tintic / Eureka, Diamond, Silver City, Mammoth	1869-1958	National Register of Historic Places	Modern Development	Not Well Suited
Harrisburg Mining District	Washington County, Utah, United States	Silver Reef	1866-1901	National Register of Historic Places	Modern Development	Not Well Suited
Oyler Uranium Mine	Wayne/Garfield Counties, Utah, United States	Capitol Reef	1880-1956	National Park	Protection due to National Park Status; recreational access	Not Well Suited
Callow Hill-Bog District	Shropshire, United Kingdom	Snailbeach	Roman to 1955	Shropshire Mines Trust	Limited Protection	**Applicable**
Cornwall & West Devon Mining Landscape	St Just, Hayle (Penwith District Parish Council), Tregonning and Gwinear, Wendron, Camborne-Redruth, Gwennap, St. Agnes, Luxulyan Valley, Charlestown, Caradon, Tamar Valley, Tavistock, Cornwall and Devon, United Kingdom	Cornwall and Devon Mining Landscapes	1700-1914	Historic Mining Landscapes	Historic Mining Landscapes	**Applicable**
Macetown Historic Reserve	Otago, New Zealand	Macetown	1862-1910	Historic Reserve	Recreational Access	**Applicable**

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Microsoft Excel - AppD3_ComparativeMines.xlsx

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Site	Country	State	Location	Associated Boomtown/s	Owner	Dates	Protection Status	Integrity Constraint	Associated Mines	Initial Discoverer/s or Instrumental People	Type of Mine / Minerals	Description	Historic Landscape Characterisation Application
2	Callow Hill-Bog District	United Kingdom	[n/a]	Snailbeach, Shropshire (UK)	Snailbeach	Private	Roman to 1955	Shropshire Mines Trust	limited protection	Bog Mine, Pontesbury (Callow Hill Quarry), Pulverbatch (Cothercott Mine, Huglith Vein, Westcott Mine, Wilderley Mine, Wrentnall Mine), Snailbeach. NOTE: Other districts in Shropshire include: (1) Buxton Hill-Cefn Gwynlle District; (2) Callow Hill-Bog; (3) Chirbury; (4) Clive; (5) Hope-Shelve; (6) Oswestry; and (7) Shrewsbury.	Thomas Powys, Thomas Lovett, Halvens Co., owner Marquis of Bath	Lead, galena, barytes, flourspar, silver, zinc	Begun in Roman times, Snailbeach was mined until 1955 for lead galena, barytes, calcite, fluorspar, silver and zinc. It was touted as the richest mine per acre of ground in Europe. It was worked for lead until 1911 and barytes until the 1950s. The land is owned by the Marquis of Bath.	Applicable
3	Tombstone District	United States	AZ	Cochise County, Arizona (USA)	Tombstone	Public / Private	1878-1931	National Historic Landscape	commercialised	Ajax Hill Area, Alkie, Alpha, Anchor, Argenta, Arizona Queen/Last Chance, Arlington, Blacktail Mine Group, Bonanza Mine Group, Brunckow (Bronco), Bunker Hill, Carolina, Charleston, Cincinnati, Comet and Black Eagle, Comstock Hill, Contact Mine, Contention-Grand Central Mine Group, Copper Blossom, Cuss, Defense, Delhi, Dry Hill, eagle Roost, East Side, Empire, Florida, Franklin, Free Coinage, Gallagher Van Adium & Rare Minerals Corp, Galvez Mine (Wolcott), Gilded Age, Girard, Grand Central South, Grand Dipper, Ground Hog, Hamilton, Hawk Eye (Little Wonder), Herschel, Hopeful, Ingersol Mine, Intervener, Joe Mine, Joe & Grand Central Shafts Area Dump, Junietta, Lewis Springs, Little Joe, Luck Now, Luck Sure, Lucky Boy, Lucky Cuss, Manganese Silver, Manila, Merrimac, Miami, Mildred et al Claims, Monitor, Montezuma, Morning Star, Mountain Maid, Mustang, Naumkeg, Ninety-Six, Old Guard, Omega Mine, Oregon-Prompter Mine Group, Owl's Nest Mine, Parallel, Plain View, Plata Rica, Plum Mine, Portland, Crescent, State of Virginia Mines, Quartzite, Rattling Boy, Sidewheel Mines, Red Top, Revenue, Rocky Bar, Sailor, San Pedro, Silver Bar, Silver Bell, Silver PLume, Silver Thread, State of Maine, State of Maine #2, Sulphuret, Sunrise, Sunset, Superior, Survey, Sydney, TEI Pit, Telephone Mine, Three Brothers Mine, Tombstone (Goodenough, Toughnut, Vizina, Way Up), Tombstone Area Dolomite, Tombstone Extension, Tombstone Limestone, Topaz, Tribute, True Blue, West Side, Wide West Mines	Ed Schieffelin	silver	Famous for the Earp-Clanton fight at the OK Corral, this town had two newspapers (The Nugget and The Tombstone Epitaph), a telegraph, running water, and refrigeration. Mining was conducted by Cornish, Irish and German miners, with commercial properties being run by Chinese and other immigrants. Fires in June 1881 and May 1882 destroyed the commercial district, with the town being rebuilt. Today it is located within the Tombstone Historic District and is recognized as a National Historic Landmark District.	Not Well Suited
4	Warren District	United States	AZ	Cochise County, Arizona (USA)	Bisbee	Public / Private	1875-1975	National Historic Landscape	minor commercialisation	Copper Queen/Halero mine, Czar Mine, Holbrook Mine, Spray Mine, Queen Hill, Atlanta, Atlast, Bay State, Bisbee Blue, Bisbee SE No 1 Limestone, Black Jack, Bounty, Brewery, Calumet, Arizona, Campbell, Cave, Cochise Project, Cochise Property, Cole, Copper King, Copper Prince, Copperopolis, Crown King, Danville-Hanchetta Claims, dern, Dreadnaught, Escabrosa Ridge, Galena, Garfield, Gold Gulch, Gold Hill, Hendricks Gulch, Higgins, Ivanhoe, John D Jr., Lavender Open Pit, Lowell Mine, Mammoth, Marquette, Neptune, New York, Northwest of Bisbee, Ohio, Ramsey Canyon, Sacramento Hill, Saginaw, Shattuck, Southwest, Superior, WMA Claim, Wade Hampton, Waterloo, Wolverine, Captain, Caretto, Cochise Queen, Congdon, Copper Glance, Copper King, Cuprite, Dallas, Don Luis, East Side, Glance, Granville, Illinois, Inspiration, Juniper Flats, Ligier Tuto Prospect, Lucky Strike, Lucky Swede, Modern Prospect, Mountain View, San Juan, Silver Bear, Uncle Sam, Warren, White Tail Deer, Yakima Dolomite	George Warren, Ed Reilly, financially backed by Judge DeWitt Bisbee	copper, gold, silver	Named for Judge DeWitt Bisbee, this town is centered on minerals of gold, silver and copper. The most known mine is the Copper Queen. The district is situated on the Mule Mountains.	Applicable
5	Butte District	United States	MT	Silver Bow County, Montana (USA)	Butte	Public / Private	1874-1934	Historic District	modern development but retains integrity	Agnostic, Ajax, Ancient, apex, Bachelor Prospect, Belcher Prospect, Black Claim, Black Hawk Prospect, Black Warrior Group, Blackstone Vein Prospect, Bland, Blue Bird, Bonanza Lode, Brilliant, Brown's Gulch, Butte, Cary Prospect, Chambers, Champion, Colonel Sellers Vein Prospect, Copper Czar Mine, Courtney Claim, Creole Mine, Cumberland Prospect, Czarina Mine, Deadwood Vein Prospect, Diamond Mine, Dixon, East Minnie Jane Prospect, East Ridge, Elba, Elvina Prospect, Eveline & Twilight, Excelsior, Fairview Mine, Florida Vein Prospect, Fredonia occurrence, Garibaldi Mine, Geneva Mine, Germania Prospect, Gold Flint, Golden King Prospect, Great Republic Mine, Gregory, Grey Eagle Mine, Hecla, Helvetia Prospect, Humbolt Mine, IXL Claim, Illinois Claim, Independence Mine, Jumbo, Keystone, Lavena Mine, Little Acre Placer, Little Annie Mine, Little Darling Occurrence, Little Georgia Prospect, Little Sarah Mine, Main Range, Mamie Vein Prospect, Manganese of Butte & Phillipsburg Occurrence, Mapleton Mine, Marget Ann Mine, Marie Prospect, Miles Crossing, Millside Prospect, Milwaukee Vein Prospect, Minnie Jane Mine, Missoula, Missoula Gulch Placer, Missouri Girl Prospect, Montana Mine, Montana Resources, Mountain Boy Mine, Narrow Gage, Nemo, New Butte Mining Company Occurrence, New Jersey Prospect, Night Hawk, None Such, North Butte, North Pole, Norwich, Olsen Fraction, Orphan Girl, Pacific, Peterson Claim, Phase II-Moly Dome Prospect, Phase I-Berkeley Neck Prospect, Poorman Mine, Poser, Poulin, Prospector, Rainbow Project, Rising Star Prospect, Rooster Prospect, Rocker Placer, Rover Prospect, Ryan Prospect, Scotia Mine, Self Rising Mine, Seymore, Silver Bow Creek Placer, Silver Bow Deposits, Silver Bow Mine, Silver Bow Prospect, Silvercleft, Silver Safe Prospect, Silver Smith, Snow Flake Prospect, Sooner Prospect, Stanislas, Sun Dorg Prospect, Tiger Lily Prospect, Uncle Sam, Unita, Walkerville, West Mapleton, West Nettie, Yankee Doodle Creek Placer	William A. Clark, Marcus Daly, F. Augustus Heinze	gold, copper	First developed during the silver boom (1874), Butte Hill amassed more than 300 stamps in 1887. Between 1864 and 1870, gold was mined as well. By 1890, the economy shifted to copper. The period of significance for Butte is 1876 to 1934. The town included a central business district, mining landscapes, a smelter district, and residential areas. The Northern Pacific Railroad led to further development and settlement. Immigrants from Cornwall, England, Ireland, and China established settlements within the area. By 1893, gambling halls and brothels formed a large Red Light District that operated until the 1960s. At the same time, skyscrapers were constructed. Today, the town maintains its mining landscape complete with iron gallus headframes.	Applicable
6	Comstock Lode	United States	NV	Storey / Lyon Counties, Nevada (USA)	Virginia City	Public / Private	1859-1882	Historic District	commercialised	American Flat, Andes, C & C, Cedar Ravine, Central Comstock, Comstock Lode (Best & Belcher, California, Chollar, Con Virginia, Gould & Curry, Hale & Norcross, Mexican, Ophir, Potosi, Savage, Union), Confidence, Crown Point, Empire, Flowery Lode (Flowery, Golden Eagle, Lady Bryan), Geiger Grade, Golden Winney, Imperial, Justice, Kentuck, Little Gold Hill, Occidental Lode, Overman Mine, Sierra Nevada, Six Mile Canyon, South Comstock, South End Group, South End Shaft, Wheeler Monument, Yellow Jacket	Peter O'Riley, Patrick McLaughlin, and later Henry Comstock	silver	First silver rush town with large-scale industrial and corporate enterprise. 1850-1864, height. Subsequent discoveries include the Ophir Mine. Site encompasses 1,475 acres and incorporates the town of Virginia City and mines of the Comstock Lode.	Applicable
7	Pioche District; Meadow Valley; Ely District; Highland District	United States	NV	Lincoln County, Nevada (USA)	Pioche	Public / Private	1863-1933	National Register of Historic Places	modern development but retains integrity	Highland, Highland Valley, Stampede Gap, Meadow Valley, Ely	Francois Louis Alfred Pioche; A. William Hamblin	silver, gold, copper	Valley Mining District. The name later changed to the Pioche District (ca. 1869). Additional information is provided by Joseph V. Tingley (1998), of the Nevada Bureau of Mines and Geology Report 47 (second edition), Mackay School of Mines, University of Nevada, Reno. http://www.nbmg.unr.edu/dox/r47/r47.pdf	Applicable
8	San Francisco Mining District	United States	UT	Beaver County, Utah (USA)	Frisco, Grampion, Newhouse	Public / Private	1871-1950	National Register of Historic Places	vandalisation but retains integrity	Beaver Carbonate (Carbonate-Rattler), Cupric, Drum, Frisco (Horn Silver Mine), Frisco Contact, Frisco Silver & Lead, Frisco Summit Shaft, Golden Reef, Grampian Hill, Imperial, King David, Luly Shaft Occurrence (Van Cott Tunnel), Michigan Group, Milford (Anaconda, OK Mine), Peacock Copper Group, Preuss-Cactus (Quad Metals Corp), Silver Star, Squaw Gulch Pit, Tintic Lead & Cobre Mine Co., Unknown Incline, Van Horn Prospect, Washington Mine	James Ryan, Samuel Hawkes	silver, copper, marble	Touted as the world's richest silver mine before its collapse in 1885, the SFMD includes the mine workings, several hundred mining claims, and a historic boomtown known as Frisco, a "suburb" of Frisco (Grampian), was established to the south of the boomtown, closer to the mines. An additional boomtown, Newhouse, is situated on the western flank of the San Francisco Mountains. At the Frisco town site, numerous structures,	Applicable

Sheet1 Sheet2 Sheet3

Microsoft Excel - AppD3_ComparativeMines.xlsx

	Site	Country	State	Location	Associated Boomtown/s	Owner	Dates	Protection Status	Integrity Constraint	Associated Mines	Initial Discoverer/s or Instrumental People	Type of Mine / Minerals	Description	Historic Landscape Characterization Application
9	Harrisburg Mining District	United States	UT	Washington County, Utah (USA)	Silver Reef	Public / Private	1866-1901	National Register of Historic Places	modern development	Wondermine, Adah, Arizona/River No. 2, B Reef Mine, Barbee & Walker (Honest Miner), Buckeye, Burg, Butte Reef, California (Kinner), Chloride Chief, Cinder Pit, Cobb Mine, Doyle Shaft, Duffin Mine, East Reef Mine, East Section 27 Prospect, Emily Jane, Hartman-Tecumseh, Hot Rock No. 1, John Dee Claim, Last Chance Mine, Leed's Uranium Mine, Leeds Creek Prospect, Leeds Mine, Llama Group, Lucky Strike No. 2, Maggie, Maud, Nevada, Paulmarttin, Plata No. 1, 2, 3, Prospects West of Harrisburg Bench, Rattlesnake Mine, Requa Mine, Rough Rider No. 2, Savage Mine, Adits North of Quail Creek Occurrence, Shafts South of Quail Creek Occurrence, silver Flat and Silver Crown, Silverman No. 2, Stormont, Stormy King, Tecumseh Hill, McNally Mine, Newton Mine, Thompson's Mine, Toquerville Mine, Vanderbilt 1 & 2, Vanderbilt # 4, Vanderbilt #5, Walkeng Mining Company Prospect, Wells Pit	John Kemple, William Barbee	silver	Also known as Barbee's Town, Bonanza City, Rockpile, the town of Silver Reef was settled by miners primarily from Cornwall and Pioche. The mines were discovered as early as 1866 with the collapse of the town by 1884/1901. A Wells Fargo office remains at the center of the once flourishing town.	Not Well Suited
10	Bodie Mining District	United States	CA	Mono County, California (USA)	Bodie, Bridgeport	Public (California State Park)	1859-1961	California State Park, National Historic Landmark	arrested decay; protected	Standard Company Mines	William (Waterman) S. Bodey	gold	Mined beginning in 1859, town established by 1876. National Register of Historic Places, National Historic Landmark and California Historic Landmark (#341). Bodey died in blizzard in 1860 and became namesake. Gold discovered by Standard Company in 1876. Two stamp mills. Population ranged from 5-7000 people and 2000 buildings. Mined through late 1880 when miners relocated to Butte, Tombstone and	Applicable
11	Leadville Mining District	United States	CO	Lake County, Colorado (USA)	Leadville Mining District	Public / Private	1859-1917	National Historic District	modern development	Matchless Mine, Climax Mine, Black Cloud Mine, Ibex Mining Company, Mineral Belt Trail	Abe Lee; Meyer Guggenheim, Horace Tabor	gold, silver, lead, zinc, magnanese, molybdenum	One of the richest mineral regions in the world, with gold, silver, lead, zinc, manganese, and molybdenum.	Not Well Suited
12	Tintic Mining District	United States	UT	Juab County, Utah County, Utah (USA)	Diamond, Silver City, Mammoth, Eureka	Public / Private	1869-1958	National Register of Historic Places	modern development	Centennial-Eureka, Gemini, Mammoth, Chief, Plutus, Godiva, Iron Blossom Ore Run	William McIntyre, John Q. Packard, John Beck, Jesse Knight, McCornick brothers, George Dern, W.W. Chilsom, Water Fitch, Sr., and E.J. Raddatz	gold, silver, lead	The Tintic Mining District was one of the largest in Utah and included gold, silver and lead mines.	Not Well Suited
13	Macetown Historic Reserve	New Zealand	(n/a)	Otago, New Zealand	Macetown	Reserve lands	1862-1910	Historic Reserve	recreational access	Twelve Mile, Macetown, Sawyer's Gully, Scanlan's Gully, Premier Mine, Homeward Bound Mine, Lady Fayer, Tipperary Mine, Balch's Reef Mine/New Caledonia, Mt. Verde Mine, Maryborough Mine, Gladstone Mine, General Havelock Mine, Garibaldi Lode, Advance Peak, Sunrise, Germania Mine. Alluvial workings at Arrow River, Rich Burn, Sylvia Creek, Eight Mile Creek, Scanlan's Gully. Batteries at Anderson's Battery, Homeward Bound Battery, All Nations Battery, United Goldfields Batter, Public Battery, Sunrise Battery, and Public Battery (Macetown Crushing Company)	Jack Tewa, William Fox, Mace Brothers, Beale Brothers	lead, gold, silver	Consists of the Macetown Historic Reserve at the Arrow River and Macetown, Otago, New Zealand. Macetown, historically, was known as Twelve Mile.	Applicable
14	Death Valley National Park	United States	CA	Inyo County, California (USA)	Death Valley National Park	Public (National Park Service)	1860-1933	National Park	preserved due to National Park Status; recreational access	Coso, Russ, Telescope Peak, Argus Mining Districts; Lone Pine Mining District; Panamint Mining District; New Coso Mining District; Lookout and Modoc Mining Districts	Darwin French; S.G. George	gold, silver, lead	Established as a National Park in February 1933, Death Valley encompasses more than 3,000 square miles. The mining districts are described in detail by Linda W. Greene and John A Latschar in a three-volume study titled Death Valley National Monument: Historic Resource Study: A History of Mining (March 1981), available online at http://www.nps.gov/history/online_books/deva/index.htm (accessed	Applicable
15	Oyler Uranium Mine	United States	UT	Wayne/Garfield Counties, Utah (USA)	Capitol Reef	Public / Private	1880-1956	National Park	preserved due to National Park Status; recreational access	Oyler Mine [Nightingale Claim]; Little Jonnie	Thomas Pirtchett; HJ McClellan; Willard Pace; James and Allen Russell; John C Jack Sumner; Thomas E Nixon	gold, silver	Boundaries are primarily associated with uranium boom of the 1950s. Towns included Junction, Fruita, Capitol Reef.	Not Well Suited
16	Cornwall & West Devon Mining Landscape	United Kingdom	(n/a)		St. Just, Cornwall	Public / Private	1700-1914	Historic Mining Landscape	Historic Mining Landscape	St Just United, Balleswidden, Boscean, Wheal Owles, Botallack and Levant			2671 hectares	Applicable
17	Cornwall & West Devon Mining Landscape	United Kingdom	(n/a)	Penwith District Parish Council (UK)	Hayle, Cornwall	Public / Private	1700-1914	Historic Mining Landscape	Historic Mining Landscape	South Wales Copper Smelters, Cornubian Orefields; Camborne-Redruth area; and large number of mineral ports	John Harvey, Richard Trevithick, William West, Arthur Woolf, William Hosken		207 hectares. Home to the largest 19th century mine engine (steam) foundries in the world; associated with famous steam engine engineers; and served as a port of departure for engines used in World's ore fields.	Applicable
18	Cornwall & West Devon Mining Landscape	United Kingdom	(n/a)		Tregonning and Gwinear, Cornwall	Public / Private	1700-1914	Historic Mining Landscape	Historic Mining Landscape	Tregonning and Gwinear Mining District	Sir Francis Godolphin		4484 hectares	Applicable
19	Cornwall & West Devon Mining Landscape	United Kingdom	(n/a)		Wendron, Cornwall	Public / Private	1700-1914	Historic Mining Landscape	Historic Mining Landscape	Wendron Mining District	Sir Francis Basset, Lord de Dunstanville, principal mineral owner of district		810 hectares	Applicable
20	Cornwall & West Devon Mining Landscape	United Kingdom	(n/a)		Camborne-Redruth, Cornwall	Public / Private	1700-1914	Historic Mining Landscape	Historic Mining Landscape	Camborne and Redruth Mining District			1403 hectares	Applicable
21	Cornwall & West Devon Mining Landscape	United Kingdom	(n/a)		Gwennap, Cornwall	Public / Private	1700-1914	Historic Mining Landscape	Historic Mining Landscape	Gwennap Mining District, including Devoran, Perran and Kennal Vale	John Taylor		3045 hectares	Applicable

