Moapa Valley Trails Study Pre-Design Existing Data Review Pertaining to Environmental and Cultural Resources of the Moapa Valley Located in Clark County, Nevada

HRC Report 2009-01-P

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Alta Planning and Design

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TABLE OF CONTENTS

LIST OF MAPS

LIST OF TABLES

INTRODUCTION AND PROJECT DESCRIPTION

In March 2009, at the request of Alta Planning and Design, the Cultural Resources Program of the Harry Reid Center for Environmental Studies (HRC) (located at the University of Nevada, Las Vegas), conducted an existing archaeological data review and literature search in support of the Moapa Valley Trails Study. HRC further consulted with Desert WalkAbouts, Inc., to conduct an existing environmental and biological data review. The project involves the conceptual planning of hard and soft surface shared-use trails within the Moapa Valley, Clark County, Nevada; including trails within the rural towns of Logandale and Overton and shared-use and off-highway vehicle trail connections to surrounding public lands. The Project also includes the conceptual planning of a trailhead near the county fair grounds in Logandale. The Moapa Valley Trails Study area is generally located in Sections 15, 21, 22, 23, 25, 26, 27, 34, 35, and 36 of Township 15S, Range 67E; Sections 1, 2, 3, 11, 12, 13 and 34 of Township 16S, Range 67E; and Sections 7, 18, 19 and 30 of Township 16S, Range 68E as illustrated on the Overton, Nevada (1983); Overton NW, Nevada (1983); and Valley of Fire East, Nevada (1983), USGS 7.5' Topographic quadrangles. The boundary of the current project area is shown on Map 1.

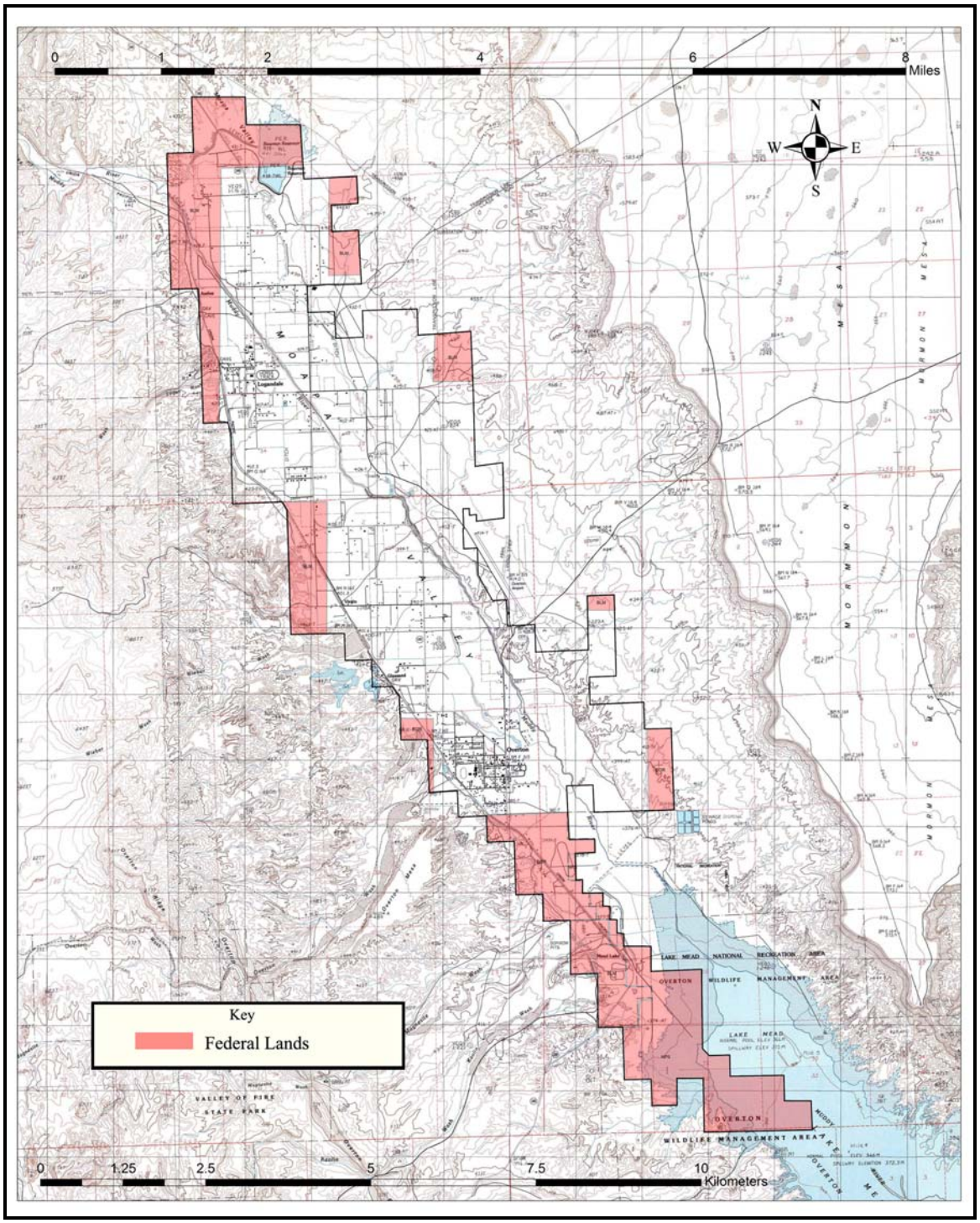
Cities and towns in Clark County are planning and constructing trail systems to provide linear recreational open spaces within urban areas. Funding for building the trails is primarily provided through the Southern Nevada Public Lands Management Act (SNPLMA). Clark County adopted a Trails Element to the Clark County Comprehensive Plan on October 10, 2005. The Trails Element Policies guide the development of a variety of trail systems within Clark County. Trails staff with the Department of Air Quality and Environmental Management (DAQEM), are responsible for the planning and implementation of off-street trails and trail systems.

THE ENVIRONMENTAL BACKGROUND OF THE STUDY AREA

This section focuses on the natural environment of the lands within and adjacent to the current study area. This discussion is two-fold. The first need is to establish the natural setting itself, including a brief review of the physiography, geology, soils, climate, paleoenvironment, water resources, and biotic communities of the Moapa Valley. This environmental discussion will be pertinent to the Cultural Background section that follows, as the environment has influenced cultural development, and sometimes required adaptation by the various people inhabiting the valley through time.

Physiography, Geology and Soils

The study area encompasses much of the Moapa Valley, which lies within the Basin and Range Province of the western United States. The Basin and Range Province encompasses approximately 300,000 square miles; extending from the southwest corner of Oregon, throughout virtually all of Nevada, western Utah, southeastern California, southern and northwestern Arizona, southwestern New Mexico, and the southwestern corner of Texas (Hunt 1967). This province is generally characterized by parallel, narrow, north-south trending mountain ranges separated by valleys or basins that are more structural rather than erosional in nature.



Map 1. General Project Area.

The Basin and Range Province can be divided into a number of smaller units based primarily on climate and biota: the Great Basin, the Mojave Desert, the Sonoran Desert, and Chihuahua Desert. The boundaries between these smaller units are sometimes indistinct, or overlap. For instance, physiographically the Moapa Valley Trails study area lies within the Great Basin. However, biotically and climatically the project area most resembles the Mojave Desert. Furthermore, the Great Basin (which comprises nearly half of the Basin and Range Province) variously has four different definitions. The most common is the hydrographic Great Basin; that region of the arid west which drains internally. The project area lies just east of the boundary by this definition. The physiographic Great Basin includes the full extent of the linear mountain ranges and adjacent valleys, not just those portions which drain internally. This shifts the Great Basin boundary to the east, encompassing the project area and reducing the boundary into California. The floristic Great Basin based on the spatial extent of a distinct assemblage of plants. The Great Basin boundary thus shifts north of the project area and extends more prominently into southeastern Oregon and southern Idaho. Finally, the ethnographic Great Basin is based on the area in the region occupied by Native American groups at the time of contact with Euro-Americans. This is the most arbitrary boundary based on the mobility of many of the Native American groups within the Basin and Range Province. Thus, when discussing the natural environment of the project area all of these definitions have some use.

Major physiographic features of the study area include: the North Muddy Mountains, the Black Mountains, the Virgin Mountains, the Virgin Valley, and the Muddy River. Other prominent landmarks include Mormon Mesa and the Colorado River. The mountain ranges are geologically complex, consisting of carbonate and non-carbonate rocks that are folded and faulted. The mountains west of the Moapa Valley, the North Muddy Mountains and Black Mountains, are relatively low ranges with highest peaks near 3,500 feet (1,050 meters) above mean sea level (AMSL). To the south and east of the Virgin Valley are the Virgin Mountains, a higher range with peaks rising well over 5,000 feet (1,400 meters) AMSL. The carbonate rocks of these ranges are primarily of Cambrian to Triassic limestones and dolomites (Longwell, *et al.* 1963). These carbonate rocks are susceptible to solution weathering that allows for the movement of water from the mountain ranges to the neighboring basins. Conversely the noncarbonated rocks are far less permeable. These noncarbonated rocks are characteristically volcanic tuffs, gneiss, granite, sandstone and schists of Precambrian to Tertiary age (Longwell, *et al*. 1963). The interface between the mountain ranges and the basin floors is in the form of alluvial aprons. These formations consist of multiple piedmont surfaces and coalescing fans adjoin at the mountains that grade down as multiple fans into the valley floors.

Soils in the Great Basin are generally either Gray Desert Soils or Red Desert Soils, occurring primarily on gravel fans and pediments. Alluvial soils are present along the major waterways. Soils in the region are generally low in organic material, slightly acidic to alkaline, and have calcium carbonate accumulations in the upper 2 meters of development (Longwell, *et al*. 1963). Cementation of the calcium carbonate formations and similar silica actions form hardpans commonly referred to as caliche. Specific to the study area, two primary soil groups occur. The first consists of alluvial soils prominent in the Moapa and Virgin Valleys. These soils are formed in silty, loamy, sandy, and

clayey alluvium that is derived from multiple geological rock formations and deposited by water and wind. The second group of soils is well-drained, formed loamy or sandy basin fill, and derived largely from limestone, sandstone and quartzite (Longwell, *et al*. 1963). Again, deposition of the parent material is of either aeolian or fluvial origin. Gravel and stones occur with soils in some areas.

Desert pavement is a surface deposit characteristic of the Basin and Range Province. The deposit is comprised of a smooth surface of gravels or pebbles that overlies silts and occasionally loams. The surface is generally just a single layer of these small cobbles. Desert pavements are often covered by dark patina referred to as desert varnish.

Water Resources

As a valuable resource in the dry desert environment of southern Nevada, the Muddy River traverses the center of the study area. It must have appeared as an oasis to prehistoric and historic peoples entering its confluences, and the floral and fauna along its course. The Muddy River originates from a series of warm springs near the town of Moapa, Nevada. From there it flows in a southeasterly direction through the valley, creating a braided stream pattern (Longwell 1949). The Moapa Valley is a relatively flat landform having an east-west axis that slopes gently down from north to south.

Two principal washes flow into the Muddy River; the California Wash enters from a north-northeasterly direction out of Dry Lake Valley, and Meadow Valley Wash has its origination further north, joining the river near the town of Glendale. Prior to Hoover Dam construction the Muddy River flowed for approximately 21.7 miles (35 kilometers) before emptying into the Virgin River just south of Mormon Mesa (Altschul and Fairley 1989; Ezzo 1996). Lush vegetation is present within many canyons found along the perimeters of the valley, suggesting that other ephemeral or seasonal spring or seep water sources are likely present. Many bedrock formations in the valley contain natural eroded tanks or tinajas which fill with water during times of precipitation. These natural tanks would fill during heavy rains, providing excellent seasonal water sources for the area.

Modern Climate

Typical of the southern Great Basin, the region has four well-defined seasons. Summers are hot with daily temperatures reaching 100+ degrees Fahrenheit. Winters are mild and short with average temperatures expected in the low 40's. Occasionally winter temperatures may fall below freezing. The prevailing wind direction is from the west with wind velocity ranging between four and six miles per hour. Northwest winds are usually the most severe during the winter and spring months. These are associated with cold fronts in the late fall, winter and spring transition. Mean annual precipitation for the project area is 13.5 centimeters (5.3 inches)(See Table 1)(Sagmiller 1998). Summer precipitation generally occurs because of storm movement originating in the Gulf of California or the Gulf of Mexico. "The summer months bring violent thunder storms which form quickly and deliver their rain in sudden showers, causing occasional local flooding" (Longwell 1965:8). In the five summer months, May through September, the region receives 25 percent of the annual precipitation. Most of this comes during July and August from a few short-duration high-intensity storms. Roughly 50 percent of the

annual precipitation occurs during the winter months, December through February (Sagmiller 1998).

Table 1. Means and Extremes of Climate in the Moapa Valley, a Climatological Summary of Temperatures Celsius (1906-1999) and Mean Monthly Precipitation.

Month	Daily Max. Mean Temp. (C)	Daily Min. Mean Temp. (C)	Monthly Mean Temp. (C)	Mean No. Days 32.2 (C) and Above	Mean No. Days 0 (C) and Below	Mean Monthly Precip. (Cm)
January	14.9	-0.4	7.2	0	18	1.6
February	18.6	2.4	01.5	0	8	1.6
March	21.5	4.9	13.2	0	3	2.1
April	26.3	7.8	17.1	4	0	0.3
May	31.6	12.5	22.1	16	0	0.7
June	37.8	16.6	27.3	27	0	0.2
July	40.6	20.6	30.6	29	0	1.2
August	39.2	19.9	29.6	28	0	1.4
September	35.6	16.3	26	24	0	0.9
October	28.8	9.5	19.1	0	0	1
November	20.6	3.5	12.1	0	6	1
December	15.4	-0.6	7.4	0	19	1.1
Year Total	27.6	9	18.5	137	54	13.5

Table adapted from Sagmiller 1998: Table 1; 63.

Wildlife and Vegetation

Undeveloped portions of the landscape through which the Moapa Valley Trail will eventually cross are largely characterized by elements of the Mojave Desert ecosystem. Creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) typically dominate local vegetative communities. These Mojave hallmarks, however, are often supplanted by various saltbrush species, typically four-wing saltbrush (*Atriplex canescens*) and/or quail-bush (*A. lentiformis*) in areas where water tables are higher or soil-salt concentrations limit creosote and bursage viability.

Riparian corridors along the Muddy River channel are frequently dominated by dense stands of non-native salt cedar or tamarisk (*Tamarix ramosissima*). Once established, this species crowds out most other plants.

Developed parts of the Valley support a variety of mostly non-native agricultural species, all of which must be sustained by artificial irrigation.

Local desert mammal assemblages typically support a few large and numerous smaller species. Desert bighorn sheep (*Ovis canadensis*) are the largest native herbivores. Coyote (*Canis latrans*) and the occasional bobcat (*Lynx rufus*) dominate the large carnivore groups. A variety of other species, including desert kit fox (*Vulpes macrotis*), raccoon (*Procyon lotor*), badger (*Taxidea taxus*), various bats (Order Chiroptera) and numerous rodents (Order Rodentia) essentially rounds out the mammalian community.

Native avifauna is both varied and plentiful – particularly during spring and fall migrations. Both golden (*Aquila chryseatos*) and bald (*Haliaeetus leucocephalus*) eagles occur here, along with a variety of hawks, owls, waterfowl, shorebirds and a vast array of both passerine and non-passerine species.

A variety of native and introduced fish species occupy Lake Mead and its tributary streams. One State-protected fish species (Virgin River chub, *Gila seminuda*) occurs in the Muddy River.

Reptiles are reasonably commonplace in this region. Included within the local assemblage are the State-protected Gila monster (*Heloderma suspectum*) and federally listed (*Threatened*) desert tortoise (*Gopherus agassizii*). Three rattlesnake species and perhaps a dozen harmless serpent varieties may be found here. Lizards, particularly side-blotched (*Uta stansburiana*), zebra-tailed (*Callisaurus draconoides*), western whiptail (*Aspidosceles tigris*) and desert spiny (*Sceloporus magister*) are frequently seen.

Amphibians are not particularly numerous here, but a few species, e.g., the native red spotted toad (*Bufo punctatus*) and the introduced bullfrog (*Rana catesbeiana*) might reasonably be expected to occur around local wet areas. Local invertebrates communities include arachnids (spiders and scorpions) and a vast variety of insects.

Paleoenvironment

The Pleistocene

The Pleistocene Epoch is generally recognized as lasting from approximately 1.8 million to about ten thousand years before present, encompassing the first appearance of man in southern Nevada. It is a time characterized by at least four major glacial periods separated by intervening interglacials (Flint 1971), and is unique in being the sole geological epoch defined by climatic change rather than by changes in characteristic faunal assemblages (Van Devender 1977). The Pleistocene's last glacial episode, the Wisconsin, achieved its final maximum stage about 18,000 years ago. At the peak of that advance Wisconsin ice covered nearly all of what is now Canada and reached well south of the Canada/U.S. border. Massive expansion of the ice sheets across normally ice-free, mid-continental latitudes resulted in a concomitant "shifting" of cooler, wetter climates associated with those areas to the south (Flint 1971). Although present-day southern Nevada was far removed from the glaciers during this (and previous) advances, it was impacted by climate changes brought about by the glacial progression. Within the ice-free zones altered local weather patterns typically resulted in diminished average annual temperatures, enhanced precipitation and reduced evaporation rates (Van Devender 1977, Brakenridge 1978, Mifflin and Wheat 1979, Smith and Street-Perrott 1983, Spaulding *et al*. 1983).