Sheet1 Sheet2 Sheet3

Microsoft Excel - AppD3_ComparativeMines.xlsx

	Site	Country	State	Location	Associated Boomtown/s	Owner	Dates	Protection Status	Integrity Constraint	Associated Mines	Initial Discoverer/s or Instrumental People	Type of Mine / Minerals	Description	Historic Landscape Characterisation Application
21	Cornwall & West Devon Mining Landscape	United Kingdom	(n/a)		Gwennap, Cornwall	Public / Private	1700-1914	Historic Mining Landscape	Historic Mining Landscape	Gwennap Mining District, including Devoran, Perran and Kennal Vale	John Taylor		3045 hectares	Applicable
22	Cornwall & West Devon Mining Landscape	United Kingdom	(n/a)		St. Agnes, Cornwall	Public / Private	1700-1914	Historic Mining Landscape	Historic Mining Landscape	St. Agnes Mining District			1225 hectares	Applicable
23	Cornwall & West Devon Mining Landscape	United Kingdom	(n/a)		Luxulyan Valley and Charlestown, Cornwall	Public / Private	1700-1914	Historic Mining Landscape	Historic Mining Landscape	Luxulyan Valley and Charlestown	Charles Rashleigh		274 hectares	Applicable
24	Cornwall & West Devon Mining Landscape	United Kingdom	(n/a)		Caradon, Cornwall	Public / Private	1700-1914	Historic Mining Landscape	Historic Mining Landscape	Caradon Mining District			1436 hectares	Applicable
25	Cornwall & West Devon Mining Landscape	United Kingdom	(n/a)		Tamar Valley, Tavistock, Cornwall	Public / Private	1700-1914	Historic Mining Landscape	Historic Mining Landscape	Tamar Valley, Tavistock			4164 hectares	Applicable

Sheet1 Sheet2 Sheet3

APPENDIX D4

San Francisco Mining District, Beaver County, Utah: Archaeological Sites

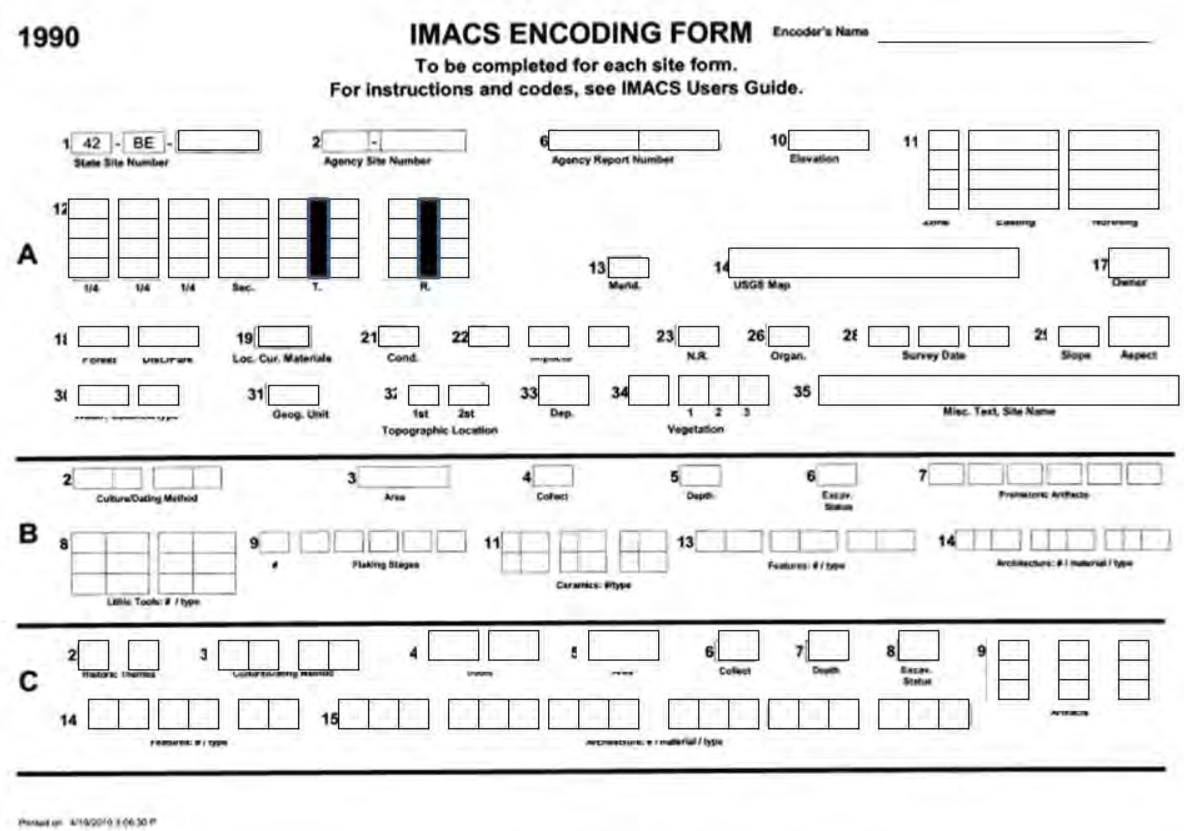
Heather R. Puckett
May 2013

In the United States, archaeological sites are designated using a trinomial, which corresponds to the Smithsonian Institution unified inventory numbering system. Under this system, each state was assigned a corresponding alphabetical letter and number (i.e., Utah = 42) which serves as the first part of the designation. A two- or three-letter abbreviation was used for the County designation (i.e., Be = Beaver), with the final number in the sequence representing the site within that inventory (i.e., site number 3180).

A total of 50 archaeological sites have been recorded formally within the boundaries of the San Francisco Mining District (SFMD). All of the sites were recorded using the IMACS forms, which offer a consistent dataset not only for the HLC or Utah archaeological resources, but for resources identified regionally within the Intermountain states (i.e., Utah, Idaho, Nevada, Wyoming and portions of California).

Copies of the IMACS data are housed at the USHS and are tracked through their Smithsonian or Trinomial designation (i.e., *42BeXX*). Thus, the SFMD HLC model database incorporates the attributes of the IMACS, as well as the Data Standard for Monument Inventories (MIDAS) utilised by English Heritage (1998).

Databases housed in Access, which may be linked to the GIS geodatabase reflect these attributes (e.g., Site Data Structure, Event Data Structure, etc.). To conform to the attributes required for consistency, a listing was created for site types (i.e., prehistoric, historical, or multi-component; see Appendix E). The attribute data is used in conjunction with the landscape polygons to define the HLC types present.


1990

IMACS ENCODING FORM Encoder's Name

To be completed for each site form.

For instructions and codes, see IMACS Users Guide.

A

1 42 - BE - State Site Number

2 Agency Site Number

6 Agency Report Number

10 Elevation

11

12 1/4 1/4 1/4 Sec. T. R.

13 Merid.

14 USGS Map

17 Owner

19 Loc. Cur. Materials

21 Cond.

22

23 N.R.

26 Organ.

28 Survey Date

Slope Aspect

31 Geog. Unit

32 1st 2st Topographic Location

33 Dep.

34 1 2 3 Vegetation

35 Misc. Text, Site Name

B

2 Culture/Dating Method

3 Area

4 Collect

5 Depth

6 Excav. Status

7 Prehistoric Artifacts

8 Lithic Tools: # / type

9 # Flaking Stages

11 Ceramics: #/type

13 Features: # / type

14 Architecture: # / material / type

C

2 Historic Themes

3

4

5

6 Collect

7 Depth

8 Excav. Status

9 Artifacts

14 Features: # / type

15 Architecture: # / material / type

The archaeological site types documented within the SFMD boundaries fall within two general categories: prehistoric or historical.

Prehistoric refers to any archaeological site, feature, or object associated with one of the cultural sequences of the eastern Great Basin such as the Bonneville Period (9000-7500 BCE); the Wendover Period (7500-4000 BCE); the Black Rock Period (4000 BCE-500 CE) (Aikens and Madsen 1985: 152, 154-160); or the Fremont Culture (400 to 1300 CE) (Marwitt 1985: 161).

Euro-Americans first encountered descendants of these groups in the late 18th century and early 19th century (Thomas, Pendleton and Cappannari 1985: 262-263; Murphy and Murphy 1985: 286, 386), which suggests a clear chronological division for the historical era. European exploration into the area was followed by the opening of the Santa Fe Trail between Missouri and Mexico, fur trapping and exploration, and ultimately, settlement.

Within this historical era were activities such as mining, agriculture, cattle and sheep ranching, transportation, utilities, and development of residential areas. Site types commonly identified within Utah and associated attributes are defined by the IMACS.

Examples of prehistoric archaeological sites include rock art, granaries, caches, or artefact scatters, while examples of historical sites may include camp sites, structural remains, irrigation features, fences, trails, ranch equipment or discarded trash. Some archaeological sites may include features or artefacts representing both the prehistoric and historical era; these are denoted as mixed or multi-component sites.

At least seven prehistoric archaeological sites – all lithic scatters – and three multi-component sites have been recorded within the SFMD boundaries. An isolated metate was noted within the commercial district of Frisco as well.

The Frisco town site has been documented as an archaeological site, 42Be3180 (Puckett 2008). An additional boomtown, Newhouse, is situated on the western flank of the San Francisco Mountains. Associated with a copper vein claimed as the Cactus Mine, Newhouse often is misidentified within the neighbouring Preuss Mining District. A review of the SFMD mining claims suggests the Cactus Mine actually falls within the SFMD boundaries. The Newhouse townsite, 42Be862, dates between 1870 and 1912 and currently is being examined by Paige M. Peyton (personal communication, 2010).

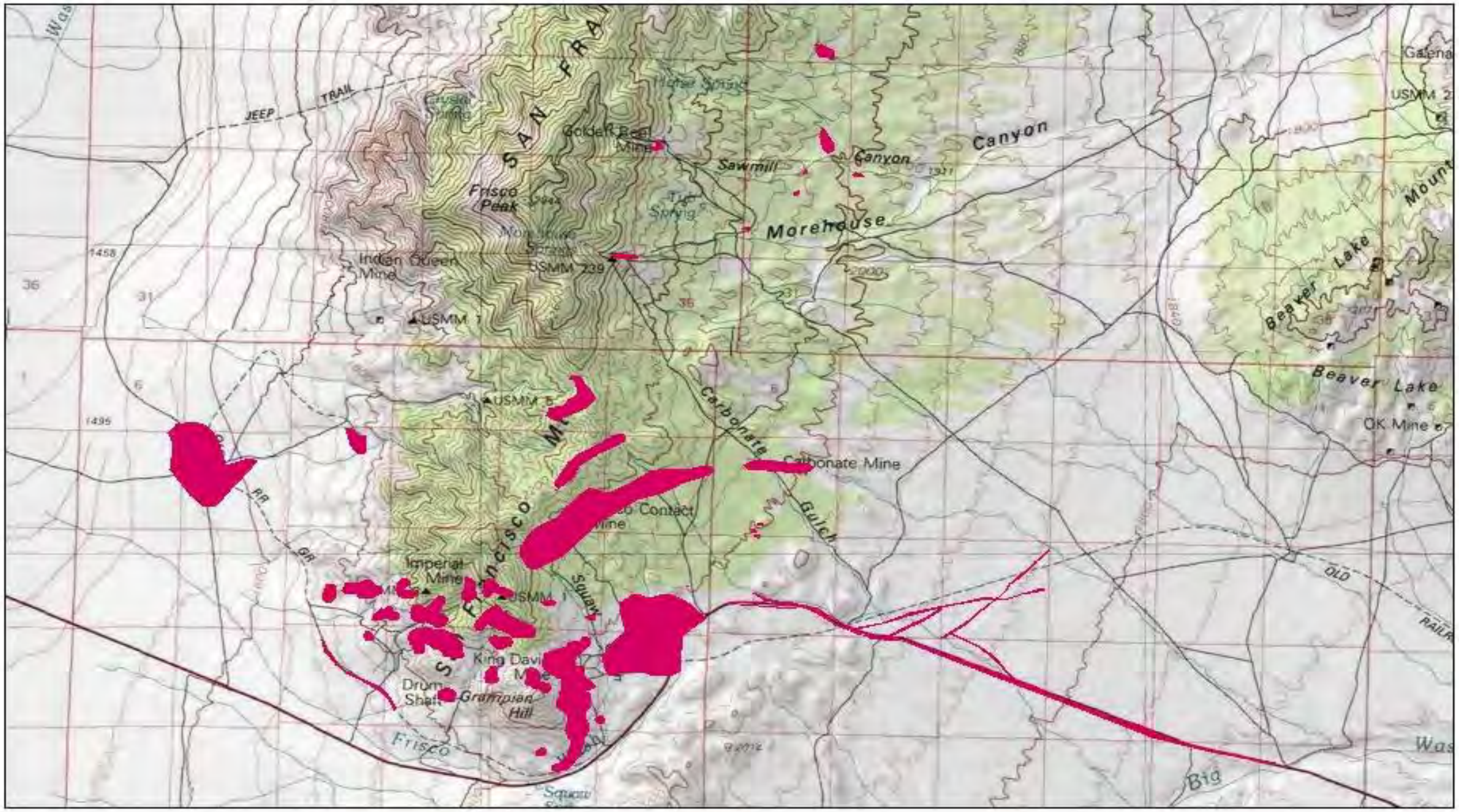
A portion of the Utah Southern Railroad Extension has been recorded as 42Be1583 (Higgins 1997). The grade extends west from Milford, Utah, to Frisco, and then continues onward to Newhouse. Initially financed by Jay Gould and Sidney Dillion, the railroad dates from June 1880 to 1943, when the line was dismantled. In 1883, the line operated under the Utah Central and Utah Southern railroads, identified as the Utah Central Railroad; in 1897, it operated under the auspices of the Oregon Short Line Railroad Company, and after 1916, operated as part of the Los Angeles and Salt Lake Railroad Company (Higgins 1997; Butler *et al.* 1920: 120). In 1921, the Union Pacific Railroad acquired the line (Higgins 1997; Butler *et al.* 1920: 120).

The railroad was instrumental in transporting ore between the SFMD and the Francklyn Smelter near Salt Lake City; after smelting, the Horn Silver Mining Company shipped the bullion to the company's refinery in Chicago, Illinois (Hooker 1879, Bancroft 1889: 745:72). Pamela Higgins (1997), who recorded the railroad as an archaeological site, notes that sites 42Be1581, 42Be1584 and 42Be1585 bisect or are situated adjacent to the railroad.

Everett Bassett (2008, 2010) has recorded multiple mining-related archaeological loci within the SFMD. Yet, the entire district is comprised of a myriad of feature types associated with the industrial mining landscape, such as refuse deposits or trash dumps, temporary, semi-permanent and company mining camps, claim markers, prospects, shafts, adits, tailings, assay offices, ore processing sites, a refinery, mine support facilities such as workshops and offices, transportation corridors including the railroad and roads, utilities, and other features.

The database provides an inventory of the archaeological sites documented within the SFMD boundaries. The following map provides an overview of the resources identified within the SFMD.

Known Archaeological Sites



0 0.5 1 2 Kilometers
0 0.5 1 2 Miles

NORTH

Legend

Archaeological Sites

USA Topo Maps

Microsoft Excel - AppD4_ArchSites.xlsx

	A	B	C	D	E	F	G	H	I	J
1	Trinomial	Era	Dates	Summary	Other Name	Description	Recorded By	Date Recorded	Significant / NRHP Eligible	
2	42Be080	historical	1870-1900+	kilns	Beehive Charcoal Kilns	Site has seven charcoal kilns. All are stone except one which has a collapsed adobe top. Four cabin sites also are present, along with a wood, lined well. Kilns are on the south side of wash occupation sites on the north. Well is near bottom of wash. Kilns are in excellent condition; one cabin is in good condition; chimneys standing on others needed. Stabilization on others is needed. Well is in excellent condition.	Dwayne Bayless and J.C. Peterson	10/15/1973	Eligible	
3	42Be0862	historical	1880-1924	Newhouse Town Site	Newhouse	A large site, former inhabitants numbered nearly 400 at its early 1900s peak. Consist of numerous mill foundations and rail tracks. Possible houses and dugouts on north side. Ceramics, glass, metal and masonry covery the area. Tailings sands have silted over and flooded the down-hill (west) portion of the housing area. Tailings have been partially removed and reworked. There are some 25-30 foundations / depressions. Old road to Wah Wah Ranch drops directly below the west side of the site. Principle ore was copper, lead, gold and silver.	Steve James, Lori Webster, John Sneed, and Jack Oviatt	7/19/1980	Eligible	
4	42Be1307	historical	1900-1920	mining features	Golden Reef Mine	This site consists of two mine portals, tailings, remains of possible buildings and trash. A single deteriorated ore car was noted on the tailing pile. The tailings are about 15 m high and 50 m diameter. A road cuts across the base of the tailing and across the top. One of the mine portals is at the back of the tailing and is about 1.5 m high and 1.5 m wide. Evidence of former buildings is noted in two level locations south and east of the tailings. The locations have recently been used for drill pads. Material evidence includes crushed timber, tin roofing, nails and bolts. A trash deposit north of the tailing contains a variety of pre-1920 bottle fragments, cans, wash tubs, buckets, and misc. metal fragments. The site has been impacted by flooding from Sawmill Canyon, and the access road to the site has been moved at least three times.	D. Southworth	4/28/1990	Not Eligible	
5	42Be1367	prehistoric	unknown	lithic scatter		Material centered in more or less level and low point of saddle. Most of prehistoric material on east, and historic on west. Very thin, dressed, fine grained slab metate fragments hold together stuff on the east; second metate, a thick informal block, is 40 m t othe N on gentle but rocky slope. Surface is broken grainte debris, virtually a pavement. Fine material is below and makes the surface 'soft.'	Gardiner Dalley	9/5/1991	Eligible	
6	42Be1368	prehistoric	unknown	lithic scatter		Light lithic scatter with couple of very minor concentrations. In low, nearly level saddle area, plus on slope to south and north (gentle). To the north have slope and then a little bench where a noticable concentration is located. No ground stone or features present.	Gardiner Dalley	9/5/1991	Not Eligible	
7	42Be1379	prehistoric	unknown	lithic scatter		Light but fairly persistent scatter of obsidian flakes on rather steep slope that is essentially solid quartzite detritus. Includes tertiary flakes, and small blocky cortex. Numerous small collection piles; lots of mineral exploitation activity.	Gardiner Dalley	10/3/1991	Not Eligible	
8	42Be1380	prehistoric	unknown	lithic scatter / metate		Nice basin metate with dozen obsidian flakes in general association. Couple scrapers and couple chert flakes also. Flakes on nice, level area with fines under some detritus. Metate a bit onto gentle slope to the north. Large pile of big quartzite boulders just off road is no doubt historic	Gardiner Dalley	10/3/1991	Eligible	
9	42Be1469	historical	unknown	refuse		This site consists of a small historic scatter including half a dozen cans.	Gardiner Dalley	10/29/1994	Not Eligible	
10	42Be1496	prehistoric	unknown	lithic and ceramic scatter		Lithic scatter of 40-50 flakes and 3-4 ceramic sherds. Site is located in a classic saddlle with a marked rocky knoll 25 ft higher on the southeast and a slight elevation on the NW.	Gardiner Dalley	6/29/1994	Eligible	
11	42Be1580	historical	1879-1929	road and refuse		This site consists of three segments of a remnant two-track road, three artifact concentration loci, and a linear deposition of in-period artifacts. Where visible on the flats, the old road is very shallow, about 10-20 cm deep. On the slopes, however, it cuts an approximately 0.5 m deep swale. It is two meters wide and occasionally lined with pushed cobbles. The road crosses a dissected alluvial fan draining the east side of the San Francisco Mountains.	Pamela Higgins	9/9/1997	Eligible	
12	42Be1581	historical	1893-1935	telegraph/telephone line		This site is a dismantled telephone/telegraph line that was probably strung between the Frisco Mining Distirct and Milford near the turn of the century...The line crosses a dissected alluvial fan draining the east side of the San Francisco Mountains. Over 90% of the poles have been removed from the line.	Pamela Higgins	9/9/1997	Not Eligible	
13	42Be1582	historical	1933-1942	telegraph/telephone line	Telephone Line (CCC)	This site is a segment of a standing, currently used, telephone line, closely paralleling SR 21 from Milford west, at least past the Newhouse Mining District. The telephone line is noted as "Telephone Line (CCC)" and was constructed by the Civilian Conservation Corps, probably in 1933, when both the MIlford and Wah Wah Valley camps were alive.	Pamela Higgins	9/9/1997	Eligible	
14	42Be1583	historical	1880+	railroad	Utah Southern Railroad Extension; Union Pacific	This site is a segment of an abandoned railroad bed plus a spur line. The main alignment crosses SR 21 at RP 64.1 and is directed northeast to southwest. To the southwest, it crosses SR 21 again at RP 62.1 and continues west to the abandoned Horn Silver Mine in the Frisco Mining District [sic]. To the northeast, it eventually turns east and heads toward Milford. The RR bed crosses a dissected alluvial fan draining the east side of the San Francisco Mountains.	Pamela Higgins	9/8/1997	Eligible	
15	42Be1584	multi-component	1873-1929	wagon road and lithic scatter	Pioche to Salt Lake City Stage Route	This site is a segment of a wagon road characterized by wheel ruts cut into a soft, volcanic ash exposure. The intact portion of the road is flat and about 125 meters long by 2 meters wide. The ruts range from 5" to 12" deep and from 4" to 23" wide. Three obsidian flakes are also present. The site is in the bottom of a wide drainage basin that is part of a dissected alluvial fan draining the east side of the San Francisco Mountains.	Pamela Higgins	9/8/1997	Eligible	
16	42Be1585	multi-component	1925-1940	road, miners refuse and lithic scatter		Site consists of a set of four connected two-track road segments and one artifact concentration. The segments are all two meters wide and generally shallow (less than 0.25 m deep cut). Pushed cobbles line the road track in some places. The road segments cross a dissected alluvial fan draining the east side of the San Francisco Mountains.	Pamela Higgins	9/9/1997	Not Eligible	
17	42Be1586	historical	1860s to 1957	road		This site consists of four segments of the old road between Beaver and Minersville (currently State Route 21). Two of the segments appear to date to an 1860s-1934 alignment, wihle two other segments appear to date to a 1913-1957 alignment.	Everett Bassett	11/11/2005	Not Eligible	
18	42Be2253	prehistoric	unknown	prehistoric camp		Site is on a long, narrow sandy strip on terrace/bench/bank directly above the Sawmill Canyon drainage. Includes 2 slab metates, ceramic sherds, and a light scatter of obsidian and chert flakes at the top (w) end of site. Ceramics are Snake Valley sherds.	Gardiner Dalley	6/12/1990	Eligible	
19	42Be2257	historical	1880-1920	mining features		Site is a little dump that lays as a scatter of trash along a relatively steep, rocky slope. The trash runs from a little bench on the point that might be suitable for a tent camp...close to Frisco. Trash runs down to the margin of a decent size but very easy drainage. Several cans are present, all hole-in-cap and all food (12-16 oz). There is a good ceramic component and several bottles are represented. Tradmarks, embossing, and bases or finishes are pretty scarce, leading one to believe the site has been picked over pretty hard.	Gardiner Dalley	7/3/2001	Undetermined	
20	42Be2258	multi-component	unknown	lithic scatter and refuse deposit		This site includes a trash dump in a small, high saddle. There are roads and trails in/out everywhere...includes a bit of glass, some metal. There is a concentration of 6 obsidian flakes (tertiary) on the NW portion. The site has been damaged due to roads.	Gardiner Dalley	7/3/2001	Not Eligible	
				dam/reservoi		Site consists of a water diversion channel and flood control dam east of Indian Creek near Adamsville. This site may fall outside of the SFMD				

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Microsoft Excel - AppD4_ArchSites.xlsx

	A	B	C	D	E	F	G	H	I	J
1	Trinomial	Era	Dates	Summary	Other Name	Description	Recorded By	Date Recorded	Significant / NRHP Eligible	
20	42Be2258	multi-component	unknown	lithic scatter and refuse deposit		This site includes a trash dump in a small, high saddle. There are roads and trails in/out everywhere...includes a bit of glass, some metal. There is a concentration of 6 obsidian flakes (tertiary) on the NW portion. The site has been damaged due to roads.	Gardiner Dalley	7/3/2001	Not Eligible	
21	42Be2283	historical	1904-1913	dam/reservoir		Site consists of a water diversion channel and flood control dam east of Indian Creek near Adamsville. This site may fall outside of the SFMD boundaries.	Asa Nielsen	10/30/2002	Not Eligible	
22	42Be2413	historical	1870-1900+	kilns	Beehive Charcoal Kilns	Site includes the remains of 2 beehive kilns plus some retaining structures, alignments of unknown use, stacked/stored stone of unknown use, and a nice trash accumulation. The kilns are at the back of a marked sandy/silty bench that picks up 3 or 4 feet above the wash (site is on both sides of a smallish wash running down generally to the SE; on the north side is a big, very rocky knoll of altered quartzite; to the south is low, rolling country). From the wash on the kiln side, the slope is gentle up to the SW for about 20 m, then it increases quickly and jumps up to another bench, maybe 15-18 ft higher. The kilns, in part, are cut/dug into the back of the bench. Both are heavily blackened on the interior, indicating extensive use. They are made of rocks from the general area rather than the knoll. The two structures are very similar in apparent construction detail and in curretn condition. Standing walls are double wide, mainly, although some big rocks tie clear through. And there is quite a bit of small rubble incorporated. Interior faces are quite smooth, but from selection rather than dressing.	Gardiner F. Dalley and Geralyn V. McEwen	8/26/2003	Eligible	
23	42Be2414	historical	1870-1900+	kilns	Beehive Charcoal Kilns	Two different forms of features. Just below the Section Line road, there is an obvious mound of dirt that is quite noticably redder than the surrounding soil. Centered in the mound, running from just two or three meters off the road and opening to the drainage just dead south, is what may be only a remnant of a slot of stone that is very heavily burned. Have a very good section of wall on the east that is 8 m long and 1 m high. The top is slightly lower than the mound, and it leans in a little. On the south is a small laid stone section on the west that indicates a parallel wall at 1.25 m from the east. Seems to be some fair evidence that there was a wall and that it was pulled. There is some rubble in the south end, but it appears to actually have been open. Would guess that the north end was closed. Have the same rock here as in the kilns - local volcanic.	Gardiner F. Dalley and Geralyn V. McEwen	8/26/2003	Eligible	
24	42Be2415	prehistoric	unknown	lithic scatter		Site is in a nice saddle directly atop a marked, very rocky knoll. Very light site including a few flakes (10+ obsidian tertiary flakes) and artifacts (few tools and fragments).	Gardiner F. Dalley and Geralyn V. McEwen	8/26/2003	Eligible	
25	42Be3107	historical	1882-1920	mining features		Site is a complex of mines located on the steep western slope of the San Francisco Mountains. The mine workings are four open adits, three open shafts, and one small pit. Also present are a segment of mine rail, an ore chute, a powder magazine, and a small rock building. The site dates between 1882 and the 1920s.	Everett Bassett	12/6/2007	Eligible	
26	42Be3108	historical	1890-1920	mining features		This site is a complex of mines located on the steep western slope of the San Francisco Mountains. The mine workings are four open adits, two open shafts, and one small pit. Also present are two collapsed frame buildings, a steam boiler, a pile of debris, and a scatter of domestic trash. The site dates between 1890 and the 1920s.	Everett Bassett	12/6/2007	Eligible	
27	42Be3109	historical	1896-1910	mining features		This site is a complex of mines located on the steep western slope of the San Francisco Mountains. The mine workings are six open adits, eight open shafts, one open incline, and seven small pits. Also present area powder magazine and a mining cairn. The site dates between 1896 and	Everett Bassett	12/6/2007	Not Eligible	
28	42Be3110	historical	1880-1950	mining features		This site is a complex of mines located on the steep western slope of the San Francisco Mountains. The mine workings are four open adits, 13 open shafts, one open incline, and 19 small pits. Also present are two rock buildings, an inclined rail system, and a trash scatter. The site dates between 1880 and the 1950s.	Everett Bassett	12/6/2007	Eligible	
29	42Be3111	historical	1898-1950	mining features		This site consists of a complex of mines along the western slope of the San Francisco Mountains. The mine workings include 8 open adits, 11 open shafts, and 10 small pits. Also present are a shaft house, 2 wood frame buildings, a rock building, a powder magazine, a loading platform, a rock pile and sledge, and a trash scatter. The site dates between 1898 and the 1950s.	Everett Bassett	12/6/2007	Eligible	
30	42Be3112	historical	1930s	mining features		This site is a mine located at the base of the western slope of the San Francisco Mountains. The mine workings consist of a single open shaft. Also present is a large ore bin. The site dates to the early 1930s.	Everett Bassett	12/6/2007	Not Eligible	
31	42Be3113	historical	1936-1940s	mining features		This site consists of a complex of mines along the western slope of the San Francisco Mountains. The mine workings include of 2 open adits, 3 building foundations, a frame building, an outhouse, a headframe, an electrical power facility, and a series of machine mounts. The site dates from 1936 to the 1940s.	Everett Bassett	12/6/2007	Eligible	
32	42Be3114	historical	1898-1920s	mining features		This site is a complex of mines located on the western slope of the San Francisco Mountains. It consists of 2 open shafts, 3 open inclines, and 4 small pits. Also present are a collapsed frame building and the base of a rock building. The site dates between 1898 and the 1920s.	Everett Bassett	12/6/2007	Not Eligible	
33	42Be3115	historical	1898-1920s	mining features		This site is a complex of mines located along the western slope of the San Francisco Mountains. The mine workings are 2 open adits, 3 open shafts, and 2 small pits. The site dates between 1898 and the 1920s.	Everett Bassett	12/6/2007	Not Eligible	
34	42Be3116	historical	1875-1950s	mining features	King David, Lulu, Bonanza, Americus, Emporia, Horn Silver	This site is a huge complex of mines that wrap around the lower eastern flank of Grampian Hill in the southern San Francisco Mountains. The mine workings are 19 open adits, 39 open shafts, 3 open inclines, and 50 smaller excavations, mostly prospecting pits. Among these are the King David, Lulu, Bonanza, Americus, Emporia, and the famously wealthy Horn Silver miens. Also present are 17 additional features including 2 headframes, an ore bin, 2 mining surface plants, 5 frame buildings, a rock building, a cabin, and a powder magazine. The site dates between 1875 and the early 1950s.	Everett Bassett	12/6/2007	Eligible	
35	42Be3117	historical	1901-1920s	mining features		This site is a complex of mines lcoated on the steep western slope of the San Francisco Mountains. The mine workings are 2 open adits, 2 open inclines, and 1 small pit. Also present is a forge stand and associated windbreak. The site dates between 1901 and the 1920s.	Everett Bassett	12/6/2007	Not Eligible	
36	42Be3118	historical	unknown	mining features		This site is a complex of mines located near the top of Grampian Hill in the southern San Francisco Mountains. The mine workings are 3 open adits, 3 open shafts, and 2 small pits.	Everett Bassett	12/6/2007	Not Eligible	
37	42Be3119	historical	1900-1940s	mining features		This site is a complex of mines located on the steep western slope of the San Francisco Mountains. The mine workings include 2 open adits. Also present is a pile of debris. The site dates between 1900 and the 1940s.	Everett Bassett	12/6/2007	Not Eligible	
38	42Be3120	historical	1908-1920	mining features		This site is located at the base of the eastern slope of Grampian Hill in the southern San Francisco Mountains. The mine workings consist of a single open shaft. The site dates between 1908 and 1920.	Everett Bassett	12/6/2007	Not Eligible	
				mining		This site consists of a complex of mines located at the base of the southern slope Grampian Hill in the southern San Francisco Mountains. The				

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	Trinomial	Era	Dates	Summary	Other Name	Description	Recorded By	Date Recorded	Significant / NRHP Eligible
38	42Be3120	historical	1908-1920	mining features		This site is located at the base of the eastern slope of Grampian Hill in the southern San Francisco Mountains. The mine workings consist of a single open shaft. The site dates between 1908 and 1920.	Everett Bassett	12/6/2007	Not Eligible
39	42Be3121	historical	1893-1920s	mining features		This site consists of a complex of mines located at the base of the southern slope Grampian Hill in the southern San Francisco Mountains. The workings include 2 open shafts. Also present are a rock building foundation and a downed utility pole. The site dates between 1883 and the	Everett Bassett	12/6/2007	Not Eligible
40	42Be3180	historical	1870-1960	Frisco Town Site	Frisco	The site includes the San Francisco Mining District and associated Frisco boom town. Present are refuse deposits, temporary, semi-permanent and company mining camps, claim markers, prospects and/or recurrent prospects, shafts, adits, tailings, assay office, ore processing sites/mills, a possible refinery, mine support facilities such as workshops and offices, transportation corridors (rail, roads, trails, stage), utilities and structural remains associated with the Frisco town site. The town encompasses the remains of serveral structures, including housing, saloons, hotels, churches, schools, stores, a hospital, brothels, two smelters, charcoal kilns, and a cemetery.	Heather Puckett	7/3/2004	Eligible
41	42Be3246	historical	1901+	mining features	U-Bet, Triumphant claims (Blackbird Copper Gold Mining Company, Ltd.)	This site is a historic mine complex on the western slope of the San Francisco Mountains. The mine workings include 3 open shafts, 1 open adit, and 4 prospect pits. Also present are a windlass, an earthen platform, a small mining building, and a retaining wall.	Bassett, Everett	2010	Eligible
42	42Be3247	historical	1890-1930	mining features		This site consists of a single historic mine shaft on an unpatented claim. The shaft has a well constructed collar and a windlass support; the windlass has been removed. The site is located south of the San Francisco Mountains adjacent to Squaw Gulch. Because no mine claim was patented and no artefacts were identified during the survey, no definitive date could be provided; however, based on the shaft construction method and condition, the site most likely dates to between 1890 and 1930. It is located on BLM land.	Everett Bassett	2010	Not Eligible
43	42Be3248	historical	1901+	mining features	Frisco Contact Mine, Ruby Mine, Excelsior #4, Lookout #2, Burlington Mining #2, Hesperides claims	This site is a historic mine complex on the southeastern slope of the San Francisco Mountains. The mine workings consist of 11 open shafts, 3 open adits, 3 closed mines, and 14 prospect pits. Twelve additional features were identified, including a machine mount, 2 mine buildings, 2 well constructed shafts, 4 earthen platforms, a pile of mine ventilation pipe, a retaining wall, and a water tank. The site dates between 1885 and 1920.	Everett Bassett	2010	Eligible
44	42Be3249	historical	1901+	mining features	Selma #5 (McHale claims)	This site is a historic mine complex on the southwestern slope of the San Francisco Mountains. The mine workings consists of 3 open adits, 1 closed mine, 1 prospect pit. Four additional features were identified during the survey, including a tent platform, a large pit, an earthen platform and a campsite. It is located on BLM land and a portion of the workings were never patented.	Everett Bassett	2010	Not Eligible
45	42Be3250	historical	1890-1940	mining features		This site is a historic mine complex at Indian Grave Peak in the San Francisco Mountains. The mine workings consist of 1 open adit, a closed adit, and their associated spoil piles. Additional features were identified as a small residence, a wooden platform, a water pipe, and complex mine building. The land was never patented for mining and is on land under the auspices of the BLM, but artefacts indicate the site dates between 1890 and 1940.	Everett Bassett	2010	Not Eligible
46	42Be3251	historical	1901+	mining features	Sunbeam Mine	This site is a historic mine complex at the southern end of the San Francisco Mountain Range. The mine workings consists of 1 open shaft, 3 open adits, 3 prospect pits, and their associated spoil. No additional features were identified. Artefacts on site consist of a lard bucket, a sanitary can, a log wrapped with wire and wire nails hammered into it (possibly a windlass spindle), and 5 lengths of PVC pipe.	Everett Bassett	2010	Not Eligible
47	42Be3252	historical	1900+	mining features	Cactus Mine, Midvale Placer Claim	This site consists of a historic mine complex west of the San Francisco Mountains near Copper Gulch. The mine workings are limited to a single adit, commonly referred to as the Cactus Mine. The mine shows 3 periods of work (1) early 1900s, (2) 1930s, (3) in the past 10 years. Additional features present consist of 2 trash scatters, a salvaged residence, a waterline running from the mine toward Newhouse, and a machine mound. The site is primarily located on the Midvale Placer Claim, associated with the Royal Copper Mining Co.	Everett Bassett	2010	Eligible
48	42Be3253	historical	1906+	mining features	Cupric, Harrison claims	This site consists of a historic mine complex west of the San Francisco Mountains. The mine workings consist of 9 open shafts, 4 open adits, 1 closed mine, 9 prospect pits, and their associated spoils. Also present are a double compartment shaft, a mine building, 3 residences, an earthen platform and a retaining wall. The site is primarily located on the Cupric and Harrison claims associated with the Cupric Mines Company.	Everett Bassett	2010	Eligible
						This site is a historic mine complex west of the San Francisco Mountains. The mine workings consist of 2 open adits, 2 open shafts, 1 prospect,			