Although the exact magnitude of changes in the Mojave Desert region has not been determined, Mifflin and Wheat (1979) suggest a roughly 2.5° C (5° F) drop in average annual temperature coupled with an average 68 percent increase in precipitation and ten percent decrease in evaporation as being sufficient to permit formation of the pluvial lakes that filled many central and northern Nevada interior basins during the Wisconsin glacial period. While pluvial lakes apparently did not form in Nevada south of about 37° north latitude (roughly 90 kilometers or 55 miles north of Las Vegas), glacial impacts did extend below that point. Mifflin and Wheat (1979) assert that substantially increased groundwater and spring discharges occurred in southern Nevada during this time, creating a number of local marsh environments. Whatever the actual numbers, it is apparent that climatic conditions across the Mojave during late Pleistocene time were, at least, somewhat more moderate than those occurring at present. This contention is substantiated by evidence of regional, late Pleistocene plant assemblages

collected from local packrat (*Neotoma* sp.) middens.

Examination of packrat middens at various locations throughout the southwestern U.S. has revealed presence, within fossil midden deposits, of numerous plant species now extra-local to the middens' locations (Spaulding 1977, 1983, 1985, 1990, Van Devender 1977, Van Devender and Spaulding 1979, Wells 1979, Thompson and Mead 1982, Quade 1986, Spaulding and Graumlich 1986, Cole 1986, 1990). But despite the relict plants' current absence from around the middens, many of the same species continues to thrive either at nearby higher elevations or at locations north of the middens, *i.e.*, in sites where more moderate climatic conditions yet prevail. Because foraging *Neotoma* typically range no farther than about 50 meters (165 feet) from their nests (Phillips and Van Devender 1974), presence of a plant within a midden deposit is considered prima-facie evidence that the species formerly grew in the midden's immediate vicinity.

Investigations of *Neotoma* middens in and adjacent to the Mojave Desert indicate that conditions there during the last glacial maximum were sufficiently moderated to support a mosaic of desert scrub/woodland in many areas where only scrub persists today (Van Devender 1977, Baker 1983, Spaulding 1983, 1985, Wells 1983, Spaulding and Graumlich 1986, Cole 1986, 1990). In late Pleistocene and early Holocene time numerous species of fir (*Abies* sp.), pine (*Pinus* sp.), juniper (*Juniperus* sp.), ash (*Fraxinus* p.) and oak (*Quercus* sp.), along with many other types now essentially confined to elevations well above those of modern desert environments, grew at elevations up to several hundred meters lower than they do today. Similarly, other plants more characteristic of xeric woodland (e.g., Joshua tree) were considerably more widespread than at present (above authors). The widespread existence of these less desert-adapted species in areas where harsh desert conditions prevail today plainly evidences a formerly more temperate Mojave Desert.

The Pleistocene/Holocene Transition

By the beginning of the Holocene epoch, some ten thousand years ago, the Wisconsin ice sheet had for all practical purposes retreated well into present day Canada (Flint 1971, Porter 1989). De-glaciation had effectively begun between eight and five thousand years earlier and, by about fourteen thousand years ago, vegetation in the Mojave Desert was beginning to change in response to a gradually warming local climate (Spaulding 1985). Continued recession of the Wisconsin ice precipitated further changes in atmospheric circulation, rainfall patterns and temperature regimes affecting the entirety of today's southwestern U.S. In the Mojave, rainfall amounts generally decreased and assumed their current, winter maximum pattern. Average annual temperatures continued to increase until, by about eight thousand years ago, essentially modern climates were in place (Van Devender 1977, Van Devender and Spaulding 1979, Spaulding et al. 1983, Spaulding 1985). The Mojave's late Pleistocene/early Holocene biotic communities responded in turn. Species unable to persist in the face of the new, more strongly xeric conditions withdrew into suitable habitats, or disappeared.

THE CULTURAL BACKGROUND OF THE STUDY AREA

For the purpose of providing a background of past lifeways and peoples who once occupied the Moapa Valley Trails Study area, and as an example of the type of

information available for generating public interpretive signage, brochures, etc., the following prehistoric historic context was compiled by HRC. The prehistoric culture history summarized in the following pages is divided into six broad temporal units: Paleoindian; Early, Middle, and Late Archaic; Protohistoric and Ethnohistoric. A detailed Ancestral Puebloan (Virgin Anasazi) chronology will also be presented as previous research has proven that this culture group was prominent in the Moapa Valley. Following the Virgin Anasazi discussion, a brief ethnographic discussion of the later Native American people to inhabit the Moapa Valley, principally the Southern Paiute and Lower Colorado Cultural Groups. The Moapa Valley is considered an ancestral homeland to the Southern Paiute people, more specifically the Moapa Band of Southern Paiutes, whom still reside within the valley today.

Prehistoric Culture History in Southern Nevada

Three regions of study, separated by archaeologists based on geographic areas and archaeological evidence, overlap in southern Nevada. These regions generally include different cultural groups: the people of the Great Basin; those from the east along the Arizona Strip and Colorado Plateaus; and the people from the Lower Colorado River and Arizona. Each of these groups has chronological sequences which are applied to southern Nevada based on the cultural group under study. Warren and Crabtree's (1986) and Seymour's (1997) chronologies was developed for the southern Great Basin and Mojave Desert areas, whereas Rogers' (1945) chronology is specific to the Lower Colorado River region, and Shutler (1961) and Lyneis (1995) focus on the Ancestral Puebloan occupations of southern Nevada. Table 2 presents a graphic overview of select chronologic sequences for southern Nevada. Easily noted are the separate and sometimes contrasting chronologies they suggest for the region. Some of the avenues leading to discrepancies between the chronologies include: the diversity of lifeways in the region; a lack of adequately radiocarbon dated sites; and a lack of stratigraphic positioning of temporally diagnostic artifacts due to insufficient deposition at most southern Great Basin sites.

Paleoindian

The first people to enter the Great Basin arrived at least 11,500 years ago (Grayson 1993). Artifacts dating to the Paleoindian temporal unit in the southwestern Great Basin (ca. 12,000 to 7,000 B.P.) are described here as fluted or stemmed projectile point assemblages. Artifacts include: Lake Mojave, Parman, Silver Lake, and rare fluted projectile points (Clovis); lunate and eccentric crescents; small flake engravers; specialized scrapers; leaf-shaped knives; and drills and heavy choppers or hammerstones (Warren and Crabtree 1986:184). Jennings (1986, Fig. 3:117) suggests that the Lake Mojave points should be associated with the Early Archaic. Warren and Crabtree (1986:184) argue that the large game hunting tradition associated with the Paleoindian lasted much longer. This problem of temporal definition is a direct result of a shortage in datable sites throughout the Great Basin. When sites do contain datable materials, artifacts are generally found on the surface with no stratigraphic separation.

Table 2. Select Chronologic Sequences for Southern Nevada.

Time	HRC Temporal Units	Seymour 1997			Rogers 1945	Warren and Crabtree 1986	Shutler 1961: Lyneis 1995	
	Ethnohistoric	Historic Period						
A.D. 1500 450 B.P.		Patayan III AD 1500+	Pueblo III	N	Yuman III A.D. 1500+	Shoshonean Proto Historic		Early Pueblo III
	Protohistoric		Pueblo II	U	Yuman II	Saratoga Springs	Mesa House A.D. 1100-1150	Late Pueblo II
		Patayan II 1050-1500						Early Pueblo II
			Pueblo I	M	1050-1500		Lost City 800-1100	Pueblo I
A.D. 1000 950 B.P.				I	Yuman I 800-1050		Muddy River 600-800	Basketmaker III
	Late Archaic							
A.D. 500 1450 B.P.		Patayan I pre 1000	Basketmaker III	C	Basketmaker III		Moapa 400-600	
							Basketmaker II	
A.D. 0/1950 B.P.			Basketmaker II		Amargosa III Amargosa I/II			
B.C.	Middle Archaic	Gypsum		?	San Dieguito III	Gypsum		
3000 B.P.		1000 B. C. -A.D. 1000		?	San Dieguito II			
4000 B.P.	Early Archaic				San Dieguito I			
		Pinto				Pinto		
6000 B.P.								
		2000-5000 B.C.						
8000 B.P.								
	Paleoindian	Lake Mojave				Lake Mojave		
10,000 B.P.								
		5000-10,000 B.C.						
12,000 B.P.								

Unlike other Southwest sites, no early Great Basin projectile point types have been found in undisputed association with the large megafauna known to have existed during that time. Warren (1967) has suggested that these early artifact assemblages reflect a widespread generalized hunting tradition. Bedwell (1970, 1973) and Hester (1973), contrarily, have interpreted the same assemblages to reflect specialized adaptations to lacustrine resources around the edges of pluvial lakes. J. O. Davis (1978) provides a synthesis; a more generalized hunting and collecting economy existed, in which lakeside sites represent the exploitation of marsh resources. These varying interpretations are considered a product of limited numbers of Paleoindian sites having adequate stratigraphic assemblages. For the purposes of this document, Paleoindian is defined as those archaeological sites which have been systematically dated by radiocarbon samples of ca. 12,000 to 7,000 years ago. The majority of Paleoindian sites in the Great Basin are characterized as surface sites commonly found along shores of pluvial lakes or Pleistocene waterways.

Early Archaic

Warren and Crabtree (1986:184-187) view the Early Archaic (ca. 7,000 to 4,000 B.P.) as a time of major cultural change, while others (Donnan 1964; Susia 1964:31; Tuohy 1974:100-101; Wallace 1962) have proposed that the environmental conditions were so adverse (the Altithermal) that the southwestern Great Basin was essentially abandoned during this time. Warren (1967) maintains that Early Archaic populations were small nomadic groups who continued a widespread generalized hunting lifestyle. Once more, Hester (1973) and Bedwell (1970, 1973) suggest a more specialized adaptation to the pluvial lakes and waterways. J. O. Davis (1978) again combines these proposals into a generalized hunting and collecting strategy imbedded within seasonal rounds.

We see a continuation of the stemmed projectile point assemblages, however, in the later part of the period; the Pinto projectile point is introduced along with leaf-shaped points, domed knives, elongated keeled scrapers, and several forms of flaked scrapers. Warren and Crabtree (1986:187) suggest that Early Archaic people in the Mojave Desert were forced to adapt to the changing environment as evidenced by the small number of known sites and their seemingly temporary nature. Flat milling slabs along with shallow basin and circular basin milling slabs have been found at some sites. Lyneis (1982:177) and others (Amsden 1937:33; Rogers 1929:52-53, 65; Susia 1964:17-18; Wallace 1977:120) contend that true milling stones are rare or missing in Early Archaic assemblages and that seed exploitation was, therefore, not an important subsistence activity. Conversely, Warren and Crabtree (1986) interpret this period as one of generalized hunting and gathering with the beginnings of a technology for processing hard seeds.

Middle Archaic

The Middle Archaic (ca. 4,000 to 1,500 B.P.) is best noted for the introduction of new technologies, ritual activities, and increased socioeconomic relationships to outside areas (Warren and Crabtree 1986:189). Major changes in settlement and subsistence patterns are perceived by Lyneis (1982:177), Rogers (1929:6-10), Wallace (1958:12), and Warren and Crabtree (1986:187-189) in the southwestern Great Basin. These perceptions

are based on a tremendous increase in the number and complexity of sites. Lyneis (1982:177) suggests a reconstruction of settlement patterns, where less mobile groups are living on valley floors exploiting a wider range of landscape, particularly highland areas. Hunting continues to be the major economic pursuit, with an increase in milling equipment suggesting expanded dependence upon hard seeds.

Projectile point characteristics exhibit stemmed, lanceolate, and notched varieties. Common projectile point types are Elko, Gatecliff/Gypsum, and Humboldt, which are later replaced by the Rose Spring and Eastgate series with the introduction of the bow and arrow and the onset of the Late Archaic period. Also, the association of split-twig figurines and extensive rock art sites has been interpreted as an expression of enriched ceremonial lifestyle and economic ties with outside areas (Pippin 1984:51-52).

Late Archaic

The Late Archaic (ca. 1,500 to 700 B.P.) for the southwestern Great Basin roughly corresponds to, and was greatly influenced by, the development of the Anasazi culture of Arizona and New Mexico and the Fremont culture of Utah. Trade routes following the Mojave River are believed to have linked the area to the California coast. Lyneis (1982:177) maintains that large camps situated on valley floors during the Middle Archaic were later replaced by smaller temporary camps. Warren and Crabtree (1986:191), however, proposed continuity in settlement patterns. Evidence for this continuity has been demonstrated with the discovery of the large Late Archaic village sites around Antelope Valley (McGuire *et al.* 1981; Sutton 1981), in Death Valley (Wallace and Taylor 1959), and on the Mojave River (Rector *et al.* 1979). The most significant technological change was the introduction of the bow and arrow. Elston (1986:145) argues that this technological change in the western Great Basin corresponds directly with an increase in plant processing implements suggesting the adoption of a diverse resource exploitation strategy. Lyneis (1982:177) states that this expansion would also include the exploitation of woodland sites above 1,829 meters (6,000 feet) in the southern Great Basin.

Evidence of agricultural societies in the southern Great Basin has been reported by Fowler and Madsen (1986:175-181), Lyneis *et al.* (1978:178-179), Warren and Crabtree (1986:191), and Winslow (2003, 2003a, circa 2006). These agricultural people, termed the Virgin Branch Anasazi, concentrated along the fertile valleys of the Muddy and lower Virgin Rivers in southeastern Nevada and adjacent portions of Utah and Arizona. Some Virgin Branch Anasazi may have occupied the Las Vegas Valley at Big Springs (Lyneis *et al.* 1978:142; Rafferty and Blair 1984a:113-114; Blair and Winslow 2004; Seymour 1997; Warren *et al.* 1978:20), and possibly mined turquoise in the east-central Mojave Desert near Holloran Springs (Leonard and Drover 1980:251; Rogers 1929:12-13; Warren 1980:81-84; Blair 1985).

The primary evidence for Anasazi influence or occupation in the southwestern Great Basin is limited to the occurrence of pottery, which has been found as far west as the Cronise Basin in California (Larson 1981; Rogers 1929). Pottery identified as belonging to Fremont agriculturalists also occurs at southern Nevada sites as far west as Mud Lake and Yucca Mountain (Fowler and Madsen 1986:179-180; Pippin 1984:101; Self 1980:127-129). It is disputed whether the pottery was left by small foraging or hunting parties (Berry 1974:83-84; Fowler and Madsen 1986:180; James 1986:114-115;

Rafferty 1984:30-35; Shutler 1961:7; Warren and Crabtree 1986:191), or if the pottery was a trade commodity along the Mojave trading route in addition to shells, turquoise, obsidian, and salt (Harrington 1927:238-239; Heizer and Treganza 1944; Hughes and Bennyhoff 1986; Morrissey 1968; Pogue 1915:46-51; Ruby 1970; Shutler 1961:58-66).

Another culture group believed to have periodically visited the Las Vegas Valley was the Patayan. They coincide with the emergence of a ceramic technology and the beginnings of an agriculturally based subsistence strategy practiced the length of the lower Colorado River. Many of the new traits have been attributed to Hohokam influence from Arizona (McGuire and Schiffer 1982:216-222). Schroeder, on the other hand, saw this cultural phenomenon as part of the Hakataya tradition that was separate from the Hohokam. According to Schroeder, the Hakataya inhabited much of western Arizona, the western extent of the Sonoran Desert, the Mojave Desert, and northern Baja California. This cultural development included all of the Yuman speaking people as well as some non-Yuman speakers in western Arizona. Schroeder characterized their villages as "rock-outlined jacales, gravel or boulder alignments, rock filled roasting pits, rock-pile shrines, thick dry-lain, low walled rock or boulder structures, rock-shelters, and bedrock milling stones [...] and crudely decorated pottery" (Schroeder 1975; 1979). Rogers (1945) separated those people along the Colorado River and called them the Yuman culture. The term Patayan used in this document is interchangeable with Yuman. The Patayan Tradition has been divided into three phases identified as Patayan I (A. D. 500-1050), Patayan II (A.D. 1050-1500), and Patayan III (A.D. 1500-present). The division of these temporal phases is based on changes in ceramic styles, settlement patterns, and the presence of trade wares. It is assumed now that the Mohave, Quechan, and Cocopa people are the direct descendants of the Lowland Patayan.

Protohistoric

The Protohistoric dates from ca. 700 years B.P. until first contact with Euro-American persons. Chronologic markers in the southern Great Basin include Brown Ware pottery (Bettinger and Baumhoff 1982; Madsen 1975:83; Thomas and Bettinger 1976) and Desert Side-Notched projectile points (Fowler and Madsen 1986:181-182; Warren and Crabtree 1986:191-192). Bettinger and Baumhoff (1982:485) have argued that changes in cultural adaptions during the Late Archaic are directly related to invading Numic groups. They believe that the Numa were able to displace the previous inhabitants because of low-cost adaptive strategies oriented around the exploitation of diverse plant resources. This hypothesis is supported by similarities in artifact types and glottochronological theory advanced by Lamb (1958:99). Young and Bettinger (1992:85), supporting Bettinger and Baumhoff (1982), propose that a competitive interaction existed between the Numic and pre-Numic groups in the Great Basin. On the other hand, Warren and Crabtree (1986:191-192) have tentatively defined regional developments to correspond with historic boundaries of Numic and Takic language groups. An alternative hypothesis suggested by Gross (1977) argues that the linguistic ancestors of the Numic were occupying the Great Basin as early as 10,000 years ago. Aikens and Witherspoon (1986:15-16) have also theorized that the expansion occurred many times during the last 5,000 years. Lastly, Rafferty and Blair (1984a), Rafferty (1989), and Lyneis (1982:180) have proposed that archaic hunter and gatherer groups

coexisted with the Anasazi becoming the ethnographically known Southern Paiute described by the first Euro-Americans entering the region.

Ethnohistoric

The Ethnohistoric dates from post-contact until the middle of the Nineteenth century. Explorers first entering the southern Great Basin encountered small scattered groups of hunters and gatherers who spoke different dialects of closely related Uto-Aztecan languages. Ethnographic and historic period sources suggest that native populations resided in temporary camps for the majority of the year, settling into more established base camps during the winter months (Davis 1965; Steward 1933, 1938; Stewart 1945; Wheat 1967:15). These people are known today as the Southern Paiute (Fowler and Fowler 1971:37).