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	Trinomial	Era	Dates	Summary	Other Name	Description	Recorded By	Date Recorded	Significant / NRHP Eligible
47	42Be3252	historical	1900+	mining features	Cactus Mine, Midvale Placer Claim	This site consists of a historic mine complex west of the San Francisco Mountains near Copper Gulch. The mine workings are limited to a single adit, commonly referred to as the Cactus Mine. The mine shows 3 periods of work (1) early 1900s, (2) 1930s, (3) in the past 10 years. Additional features present consist of 2 trash scatters, a salvaged residence, a waterline running from the mine toward Newhouse, and a machine mound. The site is primarily located on the Midvale Placer Claim, associated with the Royal Copper Mining Co.	Everett Bassett	2010	Eligible
48	42Be3253	historical	1906+	mining features	Cupric, Harrison claims	This site consists of a historic mine complex west of the San Francisco Mountains. The mine workings consist of 9 open shafts, 4 open adits, 1 closed mine, 9 prospect pits, and their associated spoils. Also present are a double compartment shaft, a mine building, 3 residences, an earthen platform and a retaining wall. The site is primarily located on the Cupric and Harrison claims associated with the Cupric Mines Company.	Everett Bassett	2010	Eligible
49	42Be3254	historical	unknown	mining features		This site is a historic mine complex west of the San Francisco Mountains. The mine workings consist of 2 open adits, 2 open shafts, 1 prospect, and their associated spoil piles. Also present are 2 windlasses, a tent platform, and a well constructed adit. No claims were patented for mining on this site which is located on SITLA land.	Everett Bassett	2010	Eligible
50	42Be3255	historical	1879+	mining features	Carbonate Shaft #2, Quadmetals Shaft, Rattler, Carbonate (amended)	This site is a historic mine complex east of the San Francisco Mountains along Carbonate Gulch. Mine workings consist of 3 open shafts, 2 closed mines, 1 prospect pit and their associated spoil piles. Two shafts were commonly known as Carbonate Shaft #2 and the Quadmetals Shaft. Nineteen additional features were identified on the site including several machine mounts, mine buildings, a corral, and possible placer apparatus. The site is primarily located on the Rattler and Carbonate (amended) claims. Original patents include a frame house at the Rattler (1879) and 6 frame houses, an office, boarding house, dwelling houes, sleeping house, engine and boiler house, and machine shop at the Carbonate (1880). A portion of the site crosses BLM land and was never patented.	Everett Bassett	2010	Eligible
51	HAER No UT-25	historical	1877-1900	mining features	Beehive Charcoal Kilns	Documentation of the charcoal kilns at the Frisco townsite for the Historic American Engineering Record, on file at the Library of Congress, Prints and Photograph Division, HAER: UTAH, 1-FRIS, 1-3. The five beehive Frisco Charcoal Kilns, built in 1877 by the Frisco Smelting Company, are significant as among the few remaining charcoal kilns in the state of Utah that retain much of their visual integrity, and help to document the state's early mining history. The structures, three of which are nearly intact, were constructed of granite float in the form of a parabolic dome, and are significant remnants of Utah's charcoal industry, as well as excellent examples of the engineering techniques of kiln construction. The Frisco kilns were among the earliest built, and excluding several kilns that may exist high in the mountains near Frisco, are the best remaining in the state of Utah. In addition, they are the best documented kilns of any in the state. http://www.loc.gov/pictures/item/ut0176/	Welch, Robert D.	9/24/1981	Eligible

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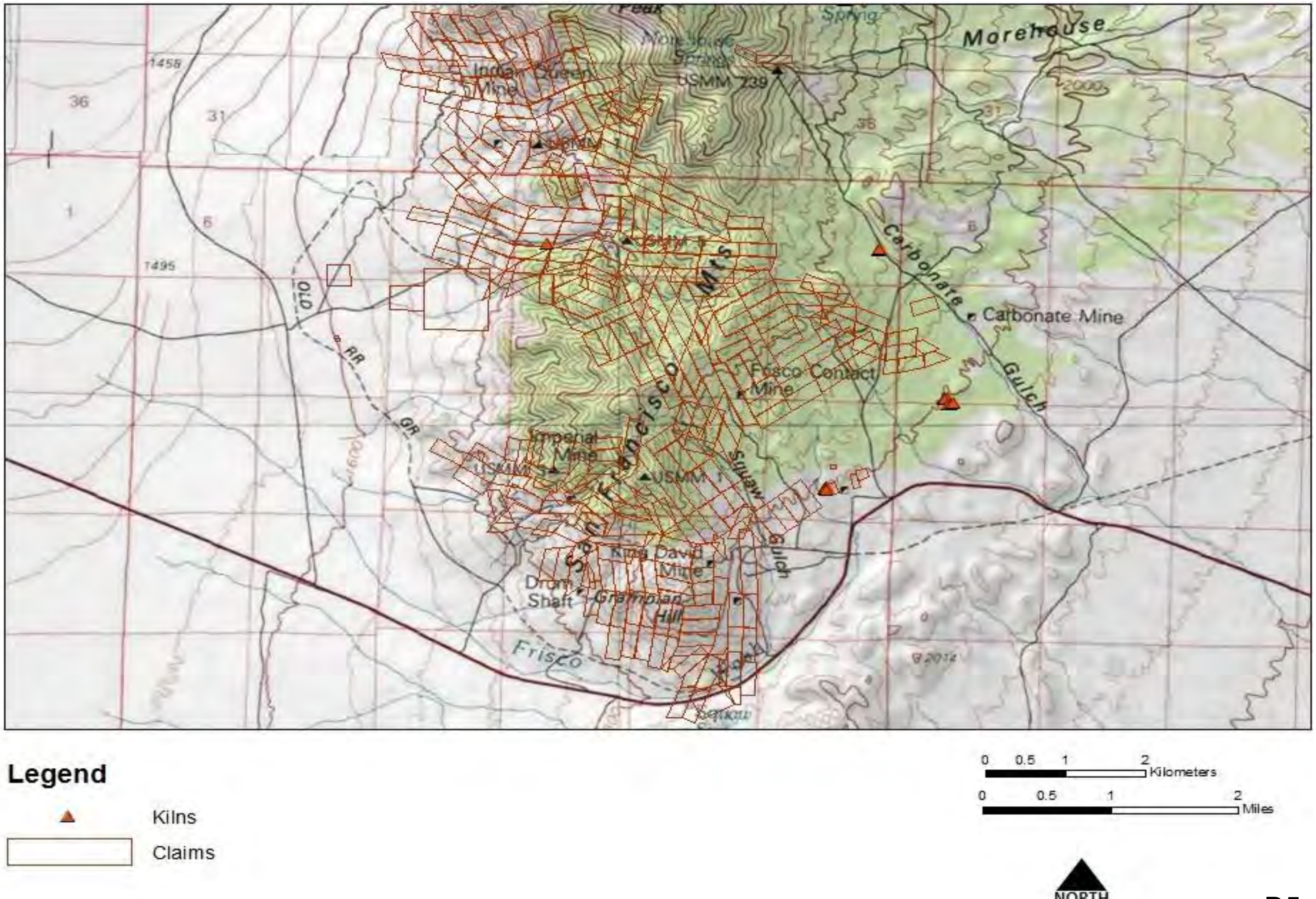
APPENDIX D5

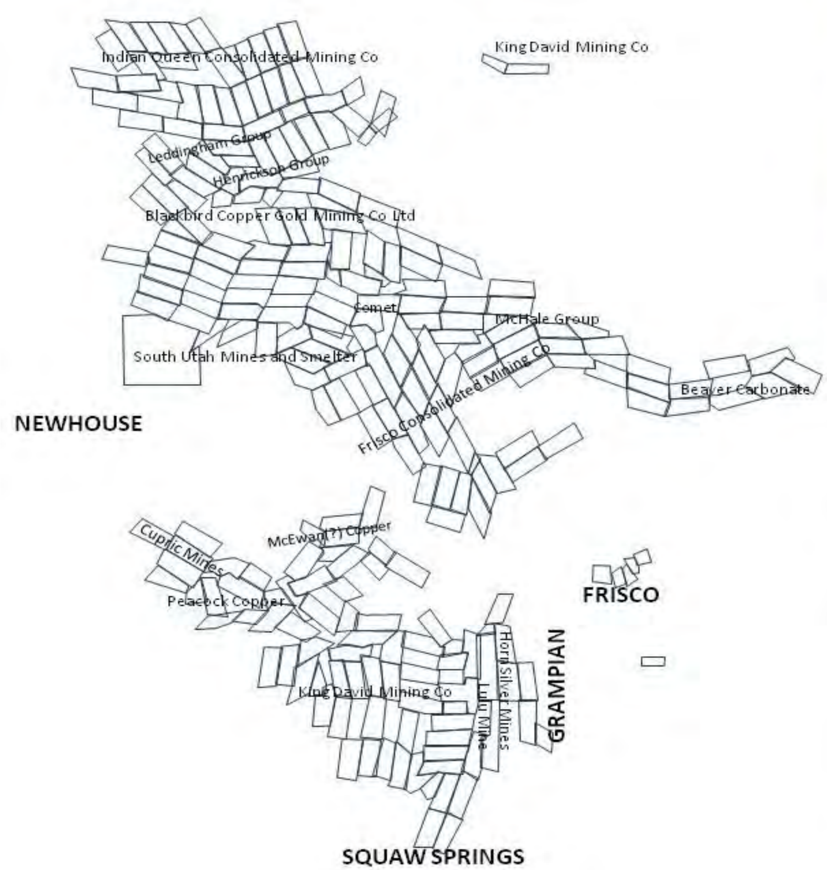
San Francisco Mining District, Beaver County, Utah: Claims

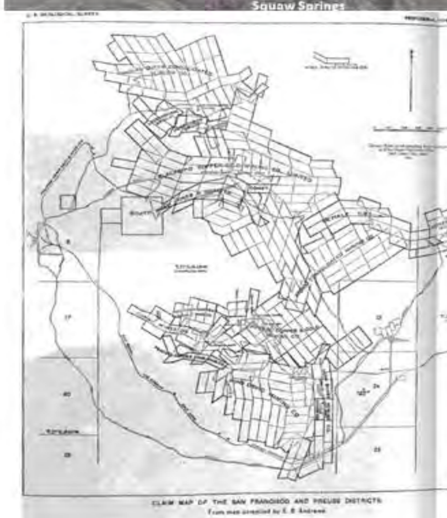
Heather R. Puckett
May 2013



A total of 207 mining claims have been included in the attached database. These claims are situated within the boundaries of the San Francisco Mining District (SFMD).

The inventory includes a listing of the claims by name, as well as the date discovered, name of discover, the names of the employees, a description of the claim, other comments, known geology and minerals, and trinomials (if recorded as an archaeological site).





Microsoft Excel - D5-Claims.xlsx

Claim Name	Date Discovered	Name of Discover	Name of Employees	Descriptions	Other Comments	Geology & Minerals	Trinomial
Absalom				unknown			
Accrington		King David		unknown			
Alturas				unknown			
Americus	27 NOV 1879			An additional claim, the Americus Lode (Survey No. 11) was filed on 27 November 1879, which prompted even further excitement in the area (Beaver County Records, Book 76: 47). The Americus Lode was situated at Lot No. 47, adjacent to the Lulu Claim (Survey No. 12, Lot No. 48). US Deputy Surveyor Frank Olmsted surveyed these two claims on September 1 and 2, 1879; both were located [North] 50' 50" [East], 3395 ft [1034.80 m] from USMM No. 2. The Americus claim included 6.31 hectares [15.592 acres], whilst the Lulu claim was 8.36 hectares [20.66 acres] in size. The patent for the Americus, filed November 21, 1879, described the improvements to include two shafts (one 21.64 m [71 ft] deep and the other 16.15 m [53 ft] deep) and tracings along the ledge for 152.4 m [500 ft] (Beaver County Records, Book 76: 47). The Lulu patent, filed January 5, 1880, indicates a half interest in a shaft, tracings, and cuttings along the ledge (Beaver County Records, Book 76: 7). According to Wray (2006: 310), the Lulu Mining Company owned the Lulu claim; it "adjoins the Horn Silver claim immediately to the south and contains the southern strike extension of the Horn Silver (Ring) fault." Butler (1913: 187) describes the Lulu one of "the most extensive search[es] for ore" in lava. Newspaper accounts confirm this information from 1881 to 1882: "The Lulu shaft, first south extension of the Horn Silver has been sunk to a depth of 90 feet [27.43 m]. The indications are [favourable] for the early development of a rich and extensive mine" (*Southern Utonian*, 24 September 1881: 2). "Work continued to progress through the fall" (*Southern Utonian*, 19 November 1881). "By April 1882, the Lulu shaft had reached 121.92 m [400 ft]" (*Southern Utonian*, 1 April 1882). Wray (2006: 310) notes that "two-compartment shafts were sunk on both claims [the Americus and Lulu], and within the Lulu claim, the Ring fault was prospected by drifts on the 400' and 650' [121.92 and 198.12 m] levels." Despite these attempts, the Americus proved disappointing and it was determined that it would not produce ore in commercial grade quantities (Butler 1913: 187; Wray 2006: 310). The Lulu, in 1906, produced a small quantity of "shipping-grade ore" at the 137.16 m [450 ft] level, which led to the expansion to the 198.12 m [650 ft] level (Butler 1913: 187; Wray 2006: 310, 347). Within six years, the HSMC had acquired the Lulu and extended drifts along the Ring fault zone (Wray 2006: 347). In 1929, ASARCO leased the Lulu, constructing a new surface plant there the following year (Wray 2006: 361-362). At that time, ASARCO drifted 457.2 m [1,500 ft] off the shaft, but failed to identify any commercial grade ore (Wray 2006: 362). Adjacent to Horn Silver No. 2 and the Lulu Shaft is an adit extending 304.8 m [1,000 ft] into Grampian Hill; the adit is known as the Van Cott tunnel (Wray 2006: 362). No further information was available for this claim.	Surveyed by Frank Olmstead, US Deputy Surveyor, September 1879 (Survey #11); N50 degrees 50 feet east, 3395 feet from USMM # 2, 15.592 ac; recorded by Bassett (2008) as 42Be3116. Beaver County Records, Book 76, page 47. Adjacent to Lulu		42Be3116
Anaconda Lode		Cactus group		unknown			
Anchor Lode				unknown			
Antelope				unknown			
Antler				unknown			
Antwerp [Antwerp Lode]	27 FEB 1880			The Antwerp mine featured two shafts on the hill on the south side of Loeber Gulch. The lower shaft is 149.35 m [490 ft] north of the initial Washington shaft. To the west of the Antwerp is an unpatented claim (Klondyke) on the western edge of the Klondyke Gulch. This area features lead, silver, gold and green oxide copper staining and is characterized by a multitude of prospects excavated prior to 1900 and commonly is referred to as the "graveyard" (Wray 2006: 310). The Antwerp Lode (Survey No. 7) encompasses a shaft measuring 10.67 m [35 ft] deep, a shaft measuring 9.14 m [30 ft] deep, and a shaft measuring 6.10 m [20 ft] deep; the patent, which was filed on February 27, 1880, also references a boarding house being located 86.87 m [285 ft] from the south corner of the claim (Beaver County Records, Book 76: 283).	Survey #7. The Antwerp Lode included a shaft measuring 35 feet deep, a shaft measuring 30 feet deep, and a shaft measuring 20 feet deep; the patent, which was filed on February 27, 1880, also references a boarding house being located 285 feet from the south corner of the claim (Beaver County Records, Book 76, page 283).		
Augusta Lode				unknown			
Bandit				unknown			
Beaver Carbonate Mining Company Property				Discovered in 1878, the Carbonate (Lot 52) – presumably named for the presence of lead carbonate or calcium carbonate – was later sold to Campbell, Burke & Donaldson (February 1879) who sunk a 64.62 m [212 ft] deep incline shaft (Butler 1913: 179; Wray 2006: 304). The Carbonate extended eight levels, with a sump being located below the eighth level (Butler 1913: 179). Campbell, et al., sold to the Frisco Mining and Smelting Company, who – through a crew of twenty men – continued exploration of the shaft, which measured 1.78 m by 1.47 m by 100.58 m [330 ft], and drifted 3.05 m [10 ft], but did not use timbering. Small steam hoisting works (12 horse-power engine) allowed the shaft to be continued to a depth of 500 ft. Following Hooker's visit (1879) to the Carbonate, a small building (9.14 m by 29.26 m [30 by 96-ft]) was constructed adjacent to the Carbonate No. 2 shaft, for use as a concentration mill. The small mill operated until approximately 1886 (Butler 1913: 113, 178; Wray 2006: 305). Wray (2006: 303) identifies the location of the original shaft (Carbonate, M.S. 16) as being 121.92 m [400 ft] northeast of Carbonate Gulch, whilst the Rattler (M.S. 9) was 167.64 m [550 ft] east of the initial shaft and 184.40 m [605 ft] east of Carbonate No. 2 shaft. The elevation for the Carbonate No. 2 is 2025.91 m [6646.7 ft] above mean sea level (amsl), whilst the Rattler was at 2017.41 m [6618.8 ft] amsl. According to the patents, the Rattler included a frame house (3.66 m by 4.27 m [12 by 14 ft]) in 1879 (Bassett 2009). In 1880, the Carbonate encompassed six frame houses, an office, boarding house, dwelling house, sleeping house, engine and boiler house, and a machine shop (Bassett 2009). The Beaver Carbonate comprising 11 claims and fractions including the Ingomar, Rattler, Stepmother, Homestake, North Side and South Side – all overlapping or flanking claims. The mines closed 1883-1886, but were leased until 1905/1908 when the Beaver Carbonate Mining Company took over, expanding the mine with a two-compartment vertical shaft (Quadmetals).			
Billy Nig		Thomas Kearns, David Keith		unknown			
Black Bird Gold and Copper Mining Company	ca. 1909	Blackbird Copper Gold Mining Company Ltd. Property; Black Bird Gold and Copper Mining		Blackbird Gold & Copper Mining Co., mined an area adjacent to Copper Gulch and the Cactus property, including the New Year's, Belmont, and Purity Claims (Butler 1913: 187). Wray (2006: 330) identifies the Colburn claim within this grouping as well. All of these claims were situated just northwest of the Cactus mine (French shaft) (Wray 2006: 329). The New Year's claim was sunk to a depth of 91.44 m [300 ft], along with several hundred feet of drifting; considerable work had been performed on the Belmont and Purity claims (Butler 1913: 187). The Belmont mine featured a three-compartment shaft. The Purity mine featured two shallow shafts. The Colburn claim consists of a shallow shaft approximately 82.30 m [270 ft] north of the Belmont shaft.	Copper Gulch area; includes New Years, Belmont, Purity adjoining the Cactus property.	carbonate, cerusite, galena, quartzite, quartz monzonite, limestone	42Be3246
Blue Bird Claim Block Property				unknown			
Bonanza [Bonanza Claim]	5 JAN 1880			The Bonanza Claim (Survey No. 13) was patented on January 5, 1880, and comprised a shaft that was 39.62 m [130 ft] deep with crosscuts and a tunnel that was 2.44 m [8 ft] long (Beaver County Records, Book 76: 27).	Survey #13. The Bonanza Claim was patented on January 5, 1880, and included a shaft that was 130 feet deep with crosscuts and a tunnel that was 8 feet long (Beaver County Records, Book 76, page 27).		42Be3116
Boston Lode				unknown			
Buck Horn				In the 1930s, mapping by Hewitt identified a group of claims known as the Plumbic claim, including the Buckhorn shaft near Block Gulch (Wray 2006: 359-360). The Buckhorn was dug as a decline shaft to a depth of 76.2 m [250 ft], with the collar being at an elevation of 1767.84 m [5800 ft]. The claim produced a small amount of high grade silver-lead ore (Wray 2006: 360). It is unclear whether these claims were absorbed into the Peacock mines at a later date.			

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	Claim Name	Date Discovered	Name of Discover	Name of Employees	Descriptions	Other Comments	Geology & Minerals	Trinomial
19	Buck Horn				In the 1930s, mapping by Hewitt identified a group of claims known as the Plumbic claim, including the Buckhorn shaft near Block Gulch (Wray 2006: 359-360). The Buckhorn was dug as a decline shaft to a depth of 76.2 m [250 ft], with the collar being at an elevation of 1767.84 m [5800 ft]. The claim produced a small amount of high grade silver-lead ore (Wray 2006: 360). It is unclear whether these claims were absorbed into the Peacock mines at a later date.			
20	Bullion Lode				unknown			
21	Burlington			McHale,	unknown			42Be3248
22	Burro Group				unknown			
24	Cactus	1878	South Utah Mines & Smelters Company; Owned by Samuel Newhouse by 1900; and 1903-1910, Newhouse Mines & Smelters Corporation; and 1910, South Utah Mines & Smelters Co		"Perhaps the first significant mineral deposit discovered in the district, and due to its location was probably found by one or more prospectors entering the district from the west" (Wray 2006: 307). He attributes this to the prominent green-copper stained outcrop at the base of Cactus Canyon, or Copper Gulch. Owned originally by the South Utah Mines & Smelters Company, the Cactus mine is situated on the western flank of the San Francisco Mountains at an elevation of 1965.96 m [6,450 ft] (Butler 1913: 172). The Cactus was discovered in 1870, but between 1870 and 1900, was worked by several different companies, including a Paris-based French company. A small smelter, situated in Copper Gulch, was erected by 1892 to work the ore, but was closed shortly thereafter. Between 1896 and 1905, the Cactus began construction and operation of an 800-ton concentrating mill, a steam plant, a compressor, trolley road, and hoists; electric power provided by Beaver River Power Company, replaced the steam plant (Butler 1913: 172; Wray 2006: 308). Plans of the Cactus mine show a surface tunnel, an old incline, a twin tunnel, three shafts (French Shaft No. 1, No. 2, and Main Shaft), a hoist, and shop (Butler 1913: Plate XXXI). Wray (2006: 322) indicates that square set timbering was implemented at the Cactus mine. Between 1870 and 1908, the mine was timbered using a caving system, whilst the surface was stripped via steam shovel (Butler 1913: 172-173). By 1906, portions of the mine were being worked as an open pit mine: ..."this was the first open-pit copper deposit in the world to use steam shovels, opening in early 1906" (Krahulec, 1997, p. 201), predating by several months the better-known (and far more successful) steam-shovel application at Bingham Canyon, which began with stripping in June 1906, and actual ore production in June 1907 (Wray 2006: 324). In 1900, Samuel Newhouse acquired the property. As early as 1902, Newhouse developed the property to include a massive concentrating mill, the Main Shaft, and a haulage tunnel. The main shaft was developed to the 182.88 m [600 ft] depth, with the sixth level being connected to the surface by a haulage tunnel (1833.67 m [6,016 ft] long, at an elevation of 1782.16 m [5,847 ft]); three additional levels are situated beneath the haulage tunnel, being developed from an inclined shaft 96.32 m [316 ft] deep (Butler 1913: 172-173; Wray 2006: 321). Ore trains travelled along a trestle and a three mile long rail line – the Newhouse, Copper Gulch and Sevier Lake Rail Road – to the Cactus concentrating mill. Additionally, a crusher house, ore load-out bins, a remodelled gravity concentrating mill with electrical power, and other equipment were completed by 1905, and a large tailings pond was created by 1908. In 1908, the Cactus had been mined to a depth of 279.20 m [916 ft] and included a sump. That same year, however, the pillars and timbers collapsed the mine down to the 152.4 m [500 ft] level, resulting in a closure of the mine temporarily until 1912. The mine reopened briefly until 1914, at which time, sulphide concentration through flotation was exercised at the plant for recovery of copper from the tailings (Wray 2006: 325). In 1915, Utah Leasing Company, under the auspices of William Strange and H.H. Adams, constructed a successful flotation concentration plant at Newhouse. "By the end of 1918, this milling operation had achieved distinction for establishing a national (if not world-wide) record for profitable operation of low-grade copper feedstock" (Wray 2006: 329). In 1919, Utah Leasing Company dismantled the plant and moved it to Colorado (Wray 2006: 329). Richard Stingley, Newhouse's brother-in-law, served as the first general superintendent of the Cactus Mine; additional superintendents included Charles Runberg, and E.A. Moffit (Wray 2006: 321). Between 1903 and 1910, the Cactus was incorporated into the Newhouse Mines & Smelters Corporation, by 1910, the company reorganized as the South Utah Mines & Smelters Co. By 1912, the mining company began a dispute with owners of the Blackbird Gold & Copper Mining Company, which lead to a potential lawsuit. The pending lawsuit and prior mine collapse, led to the closure of the mine (Wray 2006: 327-329). World War II led to a boom for copper mines and the Cactus mine was no exception. The Cactus was soon open pit mined through a lease and workings by Mr. Norman Rodgers [Rogers]; these workings included expansion of the East Glory Hole and the West Pit (Wray 2006: 368). The copper ore recovered from the mine was smelted in Salt Lake City by ASARCO, who sent geologist S.I. Bowditch to map the surface of the Cactus and adjacent properties shortly after World War II (Wray 2006: 368). After 1951, little additional work was performed at the mine with the exception of a few tons of gold and silver-lead-zinc ore between 1956 and 1957 (Wray 2006: 368).	Beaver County Plat Lot #39A; Butler 1913. Discovered 1870. The discovery of the Cactus mine predates the Horn Silver by five years.	monzonite, native copper, galena, copper-iron sulphide bornite, chalcopyrite, pyrite, cosalite, fluorite, tetrahedrite, geothite, limonite, calcite, siderite, aragonite, wollastonite, barite, anhydrite, hematite, bornite, covellite, cosalite, goethite, pyrolusite, sericite, quartz, carbonate, tourmaline, anhydrite, rutile, apatite	42Be3252
25	Cactus Mill Site	1878			unknown	Beaver County Plat Lot #39B		
26	Calliope		Blackbird Copper Gold		unknown			
27	Camille				unknown			
28	Carbonate-Rattler	ca 1878	Campbell, Burke & Donaldson	Bigelow, A.M.; Bigelow, C.D.; Clarke, W.W. [William]; Cazier, John Henry; Morrison, Loren M.	Discovered in 1878; the Carbonate (Lot 52) – presumably named for the presence of lead carbonate or calcium carbonate – was later sold to Campbell, Burke & Donaldson (February 1879) who sunk a 64.62 m [212 ft] deep incline shaft (Butler 1913: 179; Wray 2006: 304). The Carbonate extended eight levels, with a sump being located below the eighth level (Butler 1913: 179). Campbell, et al., sold to the Frisco Mining and Smelting Company, who – through a crew of twenty men – continued exploration of the shaft, which measured 1.78 m by 1.47 m by 100.58 m [330 ft], and drifted 3.05 m [10 ft], but did not use timbering. Small steam hoisting works (12 horse-power engine) allowed the shaft to be continued to a depth of 500 ft. Following Hooker's visit (1879) to the Carbonate, a small building (9.14 m by 29.26 m [30 by 96-ft]) was constructed adjacent to the Carbonate No. 2 shaft, for use as a concentration mill. The small mill operated until approximately 1886 (Butler 1913: 113, 178; Wray 2006: 305). Wray (2006: 303) identifies the location of the original shaft (Carbonate, M.S. 16) as being 121.92 m [400 ft] northeast of Carbonate Gulch, whilst the Rattler (M.S. 9) was 167.64 m [550 ft] east of the initial shaft and 184.40 m [605 ft] east of Carbonate No. 2 shaft. The elevation for the Carbonate No. 2 is 2025.91 m [6646.7 ft] above mean sea level (amsl), whilst the Rattler was at 2017.41 m [6618.8 ft] amsl. According to the patents, the Rattler included a frame house (3.66 m by 4.27 m [12 by 14 ft]) in 1879 (Bassett 2009). In 1880, the Carbonate encompassed six frame houses, an office, boarding house, dwelling house, sleeping house, engine and boiler house, and a machine shop (Bassett 2009). The Beaver Carbonate comprising 11 claims and fractions including the Ingomar, Rattler, Stepmother, Homestake, North Side and South Side – all overlapping or flanking claims. The mines closed 1883-1886, but were leased until 1905/1908 when the Beaver Carbonate Mining Company took over, expanding the mine with a two-compartment vertical shaft (Quadmetals).	Carbonate Mine discovered autumn 1878. Bought 1879 by Campbell, Burke & Donaldson. Sold to Frisco Mining & Smelting Company in Sept 1879. Used Cornish rolls and Paddock's pneumatic separators. See also: Ingomar; Rattler; Stepmother; Homestake; North Side; South Side.	rhyolite tuff, chlorite, hornblende, iron ore, carbonate, quartz, apatite, kaolinite, zircon, sulphides, galena, sphalerite, calcite, orthoclase, quartz latite, feldspar, biotite	42Be3255
29	Castle Rock		Henry W. Owen		unknown			
30	Cave Mine	1882			unknown	S.T. Godbe, Superintendent		
31	Minnesota Consolidated Silver Mining	1879			Cerro Gordo and Minnesota Consolidated Silver Mining Company claims comprised a small force of prospecting, resulting in ore assays of £25.55 to £31.93 [$40 to $50] per ton, from an opening extending 244 m (800 ft). No additional information was obtained for the Cerro Gordo and Minnesota Consolidated Silver Mining Company.	Shown on Hooker map (1879)		
32	Champion Lode		King David		unknown			
	Frisco				Chicago and Frisco Consolidated Silver Mining Company consisted of twelve locations with limited amounts of development. No additional			

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	Claim Name	Date Discovered	Name of Discover	Name of Employees	Descriptions	Other Comments	Geology & Minerals	Trinomial
32	Champion Lode		King David		unknown			
33	Frisco Consolidated Silver Mining	1878			Chicago and Frisco Consolidated Silver Mining Company consisted of twelve locations with limited amounts of development. No additional information could be gleaned for the Chicago and Frisco Consolidated Silver Mining Company.	Shown on Hooker map (1879)		
34	Comet [Commet]	1879	Nevada-Utah Mines & Smelters Corporation		French investors also operated the Comet mine in 1888; at that time the ore was smelted at Frisco (USGS 1889: 59; Wray 2006: 308). In April 1882, the Comet included a 6.096 m [20 ft] deep shaft and the beginnings of a tunnel. Newspapers touted that "the mine will pay the working expenses, [and] it will likely be pushed ahead of the coming Summer as fast as possible" (*Southern Utonian* , 22 April 1882: 2). Wray (2006: 308) cites Heikes (1920: 504) stating that the Comet was worked for only 30 days in 1889. In 1890, the Comet Mining & Smelter Works were delinquent in taxes (*Southern Utonian* , 5 December 1890: 3). According to Butler (1913: 188), the Nevada-Utah Mines & Smelters Corporation (see Silveropolis and the Imperial Mining Company, above) owned the Comet claim, a 250-ft deep shaft and tunnel in 1907. Butler (1913: 188) was unable to visit the workings in 1909. By 1910, the Comet shaft reached 300 feet in gossan, or iron cap and amassed 161.87 hectares [400 acres] (*Salt Lake Mining Review* , 30 October 1910: 8). Wray (2006: 331) notes that some drilling and roadwork have been performed adjacent to the Comet.	Shown on Hooker map (1879); Butler 1913; shaft and tunnel	copper	
35	Congress		King David		unknown			
36	Contact				unknown			
37	Copper Chief	1879			unknown	Shown on Hooker map (1879); Butler 1913	copper	
38	Copper Glance				unknown			
39	Copper Gulch				unknown			
40	Copper King				unknown			
41	Copper Spring				unknown			
42	Copperopolis	1878			unknown	Surveyed by Newel E/S Butt; shown on plat		
43	Cotton Wood				unknown			
44	Cupric Company [Cupric]	1909	Cupric Mining Company [Cupric Mines Co.]		By 1909, the Cupric Mining Company [or Cupric Mines Company] filed a block of 14 claims on 30 July 1908, which had been located between 1900 and 1904 (M.S. 5946) (Beaver County Records, Book 259: 373; Book 266: 33), including the Washington, Antwerp, Klondyke, Iron Devil, and the Cupric mines. According to the patent, no improvements had been made on the claims by 1909. The Cupric mine – or the Iron Devil mine – was situated two miles southeast of Newhouse and had been worked since the establishment of the SFMD for its iron flux, used in the smelters (Butler 1913: 184; Wray 2006: 310). By 1909, the Cupric comprised a vertical, two-compartment shaft extending to 91.44-126.49 m [300-415 ft] level, with exploration being performed at the 99.06 m [325 ft] level (Wray 2006: 332). In the mid-1930s, a deposit of tungsten was identified at the Cupric property by K.G. Hanney, mine superintendent for Tintic Lead Company. USGS geologist S.W. Hobbs again investigated the deposit in November 1941. In 1942, U.S. Vanadium Corporation and Homestake Mining Company each drilled cores and trenched the surface of the deposit, whilst the US Bureau of Mines conducted additional research between 1942 and 1943. The following year and throughout 1944, the US Government conducted further inquiry into the deposits and placed three adits in the vicinity (Adit 1, Adit 2, and Adit 3). No additional tungsten has been mined from this area since 1943/1944 (Wray 2006: 371).	14 claims, MS #5946; see also Washington Mine. Cupric is also known as the Iron Devil Mine.	quartzite, silicates, garnet, calcite, limestone, quartz monzonite, pyrite, specularite, magnetite, muscovite, tremolite, diopside, chalcopyrite, chalcocite, sulphides, hydrous iron oxides, carbonates of copper	42Be3253
45	Daisy				unknown			
46	Dandy				unknown			
47	Danish Lode				unknown			
48	Dick Taylor	1897	Richard Grace	Grace, Richard	Richard Grace filed the claim for the Dick Taylor Lode on August 4, 1897; it included a shaft measuring 1.22 by 1.83 by 12.19 m [4 by 6 by 40 ft] deep, a tunnel measuring 1.22 by 2.44 by 10.06 m [4 by 8 by 33 ft] long, and a winze measuring 1.22 by 1.83 by 6.10 m [4 by 6 by 20 ft] deep (Beaver County Records, Book 191: 247).	MS #3399		
49	Divide				unknown			
50	Doly Mack [Dolly Mack]				By 1882, two additional claims had been filed in the SFMD, including the Dolly [Doly] Mack Claim (Survey No. 25) and the Massachusetts Lode (Survey No. 29) (Beaver County Records, Book 40: 289; Book 111: 221). The Dolly Mack included a shaft measuring 30.78 m [101 ft] deep, patented on January 18, 1882 (Beaver County Records, Book 40: 289). The Cactus Mining Company filed the patent for the Massachusetts Lode on November 20, 1882; they listed among their improvements, a shaft measuring 16.76 m [55 ft] deep, with a drift at the bottom, extending 4.57 m [15 ft] long; a 12.19 m [40 ft] deep shaft, and a 7.62 m [25 ft] long tunnel (Beaver County Records, Book 111: 221).	survey #25		
51	Drum		King David		unknown			
52	Dull Knife				unknown			
53	Dumbarton [Dumb Barton]	25 FEB 1892	San Francisco Mining Company	Crozier, George Wilson	By 1891, the San Francisco Mining Company located the Dumbarton [Dumb Barton] Lode (Lot No. 73, M.S. 37); the claim was taken to patent on 25 February 1892, with improvements consisting of two shafts, including one 18.29 m [60 ft] deep and the other 3.05 m [10 ft] deep (Beaver County Records, Book 159: 354). The claim was filed by the heirs of George W. Crozier (*Salt Lake Tribune* , 17 August 1893: 5); his heirs included wife Rachel Gordon Crozier of Salt Lake City, and their young children: Rachel, Bertha Mary, and William Henry Crozier. George W. Crozier was born in the seaport of Dumbarton, Scotland; the mine was named for his homeland.	Lot #73, MS #37; lode, 2 shafts		
54	Dump				unknown			
55	Earth				unknown			
56	Elinore				unknown			
57	Elk				unknown			
58	Emerald				unknown			
59	Emporia		King David		unknown			
60	Estelle [Estella] Lode				unknown			
61	Eva				unknown			
62	Excelsior			DuBois, John	unknown			42Be3248
63	Florida [Florida Lode]	27 FEB 1880			The Florida Lode (Survey No. 6) comprised a single shaft, 36.58 m [120 ft] deep, and a 42.67 m [140 ft] tunnel; it was patented on February 27, 1880 (Beaver County Records, Book 76: 269; Book 82: 58).	Survey #6. The Florida Lode included a single shaft, 120 feet deep, and a 140-ft tunnel; it was patented on February 27, 1880 (Beaver County Records, Book 76, page 269; Book 82, page 58).		
64	Fraction				unknown			
65	Franklin				unknown			
66	Frisco [Frisco Contact Mine]				unknown		calcite, gypsum, epsomite	42Be3248