The Ancestral Puebloan (Virgin Branch Anasazi) in Greater Detail

An in depth discussion of the Ancestral Puebloan (Virgin Branch Anasazi) is being presented herein, as previous archaeological research conducted within the Moapa Valley and surrounding areas has determined that this horticultural group was most prominent in the region. For Virgin Branch Anasazi times we are using the generalized version of the Pecos Classification developed by Lyneis (1995). It is important for the reader to keep in mind that the applicability of these dates continues to be tested.

Basketmaker I

Basketmaker I was as a postulated pre-agricultural stage developed by the original Pecos Conference attendees in 1927. This designation is no longer used; rather the developments observed in the archaeological record are now related to earlier Archaic populations (Cordell 1984; 1997).

Basketmaker II, ?300 B.C. to A.D. 400

Distinguishing Basketmaker II from the earlier Archaic populations was the move to a semi-sedentary horticultural lifeway and the introduction of pottery. Generally, two types of Baketmaker II sites are found: pithouse sites and rockshelters in which semisubterranean storage pits were constructed. To date, only one Basketmaker II site has been confirmed in southern Nevada at the Black Dog Mesa Archaeological Complex (Harrington 1942; Larson 1978; Winslow 2003; 2003a; circa 2006). Other identified Basketmaker II sites identified within the Virgin Anasazi region are Cave DuPont (Nusbaum 1922), South Fork (McFadden 1994) and ZNP-21 (Schroeder 1955).

Clusters of one or two nuclear families are thought to have occupied small pithouse sites consisting of one to five with only moderate exterior storage. Pit structures generally have internal hearths, pothole patterns, and plastered floors, other internal features can be quite variable (Lyneis 1995). Additional storage cists were situated within rockshelters. Considered to be more sedentary than earlier Archaic populations, we see a mixed economy, based on horticulture and wild food procurement, contributed to a predominately semi-sedentary lifeway. Corn and squash were cultivated, and wild plant species such as mesquite, yucca, agave, pine nuts, and juniper were important elements of their diet. Hunting is believed to have focused on small game such as rabbits and desert tortoise (Lyneis 1995). Larger game was taken as noted in the

excavations at Atlatl Rockshelter located in the Valley of Fire (Warren *et al.* 1978) and at the Black Dog Mesa Archaeological Complex located in the upper Moapa Valley (Winslow 2003; 2003a; circa 2006).

Distinguishing characteristics of Basketmaker II material culture in southern Nevada include; Logandale Gray Ware ceramics, two forms of sandal construction (four-warp wickerwork and multi-warp cord with square, fringed toes), twined *Apocynum* bags decorated with red and black designs, and S-shaped "throwing" sticks. Also, characteristic of Basketmaker culture are coiled baskets having two-rod and bundle foundations with non-interlocking stitches. This technique continues into the Pueblo III period (Lindsay *et al.* 1968:99; Adovasio 1986; Lyneis 1995), and thus is not considered diagnostic of the Basketmaker II time period per se. However, this technique is not characteristic of southern Nevada Archaic basketry (Adovasio 1980:39) and as such, the basketry type in southern Nevada is a strong indicator of Anasazi occupations.

Basketmaker III, A. D. 400-800

Pit structures are the preferred living space and are accompanied by storage cists indicating an increased reliance on horticulture and increased sedentism. This model of increasing dependence on a horticultural subsistence base during the Basketmaker III is founded more on faith than on hard data. Currently, many scholars assume that horticultural products provided the staples of the diet, with hunting and gathering of wild plant foods providing important supplements (Altschul and Fairley 1989; Geib *et al.* 1986; Jennings 1966; Lyneis 1995; Powell 1983; Winslow 2003, 2003a). Beyond these vague ideas, no detailed models of Basketmaker III subsistence strategies have come to light.

Although a number of pithouse sites have been identified in southern Nevada; however, few have been accurately dated confirming their placement within the Basketmaker III period. Radiocarbon dating at the Black Dog Mesa Archaeological Complex (Winslow *In Press*) has placed several pit structures within this period and dating hearth material from Structure V at the Steve Perkins site dated this pithouse to A. D. 655 (Myher 1989:17). Two additional confirmed Basketmaker III sites are site ZNP-1 and Roadrunner Village, both located in the St. George Basin . Pithouse sites generally remain small in size, seemingly only housing one to three family units (Lyneis 1995), This model of increasing dependence on a horticultural subsistence base during the Basketmaker III is founded more on faith than on hard data. Currently, many scholars assume that horticultural products provided the staples of the diet, with hunting and gathering of wild plant foods providing important supplements (Altschul and Fairley 1989; Geib *et al.* 1986; Jennings 1966; Lyneis 1995; Powell 1983; Winslow 2003; 2003a). Beyond these vague ideas, no detailed models of Basketmaker III subsistence strategies have come to light.

As with other areas in southern Nevada, some major changes in subsistence strategies and material culture occurred Post A.D. 500. During Basketmaker III, we see the intensification of ceramic production, allowing for above-ground storage of food resources; the use of below-ground storage continues, however, to a lesser extent. Ceramics associated with this period include olivine tempered Moap Gray Ware, sand tempered Tusayan Gray Ware and Tusayan White Ware and limestone tempered Logandale Gray Ware. Bow-and-arrow technology replaces the previous atlatl

technology, precipitating a reduction in projectile point size, and other developments include the use of use of the two-handed manos and trough metates.

Pueblo I, A.D. 800-1000

Pit structures continued to serve as habitations in Pueblo I times. They often have benches, sometimes ventilators; none seem to have antechambers. The arrangements for storage change as cists become more oval and are arranged end-to-end in arcs or curves. The pit structure may be situated off one end of the alignment at some distance, or, more occasionally, the alignment of storage cists is attached to the pit structure. Either way, the relationship between pithouse and alignment of storage rooms begins to define outdoor space for co-residential group activities, anticipating the courtyards of Pueblo II times (Lyneis 1995). Cliff's Edge (Jenkins 1981) and Bovine Bluff (Myhrer and Lyneis 1985) are examples of Pueblo I sites in southern Nevada. Other classic Pueblo I sites are 42WS268 and 42WS388 at Quail Creek(Walling *et al.* 1986) and Little Man 3 (Dalley and McFadden 1988) in the St. George Basin.

Pueblo I cultural traits tend to be difficult to distinguish from the preceding Basketmaker III period. Many ceramic and projectile point types are common in both periods. Rosegate Series projectile points are typically found in Basketmaker III-Pueblo I assemblages, along with the ubiquitous Elko Series type. Ceramic assemblages continue to be dominated by plain gray pottery in the form of large, long-necked ollas and hemispherical bowls. Small quantities of pottery decorated with black paint on an unslipped gray background also occur (Altschul and Fairley 1989; Lyneis 1995). Wares types commonly assocated with this period include olivine tempered Moap Gray Ware, and sand tempered Tusayan Gray Ware, and Tusayan White Ware.

Early Pueblo II, A.D. 1000-1050

In Early Pueblo II times, pithouses continued to afford living space. Storage rooms, still laid out end-to-end, are set less deeply into the soil than earlier cists (Dalley and McFadden 1985). In addition to the sub-surface storage structures, above ground rectangular buildings of adobe and rock or waddle-and-daub were being built. These structures were situated both on terrace tops and within flood plains, forming semicircular patterns. As with the pit structures, the interior walls often were plastered. A few of the rooms contained doorways; previous structures had none, suggesting an entry from the roof. Slab-lined and prepared hearths in the above-ground features resembled those in below-ground structures (Shutler 1961; Lyneis 1995). This is a time of intense Anasazi occupation in southern Nevada (Ezzo 1996; Lyneis 1995). Increasing numbers of ceramic and groundstone implements suggest a greater reliance on agriculture (Myhrer 1986). In southern Nevada Adam 3 (Lyneis, Rusco, and Myhrer 1989) is considered an example of an Early Pueblo II site. Another classic Early Pueblo II site is Little Man 2 (Dalley and McFadden 1988) located in the St. George Basin.

Diagnostic ceramic types include North Creek Gray Ware and Black-on-Gray, Hurricane Black-on-Gray, Virgin Black-on-Gray, and Moapa Black-on-Gray. North Creek Corrugated makes its appearance during Middle Pueblo II, as does Red Ware (Lyneis *et al.* 1989; Lyneis 1995). Additionally, ceramics increased in variety and included a greater number of intrusives or trade wares from other parts of the Anasazi world.

Late Pueblo II, A.D. 1050-1150

By Late Pueblo II times, habitation rooms were usually incorporated into a curving alignment of storage rooms that defined and sheltered a courtyard shared by co-residential groups. These groups remained small in size, usually housing one or more families. Although pithouses never completely dropped out of use, habitation rooms increasingly were built essentially as surface structures. Main Ridge (Lyneis 1992), although having an unusual concentration of courtyard groupings, is an example of a regional Late Pueblo II site (Lyneis 1995)

Although not characteristic of the Virgin Anasazi, at least one cliff dwelling has been identified in the northeastern area the Virgin Anasazi territory. Cottonwood Canyon Cliff Dwelling (Judd 1926) which has been reinvestigated and stablized consists of 18 rooms mortared masonary rooms and a kiva. Well dated through tree ring dating, the site dates to roughly A.D. 1100 (Tipps 1989; McVickar 1989; Lyneis 1995).

Early Pueblo III, A.D. 1150-1225

Mesa House (Hayden 1929) is considered a type site for the Early Pueblo III period; the courtyard is almost completely enclosed by a curve of habitation and storage rooms. Although not typical of Early Pueblo III sites found in other Virgin Anasazi areas, the layout does appear to be consistent with Early Pueblo III sites in southern Nevada (Lyneis 1986). Another classic site for this period is Three Mile Ruin (Aikens 1965) located in Utah (Lyneis 1995).

During this period in the Muddy and Virgin River valleys of southern Nevada, occupation declines. Above-ground structures are thought to have been utilized exclusively, which, to Shutler (1961:168), suggested a need for easily defensible sites. Most of the material culture, however, was similar to the previous period with the exception of several newly introduced ceramic wares and types such as Virgin Black-on-White imported from up river locations. Another intrusive type for this period is Citadel Polychrome from the Kayenta area, while corrugated wares increased in percentage over plain wares from earlier times (Shutler 1961).

Virgin Branch Anasazi population numbers were at their greatest during the Early Pueblo II period, decreasing throughout Late Pueblo II, and ultimately dwindling toward final abandonment around A.D. 1200. Several theories have been proposed to explain this decline, including an increase in warfare (Shutler 1961), dramatic changes in weather patterns (Larson and Michaelsen 1990), and a general cultural collapse throughout the Southwest, resulting in the breakdown of trade networks (Rafferty 1984). Unfortunately there is not yet enough evidence to show that any one of these arguments is correct (Lyneis 1995). In fact, abandonment may have been caused by any combination of the above factors.

The Southern Paiute in Greater Detail

Many believe that before contact, Southern Paiute Culture included a subsistence regime based on foraging and hunting of seasonal rounds similar to cultures during the Archaic described above. There is some controversy, however, whether the Numic-speaking Paiute descended directly from the indigenous Archaic populations. Based on linguistic associations, Lamb (1958) for example, suggested that Southern Paiute spread

from the Death Valley area across the Great Basin prior to 1,000 years ago. In response to Lamb, several models have been proposed (Sutton and Rhode 1994:8-12). Some linguists suggest that the time necessary for this kind of linguistic diversity would be upwards of 3,000 years. Still others believe that the Numic group of languages was a result of *in situ* development, believing they were, in fact, descendants of the local Archaic populations (Lyneis 1982). There is no consensus as to how these Numic-speaking peoples came to inhabit the Great Basin, including the Las Vegas Valley. Despite the lack of agreement relating to origins, many believe that, with the addition of horticulture, the Southern Paiute embraced a lifeway which continued well into the historic period that can be compared to Late Archaic cultures of the past (Altschul and Fairley 1989).

Perhaps it was interaction with surrounding culture groups that influenced their subsistence routine most. One view suggests the Southern Paiute may have been introduced to agriculture by either the Anasazi or the Lower Colorado Cultural Groups (Altschul and Fairley 1989). Although they did not make an abrupt transition from mobility and foraging to agriculture and sedentism, they began to experiment with this technology on a limited basis. After planting small plots of corn, beans, and pumpkins, the Southern Paiute continued on their procurement rounds. They returned only when these crops were ready for harvest (Kelly 1934; Euler 1966). The Southern Paiute capitalized on the array of wild food resources available in the various environmental zones they inhabited. Wild plant foods included grass seeds, yucca, pine nuts, agave, prickly pear, acorns, wild grapes, and roots. Mesquite beans were also an important part of their diet (Stewart 1945; Warren 1981). Protein came from bighorn sheep, tortoise, deer, rabbits, ground squirrels, mice, lizards, insects and bird eggs. They used a bow and arrow, and snares and nets to catch small game.

Chronologic markers for the Paiute in southern Nevada include Brown Ware pottery (Bettinger and Baumhoff 1982; Madsen 1975:83; Thomas and Bettinger 1976), Desert Side-notched projectile points (Fowler and Madsen 1986:181-182; Warren and Crabtree 1986:191-192) and distinctive basketry. Other notable artifacts types typically found at Southern Paiute sites include well-made triangular knives, unshaped manos and milling stones, incised stones, slate pendants, occasional pestles and mortars, and shell beads.

While some think the Southern Paiute way of life changed little from time of contact through the duration of the historic period, others believe that the Southern Paiute suffered a general cultural breakdown from a more complex society based on horticulture to one of hunting and gathering. It was at this time that they were forced to occupy the few remaining springs not occupied by Euro-American settlers. Before contact, the Southern Paiute lived in small family units, the unmarried men lived by themselves (Inter-Tribal Council of Nevada 1976). Each of these groups lived by a spring or other water source they considered their own and continued to live in wickiups and rockshelters well into the 20th century. The first record of contact between the Spanish and the Southern Paiute comes from Velez de Escalante, who reported that the women were collecting seeds while the men were away hunting (Euler 1966). For additional information regarding the Southern Paiute the reader is referred to the *Handbook of North American Indians*, Vol. 11, Great Basin (D'Azevedo, ed., 1986), Euler, (1964, 1966, 1972); Euler and Fowler (1973); Fowler and Fowler (1981). For discussion of questions

relating to the arrival of the Paiute in the Great Basin, see Madsen and Rhode (1994). For the perspective of the Southern Paiute on the depth of their presence in the region, origin myths must be consulted (See for example Kelly 1934; unpublished field notes 1932-1933; Knack, unpublished field notes 1973-1982; Palmer 1933, 1946; Steward 1936, 1938; and Intertribal Council of Nevada publication on Southern Paiute Culture 1976).

The Historic Period in Southern Nevada

The Historic Period begins with the arrival of Euro-Americans to the region. For the purposes of the Historic era in southern Nevada, this will be defined as circa A.D. 1846 through 1955. Unlike the prehistoric discussion above, chronologic issues of the Historic Period are less crucial, as specific dates for many events are well documented. HRC has divided the regional Historic Period into six historic themes for discussion. Beginning with early explorers, trails and automobile roads, other historic themes to be discussed include: settlement, agriculture and ranching, railroads, ranching and homesteading, and mining.

Introduction

The most significant influx of Euro-American populations into southern Nevada began in the 1840s. In their headlong rush to the Pacific Coast, early California- and Oregon-bound Euro-American emigrants passed over much of the inter-mountain West. Lands situated between the Wasatch Range of Utah and the Sierra Nevada Range of California, including Nevada, were envisioned as vast expanses of hostile desert to be avoided or traversed as quickly as possible. As the California goldfields became exhausted, miners and entrepreneurs turned back towards those wilderness landscapes that had been initially overlooked. At the same time, the Church of Jesus Christ of Latter-day Saints (Mormons) sought to establish isolated, self-sufficient colonies in the region. Slowly, Nevada began to fill in with mining camps, railroad towns, farms and ranches.

Early Explorers, Trails, and Automobile Roads

The Old Spanish Trail

Before the United States of America formally took control of all lands between the east and west coasts, other governments had controlling interests within the North American continent. Specifically, British, Spanish and French authorities were trying to maintain a presence in America and control the distribution of natural resources (Crawford, *et al*. 1999). In an attempt to solidify their position in the American Southwest, Spain wanted to link its colonies of California and New Mexico; as a result they attempted to find a route that would go from Santa Fe, New Mexico to Monterey, California. Early efforts to find such a path included trail blazing mission priests (*i.e*. Fathers Dominguez, Escalante and Garces) who found routes through portions of the desert but never quite made it to Monterey. Dominguez and Escalante ended up looping back to Santa Fe by way of Colorado and Utah, while Garces made his way from Sonora to Los Angeles (Rowe and McBride 2002; Warren 1974).

By 1821 Mexico won its independence from Spain; however, the desire to establish a trade route between Santa Fe and California carried over to the new

government. Thus in 1829, New Mexican Gobernador Chavez dispatched Antonio Armijo to complete the trail blazing work started by the Spanish priests in 1776. With a group of 60 men, Armijo began his journey from Abiquiu, New Mexico on November 8, 1829 and arrived in the mission of San Gabriel, California on February 3, 1831. The route established by Armijo was an important one because it was the first commercial route through the Southwest, used not only by legitimate commercial interests but also by emigrants, horse thieves, slave traders, and mail carriers. However, major trading activities dwindled after the Treaty of Guadalupe Hidalgo was signed in 1848 (Warren 1974), ceding large portions of Mexican land to the United States (Crawford, *et al*. 1999).