Claims

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	Claim Name	Date Discovered	Name of Discover	Name of Employees	Descriptions	Other Comments	Geology & Minerals	Trinomial
67	Frisco Consolidated Silver Mining Company	1878			Frisco Consolidated Silver Mining Company claims included some prospecting, some openings extending 305 m (1,000 ft), with ore assayed as high as $200 per ton. Butler (1913: 187) identifies this as a "large group of claims about 1-1/4 miles northwest of Frisco." Workings included the Frisco Contact mine and Kruse mine, a shaft sunk to a depth of 213 m (700 ft), a crosscut, and an incline shaft, all performed prior to 1909 (Butler 1913: 187; see also Wray 2006: 345-346). No additional information could be gleaned for the Frisco Consolidated Silver Mining Company.	Shown on Hooker (1879); Butler 1913: 187. Butler (1913) identifies a large group of claims about 1-1/4 mile NW of Frisco, with primary development at the Frisco Contact and Kruse mines.	pyrite, specularite, quartz monzonite, lead-silver	
68	Frisco Mining & Smelting Company	Sept 1879			unknown	Butler (1913): incorporated Sept 1879 and reorganized as Frisco Smelting Company. Owned smelting plant in Frisco, Carbonate group of mines, stone quarry, wood ranches, charcoal kilns, and iron-flux mine in Rocky district.		
69	Frisco Mill Site	1878			unknown	Beaver County Plat Lot #41		
70	Frisco Silver Queen Mining Company				unknown			
71	Gad Fly				unknown			
72	Galena	1909	Golden Reef		unknown	see Golden Reef; Galena at N. 60 degrees to 65 degrees W.		
73	General Warner		Cupric Mines		unknown			
74	George Dewey		King David		unknown			
75	Gertie Group				unknown			
76	Gold Reef Consolidated Mining and Development Company				unknown			
77	Golden Reef	1909	Golden Reef		Just north of Frisco, on the east side of the San Francisco Mountains was a group of three claims operated under the name of Golden Reef. The mines comprised a tunnel (548.64 m [1800 ft] long) driven into the mountain just south of Sawmill Canyon at an elevation of 2362.2 m [7,750 ft] and extending 60.96 m [200 ft] deep, with drafting along the shaft at the 18.29 m and 42.67 m [60 and 140 ft] levels (Butler 1913: 186). All of the early workings were performed prior to 1900 and included shafts, adits, prospects and open cuts (Wray 2006: 309). No work is documented at the Golden Reef until 1945-1946 (Wray 2006: 372). At that time, several winzes had been constructed and lead, gold, silver and copper ore was being recovered from a long adit (Wray 2006: 372).	east of the SF Mtns, 5 mils north of Frisco; tunnel, collar and shaft.	gold, lead, silver, sulphide ore, shales, quartzites, galena, antimony, selenium, pyrite, barite	
78	Good Hope				unknown			
79	Good Fortune				unknown			
80	Good Luck				unknown			
81	Grampian	March 1880	Grampian Ledge & Company Claim		This prospect, which consists of a tunnel (42.1 m [138 ft] long), a shaft (15.24 m [50 ft] deep), minor timbering, and an incline with a windlass, was located in dolomite on the hill above the Horn Silver. The patent, filed December 11, 1880, for the Grampian Ledge and Company Claim also references a cabin measuring 18 feet by 18 feet in dimension (Beaver County Records, Book 87: 281), which was visible still in 2006. By March 1880, the Grampian prospect was sold to the Grampian Silver Mining Company of Chicago, Illinois. Silver and gold ore were extracted from the surface and to depths of 24.38 m [80 ft], comprising "1 foot to 8 feet of ore" [i.e., 0.31 to 2.44 m] (Hooker 1879; Emmons and Becker 1885: 469; Butler 1913: 113). Hooker (1879) estimated the cuttings at amounting to 156.97 m [515 ft], with less than 200 tons of ore being shipped for smelting.	Survey #15; See Hooker 1879 for Grampian Prospect; identified in dolomite above the Horn Silver. Sold to Chicago based compnay, Grampian Silver Mining Company, in March 1880. Mined 80 feet down, showing 1-8 feet of ore; little stoping had been done. Mine developed by a tunnel and an incline having a windlass. Cuttings amount to 515 feet.	dolomite, limestone, ocherous lead ore, silver and gold	
82	Grampian Smelter Mill Site	1878			unknown	Beaver County Plat Lot #40		
83	Granite	1888		Royle, Jonathan C.; Scott, George M.	Jonathan C. Royle and George M. Scott filed the patent for the Granite Lode (M.S. 36) on May 27, 1890; they initially discovered the claim in September 1888, through the placement of a tunnel (1.22 by 1.52 by 36.58 m [4 by 5 by 120 ft] long) and a cut (6.10 m [20 ft] long) (Beaver County Records, Book 149: 145).	MS #36		
84	Grey Horse				unknown			
85	Gultch [Gulch]		Gibson A. Marr	Lewis, A.B.	unknown			
86	Harrington-Hickory Mines				unknown	Harrington & Hickory Consolidated Mining Company, Scotch and Canadian Company. Old Hickory Mine. Owned a 10-stamp mill in Milford until leased by the Cave Company.	plumbojarosite, wulfenite	
87	Harrison		Cupric Mines		unknown			42Be3253
88	Hendrickson (Henrichson)				unknown			
89	Hedges Fraction Lode				unknown			
90	Hesperides			Rohlfing, D.P.	unknown			42Be3248
91	High				unknown			
92	High Point				unknown			
93	Hillside				unknown			
94	Homestake Lode [Home				unknown	See Carbonate-Rattler Mine		
95	Hope [Hope Claim]	16 AUG 1880			The Hope Claim (Survey No. 18), filed August 16, 1880, listed no improvements, but referenced a boarding house and the location of the Horn Silver dump, hoist works and shaft (Beaver County Records, Book 82: 58).	Survey #18. The Hope Claim, filed August 16, 1880, listed no improvements, but referenced a boarding house and the location of the Horn Silver dump, hoist works and shaft (Beaver County Records, Book 82, page 58).		
						Grampian Hill, depth 9.14 m (30'); sold later to Campbell, Cullen & Co.	copper sulphide chalcocite, sphalerite, covellite, wurtzite, jamesonite, pyrargyrite, cerargyrite, opal, smithsonite, zircon,	

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	Claim Name	Date Discovered	Name of Discover	Name of Employees	Descriptions	Other Comments	Geology & Minerals	Trinomial
96	Horn Silver Claim, Extension, Apex, Fraction	24 Sept 1875	Samuel Hawkes & James Ryan; King David Mines	See Horn Silver Tab	unknown	Grampian Hill, depth 9.14 m (30'); sold later to Campbell, Cullen & Co; February 1879 sold to Horn Silver Company; Beaver Co Plat Lot # 38 (1878); 2 claims filed Oct 1908 MS #6356; 1880-1884 one of the largest producers of lead and silver in the State. On 12 Feb 1885, cave in from ground to 7th level. Shaft closed but reopened until 1909. Elevation 6,550 feet.	copper sulphide chalcocite, sphalerite, covellite, wurtzite, jamesonite, pyrargyrite, cerargyrite, opal, smithsonite, zircon, barite, anglesite, brochantite, linarite, beaverite, gypsum, goslarite, chalcanthite, alunite, plumbojarosite	42Be3116
97	Horn Silver (Survey No 2)	9 July 1877	Horn Silver Company	See Horn Silver Tab	unknown	59.912 m deep shaft #1; 30.48 m deep shaft #2		42Be3116
98	Horn Silver Mill Site	1878		See Horn Silver Tab	unknown	Beaver Co Plat Lot # 38B		42Be3116
99	Hub		NOT IN SFMD		unknown		plumbojarosite	
100	Humbug		Peacock Copper Consol Mining	Block, Louis F.	Prior to 1937, the Frisco Silver Lead Company leased the Humbug, Jenny Fraction, Reciprocity, and Sunbeam No. 1 (approximately 32.37 hectares [80 acres] together) to Manager Louis F. Block (Wray 2006: 360). Block sank a series of inclined and vertical shafts, crosscuts and drifts along Block Gulch, and along the drainages between Loeber and Marble Gulches, recovering a small quantity of silver and lead ore. Block located the Jennie Fraction Lode (M.S. 6170) in 1910, but waited until 6 October 1911 to patent the claim; he spent the interim making improvements which included two shafts (Beaver County Records, Book 266: 461). By 1938, the Frisco Silver Lead Company continued to work the Block lease, although by World War II the Block lease was dormant (Wray 2006: 372). It is unclear whether these claims were part of the Peacock Copper Consolidated Mining Company.			
101	Igneous				unknown			
102	Imperial (31 claims)	height 1906-1907	Nevada-Utah Mines & Smelters Corporation	Anderson, George; Lawson, Thomas W.; Loomis, L.R.; Lewis, A.B.	Between 1906 and 1907, the Imperial Mine made a large output of copper, gold and silver (Butler 1913: 182). The mine, situated at Loeber Gulch approximately 2.09 km (1.3 miles) northwest of the Horn Silver, included a tunnel driven along the contact, eastward, for a distance of 335.28 m (1,100 ft); a winze, two adits, and several short crosscuts with winzes have been used for extraction of the ore.	Loeber Gulch, northeast of Washington Mine	quartz monzonite, altered limestone, quartzite, silicates, molybdenite, iron, copper, sulphides, pyrite, chalcopyrite, feldspar, magnetite, specularite, garnet, pyroxene, vesuvianite, quartz, augite, biotite, opal, cuprite, hematite, copper pitch, gold, silver	
103	Indian Queen Group	pre 1909	Indian Queen Consolidated Mining Co		The Indian Queen Consolidated Mining Company owned a group of claims – including the Mountain Queen and the Galena mine – near the west summit of the San Francisco Mountains near the quartz monzonite and limestone contact (Butler 1913: 188; Wray 2006: 309). High grade lead-silver ore was extracted from these workings and subsequently treated at a smelter by the Wah Wah Springs. The workings included the Indian Queen tunnel, a crosscut, and an electric powered plant. To the north of the Indian Queen property was the Hendrickson property; Butler (1913: 189) visited the Hendrickson claim, but found it unworked in 1909. According to Wray (2006: 310), the Indian Queen group reportedly yielded a large quantity of lead-silver ore amounting to a value of £63,865.24 [$100,000.00]. Wray (2006: 346) also reports that the Indian Queen properties were acquired by the Iron Queen Consolidated Mining Company. Additional holdings, such as the Leland Mining and Milling Company (1906) were later absorbed into the Iron Queen holdings (Wray 2006: 347).	including old Mountain Queen workings, used a smelter near Wah Wah Springs; tunnel; crosscuts	limestone, iron oxide, gypsum, sulphide	
104	Independence				unknown			
105	Iron Chief Lode				unknown			
106	Iron Devil	See Cupric			unknown		limonite	
107	Italian Marble Quarry				unknown			
108	Jay Hawker	11 DEC 1880			The Jay Hawker Claim (Survey No. 24) was filed on December 11, 1880, with two drifts, each 3.66 m [12 ft] long, and a shaft that was 14.17 m [46.5 ft] deep (Beaver County Records, Book 87: 301).	Survey #24. The Jay Hawker claim was filed on December 11, 1880, and included two drifts, each 12 feet long, and a shaft that was 46.5 feet deep (Beaver County Records, Book 87, page 301).		
109	Jinney [Jenny]	1909	Louis F. Block	Block, Louis F.	Prior to 1937, the Frisco Silver Lead Company leased the Humbug, Jenny Fraction, Reciprocity, and Sunbeam No. 1 (approximately 32.37 hectares [80 acres] together) to Manager Louis F. Block (Wray 2006: 360). Block sank a series of inclined and vertical shafts, crosscuts and drifts along Block Gulch, and along the drainages between Loeber and Marble Gulches, recovering a small quantity of silver and lead ore. Block located the Jennie Fraction Lode (M.S. 6170) in 1910, but waited until 6 October 1911 to patent the claim; he spent the interim making improvements which included two shafts (Beaver County Records, Book 266: 461). By 1938, the Frisco Silver Lead Company continued to work the Block lease, although by World War II the Block lease was dormant (Wray 2006: 372). It is unclear whether these claims were part of the Peacock Copper Consolidated Mining Company.	claim filed 6 OCT 1911; MS #6170		
110	Jupitor [Jupiter]				unknown			
111	King David [Mining Company]	1908	King David Mining Company	Jacometti, Pete	unknown	Block of 23 claims (MS #5921) and 29 other properties; water provided via Morehouse Spring pipeline; encompassed steam plant with compressor hoist. 1909 sunk shaft 1/4 mile NW of Horn Silver; drive tunnel from Grampian claim to cut at depth and E-W fissure; double-compartment shaft sunk to 440 ft, with exploration on 200 and 300-ft levels.	limestone, quartz monzonite, pyrite, silicates, carbonates, galena	42Be3116
112	Klondike Lodge				unknown			
113	Lady Bryan		NOT IN SFMD		unknown		copper pitch, malachite	