Fremont's Expedition

A strong desire to explore the Southwest did not end with Armijo's journey, instead American explorer Captain John C. Fremont launched two expeditions into the western frontier, one in 1843-1844 that took him through the central portion of Nevada and one in 1844 that took him through southern Nevada (Jackson and Spence 1970). Sponsored by the U.S. Topographic Engineers, Fremont's explorations were an important step in understanding the makeup of the Southwestern landscape, as Fremont was more interested in science than trade routes. During his journeys, Fremont was the first to realize that the land between the Sierra Nevada and Wasatch Mountains was a drainage; as such the name "Great Basin" was born (Warren 1974). He also was the first to scientifically record plant names and land formations. Fremont's trips fascinated a national audience with tens of thousands of his reports and maps being published by the federal government (Jackson and Spence 1970).

Fremont's 1844 expedition developed a trail between Utah and California by way of southern Nevada. Before his travels Fremont collected a large volume of information from guides and travelers. From that information, Captain Fremont had a fairly clear picture of the landscape he would be traversing, including the inhospitable desert he had to cross. Part of the trail established in 1844 covered ground and overlapped routes others created previously; in fact, Fremont thought he was close to, if not on, part of the trail established by Spanish/Mexican interests before him. Thus it was Fremont who coined the phrase the "Old Spanish Trail" and established its boundaries for posterity (Warren 1974).

Fremont's route was 1,200 miles long, began in Santa Fe and:

> ...proceeded northwest into Utah, traversed the Green River near the present day town of Moab, turned east briefly and then south, following the eastern slope of the Wasatch Range. The trail paralleled the Sevier River in Central Utah until it reached to present day town of Cedar City and Littlefield, Arizona. It then followed the Virgin River near Mesquite, Nevada (near the Arizona border). The route continued to the springs of the Muddy River from the Virgin River corridor, near the town of Moapa. The route then stretched 50 miles across a vast, waterless expanse between the springs at the Muddy to Las Vegas...and from Las Vegas...over Potosi Pass in the Spring Mountains, through Pahrump Valley, and into California over Emigrant Pass and Bitter Springs. The trail continued on

> to the mission at San Bernardino, over Cajon Pass and into the former pueblo of Los Angeles. (McBride and Rolf 2001)

After Fremont's publication detailing his 1844 route, the trail eventually became quite popular with folks traveling the western states, particularly after the discovery of gold in California. News of finding gold at Sutter's Mill was rushed to Washington, D.C. by courier Kit Carson using the Spanish Trail through southern Nevada. Carson and his companion reached the east coast too late in the season to immediately turn back and risk crossing the cold Rocky and Sierra Nevada mountains that year; however, early the next season, thousands of people flocked to California intent on finding their own fortune. The phenomenon known as the "49ers-emigrants" to California occurred the first year after news of the find reached "the States"(Brewerton 1930).

The Mormon Road

Mormons first began using the Old Spanish Trail in 1848 when their leader, Brigham Young, ordered a party to California to purchase seeds. The Mormon expedition traveled to Los Angeles via Las Vegas on a route selected by Miles Goodyear, a fur trapper and horse trader from Ogden, Utah. Goodyear knew the route thanks to earlier commercial interests. In 1846, using directions he obtained from his old friends and neighbors, mountain men Bill Williams and Joe Walker, Goodyear packed hides to California over the Spanish Trail and sold them to Fremont for army clothing. Using his knowledge of the trail, Goodyear was able to show the Mormons a safe route to California; thus the Mormon party made it to California, acquired the needed supplies, and returned home (Warren 1974). Picking up the Old Spanish Trail near the Sevier River in Utah, Mormon missionaries realized the route would be invaluable in getting from Salt Lake City to southern California (NPS 2001). After the first journey across the trail, the route, with minor modifications to allow wagon travel, became so popular with Mormons carrying supplies between Utah and California and establishing missions along the way that the "Old Spanish Trail" was re-dubbed the "Mormon Road" (Warren 1974; NPS 2001). In fact, travel between Salt Lake City and Los Angeles became so heavy that eventually the railroad came to Las Vegas, an in-between point on the route.

The Arrowhead Trail and Early Automobile Roads

In the early days of southern Nevada, transportation to other cities was at best difficult due to the paucity of roads in the state, while roads that did exist were usually circuitous and in poor condition. While railroads were being built, trains did not go everywhere Nevadans wanted to travel. The situation was improved when, in1905, a group of enterprising individuals met specifically to discuss ways of using automobiles to get supplies to mining districts in the state. If the plan to use automobiles was to be successful, roadways needed vast improvements as traveling from one point to another took an absurdly long time. For instance, despite the fact that Beatty and Las Vegas are separated by a mere 110 miles, in 1905 the drive took 20 hours each way. By 1913, Las Vegas city leaders had a meeting in Salt Lake City, Utah with other western state leaders to rally folks to the idea of creating an "all weather road" that would run from Salt Lake to Los Angeles via Las Vegas; thus in 1914 the Arrowhead Trail was created (Lyman 1999).

Construction of the road was enthusiastically embraced by locals, being lobbied for by many leaders and having volunteers do a large portion of the actual construction. Nonetheless, news headlines were made by Californian, Charles H. Bigelow, who drove the length of the trail in his Twin-Six Packard nicknamed "Catus Kate," coining the name "Arrowhead Trail" in the process (James 2003; Lyman 1999). However, as traffic increased and cars improved, the need to upgrade the Arrowhead Trail became apparent. By 1923 Assemblyman A.S. Henderson introduced a bill authorizing Las Vegas to issue a $50,000 bond to pave a portion of the trail, a move approved of by the *Las Vegas Age* newspaper which stated that, "Las Vegas is more often criticized because of her poor streets than on any other count" (*Las Vegas Age [LVA] 2/10/1923: p1*). As a result, the first large scale effort to improve the Arrowhead Trail and make it into the Arrowhead Trail Highway came from Clark County (*LVA 12/15/1923: p1*). The County's plans for road improvements were ambitious and included paving existing portions of the Arrowhead Trail from Indian Springs to Las Vegas and expanding the road by adding a segment from Mormon Mesa to the Arizona state line (*LVA 2/10/1923: p4*).

Despite the favorable community response to the paving project and the desire to see construction completed quickly, there were last minute disagreements over the exact route the new highway should take through the Moapa Valley. In the words of the *Las Vegas Age*, "After having for a time that satisfied feeling which comes of having proper[l]y settled a perplexing question, we are again being confronted with new ideas and new suggestions for the location of the Arrowhead Trail Highway where it crosses the Moapa Valley" (*LVA 2/17/1923: p1*). Citizens on one side argued that the road should go through Overton and reach Las Vegas by the easiest, from an engineering standpoint, route possible. Engineers from the Federal government had assessed the land and had outlined what they thought to be the best path. As the Federal government was financing 80% of the construction, many believed the engineers should have the final say. Others disagreed, feeling that Nevada should take full advantage of the government's generosity and route the new highway through the Valley of Fire. Arguments for the Valley of Fire path included the natural beauty of the park; the belief that Valley of Fire was about to become a National park thus the federal government would want a road built there anyway; and the belief that soon a dam would be built and the ensuing water would flood the location engineers had chosen for the road (*LVA 2/17/1923: p1*).

After much discussion the Board of County Commissioners voted to have the highway go through the Moapa Valley by way of the east side of the California Wash, crossing the Muddy River below the junction of Meadow Valley Wash and continue around the west slope of Mormon Mesa. As a result, the road missed the main population center of Overton, a point of contention to many, but nonetheless the route given final approval by the state of Nevada (*LVA 3/3/1923: p1; LVA 4/14/1923: p1*).

Once the route was approved and construction was underway, enthusiasm began to build in other states. The governor of Utah visited the project area and decided to tour the new road in December 1923; after getting through the badly rutted and washed out portions of the old unpaved section of the Arrowhead Trail linking St. George, Utah to Crystal, Nevada, the governor's driver became a little too excited about the newly paved road through Moapa:

> ...their driver found the new speed road of Clark County from Crystal to Las Vegas so refreshing he nearly accomplished the impossible, namely, "Can you drive a Lincoln car into the concrete culvert at Apex Crossing and drive a number of Fords out?" The new road is so good he stepped on the gas, but he also stepped on the brake and she came up suddenly, just in time to save the party from a terrible mishap (*LVA 12/8/1923: p1*).

Utah leaders were not the only ones to see the potential of the Arrowhead Highway. Representatives from Utah, California and Colorado decided they too would like to link paved roadways to Nevada's highway because they knew it would increase tourist volumes for everyone. Western state leaders became advocates for the "all-the-year route" which would be accessible even during the harsh winters of the mountainous regions (*LVA 12/15/1923*).

Finally on August 21, 1925, the Mormon Mesa section of the Arrowhead Highway was completed (*LVA 8/22/1925: p1*). Other states completed and linked their roads together, creating a paved road that went from Denver to Los Angeles. The official name of the Nevada portion of the Arrowhead Highway was State Route 6, later replaced by US 91/US 93. Work, however, did not stop thanks to a realignment project that stretched from Byron to Glendale. The realignment took from 1925 to 1955 but by then Interstate 15 was being built. US91/ US93 largely fell out of use with the advent of I-15, an interstate that partially covered the old road (Knight & Leavitt 1993).

Settlement

Mormons of the Muddy Mission

Mormon settlement of the Virgin Valley and the Muddy River area comprised the earliest Euro-American colonies in the region. Soon after the Mormons settled in Salt Lake City in 1847, pioneers and scouts ventured westward to explore the region (Hunter 1939). A northern route and a southern route to the Pacific Ocean were scouted. The southern route was ascertained to be preferable as Native Americans in the south were perceived to be less hostile than those along the northern route (Hunter 1939). In addition, due to the milder climate, the southern route was never blocked by snow being passable at all times of the year. A good wagon road, established along the southern route, remained a major transportation corridor to Los Angeles for freighters and emigrants for the next 20 years. Brigham Young planned a continuous string of Mormon settlements along the 700 mile stretch from Salt Lake to San Bernardino to provide supply stations and way stops for the Church members (Hunter 1939). By 1857 the Mormons had established 30 communities along the southern road.

In 1855, Young began to explore the possibility of utilizing the Colorado river as a transportation corridor in order to reduce the overland mileage and cut transportation costs of bringing immigrants into the area (Hunter 1939). Toward this end he sent a contingent of five men to explore the river to see if it was navigable by boat. In June of that year, the small party traveled to Las Vegas with the Bringhurst party which was to settle at the Las Vegas spring. From Las Vegas, the company headed for the Colorado River. After five days, the party turned back due to the summer heat which made further exploration unendurable. They returned without answering Young's questions about the

navigability of the River and two years elapsed without further exploration by the Mormons (Hunter 1939).

In 1858, Young's attention was again drawn to the Colorado River. Lieutenant Joseph Ives had been sent by the US Department of War to explore the possibility of using the river for transportation of troops and munitions into the Great Basin (Hunter 1939). In a small steamship, the Ives party entered the mouth of the Colorado in the Gulf of California. Ives managed to navigate 275 miles upriver from Fort Yuma, and reported the mouth of Black Canyon was the practical head of navigation (Ives page 87 in Hunter 1939). Ives further concluded:

> A reconnaissance, made from the foot of the Black Canyon towards the nearest point on the emigrant road to Utah, showed that a wagon-road might be opened between the trail and the head of navigation. For sixteen miles, while passing through the gravel hills and ravines that cover the eastern slope of the intervening range of mountains, the country is somewhat rough, and a little work would be required to make a good roadway, but, after reaching the summit, there would be no further difficulty. The distance from the river to the emigrant road is about 40 miles. (Ives 1859:42)

This expedition was brought to the attention of Brigham Young by Jacob Hamblin. In the aftermath of the 'Utah War' in which the United States Government sent military forces to enforce Federal authority over the Mormons (Blair *et al.* 1996), Young was highly suspicious of the motives of the U.S. Government. Thales Haskell was sent to gather information on the Ives expedition (McClellan *et al.* 1980; McClintock 1921). Haskell reported that the steamer company was hostile to the Mormons and the ultimate goal of the expedition was to learn if the route could be used by a military force to enter southern Utah and subjugate the Mormons (McClintock 1921). Fearing that the Ives expedition posed a threat, Young quickly sent another contingent of 20 men, headed by George Smith, to explore the Colorado River ostensibly for suitable locations for settlements. The group followed the Santa Clara and Virgin Rivers to the Colorado River. Smith's report that there was no area suitable for settlement temporarily postponed further plans to develop shipping on the Colorado until the fall of 1864 (Hunter 1939).

In 1864, Anson Call was dispatched to the Colorado River to establish a boat landing and colony. Young hoped that the Mormons would be able to enter Deseret by sailing up the river from the Gulf of California to the mouth of Black Canyon, described by Ives as marking the end of the navigable part of the river. Call established a church warehouse and landing on the north bank of the river approximately 15 miles up river from the present location of Hoover Dam (Hunter 1939, Sterner and Ezzo 1996:94). Call, instructed to found a community near the landing, chose a site at the lower end of the Muddy River. The Muddy Mission was founded in the fall of 1864 to provide support for Call's Landing (or Callville), and was part of Brigham Young's plan to establish a continuous string of Mormon settlements along the emigrant route (Hunter 1939). The Moapa Valley was a strategic location from which the Mormons could regulate extractive industries and provide a 'jumping off point' for exploitation and

exploration of the little known western edge of 'Deseret' (Blair *et al.* 1996). Young wanted to expand his empire westward in an attempt to discourage Gentile settlement of the area he envisioned as a 'State of Deseret' which included most of the Great Basin and extended to the coast of southern California. The mission was also to provide support for navigation of the Colorado River and be part of Young's planned cotton growing empire (Gratton 1998).

In January of 1865 the first colonists arrived, led by Thomas Smith, and within days the colony of St. Thomas was home to 45 families. Between 1865 and 1870, seven settlements were established along the Lower Virgin and the Muddy Rivers: Beaver Dams, St. Thomas, Overton, St. Joseph, West Point, Mill Point, and Simonsville. (McClintock 1921). St. Joseph (now Logandale, Nevada) was established in 1866 (12 miles upstream from St. Thomas) and the next year had 151 acres under cultivation. The primary crop was cotton but subsistence crops such as wheat, corn, orchards and vinyards were planted (Ezzo 1996). Simonsville was established in December of 1865 south of St. Joseph. By the spring of 1866 a grist mill used to grind wheat, corn and salt had been constructed at Simonsville (Fleming 1967). Steamers made regular runs from the mouth of the Colorado to Callville hauling freight bound for the Mormon settlements until at least December of 1866. The landing at Callville ceased to exist by 1869 because navigation of the river was not possible during periods of low flow. In addition, the combination of the cost of building a road from Callville to St. George, and news of the transcontinental railroad made the landing obsolete (Ezzo 1996).

West Point was the only settlement to be established in the upper part of the Muddy River Valley. In 1867, an abortive attempt at settling the upper valley was mounted by immigrants from the Beaver Dams area to the north. A town site was selected in the upper valley and 15 families moved from the fort. Later that December, it was determined that the settlers were susceptible to Indian attack as the Native Americans already living and farming in that part of the valley, were openly hostile about the new settlement. The small colony was ordered by Brigham Young to return to the fort at New St. Joseph. All but five families complied and either relocated at New St. Joseph or to went to their former homes in the north (White 1990).

In the fall of 1868 a second town site, also to be known as West Point, was selected and surveyed in the upper valley and by June 1869, 20 families resided there with wheat and cotton under cultivation. The 1870 census enumerated 138 people at West Point (US Census 1870). The colony was short lived, lasting approximately two years as a flood occurring in 1870 destroyed many of the crops, forcing some settlers to abandon the site. There were, however, a few people still residing at West Point when the Muddy Mission was finally dissolved in 1871 (White 1990).

Missionaries camping at the New St. Joseph Fort were instructed to build a city on the sandy bench above the river and adjacent to the fort (Its construction would be the first planned city in southern Nevada). After considerable hesitation, they began to dig seven miles of canal to provide water to St. Joseph City. Terrible hardship was endured by all as seasonal winds destroyed each attempt to tame the shifting sands and provide water to the city plots. Temperatures were unrelenting and when there was water in the ditch for use, it caused great illness and sores to occur on all residents within the community. Hauling water from the Muddy River most of the time, residents built their

small houses on the bench as they continued to farm the bottom lands (Blair and White 1999).

By 1870, the Muddy Mission as a whole was approaching destitution. In the fall of that year, Brigham Young made a long anticipated appearance to the distressed mission (Blair *et al.* 1996, 1997); Blair (2004). Upon observing the impossible living conditions, Young released the settlers from their mission and in December 1870, the people of the Muddy decided to abandon the location. The only dissenting voice was that of Daniel Bonelli who remained in the area with his family. In 1871 over 600 colonists returned to Utah leaving behind 150 homes, irrigation canals and farms (Fleming 1967; McClintock 1921). For a more detailed account of Mormon expansion and the Muddy Mission see Blair *et al* (1996, 1997); Blair (2004); Gratton (1982); McCarty (1981); and White (1990).

European-American Resettlement

The Virgin and Muddy River valleys were abandoned by Euro-American settlers for less than a decade. Shortly after the mission was vacated, non-Church members moved into the area to lay claim to the abandoned farms and homes and late in the 1870s, a number of the original settlers returned to the area. Without the constraints imposed by the Church leadership, the area had become much less isolated in a few intervening years; therefore, the resettlement was more successful than the first. Mining boom camps at Eldorado Canyon and Pioche provided nearby markets for farmers on the Muddy. While the Union Pacific railroad did not reach Moapa until 1904, in 1880 the Utah Central Railroad from Salt Lake had reached Milford, Utah, just 70 miles from the Muddy (Myrick 1992). In 1880, the widowed Elizabeth Whitmore moved into the area with her young son Brigham. She purchased what is now the Overton townsite for $4,000. The same year, Ute Warren Perkins and his family moved to the area from St. George, Utah. Perkins was hired by Elizabeth Whitmore to clear her ranch, construct irrigation ditches and handle livestock. The extensive Perkins family went on to become one of the most influential families in the area (Hopins and Evans 2000).

Agriculture and Open Range Ranching in the Moapa Valley

For the first 35 years after the return of settlers, the valley remained dependant on regional markets. The opening of the San Pedro, Los Angeles and Salt Lake railroad to Moapa in 1904 created more distant distribution for Moapa Valley farms producing a booming agriculture industry (*LVA 6/17/1905: p1*). At the turn of the 20th century orchards, vineyards and a variety of row crops were cultivated in the valley (Olson 1984). More than 2,000 head of cattle were being raised and approximately 3,500 acres were under cultivation in the Muddy River and Virgin River Valleys by1905 (Sterner and Ezzo 1996). In April 1905, the Moapa Improvement Company purchased a 600 acre ranch at St. Thomas and was planning to grow early vegetables, melons and grapes for the northern market *(LVA 4/7/1905: p1*). By August, the Company was shipping between 75 and 100 crates of cantaloupes per day. By the end of the season they had cleared $2,000 on cantaloupes alone. Other produce shipped by the company to Salt Lake included watermelons, onions and tomatoes. It was reported that of the 15,000 acres of good agricultural land in the Muddy and Virgin Valleys, only a quarter was under cultivation (*LVA 8/5/1905: p1; LVA 8/19/1905: p1*). A wide variety of vegetables and fruits grew

very well in the valley which was capable of producing five crops of alfalfa during the summer in addition to wheat and a good late season crop of corn (*LVA 2/19/1906: p1*).

Despite the valley's richness, Moapa's agricultural economy was dependent on the railroad which was not always reliable. Storms repeatedly washed away tracks preventing produce from reaching markets. These events were extremely costly to area farmers. The *Age* urged the Railroad Commission to require the railroad to build their tracks above high water and 'maintain a decent service' (*LVA 3/16/1907: p1*). The reliance on the railroad and the general isolation of the area was demonstrated in 1907 when a storm demolished the rails and made the roads impassable. The crisis was reported in the *Los Angeles Times [LAT]*:

> Famine confronts the inhabitants of the Muddy River Valley and adjacent mining camps...as a result of long continued wash-outs on the Salt Lake Railroad. Moapa...has been gutted of all foodstuffs and grain. Warehouses are empty and the railroad is unable to rush long overdue cars of merchandise to relieve a situation that has become serious. Down the valley of the Muddy the towns of Overton, St. Joe and St. Thomas are practically isolated, cut from the world. Three hundred people have been compelled to go on rations, and all stock has been turned into the hills. Inhabitants at those points are unable to reach Moapa or haul supplies between the respective towns. Bridges have been swept away and all roads are impassable. Families are pooling their larders and restricting consumption to a bare sustenance in order to tide over the famine.... Thousands of acres of land have been flooded that was never flooded before. The damage to crops will exceed anything in any memory of this locality.... Acres of garden truck are rotting because the farmers are unable to convey their crops to the railroad (*LAT 3/31/1907: p1*).

Although the crisis was a result of natural forces, the county was held in part responsible for the consequences of the flood. After the advent of the railroad, freight teams that had previously hauled produce and supplies in and out of the valley were abandoned. Roads once utilized by the freighters were no longer maintained (*LAT 3/31/1907: p1*). Almost impassable before the flood, the roads were no longer useful and the railroad had become the sole means of transportation in the Valley. Another disastrous flood on January 1, 1910, destroyed railroad transportation for nearly six months. The possibility of not being able to ship their crops discouraged farmers from planting that season (*LVA 7/23/1910: p1*).

Another obstacle to farming in the Moapa Valley was the difficulty of transporting produce from the lower parts of the valley to the rail stop at Moapa. Approximately 80 percent of the arable land in the valley lay to the southeast of Logan (*LVA 4/29/1911: p1*) and much of the produce had to be hauled by wagon to the Moapa rail head over treacherous roads. In 1911, it was predicted that the shipment of cantaloupes from the lower part of the valley would exceed 200 cars, while the upper Valley would produce only 150 (*LVA 4/29/1911: p1*). The citizens of the valley lobbied for the construction of a branch railroad to connect Logan, and preferably to as far as St.

Thomas, 26 miles from Moapa (*LVA 3/25/1911: p8*). After many missed deadlines, the branch was completed in 1912 (see St. Thomas Branch discussion below).

Industries expanded in the Moapa Valley to support agricultural successes such as the replacement of a small canning plant operating in Overton. The new plant, built in 1917, had the capacity to process 30 to 40 tons of tomatoes per day (*LVA 6/23/1917: p1*). In 1929 Harry Anderson opened a creamery on Fremont Street in Las Vegas. At first, the milk was purchased from Moapa Valley dairies and shipped it in refrigerated trucks to Las Vegas (*LVA 7/16/1929: p1*). Later, Anderson purchased an alfalfa ranch near Mesquite and converted it into a dairy farm. Eventually Anderson's Dairy supplied milk to Boulder City for the workers constructing Hoover Dam and their families (*Las Vegas Evening Review Journal [LVERJ] 11/24/1931: p3*).

Regional subsistence farming took on added importance during the Great Depression (1929 to 1939) as displaced farmers, workers, and their families migrated west from the Dust Bowl in search of arable land to homestead. The Boulder Canyon Act of 1929 set in motion the construction of Hoover Dam which promised job opportunities for many of the nation's unemployed. These factors contributed to population growth in southern Nevada while the nation was sinking into depression (Jones and Cahlan 1975; Dunar and McBride 1993). With the construction of the dam just beginning, farmers in the Moapa and Virgin Valleys were encouraged to relocate before the waters inundated their land. The federal government was appraising land to be flooded and was looking at farmland in the Pahranagat Valley for relocation of the Moapa farms. Landowners were given cash payments by the government but were given the opportunity to lease the land back until inundation of their lands which was not projected to occur for over five years (*LAT 4/26/1931: pJ4*)

From the 1950's through the 1970's, large numbers of migrant workers came to work in the Moapa Valley. Due to a labor shortage in the United States during World War II, the government entered into an agreement with the government of Mexico known as the 'Bracero Program' (Miranda 1997). Under this agreement labor for farms and railroads in the United States was provided by Mexican nationals. The first major wave of Mexican migrant laborers into the Moapa Valley occurred in the mid 1950s and by the end of that decade the seasonal migrant worker population was between 1,500 and 2,000. During this same period the permanent population of the area was approximately 500 people (Miranda 1997).

In early 1959, a crisis loomed in the valley when the cotton crop in Arizona was destroyed by weevil. The migrant workers who normally worked the Arizona cotton fields moved on to Moapa before there was work available. In normal years, Moapa provided employment and housing for between 300 to 350 migrant workers, however the approximately 1,000 jobless workers made their way to Moapa and, with their families, were stranded, camping near Logandale (*LAT 2/26/1959: p2*). News of the plight of the workers and fears of a typhoid epidemic prompted the Nevada Governor to declare a state of emergency for the camp. Tents were flown in from Carson City and food and clothing were provided by St. Viators Catholic Church. Along with private donations, more than enough supplies were available for the needs of the workers. Excesses were then routed to the Indian reservation at Moapa (*LA Times 2/27/1959: p2*).

The sympathetic tone of the *Los Angeles Times* reporting of this crisis, and the outpouring of generosity, contrasts markedly with the report of the incident in the New York Times:

> The migrant labor problem that has plagued the tolerant Mormon farmers of the Moapa Valley for the last several years has become the subject of study by Federal and state agencies. Harvesting of the onion crop has begun. This is the first of four annual crops raised in the agricultural valley at the junction of the Muddy and Virgin Rivers, fifty miles north of Las Vegas. There is work for those who wish it. One of the larger operators, who provides well built air cooled furnished barracks for his workers, asked for 100 workers recently to harvest onions. About 40 answered the call. Some worked only a few hours, collected their wages and headed for the nearest bar. Onion pulling is on a piece-work basis. One farmer said he paid one man $8.10 for two hours work.
>
> Annually, weeks before the crops are ready, hundreds of Mexican workers arrive in the valley, many in late model autos or trucks, despite warnings that there is no work yet available. The valley of fewer than 400 residences then finds itself besieged by demands for food and lodging. The generous religious folk have done what they could to alleviate the situation, donating considerable quantities of food to the unwanted migrants. This advance guard, for the most part, is composed of a horde that makes the rounds of Far Western harvest fields ahead of the contracted labor groups demanding handouts - but apparently having money to buy wine and gasoline.
>
> A story was spread this year of a threatened typhus epidemic and starvation. None of this proved to be true. The typhus story resulted when one customer of a private water company, which serves a small number of the residences through meter, refused to allow the migrants to use - and waste - his high priced water. Actually, the majority of the citizens use water from natural sources, and no epidemics of any sort have resulted (*New York Times 3/1/1959*).

After 1970, the importance of farming declined significantly in the Moapa Valley. As the Valley's agricultural and ranching pursuits began to dwindle, recreational and tourist developments tied to Lake Mead have expanded.

The State Experiment Farm

In 1904, the 22nd session of the Nevada legislature passed an act establishing an experiment farm in the southeastern part of the state contingent upon suitable land to be provided by the people of Lincoln County. Ten thousand dollars was appropriated for its maintenance for the years 1905 and 1906 (*LVA 8/13/1910: p1*). The purpose of the farm was to expand and diffuse knowledge about agriculture and horticulture in a semi-tropical

climate. The Moapa Valley was selected as the location for the farm. As reported in the *Los Angeles Times*:

> The products of the valley, fostered by the climate and rich soil, are truly wonderful, as demonstrated by the present tillers of the earth. Into what state of perfection they may be brought after careful experimentation has shown just what the soil is best adapted to raising, and in what manner the crops shall be cared for and irrigated, can only be conjectured (*LAT 12/24/1905*).

In addition to the agricultural richness of the area, Moapa was deemed a desirable location because the proposed experimental farm received widespread support from the local residents and a number of properties were offered (*LAT 12/24/1905*). Governor Sparks appointed a special commission to oversee the development and operation of the farm. This commission consisted of Col. H. B. Maxon, Prof. Gordon H. True of Reno, and Phil. S. Triplett of Wells. The commission chose eighty acres near Logan (now Logandale) which was donated to the state by Charles Cobb, H. B. Mills, and H. H. Church (*LVA 8/13/1910: p1*; *LVA 1/6/1906: p1*). The condition of the land at the time was described in the *Las Vegas Age* as "…mostly covered with mesquite and screw bushes and a thick tough sod called 'siccatone'". This sod is so tough that one can hardly cut through the top with an axe" (*LVA 1/6/1906: p1*). In November, 1905, the farm was turned over to the Nevada Agricultural Experiment Station.

The first two years were occupied with preliminary preparations including clearing and leveling land, and ditch construction; little in the way of experimentation was accomplished (*LVA 8/13/1910: p1*). In 1906, the only 'experiment' being undertaken on the farm was a dubious venture; "Foreman Gooding is experimenting on the length of time it takes to starve a sidewinder to death, having had one in a stove boiler over a month" (*LVA 5/5/1906: p6*). The outcome of this experiment is unknown. Early in 1906, the farm had been cleared and leveled (*LVA 1/27/1906: p6; LVA 2/10/1906: p5*) and Sam Wells had been awarded the contract for fencing the property (*LVA 2/19/1906: p1*)

The 23rd session of the legislature appropriated another ten thousand dollars for 1907 and 1908. Between $4,000 and $5,000 went for the construction of a residence and the purchase of a team. Ten more acres of land were leveled, two orchards and a vineyard planted. Several permanent experiments were begun (*LVA 8/13/1910: p1*). Despite these accomplishments, there was apparently some difficulty disbursing the funds to the farm in a timely manner. In February of 1908, H. H. Church published the following letter:

> Replying to yours of the 20th last, in regard to Lincoln County Experiment Farm. I do not know that any of the Farm's money is tied up in a suspended bank, or in what bank the money is. However, we have been obliged to suspend all building operations, and expense bills including October, are yet unpaid. Our men working on the farm have not had pay since that date. The only reason given us is 'money stringency'.

> We have no blooded stock on the farm yet, except a span of three quarters Norman work horses, more attention is given to agriculture and horticulture than to animal husbandry.
>
> We are arranging to put out five acres of orchard and vineyard this season which will include one half acre of raisin grapes, fifteen varieties of table grapes, one half acre each of Bartlett pears, Early Crawford peaches and Calimyrna figs, besides several varieties each of peaches, pears, plums, apricots, apples, pomegranates, oranges, walnuts, almonds, pecans, shade and ornamental trees for experimental purposes.
>
> We are also testing at present some thing over 50 varieties of alfalfa, including a dry land alfalfa introduced from the arid portions of western Asia. We also have one fourth acre of lettuce nearly ready for the market and one fourth acre of radishes, and one half acre of tomatoes under way, and about 35 acres of barley, oats, wheat and alfalfa for experimental and feeding purposes.
>
> Very Truly,
> H.H. Church, Sec'y Board of Control (*LVA 2/1/1908: p1*)

The legislature continued funding the Farm, appropriating $12,000 for 1909 and 1910. The residence was completed, more acreage was cleared and leveled and the planting of orchards while experiments with trees, vegetables, forage crops, green manures and cereals continued. As of August 1910, 60 acres of the farm were under cultivation.(*LVA 8/13/1910: p1*). In 1912, the Farm expanded from planting to husbandry with the purchase of 'blooded stock' which was expected to upgrade the dairy cattle of the valley. The purchase included one mature cow, costing $300 and four yearling heifers for $150 each (*LVA 5/18/1912: p1*). By 1921 the State Experiment Farm had become county property. The county was making arrangements to lease the property for a term of two to three years, (*LVA 6/11/1921: p1*) however, in 1925 the property and all attachments, including 80 shares of Muddy Valley Irrigation stock, was sold at public auction (*LVA 7/18/1925: p6*).

Ranching

The historic period theme of ranching is physically manifest in the Logandale Trails project area in the form of previously documented corrals and range fences (White and Blair 2001; Winslow and Wedding 2004). However, the historical record of ranching in Logandale and the greater Moapa Valley is sparse. Ezzo's (1996) in-depth cultural context for the Moapa Valley includes a section titled Ranching and Farming. The discussion of *specific* ranching activity is limited to a statement acknowledging that "By the middle of the 1870s, ranchers had appropriated most of the land accessible to water using national land laws"; and that "In 1880, Lincoln County [portions now Clark County] listed 96 farms maintaining horses, cattle, dairy cows, and swine" (Ezzo 1996:117). The mention of "96 farms" maintaining livestock is the core of the problem within the historical record; range ranching was integrated with agricultural farming

practices. "Southern Nevada ranchers, like most frontier farmers, generally operated a combination livestock, grain and crop operation" (Weber 1995). This was a marked contrast to northern Nevada where livestock ranching involved dedicated enterprises, more closely resembling the large cattle operations of Texas.

In the 1860s, the average farm size in southern Nevada was approximately 617 acres encompassing sufficient range land for grazing livestock (Weber 1995). By 1870 the average farm size had declined to 201 acres as agricultural pursuit of crop raising began to displace larger livestock herds (Weber 1995). The valley's farmers made a living growing what their families required, plus a small surplus to sell to area miners for a meager profit. This marginally better than subsistence production approach included livestock as well as grain and crop harvests. Farming and ranching were both hindered by two factors: water and transportation. Although crop lands were networked by irrigation canals to the Muddy River, the Moapa Valley did not have the additional water resources to support large herds of livestock. Valley ranching growth was further restricted by the lack of a rail system until well after the turn of the Twentieth Century, limiting access to market outlets in southern Utah or southern California

In 1910, the United States Federal Census documented 17 households in the town of Logandale. Of the residents, only William Ganes listed his occupation as a range stockman. Nearby Overton tallied 57 households, again with a single ranch stockman - Bryant Whitmore. The 1920 Census catches a glimpse of a growth in livestock populations in the valley following the construction of the St. Thomas Branch of the Union Pacific Railroad which opened market access to Las Vegas. Of 16 households enumerated in Logandale, five men list the occupation of Livestock farmer: Samuel Mills, Hyram Mills, William Perkins, Mads Jorgensen, and a man named Whipple. Of the 70 households in Overton 10 include men with livestock-related occupations. Rexford Perkins lists an occupation of cowboy and cattleman, while Lionel Lewis and Bryant Whitmore are cattlemen for ranches. Ephriam Snyder has developed a dairy operation in the valley. Ute Perkins, Smauel Conger, Willard Jones, Joe Perkins, George Roseberry and Edwin Marshall are list there occupations as farmer with general livestock.

Olson (1986:33) suggests that drought and overgrazing by the 1930s curtailed ranching activity and gradually phased out ranging of cattle. The flux of livestock is again noted in the Census listings for 1930. Logandale doubles in size to 36 households but occupations show only one cattle stockman - Joseph Adams. Overton's population also increased; but of 84 households enumerated, only three cattle stockman (Frank Perkins, Ethen Swapp, and Joseph Perkins) appear among the Census listings. Although some of the cowboys and cattlemen found secondary employment during the Hollywood era of the valley's history, most farming and livestock families in the valley continued a trend towards smaller acreage and crop specialization efforts throughout the remainder of the Twentieth Century. Even after the demise of the State Experiment Farm, for most Moapa Valley operations "scientific farming" techniques, diversification, and experiments were the norm (Weber 1995).

Development of Irrigation

The richness of agricultural production in the Moapa Valley could not have been accomplished without irrigation**.** The importance of the westward Mormon expansion in

the development of dry-land irrigation cannot be overstated. Although irrigation of dry land for agriculture purposes has ancient roots in both the new and the old worlds, the first known instance of dry land irrigation by European Americans in the western United States was not until 1847 when; "Mormon colonists of Utah first diverted the waters of City Creek, near Salt Lake City, for the purpose of irrigation in the summer of 1847" (Hess 1907:17). The success of irrigation farming in the arid west is evidenced by the enormous success of many Mormon colonies in the face of extreme hardship and isolation. The Mormons entered Utah in the summer of 1847 and within 30 years they had established more than 300 settlements based on irrigation agriculture. Irrigation agriculture facilitated the "largest planned immigration to cross the North America in the Nineteenth Century" (Taylor and Arrington 1958).