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	A	B	C	D	E	F	G	H
1	Claim Name	Date Discovered	Name of Discover	Name of Employees	Descriptions	Other Comments	Geology & Minerals	Trinomial
114	Lady Franklin [Laky Franklin]	1883	Sebrina Grace	Grace, Sebrina	Sebrina Grace filed the Lady Franklin Lode (MS 3400) claim on 4 August 1897; it is unclear why it took Grace 14 years to file the patent (Beaver County Records, Book 114: 345; Book 191: 259; Book 191: 271; Book 191: 247). By then, the Lady Franklin included a shaft measuring 1.22 by 1.83 by 12.19 m [4 by 6 by 40 ft] deep, a shaft measuring 1.22 by 1.83 by 12.19 m [4 by 6 by 40 ft] deep with a tunnel (1.22 by 1.83 by 21.34 m [4 by 6 by 70 ft]) and a winze (1.22 by 1.83 by 12.19 m [4 by 6 by 40 ft] deep) (Beaver County Records, Book 191: 259).	MS #3400; tunnel & winze, 4x6x70/4x6x40; shaft #1 = 4x6x40 feet deep; shaft #2 = 4x6x40 feet deep		
115	Lady Washington	Dec 1886 / 4 AUG 1897	Richard Grace	Grace, Richard	Richard Grace filed the patent for the Lady Washington Lode in December 1886. The Lady Washington included a shaft (1.22 by 1.83 by 3.05 m [4 by 6 by 10 ft] deep), a tunnel (1.22 by 1.83 by 30.48 m [4 by 6 by 100 ft] long) and a winze (1.22 by 1.83 by 12.19 m [4 by 6 by 40 ft] deep) (Beaver County Records, Book 191: 271).	MS #3401; lode claim		
116	Lambson				unknown			
117	Laura Lode				unknown			
118	Little Dick				unknown			
119	Look Out				unknown			42Be3248
120	Louise R.				unknown			
121	Lulu	SEPT 1879	Lulu Mining Company		An additional claim, the Americus Lode (Survey No. 11) was filed on 27 November 1879, which prompted even further excitement in the area (Beaver County Records, Book 76: 47). The Americus Lode was situated at Lot No. 47, adjacent to the Lulu Claim (Survey No. 12, Lot No. 48). US Deputy Surveyor Frank Olmsted surveyed these two claims on September 1 and 2, 1879; both were located [North] 50" 50' [East], 3395 ft [1034.80 m] from USMM No. 2. The Americus claim included 6.31 hectares [15.592 acres], whilst the Lulu claim was 8.36 hectares [20.66 acres] in size. The patent for the Americus, filed November 21, 1879, described the improvements to include two shafts (one 21.64 m [71 ft] deep and the other 16.15 m [53 ft] deep) and tracings along the ledge for 152.4 m [500 ft] (Beaver County Records, Book 76: 47). The Lulu patent, filed January 5, 1880, indicates a half interest in a shaft, tracings, and cuttings along the ledge (Beaver County Records, Book 76: 7). According to Wray (2006: 310), the Lulu Mining Company owned the Lulu claim; it "adjoins the Horn Silver claim immediately to the south and contains the southern strike extension of the Horn Silver (Ring) fault." Butler (1913: 187) describes the Lulu one of "the most extensive search[es] for ore" in lava. Newspaper accounts confirm this information from 1881 to 1882: "The Lulu shaft, first south extension of the Horn Silver has been sunk to a depth of 90 feet [27.43 m]. The indications are [favourable] for the early development of a rich and extensive mine" (*Southern Utonian*, 24 September 1881: 2). "Work continued to progress through the fall" (*Southern Utonian*, 19 November 1881). "By April 1882, the Lulu shaft had reached 121.92 m [400 ft]" (*Southern Utonian*, 1 April 1882). Wray (2006: 310) notes that "two-compartment shafts were sunk on both claims [the Americus and Lulu], and within the Lulu claim, the Ring fault was prospected by drifts on the 400' and 650' [121.92 and 198.12 m] levels." Despite these attempts, the Americus proved disappointing and it was determined that it would not produce ore in commercial grade quantities (Butler 1913: 187; Wray 2006: 310). The Lulu, in 1906, produced a small quantity of "shipping-grade ore" at the 137.16 m [450 ft] level, which led to the expansion to the 198.12 m [650 ft] level (Butler 1913: 187; Wray 2006: 310, 347). Within six years, the HSMC had acquired the Lulu and extended drifts along the Ring fault zone (Wray 2006: 347). In 1929, ASARCO leased the Lulu, constructing a new surface plant there the following year (Wray 2006: 361-362). At that time, ASARCO drifted 457.2 m [1,500 ft] off the shaft, but failed to identify any commercial grade ore (Wray 2006: 362). Adjacent to Horn Silver No. 2 and the Lulu Shaft is an adit extending 304.8 m [1,000 ft] into Grampian Hill; the adit is known as the Van Cott tunnel (Wray 2006: 362). No further information was available for this claim.	surveyed by Frank Olmstead (Survey #12, Lot #47), N50 degrees, 50 feet E, 3395 feet from USMM #2, 20.66 acres; depth 650 feet; ASARCO drifted 1500 feet from shaft; Bassett (2008) recorded site as 42Be3116	limestone, quartz monzonite; lead-silver	42Be3116
122	Makalola and Summit	1879			These mines were worked irregularly and produced 1,414 tons of ore with an opening extending 259 m (850 ft). A total of 1,814 tons were assayed, producing 75 ounces of silver and 55 percent lead, and the other 100 tons one-third of this. No other information was obtained for the Makalola or Summitt claims.	Shown on Hooker map (1879)		
123	Maggie				unknown			
124	Mamie				unknown			
125	Mars				unknown			
126	Mascot				unknown			
127	Massachusetts			Lewis, A.B.	By 1882, two additional claims had been filed in the SFMD, including the Dolly [Doly] Mack Claim (Survey No. 25) and the Massachusetts Lode (Survey No. 29) (Beaver County Records, Book 40: 289; Book 111: 221). The Dolly Mack included a shaft measuring 30.78 m [101 ft] deep, patented on January 18, 1882 (Beaver County Records, Book 40: 289). The Cactus Mining Company filed the patent for the Massachusetts Lode on November 20, 1882; they listed among their improvements, a shaft measuring 16.76 m [55 ft] deep, with a drift at the bottom, extending 4.57 m [15 ft] long, a 12.19 m [40 ft] deep shaft, and a 7.62 m [25 ft] long tunnel (Beaver County Records, Book 111: 221).	Survey #29		
128	May Queen				unknown			
129	Michigan Copper and Gold Mining Company	1909	Michigan Gold & Copper Co.		The Michigan Gold & Copper Co. established a series of claims to the west of the Imperial. These included an inclined shaft sunk into a fissure of quartz monzonite with gold bearing ore (Butler 1913: 185). In 1912, the Company published an assessment notice in the Salt Lake Herald requesting funds be paid to R.T. Badger, State Treasurer (*Salt Lake Herald*, 30 September 1912: 5).	west of Imperial group, Inclined shaft.	serpentine in limestone; pyrite, galena, chalcopyrite, quartz, carbonate, iron, gold	
130	Midvale Lode				unknown			42Be3252
131	Mill Site # 1				unknown			
132	Mill Site # 2				unknown			
133	Moose				unknown			
134	Morning Star [not patented]			Godbe, Frank; Hampton, Benjamin Y.	Wray (2006: 304) suggests that the initial claim of the Carbonate Rattler / Beaver Carbonate was made upon the workings of the Morning Star (Lot 50) as early as 1875 in a shaft extending to a depth of 15.24 m [50 ft]. The Morning Star was sold to Benjamin Hampton and Frank Godbe, who erected a hoist on the shaft "made out of a stationary engine from a steam ship" (Wray 2006: 304). The Morning Star claim was never fully patented (Wray 2006: 304).			
135	Morrison Lode				unknown			
136	Moscow				unknown		plumbojarosite	
137	Nana Lode				unknown			
138	National Lead Company				unknown			
139	Neptune				unknown			
140	Nevada Ready Pay Property				unknown		native copper	

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	Claim Name	Date Discovered	Name of Discover	Name of Employees	Descriptions	Other Comments	Geology & Minerals	Trinomial
140	Nevada Ready Pay Property				unknown		native copper	
141	Nevada-Utah Mines and Smelter Corporation				unknown			
142	New Years	pre 1913	Blackbird Gold & Copper Mining Co		Blackbird Gold & Copper Mining Co., mined an area adjacent to Copper Gulch and the Cactus property, including the New Year's, Belmont, and Purity Claims (Butler 1913: 187); Wray (2006: 330) identifies the Colburn claim within this grouping as well. All of these claims were situated just northwest of the Cactus mine (French shaft) (Wray 2006: 329). The New Year's claim was sunk to a depth of 91.44 m [300 ft], along with several hundred feet of drifting; considerable work had been performed on the Belmont and Purity claims (Butler 1913: 187). The Belmont mine featured a three-compartment shaft. The Purity mine featured two shallow shafts. The Colburn claim consists of a shallow shaft approximately 82.30 m [270 ft] north of the Belmont shaft.	see Blackbird Group		
143	New Year Grap [Group?]	pre 1913	Blackbird Gold & Copper Mining Co		see above	see Blackbird Group		
144	Mines and Smelters Corporation				unknown			
145	Silver and Copper Mining Company				unknown			
146	1900 [Nineteen Hundred] Lode				unknown			
147	Oil City Lode				unknown			
148	Old Crow Lode				unknown			
149	Old Warrior				unknown			
150	Olga				unknown			
151	Ophir				unknown			
152	Pathfinder				unknown			
153	Peacock Consolidated Mining Company	1898-1904		Block, Louis F.	The Peacock Copper Consolidated Mining Company made improvements between 1898 and July 1909 on the Hambug [Humbug] Mine Claim, including an incline shaft and two drifts (Butler 1913: 185; Wray 2006: 309; Beaver County Records, Book 259: 247). In 1908, several shareholders in the Peacock Copper Consolidated Mining Company were delinquent, including G.S. Hayes, Peter G. Armstrong, M.H. Osborn, R.M. Johnson, and Owen Grover (*Deseret News* , 2 January 1908: 10). The same year, the Company installed a new hoist, windlass, and whim, and began additional drifting (*Inter-Mountain Republican* , 24 May 1908: 8). Louis F. Block served as the manager of the Peacock Copper Consolidated Mining Company (*Salt Lake Herald* , 29 March 1910: 20; *Salt Lake Herald* , 28 June 1910: 8). In 1909, the Peacock Copper Consolidated Mining Company filed a block of four claims (M.S. 5922), including the Reciprocity claim; all of these claims were located between 1898 and 1904 along a limestone vein between Marble and Loeber Gulches (Butler 1913: 185; Beaver County Records, Book 259: 247). By 1909, most of the work appeared idle, although at least one shaft was sunk at the Peacock mines by 1913 (Butler 1913: 185). Further, Wray (2006: 309) notes that whilst the name of this mining company inferred the presence of copper, most of the metal obtained from the claims was lead, zinc and silver. Prior to 1937, the Frisco Silver Lead Company leased the Humbug, Jenny Fraction, Reciprocity, and Sunbeam No. 1 (approximately 32.37 hectares [80 acres] together) to Manager Block (Wray 2006: 360). Block sank a series of inclined and vertical shafts, crosscuts and drifts along Block Gulch, and along the drainages between Loeber and Marble Gulches, recovering a small quantity of silver and lead ore. Block located the Jennie Fraction Lode (M.S. 6170) in 1910, but waited until 6 October 1911 to patent the claim; he spent the interim making improvements which included two shafts (Beaver County Records, Book 266: 461). By 1938, the Frisco Silver Lead Company continued to work the Block lease, although by World War II the Block lease was dormant (Wray 2006: 372). In the 1930s, mapping by Hewitt identified a group of claims known as the Plumbic claim, including the Buckhorn shaft near Block Gulch (Wray 2006: 359-360). The Buckhorn was dug as a decline shaft to a depth of 76.2 m [250 ft], with the collar being at an elevation of 1767.84 m [5800 ft]. The claim produced a small amount of high grade silver-lead ore (Wray 2006: 380). It is unclear whether these claims were absorbed into the Peacock mines at a later date.	Block of 4 claims from 1898 to 1904; including Hambug	sphalerite, galena	
154	Puritan Lode				unknown			
155	Purity	pre 1913	Blackbird Gold & Copper Mining Co		Blackbird Gold & Copper Mining Co., mined an area adjacent to Copper Gulch and the Cactus property, including the New Year's, Belmont, and Purity Claims (Butler 1913: 187); Wray (2006: 330) identifies the Colburn claim within this grouping as well. All of these claims were situated just northwest of the Cactus mine (French shaft) (Wray 2006: 329). The New Year's claim was sunk to a depth of 91.44 m [300 ft], along with several hundred feet of drifting; considerable work had been performed on the Belmont and Purity claims (Butler 1913: 187). The Belmont mine featured a three-compartment shaft. The Purity mine featured two shallow shafts. The Colburn claim consists of a shallow shaft approximately 82.30 m [270 ft] north of the Belmont shaft.	see Blackbird Group		
156	Quad Metals Mining				unknown			42Be3255
157	Quartz				unknown			
158	Quartzite				unknown			
159	Raleigh				unknown			
					Prior to 1937, the Frisco Silver Lead Company leased the Humbug, Jenny Fraction, Reciprocity, and Sunbeam No. 1 (approximately 32.37 hectares [80 acres] together) to Manager Louis F. Block (Wray 2006: 360). Block sank a series of inclined and vertical shafts, crosscuts and drifts along Block Gulch, and along the drainages between Loeber and Marble Gulches, recovering a small quantity of silver and lead ore. Block located the Jennie Fraction Lode (M.S. 6170) in 1910, but waited until 6 October 1911 to patent the claim; he spent the interim making improvements which included two			

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	Claim Name	Date Discovered	Name of Discover	Name of Employees	Descriptions	Other Comments	Geology & Minerals	Trinomial
160	Reciprocity		King David Mines	Block, Louis F.	Prior to 1937, the Frisco Silver Lead Company leased the Humbug, Jenny Fraction, Reciprocity, and Sunbeam No. 1 (approximately 32.37 hectares [80 acres] together) to Manager Louis F. Block (Wray 2006: 360). Block sank a series of inclined and vertical shafts, crosscuts and drifts along Block Gulch, and along the drainages between Loeber and Marble Gulches, recovering a small quantity of silver and lead ore. Block located the Jennie Fraction Lode (M.S. 6170) in 1910, but waited until 6 October 1911 to patent the claim; he spent the interim making improvements which included two shafts (Beaver County Records, Book 266: 461). By 1938, the Frisco Silver Lead Company continued to work the Block lease, although by World War II the Block lease was dormant (Wray 2006: 372). It is unclear whether these claims were part of the Peacock Copper Consolidated Mining Company.			
161	Regulator				unknown			
162	Relief		Cupric Mines		unknown			
163	Royal Copper and Royal Copper Mining				unknown			
164	Roylist				unknown			
165	Ruby			Rohlfing, D.P.	unknown			42Be3248
166	San Antonio				unknown			
167	Sapho				unknown			
168	Saturn				unknown			
169	Scorpion				unknown			
170	Sego Lily				unknown			
171	Selma			McHale, William	Adjacent to the Cactus stock was a group of 15 patented claims identified as the McHale group. The claims encompass 111.81 hectares [276.29 acres] and are 3.7 km [2.3 miles] north of the Horn Silver. Charles H. Graham located the majority of the claims in 1901 and deeded his claims to William McHale the following year; McHale, a resident of Frisco, located four additional claims between 1903 and 1905 (Wray 2006: 347). Between 1907 and 1910, patents were issued to McHale and [Senator] Thomas Kearns and David Keith, founders of the Kearns-Keith Mining Company based out of Salt Lake City. According to Wray (2006: 440, fn62), McHale was a widower, staked claims on behalf of Kearns, and in the spring of 1908, was dying of pneumonia. Both Kearns and Keith were referred to as "the Silver Kings" associated with several productive claims at Park City, as well as in Colorado and Nevada (Wray 2006: 440-441, fn63). Both men died in 1918, with Kearns' heirs deeding the interest in the McHale claim group to Kearns Corporation [later Kearns-Tribune Corporation]; Keith's heirs retained a partial interest in the property (Wray 2006: 441, fn63). World War II led to a boom for copper mines and the Cactus mine was no exception. The Cactus was soon open pit mined through a lease and workings by Mr. Norman Rodgers [Rogers]; these workings included expansion of the East Glory Hole and the West Pit (Wray 2006: 368). The copper ore recovered from the mine was smelted in Salt Lake City by ASARCO, who sent geologist S.I. Bowditch to map the surface of the Cactus and adjacent properties shortly after World War II (Wray 2006: 368). That being said, after 1951, little additional work was performed at the mine with the exception of a few tons of gold and silver-lead-zinc ore between 1956 and 1957 (Wray 2006: 368).			42Be3249
172	September Lode				unknown			
173	Side Line				unknown			
174	Silver Dream Lode				unknown			
175	Silveropolis	1878	Imperial Mining Company	Lewis, A.B.	The Imperial Mining Company held the "Silveropolis" claim (Lot 37) and the associated Imperial claim. The Silveropolis was one of the earliest claims surveyed for patent within the SFMD; USMM No. 1 is situated on the south side of this claim and serves as the initial patent survey reference monument within the SFMD (Wray 2006: 309). The Silveropolis was never taken to patent (Wray 2006: 309). Rather, by 1901, the Imperial Mining Company, which was successful in obtaining gold, copper and silver ore, consolidated this claim into its holdings.	Beaver County Plat Lot #37	gold, copper, silver	
176	Skylark				unknown		cuprite, melaconite, magnetite, copper pitch	
177	Solomon Group				unknown			
178	South Utah [formerly				unknown			
179	St. Louis		King David		unknown			
180	St. Mary's Mine				unknown	Magnolia? Red Warrior?	bismuthinite	
181	St. Stephen				unknown			
182	Step Mother				unknown	See Carbonate-Rattler Mine		
183	Summit Mining Company				unknown			
184	Summner				unknown			
185	Sun				unknown			
186	Sun Beam		Peacock Copper Consol Mining	Ledingham, William; Block, Louis F.	Prior to 1937, the Frisco Silver Lead Company leased the Humbug, Jenny Fraction, Reciprocity, and Sunbeam No. 1 (approximately 32.37 hectares [80 acres] together) to Manager Louis F. Block (Wray 2006: 360). Block sank a series of inclined and vertical shafts, crosscuts and drifts along Block Gulch, and along the drainages between Loeber and Marble Gulches, recovering a small quantity of silver and lead ore. Block located the Jennie Fraction Lode (M.S. 6170) in 1910, but waited until 6 October 1911 to patent the claim; he spent the interim making improvements which included two shafts (Beaver County Records, Book 266: 461). By 1938, the Frisco Silver Lead Company continued to work the Block lease, although by World War II the Block lease was dormant (Wray 2006: 372). It is unclear whether these claims were part of the Peacock Copper Consolidated Mining Company.			42Be3251
187	Sun Set				unknown			
188	Switch		Gibson A. Marr		unknown			
189	Thanksgiving				unknown			
190	Townsite Lode				unknown			
191	Transcendent		Cupric Mines		unknown			
192	Triumphant		Thomas Kearns, David Keith	Kearns, Thomas; Keith, David	unknown			42Be3246
193	Tunnel Lode				unknown			