The occupation of unfamiliar climates in the arid west led directly to innovation of new methods of making the land productive. In turn, this development eventually led to a new system of laws regulating irrigation practices.

> Of special significance, is an independent and scientific development of rights of user in inland waters, and, at the same time, and unconscious recognition of the fundamental principles of a social theory of property, in so far as property may be made to comprehend rights to the use of streams, lakes, submerged waters, and glacial snows for the purposes of agriculture and mining. In spite of more or less general recognition of the postulates of the common law of England, contemporary with early Anglo-Saxon sovereignty, the innovation was facilitated by virtue of the former prevalence of the civil law and the lapse of recognized precedent incident to the transfer of sovereignty from France, Spain, and Mexico (Hess 1907:17).

The typical Mormon agricultural pattern consisted of farm villages comprised of a townsite located in the center of 5,000 to 6,000 acres of farmland. Housing plots in town were distributed by the drawing of lots while farmland was allocated based on family size. The distribution of water was controlled by town authorities and a 'water master' was employed by the people. Water rights were allocated with the land and were inseparable from that land (Ganoe 1938). Community labor organized by the church was responsible for the development of irrigation in Utah until the 1890s when capitalistic development of irrigation began to take place (Walker 1899).

Irrigation agriculture was attempted by the earliest of the Muddy Mission settlers with mixed results. Irrigation techniques familiar to the Mormons were tailored for environmental conditions in the Great Basin and were not well suited for the area. Beginning in the fall of 1866, the residents of Sand Bench struggled to complete an irrigation ditch across miles of drift sand to Saint Joseph City. By the winter of 1869 the ditch was deemed a failure and the settlers had been moved off the bench, where they had been ordered to settle, relocated back onto the valley floor. Because conditions in the Virgin Valley made the construction of irrigation ditches difficult, towns were built near the river in the valley bottom, rather than on the benches above the floodplain (McCarty 1981).

By 1905, farmland in the Moapa Valley was watered by a complex system of private and community constructed irrigation ditches. Three ditches at St. Thomas totaling six miles, irrigated about 500 acres of land. Six ditches in Overton, with eleven aggregate miles in length, watered 776 acres. Five ditches consisting of five miles of ditch, irrigated 421 acres in Logan (*LVA 10/7/1905: p1*). In accordance with the Mormon model, shares of water were typically attached to the land (*LVA 2/19/1906: p1*). The Muddy Valley Irrigation Board controlled and maintained the ditch system (*LVA 12/10/1910: p8*). In 1908, a Mr. Angel was the water master and the water company was expanding and improving on the ditch system (*LVA 3/21/1908: p6*).

Some water rights were also managed by the Nevada Land and Livestock Company. In 1911 that company had subdivided 1,000 acres of land into 10 acre plots to be sold for $100 per acre. Five shares of primary water rights and 10 of secondary were attached to each plot. The water rights had been secured by the company from the State Engineer (*LVA 9/30/1911: p1*). In 1913, the Nevada Land and Livestock Company assigned all its water rights to the Muddy Valley Irrigation Company which then became the sole distributor of water from the Moapa River at Overton and all points below (*LVA 7/13/1913: p1*).

Mining

Mining in the Virgin and Moapa Valleys area included both metallic and nonmetallic minerals. The extraction of, and exploration for, precious metals such as gold, silver and copper, attracted prospectors to nearby mining districts in the early part of the 20th Century. The lure of riches led to a cycle of small booms that were fueled by 'gold fever' and attracted waves of prospectors. However, it was the nonmetallic minerals (industrial minerals) that played a substantive role in the economic development of the region (Sterner and Ezzo 1996).

Non Metallic Resources

Salt

Salt mining has been an important enterprise in the area since well before the appearance of European-Americans. The natural salt deposits of Salt Mountain on the west side of the Virgin River between St. Thomas and Bonelli's Ferry, were mined by the Native American groups that inhabited the area prehistorically; and by the Mormons who settled in the mid 19th century (Sterner and Ezzo 1996). Evidence that the prehistoric inhabitants of the area were regularly mining the salt was found at the Salt Cove Salt Mine as well as at Pueblo Grande de Nevada. Throughout the 1920s, archaeologist Mark Raymond Harrington recorded a series of salt caves in the vicinity of Salt Cove Salt Mine that provided extensive evidence of aboriginal exploitation. Many of the salt caves recorded by Harrington are now submerged under the waters of Lake Mead (Seymour and Simpson 1982).

This deposit was also exploited by the Mormon colonists who occupied the area in the latter half of the 19th century. Diaries reveal that the settlers traded salt to mining camps in the Pahranagat Valley (Ezzo 1996). It is also suggested that salt was traded by the Indians to the settlers. *The Los Angeles Times* stated:

> In the old days Salt Mountain was the principal saline supply point of Southern Utah and Nevada, and the article was conveyed to the settlements for a long time by the Indians, who carried the crude deposit in sacks upon their backs to the whites, to whom they traded it for such articles of food and wearing apparel that they did not themselves possess. The whites, in turn, would "boil it down" and refine it for domestic use. For years it was hauled into St. George by freighters who quarried it from the mountains and retailed it at ten cents per pound (*LAT 4/14/1901: p4*).

After the abandonment of the Muddy Mission in 1871, Daniel Bonelli mined deposits in the area and supplied salt and agricultural produce to mining camps. He established a ferry service near the confluence of the Virgin and Colorado Rivers (Ezzo 1996). Bonelli formed the Virgin River Salt Company and operated the mine and mill for many years (*LVERJ 6/24/1937: p1*). Salt mining continued well into the 20th century. In 1901 it was reported by the *Los Angeles Times* that capitalists from Utah and Nevada located a large section of Salt Mountain near St. Thomas. The principal locators, including Nevada congressman Cleveland and R. C. Lund of St. George, Utah, reportedly intended to build a large refinery and ship the product (salt) to southern California (*LAT 4/14/1901: p4*).

In 1905 valley residents thought that salt mining would eventually be one of the most important industries in the county (*LVA 8-19-1905: p1*). In 1912 W.T. Neel and M.J. Rogers of Ventura Cal, and E. F. McGonigle of Los Angeles made application for a mineral patent on the Lucky Boy and Last Chance salt placer mining claims in the St. Thomas Mining District.(*LVA 8/24/1912: p5*). In 1926 the Union Salt Company, operating near St. Thomas, had excavated a tunnel for 200 feet and was developing an 80- foot thick bed of salt. A mill was constructed on the property in 1926 that employed 20 men. The salt produced by Union Salt was marketed in Los Angeles (*LVA 7/31/1926: p; LVA 10/9/1926: p4*). In the late 1920s, the Virgin River Salt Company was leasing a salt mine four miles south of St. Thomas, and in 1929 was making plans to restart the mine after a year of idleness (*LVA 1/ 29/1929: p3*). The Virgin River Salt Company was in operation and held annual stockholders meetings until at least 1931 (*LVERJ 8/27/1930; LVERJ 9/7/1931: p5*). The company shipped a small amount of rock salt to Los Angeles in 1932 and for a number of years about 200 tons was mined per year for use by local stockmen (Vanderberg 1937). When the Virgin River Salt Company went out of business, local residents continued to exploit the mine sporadically. Salt mining in the valley came to a halt in 1937 with the inundation of the salt deposits by the rising waters of Lake Mead. By June 1937, although the salt mine was not covered, the road was under water and the only way to access the mine was by boat (*LVERJ 6/24/1937: p1*). Today, remnants of the salt mine reappear when Lake Mead water levels are low at a place called Salt Cove.

Gypsum Mining

Discovery of non-metalic deposits in the vicinity of the project area resulted in the formation of the Moapa Mining District. The district is generally situated in the northern segment of the Muddy Range, southeast of Moapa, Clark County. Also known as the North Muddy Mountains, Big Muddy, and Riley, the Moapa District includes the North

Muddy Mountains (Tingly, 1992). Gypsum was the prime mineral being mined in the district, although to a lesser degree borax, magnesite, silica and uranium were also mined. The first gypsum deposits were discovered in 1919, and were extensively mined. The White Star Plaster mine was the largest and most productive mine in the area and led to the formation of the Hupton mining area. The mining of gypsum also contributed to the development of the town of Logandale (Ezzo 1996:11-112).

Hupton existed near present day Glendale, about three miles southeast of Moapa, and was named for A.C. Hupp, a White Star company official. This company owned and operated mining community was founded in the early 1920's by the White Star Plaster Company of Los Angeles (Hafner 1967). Gypsum was mined and processed at Hupton for the production of plaster. The Hupton community itself was considerably small, consisting of the plaster mill, a company owned boarding house, pool hall, general school, a post office and a small amount of employee housing located in a narrow canyon. Early on, the mined gypsum was hauled by wagon team to the processing plant, but later a short spur line was added to the St. Thomas Branch rail alignment connecting the Arrowhead Siding directly with Hupton. Also, a narrow gauge railroad was constructed, *circa* 1922-1923, extending north from Weiser Valley and connecting with the same branch line at the Jackman Siding, thereby providing additional sources of gypsum to the plant at Hupton (Olsen 1986). This short-lived mining operation began to bounce checks in 1925, and the operation closed down within two years after financial difficulties began. Further discussion of the mining operations of the White Star Plaster Company can be found below.

Although gold and copper deposits were still the main focus of mining in the Moapa Valley, gypsum was attracting attention as early as 1905 when large deposits were located just south of the town of Moapa (*LVA 8/19/1905: p1*). The gypsum deposits in the Moapa Valley are in the Moapa District situated in the north part of the Muddy range. They occur near the St. Thomas branch of the Union Pacific Railroad; and the product was shipped on that branch. Although gypsum deposits are common in Nevada, statewide only four plants were in operation in 1923, and only one was located in the Moapa Valley (Lincoln 1923:273).

In 1910, the Moapa Gypsum Company was organized by Mr. J. Bouse. Bouse purchased 640 acres from James Logan, J. A. Enger, Charles Feldt and J. T. Sprague, all of Moapa (*LVA 7/23/1910: p1*). The property contained large deposits of gypsum with no over-burden which made extraction easy and profitable. The deposit was located two miles from the railroad at Moapa Station contributing to the profitability of the deposit. The company was contracted to ship 4,000 tons per month to cement manufacturers in California, and a screening and crushing plant with a capacity of 100 tons per day was in operation. The anticipated benefit to the community was the $3000 to $4000 in payroll to local workers per month (*LVA 7/23/1910: p1*). By October of 1910 the company was shipping three carloads daily from the mine to the railroad station using 8 four-horse teams (*LVA 10/15/1910: p4*) and the Salt Lake and San Pedro railroad was surveying a branch line to the gypsum mines (*LVA 10/15/1910: p1*):

> The engineers on the ‘gyp’ mine survey are progressing with the work to the mines two miles from Moapa. A force of 14 men are working and they expect to get through in about three weeks, when about 100 men will

> be employed grading and laying track. The revenue from this source should also improve the business of local merchants to some extent (*LVA 10/22/1910: p1*).

The Moapa Gypsum Company constructed a mill near Logan that was predicted to employ 75 men and produce 100 tons per day of high grade gypsum-plaster (*LVA 8/2/1913: p1*). The deposits worked by White Star Plaster Company were located on the St. Thomas Branch 3.5 mile east of Moapa. A mill was located about 1.5 miles from the deposit. In 1922 White Star Plaster shipped an average of 3,000 tons per month to Los Angeles (Lincoln 1923:22, Vanderberg 1937). White Star operated two major gypsum deposits in the Moapa Valley. White Star 1 is located in Sections 2 and 11, in Township 15S, Range 66E, at the north end of the North Muddy Mountains. White Star Plaster produced plaster from 1919 to 1923 at a mill located in the NW 1/4 of Section 11. For the first two years, gypsite from White Star 1 was processed at the mill. White Star 2 is located in the NW 1/4 of section 18 in Township 15S, Range 67E, on the west flank of Weiser Ridge. Surface workings include 3 shallow open pits covering most of the 1,500 foot exposed strike length of gypsum and about 50% of the production from this deposit was from underground recovery. The deposit produced a total of approximately 100,000 tons. White Star 2 was the source of gypsum for White Star Plaster mill from 1921 to 1923 when the plant closed (Papke 1987). By 1923 the White Star Plaster Company was the only mining company still operating in the Moapa District (Lincoln 1982).

The third major gypsum deposit in Moapa Valley is the Anderson (or January) gypsum deposit located about five miles south of Moapa in the SW 1/4 of Section 31 in Township 15S, Range 67E in the North Muddy Mountains (Papke 1987). In November of 1911, Harrison Anderson and others filed a notice of forfeiture against W. A. Crawford, laying claim to the New Chance placer claim, January Gypsum placer claim, January No. 2 Gypsum placer claim and Best Gypsum placer claim (*LVA 11/2/1912: p2*):

> Notice of Forfeiture: To W. A. Crawford..notified we the undersigned have expended during the years of 1909, 1910, and 1911, 100 dollars each year on each of the following mining claims: New Chance Placer Claim, January Gypsum Placer claim, January No. 2 Gyp. placer claim, Best Gypsum Placer claim...that such expenditure was made for the purpose of holding said claims under the provisions of Section 2324 of the revised statues of the US..concerning annual labor on mining claims...that of such expenditure you have furnished no part or portion in labor, material of money. You are hereby notified that if within 90 days after the publication thereof, you fail or refuse to contribute your portion of said expenditure as co-owner which amounts to $12.50 for each of said claims for each of the years 1909, 1910,1911,....your interest being 1/8 interest in each of said claims will become the property of the undersigned, your co-owners who have made the expenditure required....signed by John M. Thomas, W. R. Anderson, Harrison Anderson (*LVA 11/2/1912: p2*).

In 1913 Anderson and his associates sold the gypsum property to Los Angeles contractors Tracy, Calder and Johnson. It was reported that the new owners planned to

put a crushing plant on the property and ship the raw material to their mill in Los Angeles (*LVA 11/22/1913: p1*). This area was explored by a few shallow prospect pits and one adit but no production emerged from this deposit (Papke 1987). The nearest siding on the St. Thomas branch was Jackson Siding, four miles east of the deposit. In 1939 Pacific Portland Cement applied for a patent application in the St. Thomas mining district, in Sections 30 & 31, T 15S, R67E (*LVERJ 1/ 29/1940: p7*). A land patent for the property was issued to the Pacific Portland Cement Company in 1944 (BLM GLO records accessed electronically on December 2004). A deposit "occurs in the Muddy Mountains about 2.5 miles southwest of Comstock, Nevada. The deposit is 3.5 miles from the Union Pacific RR. C. C. McDonald of Overton and associates own 320 acres, and the Pacific Portland Cement Co. owns 640 acres, the latter purchased from McDonald in 1922"(Vanderberg 1937:53).

In 1914, the Rex Plaster Co. took a lease on the Etna Cement and Plaster Co. deposit, five miles west of Logan. They constructed a road from the deposit to the railroad and built bunkers seven miles from Moapa on the St. Thomas Branch. Three four-horse teams hauled sixteen tons of gypsum per trip. The gypsum was transported to the company's mill at Fillmore, California (*LVA 2/14/1914: p4*). Rex Plaster shipped a small amount of gypsum from this deposit circa 1917, but by 1923 the deposit was not active (Lincoln 1923, Vanderberg 1937). This property encompassed an area two miles long by one-half mile wide running north/south through the middle of T16S, R66E (Jones 1920).

In 1920, Rex Plaster Co. owned a large gypsum deposit in the Muddy Range south of Moapa. This deposit was about five miles from the nearest shipping point on the St. Thomas Branch. The deposit was two miles long and one-half mile wide running north/south through the middle of T16S, R66E (Jones 1920 in Stone *et al.* 1920).

Silica Sand Mining

Silica sand mining in the Moapa Valley began in the latter half of the 1920s. This development grew of the congruence of a number of factors: the presence of a burgeoning glass industry on the west coast, a plentiful water supply, and huge deposits of high grade white sand and lower grades of pink sand. One of the requirements for the production of quality white glass sand is a steady supply of water for washing to remove impurities. While white sand deposits occur elsewhere in the county, the co-occurrence of large sand deposits and a reliable water supply; the Muddy and Virgin Rivers made the production of high quality white sand viable in the Moapa Valley (Vanderberg 1939). The existence of the St. Thomas branch of the railroad was crucial to the development of this industry. The branch line was highly anticipated by both silica and gypsum concerns as well as the agricultural industry in the Valley. Large deposits of high-quality silica sand in the Moapa Valley were mostly unexploited until the development of a market on the Pacific coast. In the late 1920s the Pacific coast had an established glass manufacturing industry however, it relied on Belgian sand. The huge silica deposits in Moapa and their relative proximity by rail to Los Angeles, stimulated interest in developing this new source of silica sand to provide for the glass industry (*LAT 7/23/1928*). In October of 1928 the Southern Glass Company of Los Angeles contracted for delivery of 5,000 tons of sand for bottle and jar manufacture from the St. Thomas deposit (*LAT 10/ 7/1928: pE3*).

In 1930, the American silica industry was given a boost by the implementation of a tariff on foreign silica. This $2.00 per ton silica tax effectively removed any Belgian competition. Prior to this tariff, in 1930, the Spartan Company shipped approximately 20,000 tons of sand a year out of their Moapa Valley plant to the Los Angeles Market (*LVERJ 3/11/1930: p1; LVERJ 4/17/1930: p1*). By 1937, total production from the St. Thomas district deposits topped 200,000 tons. The average monthly production in 1937 was 2,500 tons of washed white sand and 1,000 tons of untreated pink sand (Vanderberg 1939).

Spartan Silica Co.

The Spartan Silica Co., later Morledge and Veitch, produced the bulk of the white sand in the valley (Vanderberg 1939). The Spartan Silica Company based in California, gained control of large silica deposits and a mill site in the Moapa valley near St. Thomas. In 1928 the company filed a trust deed for $47,000 with the Clark County recorder. The funds were earmarked for securing more claims and increasing production in the Moapa Valley (*LAT 4/30/1928: p15*).

By 1934 Fred Morledge and Lloyd Veitch began operating the 'old' Spartan silica plant (*LVERJ 3/5/1936: p4*). Morledge and Veitch operated a washing plant five miles south of Overton on the St. Thomas branch. The company controlled the right to appropriate water from the Muddy River to supply the washing plant (*LVERJ 8/11/1936: p4*). Their white silica sand deposits were located 3.8 miles southwest of the plant. In 1937 the plant was producing 2,500 tons of white sand per month and employed 25 men (Vanderberg 1939). In July 1937 Spartan Silica shipped approximately 5,000 tons of sand, while their main competition, Nevada Silica Sand, shipped about 1,500 tons. At the same time, another silica operation, the Nun brothers Company, had completed the third silica treatment plant in the valley (*LVERJ 8/17/1937: p2*). In August 1937, the Morledge and Vietch plant was burned to the ground throwing 40 men out of work (*LVERJ 8/21/1937: p2*). The company made arrangements with the Nun brothers to process and ship the sand from their deposits (*LVERJ 8/24/1937: p2*, *LVERJ 9/2/1937: p2*). Less than three months after the Spartan mill was destroyed by fire, the Morledge residence located on the property, also burned to the ground (*LVERJ 11/6/1937: p1*). The Moapa Minerals Company, owned by Morledge and Veitch began rebuilding the silica plant on the same site in December 1937 and the new plant was in operation in early 1938 (*LVERJ 12/18/1937: p3; LVERJ 2/7/1938: p2*).

Nevada Silica Sand Co.

The second major silica producer in Moapa Valley was the Nevada Silica Sand Co., controlled by Harold J. Stocker and his mother Mayme Stocker beginning in 1934. This deposit was located north of Overton, about four miles west of Tokio Siding on the St. Thomas Branch. The 160-acre deposit was leased from the owner, Fay Perkins of Overton. A washing plant was located 5 ½ miles from the deposit, 1 ½ miles south of Tokio Siding (SW1/4, SE 1/4, Section 22, T20S, R61E)(Vanderberg 1939). In 1937 Nevada Silica Sand shipped an average of 40 carloads of 50-60 tons each, per month, to glass manufacturers in Los Angeles and San Francisco (*LVA 12/21/1937: p8*).

Smaller producers of silica included W. R. Cozart who owned 800 acres of white silica sand southwest of Overton. In 1927-1928 this deposit shipped 112 carloads of

sand. The Nun brothers leased the property in 1937. Paul and Greg Nun constructed a washing plant on the St. Thomas branch several miles south of Overton. U. V. Perkins of Overton held unpatented claims on a deposit of pink sand 3.5 miles west of Logandale which was leased to Morledge and Veitch who were shipping about 500 tons per month. This material was hand shoveled into trucks and hauled 3.5 miles to a railroad spur (possibly referring to Amber siding) for shipment (Vanderberg 1939).

Two of the major silica producers in the Valley went on to be important figures in the southern Nevada. After moving to Las Vegas in the 1950s, Fred Morledge became a partner in the El Cortez Hotel and was involved in the construction and operation of the Showboat Hotel. He was a member of the Hualapai club in Las Vegas, whose members included important political figures in the state including Pat McCarran, Alan Bible and Howard Cannon. Moreledge's daughter Carolyn, later Carolyn Sparks, was a university regent (*LVRJ 11/ 23/1991: p1*).

In addition to being an important figure in the silica-sand industry in Moapa Valley, Harold Stocker and members of his family were early Las Vegas pioneers in the gaming industry which has come to dominate the state of Nevada. Stocker served one term on the Clark County Board of Commissioners as a Democrat and later went on to be the chairman of the Republican Party in the 1950s.

Borates

Two borate deposits occur in the southern part of the Muddy Mountain mining district: one in White Basin in the southeast Muddy Mountains, and the other 12 miles away near Callville Wash. These deposits are a borate called colemanite which was commercially profitable for a very short period of time. In the 1870's borates were chiefly obtained from playa deposits. The 1887 discovery of colemanite in Death Valley, supplanted the exploitation of playa deposits (Vanderberg 1937). In 1920, John Perkins of St. Thomas located colemanite deposits in White Basin, 20 miles south of Crystal. Perkins' group of 12 claims were purchased by the Pacific Coast Borax Company which owned the United States Borax Company. The American Borax Company also had holdings in the White Basin area and developed an inclined shaft and hundreds of feet of lateral workings. The American Borax Company, owned by the Standard Sanitary Company, was contracted to supply raw borates to the Union Borax Company of Los Angeles (*LAT 7/3/1921: pV4*). The relationship of the borax industry in Los Angeles with the St. Thomas mining enterprise was described in the *Los Angeles Times*:

> Plans are going forward for the erection...of a borax mill for the Union Borax Co....The real backing for the borax mill comes from the officers of the American Borax Company all of whom are also officers of the Standard Sanitary Company, largest manufacturers in the world of sanitary porcelain wares and pottery...borax is a necessary part of the enamels of which the Sanitary Company is the heaviest user...As these are the interest that control and would annex to Los Angeles the great borate deposits of Southeastern Nevada, about which much has been published recently in the technical press, they become of special interest to LA present industrial progress.... Mines discovered by Hoyt S. Gale, formerly geologist of the U.S. Govt. and August Vogt, chemist formerly with

> Stauffer Chemical co. during the month of October 1920 discovered an enormous deposit of borate of lime, which no doubt will be the largest deposit of its kind in America...
>
> Several shafts were sunk about 12 miles north of the famous Borax Smith property...The Smith property, standing up like a mountain of ore, has no doubt a better surface showing, because more ore is exposed, while the American Borax mine, lying flat like coal veins, had to be developed by shafts and levels. The nearest town to the American Borax mine is St. Thomas which was settled a good many years ago by the Mormons, whose progeny are tilling the soil, raising wheat, sorghum and like cereals, while the amounting hills furnish food for cattle and sheep... The borax field is about one and a half miles wide and several miles long. Its longitudinal extension is probably much greater than appears, for apparently to the eastward across the Muddy Range a well displayed sedimentary formation of great thickness is cut by the valley of the Virgin Rivers; and it would not be surprising if these borax-bearing beds extend in a far easterly direction, even if they do not come to the surface, for it is proven that they run in a westerly direction for a good many miles as the Smith mine is on this westerly strike of the vein... The mine will be connected up by railroad as soon as possible.
>
> Officials of the Union Pacific and Salt Lake lines were in St. Thomas several weeks ago with their engineers looking over the possibility of extending the railroad from St. Thomas to Boulder Canyon, and with this object in view also figuring on connecting a branch line from the borax mine to come into their main line just north of Bitter Springs... At present the ore is being hauled by mule-team twenty miles to St. Thomas where it is loaded on the cars for shipment. The first 100 tons of ore hauled to St. Thomas averaged 40 per cent boric acid content. This is one of the richest shipments of crude borax ore ever shipped from any borax mine in America without any special treatment...The principal ore of the St. Thomas district is like that of Death Valley, Lang, Dagget and Ventura, lime borate or colemanite (*LAT 8/14/1921: V1*).

The American Borax Company ceased operations in 1924 as a result of litigation with the Pacific Coast Borax Company, parent company of United States Borax (Vanderberg 1937). The dispute centered on the filing of two different types of claims on the same deposits. Lode claims apply to mineral deposits that occur as veins or lodes with well defined boundaries. Lode type claims are described as parallelograms with the long axis parallel to the vein or lode. Placer claims, on the other hand, are usually applied to unconsolidated deposits such as sand and gravel, although historically, non-metallic bedded or layered deposits such as gypsum and limestone were also considered to be placer deposits (http://www.mine-engineer.com/mining/claim.htm). There was some confusion whether the colemanite deposits in White Basin were lode or placer deposits. United States Borax filed lode claims on the deposits they purchased from

Perkins in 1921. At a later date, other parties filed placer claims over the previously recorded lode claims. The American Borax Company was formed around these placer claims and operated them profitably for two years (*LVA 8/22/1925: p1*). In 1923 United States Borax filed an injunction against American Borax disputing their right to mine the claims (*LVA 9/15/1923: p2; LVA 8/22/1925: p1*). The case was decided in favor of United States Borax on the basis that the deposits were in vein or lode form, invalidating the placer claims (*LVA 8/29/1925: p1*).

The Callville Wash colemanite deposits, discovered in 1921, were purchased by F. M. "Borax" Smith for the West End chemical company. In 1922, West End established a camp and was actively producing colmanite. By 1923 the company was operating a mill capable of producing 30 tons per day (Lincoln 1982, Vanderberg 1937). The Muddy District colemanite deposits were exploited until 1928 when the discovery of a better quality borate (kernite) near Kramer, California led to the abandonment of colemanite mining in the area (Vanderberg 1937).

Precious Metals

Exploration for Oil, Copper, Gold and Silver

In the first half of the 20th century, the Moapa Valley was the focus of exploration for a variety of minerals including copper, silver, gold and oil, each meeting with varying degrees of success. In 1905, the *Las Vegas Age* reported that strong indicators of oil were to be found on the Muddy River between Overton and Moapa and 6,000 acres of land had been leased by an Ohio company for the purpose of oil exploration (*LVA 8/19/1905: p1*). Oil speculation on the Virgin River continued until at least 1907 when preparations for oil drilling were underway at Virgin City 30 miles east of St. George, Utah. It was asserted that the same oil bearing rocks were found on the Virgin River in Lincoln County (*LVA 4/13/1907: p4*). In 1908 the *Las Vegas Age* reported that Standard Oil was preparing to drill for oil in the Muddy River Valley and speculated that Lincoln County was poised to be an important oil field (*LVA 2/1/1908: p1*). Despite these efforts, oil has never been produced in Clark County (Longwell *et al*. 1965).

A brief flurry of excitement surrounding silver occurred in 1906 when a 25 foot silver ledge was reported to have been discovered within five miles of Moapa (*LVA 10/20/1906: p6*). Six years later rich silver discoveries were reported by Crayton Johnson and James McQuaid who claimed to have discovered a formation comparable to the Silver Reef area in Utah. In fact, the envisioned camp was to be called 'Nevada Silver Reef.' Among the first locators were Crayton Johnson, James McQuaid, Tom J. Main, Joe F. Perkins, Wilford Cox and Col. Gregory. Not all citizens of the valley were caught up in silver fever, however. One "well informed resident of Moapa" described the high ore assays as "considerable buncombe" and complained that the "whole county is being located" (*LVA 12/28/1912: p1, p4*). Despite this skepticism, the strike was still making front page news in January 1913 when two separate stories were printed on the front page of the same issue of the paper. The *Age* reported that most of the ground around the new camp was covered by locations and urged caution to those contemplating making claims until further information about the find was made available (*LVA 1/4/1913: p1*). By January 25 the rush in Silver Basin was virtually over and assays were coming back with only small traces of silver (*LVA 1/ 25/1913: p1*).

Railroad Service in the Valley

During the early part of the 20th century, the Moapa Valley was a center of railroad activity. The development and growth of the valley was closely tied to the construction of the San Pedro, Los Angeles and Salt Lake Railroad (or SP, LA & SL, later part of the Union Pacific Railroad system) which traversed across the northern end of the valley at Moapa, then up the Meadow Valley wash from the Muddy River to Caliente on its way northward from Las Vegas to Salt Lake City (Myrick 1992). The history of the construction of the railroad has been thoroughly reported on several occasions (Myrick 1992, Signor 1988, White 2001, Lyman 1991) and is outlined below from these sources.

The SP, LA & SL was organized in 1901 to acquire sections of road in Nevada that had already been partially graded by other lines (*San Bernardino Sun Telegram 8/23/1953*). The SP, LA & SL was in competition for this route with the Union Pacific Railroad (UP), whose president, E.H. Harriman, was also planning the construction and operation of a railroad connecting Los Angeles and Salt Lake City. Construction on the SP, LA & SL began in the San Pedro and Los Angeles areas in 1901 but was soon halted due to legal complications involving the competing project by the UP. Clark's railroad route paralleled the UP's previously established rights-of way in the Meadow Valley Wash/Clover Valley area in southeastern Nevada (Lyman 1991). Eventually an agreement was reached between Clark and Harriman in the fall of 1902 and by July of 1903 the route was established (White 2001).

In 1903, a call for bids for the construction of the first 100 miles of roadbed for the Salt Lake Route was issued. This stretch between Caliente, Nevada to a point 15 miles west of Daggett was divided into two divisions (*LAT 7/15/1903: p6*). The first 85 miles from Caliente to the Moapa River was awarded to the Utah Construction Company (UCC) (Myrick 1992, Signor 1988). Construction began in Caliente on August 31, 1903, and the stretch was due to be completed by July 1, 1904 (Signor 1988). The first 85-miles were completed ahead of schedule and the UCC was awarded a contract for the next section between Moapa and the Nevada/California border. By May 1904 most of the grading had been completed from Moapa to the Las Vegas Valley (*Lincoln County Record [LCR] 5/6/1904: p4*).

By May of 1904 rail was laid all the way down the Meadow Valley Wash from Caliente to Moapa (*LCR 7/8/1904: p4*) and to Las Vegas Ranch by mid October 1904 (Signor 1988, Myrick 1992). In February 1905, the first train traveled the route from Salt Lake to the Pacific Coast and regular passenger service established in May 1905 (White 2001).

The completion of the SP, LA & SL Railroad was critical to the economic development of southern Nevada. The Salt Lake Route brought development, expansion, and increased services to southern Nevada. In the Moapa Valley, railroad access stimulated the development of numerous mining efforts and provided an avenue for exportation of agricultural products. In turn, the development of mining and agriculture in the Valley resulted in the organization of small independent connecting railroad spurs and branches (Myrick 1992).

St. Thomas Branch

As early as 1908, ranchers in St. Thomas were expressing a desire to see the railroad extended from Moapa south through the valley (*LVA 5/23/1908: p6*). A branch line running through the Moapa Valley would provide easy transport of valley agricultural goods and livestock to outside markets. As with the farmers in the valley, the mining industry was totally reliant on the railroad as the sole means of distributing their product. The construction of a branch as far as Logan was assured by March 1911 (*LVA 3/25/1911: p8*), however the people of the valley were lobbying to have the line extended to St. Thomas. Engineers were in the valley in April 1911 to secure the right of way for that stretch of the line.

Construction of the St. Thomas branch began in the summer of 1911 from the main line at Moapa through Logan and Overton and terminating at St. Thomas. The hope that the line would be completed as far as Logan in time to handle the season's cantaloupe shipment that year proved futile (*LVA 4/1/1911: p1*). Construction was so far behind schedule that, in June, local farmers were expressing fears that the track would not be completed in time to ship the ripe cantaloupes (*LVA 6/24/1911: p4*). Construction was slowed by unforeseen difficulty of rock work in the Narrows, and in July, the railroad gave orders to construct a shoo-fly through the Narrows in an attempt to make the deadline to Logan. When this plan failed, the railroad company built a loading station at the Narrows to accommodate the farmers, about halfway between Moapa and Logan. This measure was greeted with mixed feelings; it saved 12 miles of hauling produce over rough wagon roads, however, the branch was not the boon to agriculture that the farmers had hoped for that season (*LVA 7/15/1911: p1; LVA 7/22/1911: p1*). By August, the line was still not completed to Logan and the mood in the valley was not optimistic. The *Las Vegas Age* reported:

> After delays and disappointments which have caused the loss of probably 200 cars of cantaloupes now lying in the fields because of the difficulty of reaching rail transportation, the new Moapa Valley Railroad is now nearing the final stages of construction....The rock work in the Narrows, which has been the means of delaying construction for over a month, is now so far completed that the contractors expect to be through there early in September. The steel gang will then be brought to complete the work of laying the rails, and the grade having already been completed, the whole should be so far along as to permit running through to St. Thomas by October first (*LVA 8/19/1911: p1*).

Even this prediction proved to be overly optimistic. The railroad company's priority was the construction of the high line through Meadow Valley Wash. Work on the branch line to Logan was postponed until the high line was completed which was not expected until the first of November 1911 (*LVA 9/30/1911: p8*). Construction on the St. Thomas branch did not resume until February of 1912 and the branch was not completed until the middle of March (*LVA 4/27/1912: p1*).

The completion of the line apparently did not insure all services would be immediately forthcoming. Seven months after the line was completed to St. Thomas, the *Age* reported:

> After months of weary delay the Moapa Valley railroad is at last being operated regularly, a motor car making the round trip each day. The car leaves St. Thomas daily at 7:00 am, arriving at Moapa at 9:30. The return trip leaves Moapa at 3:30, arriving at St. Thomas at 6:00 pm (*LVA 12/21/1912: p1*).

As late as March, 1913, a year after the completion of the line, full services were still not in place.

> We are expecting a daily mail service in the near future to be taken over by the railroad company, which with a first class car, would improve conditions materially. We need a light, quick, freight service between this place and Moapa very badly (*LVA 3/18/1913: p1*).

By August "the daily train on the branch line which the people of the valley hoped might be maintained has been taken off again (*LVA 8/16/1913: p1*).