Claims | BLM-GLO Records | Horn Silver Employees

Microsoft Excel - D5-Claims.xlsx

	Claim Name	Date Discovered	Name of Discover	Name of Employees	Descriptions	Other Comments	Geology & Minerals	Trinomial
193	Tunnel Lode				unknown			
194	U-Bet		Blackbird Copper Gold		unknown			42Be3246
195	Uncle Sam				unknown			
196	Union Lode				unknown			
197	Utah		King David	Nelson, Mike	unknown			
198	Van Cott Tunnel				An additional claim, the Americus Lode (Survey No. 11) was filed on 27 November 1879, which prompted even further excitement in the area (Beaver County Records, Book 76: 47). The Americus Lode was situated at Lot No. 47, adjacent to the Lulu Claim (Survey No. 12, Lot No. 48). US Deputy Surveyor Frank Olmsted surveyed these two claims on September 1 and 2, 1879; both were located [North] 50' 50" [East], 3395 ft [1034.80 m] from USMM No. 2. The Americus claim included 6.31 hectares [15.592 acres], whilst the Lulu claim was 8.36 hectares [20.66 acres] in size. The patent for the Americus, filed November 21, 1879, described the improvements to include two shafts (one 21.64 m [71 ft] deep and the other 16.15 m [53 ft] deep) and tracings along the ledge for 152.4 m [500 ft] (Beaver County Records, Book 76: 47). The Lulu patent, filed January 5, 1880, indicates a half interest in a shaft, tracings, and cuttings along the ledge (Beaver County Records, Book 76: 7). According to Wray (2006: 310), the Lulu Mining Company owned the Lulu claim; it "adjoins the Horn Silver claim immediately to the south and contains the southern strike extension of the Horn Silver (Ring) fault." Butler (1913: 187) describes the Lulu one of "the most extensive search[es] for ore" in lava. Newspaper accounts confirm this information from 1881 to 1882: "The Lulu shaft, first south extension of the Horn Silver has been sunk to a depth of 90 feet [27.43 m]. The indications are [favourable] for the early development of a rich and extensive mine" (*Southern Utonian*, 24 September 1881: 2). "Work continued to progress through the fall" (*Southern Utonian*, 19 November 1881). "By April 1882, the Lulu shaft had reached 121.92 m [400 ft]" (*Southern Utonian*, 1 April 1882). Wray (2006: 310) notes that "two-compartment shafts were sunk on both claims [the Americus and Lulu], and within the Lulu claim, the Ring fault was prospected by drifts on the 400' and 650' [121.92 and 198.12 m] levels." Despite these attempts, the Americus proved disappointing and it was determined that it would not produce ore in commercial grade quantities (Butler 1913: 187; Wray 2006: 310). The Lulu, in 1906, produced a small quantity of "shipping-grade ore" at the 137.16 m [450 ft] level, which led to the expansion to the 198.12 m [650 ft] level (Butler 1913: 187; Wray 2006: 310, 347). Within six years, the HSMC had acquired the Lulu and extended drifts along the Ring fault zone (Wray 2006: 347). In 1929, ASARCO leased the Lulu, constructing a new surface plant there the following year (Wray 2006: 361-362). At that time, ASARCO drifted 457.2 m [1,500 ft] off the shaft, but failed to identify any commercial grade ore (Wray 2006: 362). Adjacent to Horn Silver No. 2 and the Lulu Shaft is an adit extending 304.8 m [1,000 ft] into Grampian Hill; the adit is known as the Van Cott tunnel (Wray 2006: 362). No further information was available for this claim.			
199	Venus				unknown			
200	Volcanic				unknown			
201	Vorheas [Voorhes, Voorheas]	JAN 1888	Ancel Newhouse	Newhouse, Ancel	The Vorheas [Voorhes or Voorheas] Lode (M.S. 4750) was located in January 1888 by Ancel Newhouse; he patented this claim on 25 March 1902. Newhouse's improvements included an incline shaft (4.5 feet by 8 feet by 140 feet deep) in the amount of £1072.94 [$1680.00], and a tunnel (1.22 by 1.83 by 6.71 m [4 by 6 by 22 ft] long) in the amount of £140.50 [$220.00] (Beaver County Records, Book 223: 137). Between 1901 and 1908, however, George Anderson conducted a mineral survey (no. 5295) that included three claims in this same area as Newhouse's claim. Anderson's improvements included a tunnel, winze and shaft (M.S. No. 5295, Beaver County Records, Book 239: 375).	MS #4750; patented 25 MAR 1902, tunnel, winze & shaft		
202	Washington Group	pre 1909	Cupric Mining Company		The Washington Mine – not to be confused with the Lady Washington claim – was situated southwest of the Imperial mine in Loeber Gulch, just west of Grampian Hill, and featured an inclined shaft (Butler 1913: 183). The shaft was created prior to 1900, to a depth of approximately 30.48 m [100 ft]. A second shaft, Washington No. 2, was situated 47.24 m [155 ft] south of the initial shaft and also was sunk to a depth of 30.48 m [100 ft]. Work on the Washington mine ceased by the summer of 1909 (Butler 1913: 183-184). During its time of operation, the mine produced high-grade ores including lead, copper, gold and silver (Wray 2006: 348).	Loeber Gulch, southwest of the Imperial Mine	quartzite, silicates, garnet, tremolite, muscovite, fluorite, galena, sphalerite, sulphides, diopside, vesuvianite, quartz, chlorite, recrystallized carbonates, pyrite, chalcopyrite, quartz monzonite	
203	Wild Bill		NOT IN SFMD		unknown		jarosite	
204	W.P.J.				unknown			
205	Yellow Jacket Claim	1879			Yellow Jacket claim's opening extending 76 m (250 ft) to produce 10 tons of high-grade ore. No additional information was available for the Yellow Jacket claim.	Shown on Hooker map (1879)		
206	Young America	1883		Sarault, Abasime	Abasime Sarault and Clifton Byram filed the patent for the Young America Lode (Survey No. 34) on September 12, 1883. The discovery shaft measured 3.05 m [10 ft] deep, with a tunnel measuring 1.83 by 1.22 by 74.68 m [6 by 4 by 245 ft] long (Beaver County Records, Book 114: 345).	Survey #34		
207	O22				unknown			
208	Warner No. 2		Cupric Mines		unknown			
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Claims | BLM-GLO Records | Horn Silver Employees

APPENDIX D6

San Francisco Mining District, Beaver County, Utah: Historic American Landscape Survey / Historic Landscape Characterisation Compilation Form

Heather R. Puckett

May 2013

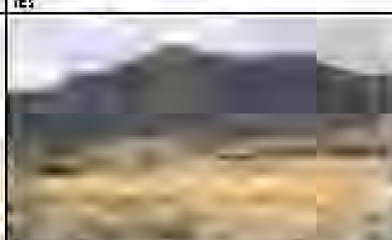
HALS

National Park Service
U.S. Department of the Interior

ENGLISH HERITAGE

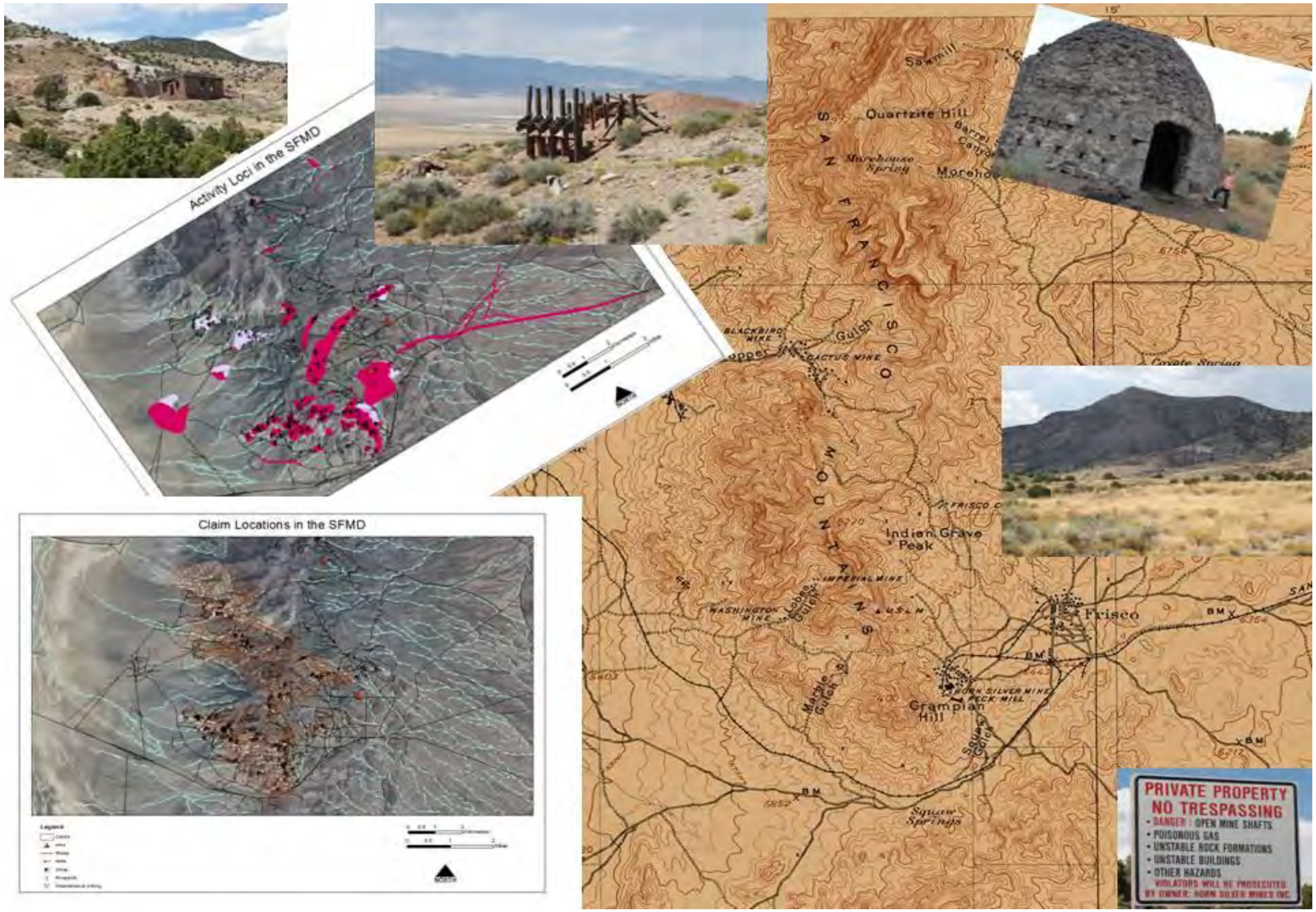
A total of 207 mining claims have been included in the attached database. These claims are situated within the boundaries of the San Francisco Mining District (SFMD).

The inventory includes a listing of the claims by name, as well as the date discovered, name of discover, the names of the employees, a description of the claim, other comments, known geology and minerals, and trinomials (if recorded as an archaeological site).

HISTORIC AMERICAN LANDSCAPES SURVEY and HISTORIC LANDSCAPE CHARACTERISATION INFORMATION SHEET	
Site Name	San Francisco Mining District (SFMD)
Address	n/a
City / Town / Vicinity	Frisco, Grampian, Newhouse; Section 23, Township 27S, Range 13W
County	Beaver
State	Utah
National Park	n/a
Size of Development	over 50 hectares
Adjacent Land Use	Rural
Coordinates	301354 mE / 4257827 mN
Statement of Significance	The SFMD meets National Register of Historic Places Criteria A (association with events that have made a significant contribution to the broad patterns of history); Criteria B (association with the lives of persons that are significant in our past); and Criteria D (have the ability to yield or may be likely to yield information important in history). In addition to meeting the National Register criteria, the archaeological resources have integrity of location, design, setting, materials, workmanship, feeling and association to convey its significance as defined by 36 Code of Federal Regulations Part 60, Section 60.6.
Context / Physical Description / Historical Summary	One of the earliest regions in the Utah Territory to focus its economy on mining was that of Beaver County. During the 1870s, miners discovered silver, copper, lead, zinc ad gold in the San Francisco Mountains. Between August 1871 and February 1879, the SFMD formed and the Horn Silver Mining Company organized; by 1885, the community of Frisco was established along the southeast slope of the mountains. The Horn Silver Mining Company encompassed the claims for the Silver Horn, Blackbird, King David, Cactus, Carbonate, Rattler, Comet, Yellow Jacket and Imperial Mines. By 1920, more than seventy-four claims had been filed within the SFMD alone; this number would more than triple. Several structures, including housing, saloons, hotels, churches, schools, stores, a hospital, brothels, bros melters, charcoal kilns, a cemetery, and housing were constructed in Frisco. Between 1886 and 1920, the Horn Silver Mine, the largest in the district, became one of the territory and nation's leading producers of both silver and lead, with a total output worth over $70 million. Today, only the remnants of a few dozen buildings are extant.
Historic Landscape Type	Industrial (Mining)
Visual Characteristics	Natural; Mining; Settlement; Linear Systems; Vandalism
Condition	Threatened
Accessible to Public	Yes (Posted)
Property Contact	Mr. John P. Bogdanich, Horn Silver Mines, Inc., 1005 East 3900 South, Salt Lake City, Utah 84124-1110, Telephone 1+801.281.5656
Existing Site Surveys	HABS/HAER; NRHP; State (UTAMBP); Other (Volunteered)
Bibliographic / Other Sources	Frisco Quad, USGS 15' Series
Inventoried by	Heather R. Puckett
Date	2011
Email	HRP808@bham.ac.uk
Other Contact Info	1+931.322.7326
GIS Data	Yes
Images	

APPENDIX E
San Francisco Mining District, Beaver County, Utah: GIS Data

Heather R. Puckett
May 2013



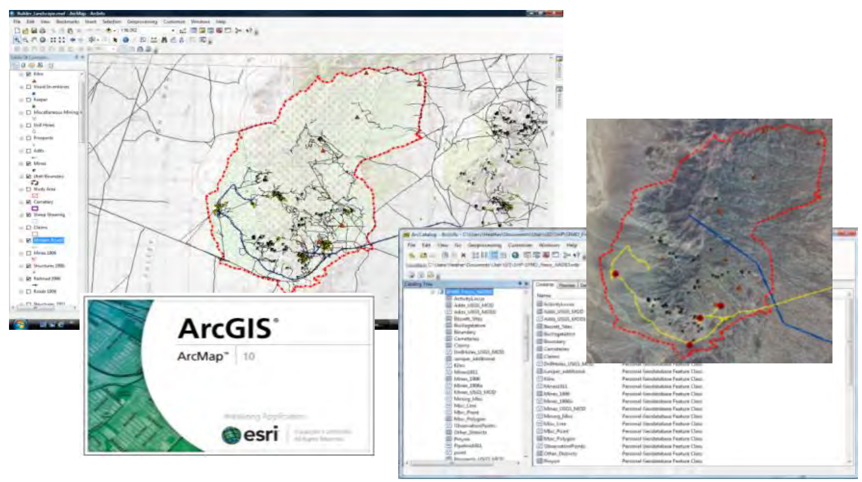
Introduction

In 1969, Jack Dangermond established the Environmental Systems Research Institute, Inc. (ESRI). In the early 1980s, ESRI created GIS technology; ARC/INFO was launched in 1982. In 2004, ESRI issued ArcGIS version 9. ESRI released ArcGIS version 10 in September 2010. The present study initially began under ArcGIS version 9, but now utilises ArcGIS version 10.

One of the primary guides for GIS is *Getting to Know ArcGIS desktop: Basics of ArcView, ArcEditory, and ArcInfo* (Ormsby *et al*. 2004). This publication provides an introduction and overview to GIS and the appropriate computer software programs. The guide includes information on how to display, navigate, browse, search, create and edit maps; and similar information for preparing databases, conducting data queries, and analysing spatial data.

Paul Box (1999) produced a concise guide entitled *GIS and Cultural Resource Management: A Manual for Heritage Managers*, in conjunction with the office of the UNESCO Regional Advisor for Culture in Asia and the Pacific, and the United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Centre Asia-Pacific Desk. Box (1999: 9) defines GIS as a "computer-based technology for producing, organizing and analysing spatial information...It is the ability of a GIS to reference and describe objects by a location that distinguishes it from traditional databases and spreadsheets."

Due to the flexibility of comparing data in a computer format, GIS is the easiest format for developing and managing the themes in the historic landscape characterisation (HLC) model. The model employed for the San Francisco Mining District (SFMD) HLC incorporates the themes of geology, vegetation, hydrology, mining, settlement, and transportation; utilities were documented nominally due to the lack of resources associated with and data available for the district. Data supporting these themes was acquired from a variety of sources. For instance, aerial imagery was provided through Digital Ortho Quarter Quads (DOQQ) online at http://gisdata.usgs.net/website/seamless. Datasets may include roads, hydro layers, and Digital Raster Graphic scans of United States Geological Survey (USGS) quadrangles. The state offers GIS data via the Utah State Geographic Information Database (SGID) and the Utah Automated Geographic Reference Center [sic], housed online at the Utah GIS Portal, http://agrc.its.state.ut.us.



This includes geospatial data and digital imagery, such as hydrology, vegetation, geology, transportation, and Public Land Surveying System (PLSS) data. Most of the data is available from the SGID uses the Universal Transverse Mercator (UTM) Zone 12 North, 1983 North American Datum (NAD 83) as the standard for projection, coordinate system and datum. Further information regarding western lands is documented through the Bureau of Land Management (BLM); their National Mine Land Inventory for Coal and Non-Coal Abandoned Mines is available online at http://www.geocommunicator.gov, searchable through the PLSS.

Public Land Surveying System, United States

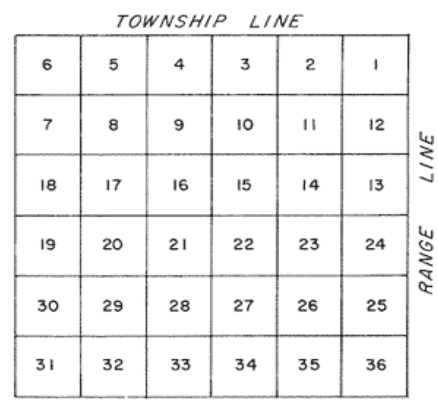
In the US, land descriptions define, in legal terms, where a property is located and the number of acres or areas it contains. In rectangular land descriptions, the square measure is given in acres, and location in PLSS descriptions. In non-rectangular descriptions, distance is given in metes and bounds (feet or rods and square measures in terms of acres). Metes and bounds typically are used in state-land states, also known as the Colonial System; as such, it is applied to the thirteen original states, as well as Maine, Tennessee, Vermont, West Virginia, Hawaii, and Texas. The PLSS is applied to states operated under the public domain, whereas the US federal government granted the land; generally the PLSS relates to lands associated with western expansion and also is known as the Rectangular System.

The US acquired land including present-day Utah through cession from Mexico in 1848. Spain held title to much of the US until 1821; at that time, Spain withdrew from Florida and Mexico gained independence, claiming title to the southwest US – including present-day Arizona, New Mexico, Nevada, Colorado, Utah, California and Texas. Portions of Utah had been claimed under Spanish and Mexican Land Grants. Copies of some grants are available on microfilm through the Family History Library of the Church of Jesus Christ of Latter-Day Saints in Salt Lake City, Utah, and at the National Archives in Washington, District of Columbia (D.C.). Following the Mexican War, lands were transferred from Mexico to the US, as federal lands (or public domain).

The land office in Salt Lake City officially opened in 1868, although a few earlier entries were documented at the land office in Denver, Colorado (Hone 1997: 478). Between 1868 and 1876, all land claims were made through the Salt Lake City Land Office. In June 1876, the Beaver Land Office opened. The following year, the Beaver Land Office merged with the Salt Lake City Land Office, consolidating all of the land records (Hone 1997: 478-480).

PLSS includes townships which are six mile square tracts of land that include 36 sections. The townships run from base lines and principal meridians, with a series of numbers to the north or south of the base line. The meridians are north-south lines whilst a horizontal line serves as the base line from which north-south descriptions are measured. Meridians used in Utah include the Salt Lake and Uintah Meridians (Hone 1997). The SFMD falls within the Salt Lake Meridian. Range numbers are identified from the blocks running east or west of the principal meridian. Each section is one-square mile containing 640 acres. Sections are defined in terms of quarters or aliquot parts with the fractional division in government lots. Sometimes a hybrid legal description is used when property involves a fractional section.

As E. Wade Hone (1997: 108) notes, during the 1860s, “legislation began requiring town sites to be surveyed into urban or suburban locations, designating lots and blocks which were in turn surveyed for individual disbursement. These inner township surveys were eventually placed under the jurisdiction and financial responsibility of the town rather than the US government.” The Frisco town site is divided into lots and blocks (Tolton 1904).



Further land claims were made under the Homestead Act of May 1862, the enlarged Homestead Act of 1909, the Land Ordinance of 1785, the General Mining Law of 1872, the Desert Land Act (1877, 1890), and railroad grants. Based on the divisions under the PLSS and mineral entries, many patterns of property use and ownership may create a series of features that are visible on the landscape. Examples are from roads, fences, tree lines, and structures in grids on the landscape and reflected easily in the SFMD GIS model.

The GIS data is the result of compilation of the archival research and ground-truthing data into the HLC model. Together this data allows for better spatial and temporal management of the landscape. When viewing the data, please use ArcGIS 10.0 and follow the instruction on the “Read Me” files enclosed.