Spurs were added to the line as needed to accommodate mining operations. In 1913 a spur to a gypsum plant was constructed south of the Narrows (*LVA 7/19/1913: p1*). In 1921, a two-mile long spur track was constructed to the gypsum deposit five miles southeast of Moapa (*LVA 4/30/1921: p1*). When magnesite was discovered in the Muddy River Valley a few miles above St. Thomas, a sidetrack was already available for use about 3 miles northeast of the new claims (*LAT 7/17/1922*). In 1919 a spur from Arrowhead siding eastward to the White Star Plaster Mill was added to the line (Myrick 1992). The burgeoning silica sand industry also required spur tracks to transport product to the branch line. In 1936 a spur track was laid to a newly exploited sand deposit which was shipped to the Stocker Sand Mill at Tokio siding north of Overton (*LVERJ* 8/5/1936: p2). An extension loading track at Amber Siding was requested by Fred Morledge to facilitate the shipping of sand from a new deposit to the Overton Silica Sand Mill (*LVERJ 8/8/1936: p2*). In 1938-39, six miles of the branch between Overton and St. Thomas was threatened by the rising waters of Lake Mead, and the track was abandoned and removed (*LVERJ 6/13/1938: p3*). In 1937 a new "Y" for the branch line was constructed a mile and a half below Overton to replace the old "Y" at St. Thomas (*LVERJ 6/24/1937: p2*).

Civilian Conservation Corp Activities in the Moapa Valley

The Civilian Conservation Corp (CCC) was created during the Great Depression to put unemployed men to work on conservation projects throughout the country. With an unemployment rate of 25%, many young men faced a bleak future coming of age in 1933. The CCC provided a lifeline to many of these young men. It was a federally sponsored social and environmental program born out of the economic disaster that faced the nation (Sterner and Ezzo 1996, McBride 1995, White 2003). Numerous federal agencies played a part in the supervision, planning, and administration of CCC camps. The army provided reserve officers to supervise work at the camps, and the USDA Forest Service and USDI National Park service were often responsible for planning and supervising projects (White 2003).

Several CCC camps served in the Moapa Valley until the early 1940s, when nationally the CCC was gradually being phased out. Improving economic conditions and the onset of World War II rendered the CCC obsolete and funding was discontinued (White 2003). In their brief occupation of the Moapa Valley, the CCC completed an ambitious flood control system which saved countless farms and homes along the river. They built the infrastructure for the Valley of Fire State Park and constructed roads to access the area. They participated in significant archaeological projects that could not have otherwise been funded. While providing a livelihood for thousands of unemployed men, the contribution of the CCC to the economy of the Moapa Valley cannot be overestimated. For a more complete discussion of the CCC in Nevada see McBride (1995) and White (2003).

Because there was no State Park Commission in Nevada at the time, CCC camps in the state were placed under the jurisdiction of the State Highway Department (*LVERJ 10/12/1933: p1*). Between May 1933 and June 1942, nine primary camps and several small spike camps (temporary camp locations for specific work details) operated in Clark County. Workers were organized into companies which often traveled from place to place, occupying the different camps at different times. Four of the primary camps in Clark County were located in Moapa Valley: Moapa Camp near Warm Springs, Wells Siding Camp at Logandale, Overton in the vicinity of Moapa, and the Muddy River camp also in the vicinity of Moapa (White 2003). The Moapa Valley camps were originally intended to be occupied during the winter months (*LVERJ 10/12/1933: p1*) and were usually abandoned during the hottest parts of the summer (White 2003: Table 1). In 1934, on April 1, the Overton Camp was moved into the mountains near Bunkerville, the Moapa camp was removed to Mt. Charleston and the camp at Alamo returned to Lamoille Canyon in Elko County (*LVERJ 3/29/1934: p1*).

Moapa Camp PE-202 (Public Entity) and SCS-1 (Soil Conservation Service) was constructed near Warm Springs on the "Plumber Place" (SHPO 2003). The camp, whose primary tasks involved flood control projects in the Meadow Valley Wash and upper Muddy River Valley, was first occupied sometime after October 12, 1933. By November of 1934, the Moapa Camp was constructing a 35-foot dam of ruffle masonry construction 15 miles west of Moapa in Arrowhead Canyon, primarily for flood control with water storage a secondary consideration. During the same period, the Moapa camp made improvements to the flood control project in Meadow Valley Wash. The improvements took approximately three months to complete and about 25 head of horses were used to assist the crew with the heavy work (*LVERJ 11/20/1934: p3*).

The Muddy River Camp (DG-22-Department of Grazing), established in 1935 under the command of Lt. Stanley Caford, was a flood control and conservation service camp (*LVERJ 7/2/1935: p3*). The camp was located just east of the current Nevada Power Co. (NPC) Reid Gardner power plant. A concrete silo or shed now stands on the location of the camp. Enrollees at the Muddy River camp worked on flood control projects such as construction of earth and masonry reservoirs. Seven different companies occupied the camp between June 1935 and August 1941 (White 2003).

Overton Camp designated SP-1 (State Park) was established near Kaolin in October 1933. As with all CCC camps SP-1 was occupied by more than one company over the life of the camp. The Overton camp was dedicated to the construction of a new highway from Overton to the Valley of Fire and the development of tourist facilities,

flood control and soil erosion projects. The new highway, as originally planned, was a one-way route from Overton consisting of a gravel-surfaced highway (*LVERJ 10/12/1933: p1; LVERJ 11/7/1933: p1*). By 1934 the highway had been redesigned as a loop or circle to allow visitors to travel through the Valley of Fire without retracing their path. The road left the Arrowhead Trail (Highway 91) at Crystal, went through Overton and up the Moapa Valley to Glendale, a distance of 41 miles. Two cut-offs of approximately 6,800 feet each, were planned to provide access to Mouse's Tank and Atlatl Rock. The road was described as a good country dirt road, but not a high speed one. The Overton CCC camp also constructed campgrounds, water developments, and erected signs along the route (*LVERJ 1/16/1934: p1; LVERJ 1/26/1934: p6*). The Valley of Fire Highway was dedicated on April 1, 1934, providing easy access to the Valley of Fire for the sight-seeing public (*LVERJ 3/19/1934: p1, LVA 4/6/1934: p2*). The completion of the road and development of tourist facilities by the CCC in the Moapa Valley was undertaken at the urging of Congressman Scrugham, and was instrumental in the movement to make the Valley of Fire the first state park in Nevada.

In the autumn of 1933, Nevada congressman Scrugham, initiated an Emergency Conservation Work (ECW) project to salvage the remains of Pueblo Grande de Nevada, popularly known as the Lost City, which was threatened with inundation by the waters of Boulder Lake (*LVERJ 4/22/1936: p1*). In 1934 and 1935, under the direction of M. R Harrington, the Overton CCC Camp participated in the archaeological investigation of the Lost City. During the 1933-34 season the work was done by the 974th company and the following season it was done by the 573rd (*LVERJ 4/22/1936: p1*) during their respective tenures at the Overton Camp. This camp also built the Lost City Museum to house the artifacts recovered from Lost City. The museum was completed in June 1935 and was initially cared for by Colonel Tom Miller, superintendent of Camp SP-1, along with enrollees from the camp. The camp was soon to be moved, however, leaving the future of the museum uncertain (*LVERJ 4/22/1936: p1*).

The camp located at Wells Siding (P-206) near Overton, was established in the autumn of 1934 and was involved in flood control projects such as construction of the Wells Siding dam (White 2003). In 1934 a tent camp was established along with fixed buildings including a mess hall, recreation hall, administration building, latrine and showers. In 1938 the camp included portable barracks and an infirmary (CCC 1942). The Wells Siding camp was located east of the railroad tracks at the Tai Arabica Road on Isola Ranch about 1.5 miles north of Logandale. The land is currently under cultivation.

Among the flood control projects constructed by CCC camps in the Moapa Valley were an earth and clay dam at Bowman, a series of low dams and levees northeast of Moapa, a rock and earth dam at Wells siding (*LVERJ 7/23/1936: p1*). The diversion dam near Wells Siding was the first dam on the lower part of the Muddy River. This structure was constructed of gravel and clay, 100 feet thick at the base, 25 feet high and 300 feet across the channel. This structure diverted water into adjacent washes away from the downstream farms and ranches. The dam constructed near the Bowman ranch was 200 feet thick at the base, 36 feet high and 620 feet across (*LVERJ 11/6/1937: p6*). The work described above was under the supervision of the U.S. Forest Service or the Soil Conservation Service (Shamberger 1940).

The daily life of a young man in a CCC camp was described by an unknown author in a report on the Muddy River Camp (DG-22) in 1937. This was one of two CCC

camps dedicated to rangeland and grazing improvement projects in Clark County (White 2003:28). The camp was constructed near the Searles Ranch, south of Moapa, in the summer of 1935 and operated between the fall and winter of 1935 and 1936 and was closed during the summer of 1936. In November 1936 the technical staff and equipment from Camp DG-7 in northwestern Nevada was moved to DG-22. The camp was in operation for six months and worked on water development projects and range improvement projects in coordination with the local stockmen. Men at the camp also mined approximately 1,000 tons of salt to be distributed on the range for livestock (Anonymous 1937).

One of the objectives of the camp was the rehabilitation and re-employment of the men through job training and the eradication of illiteracy. The enrollees were offered academic classes including Arithmetic, English, History and Citizenship and vocational training in skills such as auto mechanics, forestry, surveying, and business law. Recreation was an important part of the camps routine. The company participated in field trips to Boulder Dam, Valley of Fire and the Lost City Museum. They had basketball and baseball teams which played against the teams from the CCC camp at Bunkerville, Wells Siding, the Overton spike camp and Boulder City. The men also played volley ball, badminton and swam in the Muddy River. The camp was operated under the supervision of Superintendent Pine and Foreman Young. A photograph included in the report depicts two enrollees identified as Enrollee Fletcher, age 65 and Enrollee Lynch, age 17 illustrating that the CCC was not only for the young (Anonymous 1937).

The Movie Industry

The dramatic landscapes in Moapa Valley and the Valley of Fire have provided backdrops for a number of Hollywood motion pictures. Proximity to Hollywood, spectacular scenery and excellent weather made southern Nevada attractive to movie producers. In the silent era of episodic serials, southern Nevada provided locations for several of these series. Several episodes of the *Hazards of Helen* silent serial (1915-1918) were shot in the Las Vegas Valley, Goodsprings and Bard (*LVA 1/30/1915: p1; LVA 2/20/1915: p1; LVA 1/15/1916: p1*). The western serial *The Painted Stallion* (1937) was filmed in the Las Vegas area, and three chapters of *Rex, King of the Wild Horses* were filmed in the Moapa Valley (see below).

During the 1920s, two Hollywood movie studios took up residence on ranches in the Moapa Valley. In 1926 the Big Horn Ranch became the permanent location camp of the Francis McDonald Company to produce western films released by MGM. Francis McDonald was a prolific actor appearing in over 280 films and 86 guest appearances on television between 1913 and 1965 (http://www.imdb.com/name/nm0567756/). The ranch, as described in the *Los Angeles Times* (7/4/1926: pC13*)* "...is located in the midst of majestic mountain ranges and is noted for the picturesqueness of its vistas." McDonald had ambitious plans for the ranch, including the construction of a western town to function as a set and housing for cast and crew. He intended to call his company "The Big Horn Ranch Riders" (*LAT* 7/4/1926: pC13). It is unclear how many movies were filmed at the ranch or whether the western town was built. *The Nevada Filmography* (Du Val 2000) lists only one film starring McDonald in the Moapa area, *The Valley of Hell* released in 1927. During the same time period Hal Roach, famous for

his *Our Gang* series, began filming western serials in the Moapa Valley. In 1924, Roach was looking for a location where his pictures could be shot without the delays due to inclement weather. He found what he was looking for in southern Nevada (Du Val 2000). Three episodes of *Rex, King of the Wild Horses* were filmed at the Home Ranch in Moapa Valley: *King of the Wild Horses* (1924), *Black Cyclone* (1925), and *The Devil Horse* (1926). The daily life of filming on the ranch was described in a story which appeared in the *Los Angeles Times* in 1924. After the day's new shooting, the film's director viewed the quickly developed film (known as "rushes") from several days before, then cut and edited in a wooden shack in the camp.

> The world's strangest motion picture cutting-room is barred against the entrance of the star of the picture.
>
> In a lonely spot in the hills of Nevada, seven miles from Moapa on the Union Pacific Railroad, there is a camp of seven tents and some three or four flimsy temporary structures of wood. By day it is deserted; its inhabitants are out on the sky line, perhaps, or wandering in the bottom of a painted valley. At night, from dusk to a late hour, one of the wooden shacks shows lights, regardless of the hour at which others are darkened.
>
> Occasionally there comes from this cabin the whir of a revolving reel interspersed with bits of conversation, but for the most part the activities inside are accomplished in silence.
>
> If the star should come to the door and ask for admission he would be sent back to his quarters and rather rudely too; for the director realizes that his star, while the possessor of a princely disposition, could wreck the cutting-room and destroy several weeks of labor in twenty seconds.
>
> Fred Jackman is doing a unique thing while directing Rex, the King of Wild Horses, for Hal Roach in a new feature. When Rex and his director and the leading human players, Guinn (Big Boy) Williams and Kathleen Collins, left for the Nevada hills ten weeks ago, they took with them a portable projection machine, a small gasoline-plant generator, a cutting table out of the Hal Roach editorial department, and plenty of razor blades and film glue for patching.
>
> During the past ten weeks all the film shot has been shipped to the Hal Roach studios in Culver City, developed and printed - and a print sent immediately back to the Rex Company. Jackman himself has been assembling the film in rough cut as he followed his shooting schedule, playing the cutter's role at nighttime and during bad weather. ...
>
> From the mass of rough film previewed at the studio as 'rushes' Hal Roach and his executive committee ... believe that the new Rex

> picture will far outclass the 'King of the Wild Horses' in spectacular beauty (*LAT 12/28/1924: pC21*).

Moapa Valley was chosen for the film's location because it was "...one of the few remaining spots as yet un-invaded by settler's and some wonderful scenic effects have been obtained." Fred Wood Jackman, the director, was so fortunate as to find a herd of wild horses and the utilization of this herd makes for some excellent shots of the animals in their native habitat" (*LAT 4/29/1925: pC9*). The human actors in the film were Guinn (Big Boy) Williams, Kathleen Collins and Christian Frank (*LAT 4/29/1925: pC9*). In 1926 Hal Roach attempted to buy the Home Ranch outright, however, the sale was never finalized (*LV Age 8/7/1926: p1*). The Home Ranch, located six miles northwest of Moapa, later became the Warm Springs Resort.

In 1929, a local production company cast local socialite, Alta Ham, in *The Pot of Gold* which was alternately known as *Water* or *Water and Sand*. Other cast members included Emil Wickman, Harley Harmon, and the Whitney family. The story mirrored impending events in St. Thomas, however with a happier result than that which ultimately prevailed. The film told how "A struggling desert community learns that the newly approved Boulder Dam Project will provide irrigation water that will transform the arid soil into fertile farm land"(DuVal 2000:140). Little is known about the film; however, photographs from the Betty Ham Doktor collection housed in the UNLV library special collections show scenes shot in the reconstructed Lost City at St. Thomas which was eventually flooded by Lake Mead. The film no longer exists and it's producer is unknown. The film was used by "real estate broker, T. J. Lawrence who offered free performances of the film which were followed by a sales presentation for home lots in the Las Vegas Estates" (Du Val 2000:140).

The filming of western features continued into the 1930s when Republic Pictures scouted the Moapa Valley and the Paiute reservation for a location to film their *Painted Stallion* serial which starred Ray "Crash" Corrigan (*LVERJ 1/9/1937: p1*). Some chapters of this 12-part series were filmed around Las Vegas however there is no documentation that the Valley of Fire or Moapa area was utilized. It was during the making of this serial that legendary stuntman Yakima Canutt developed his trademark stagecoach stunt in which he was drug between the team of horses holding onto the rigging between the team. Finally releasing the rigging, the team and the stagecoach passed over his body. This stunt was later recreated by Steven Spielberg in his 1981 film *Raiders of the Lost Ark* (DuVal 2000).

In 1939 Hal Roach returned to the Moapa Valley to film his prehistoric epic *One Million B. C.*, in the Valley of Fire (*LVERJ 9/22/1939: p1*). The film, starring Victor Mature, Lon Chaney Jr., and Carole Landis, was the story of two warring tribes of cave men and featured anachronistic prehistoric creatures such as mastodons and dinosaurs. A crew of up to 200 persons was on location in the Valley of Fire for two weeks housed in temporary quarters. A camp consisting of about 20 tent houses and a mess hall was constructed on the Neils Tobiasson property (*LVERJ 11/4/1939: p6*). Meals were provided by Anderson's Board and Supply Company (*LVERJ 9/27/1939: p5, LVERJ 10/20/1939: p1*). Filming was completed in mid November 1939 (*LVERJ 11/17/1939: p7*).

In subsequent years, a number of feature films and television projects have been set in the desert landscapes of the Moapa Valley and Valley of Fire. One of the more important films shot here was, *They Came to Cordura* in 1958-59. The cast, led by Rita Hayworth, Gary Cooper and Van Heflin, resided at the Sands Hotel in Las Vegas and traveled by train to the set each day (*LAT 11/28/1958: pC13*). *The Professionals*, starring Burt Lancaster, Lee Marvin and Claudia Cardinale was filmed in the Valley of Fire in 1966. The film was nominated for three academy awards in the categories of Direction, Screenplay Based on Material from Another Medium, and Cinematography. In 1994, the Valley of Fire doubled for a distant planet in *Star Trek: Generations*. In all, a minimum of 39 feature films and television shows have been filmed in the Moapa Valley area from the 1920s to the present (Du Val 2000).

Development of Valley of Fire State Park

In 1922, Nevada State Senator E. W. Griffith went to the National Park-to-Park Highway Convention in Sacramento to promote Valley of Fire as a National Monument while promoting the Arrowhead Trail as a link in the Park-to-Park Highway (*LVA 6/3/1922: p1*). The Park-to-Park highway was a 5,590 mile-long circuit of 12 major national parks located in nine western states. The route included Mesa Verde Park, Rocky Mountain Park, Yellowstone, Glacier, Mt. Ranier, Crater Park, Sequoia and Yosemite. The circuit back to its origin in Denver was completed by winding through northern Arizona. The route was dedicated in 1920 (*LA Times 12/5/1920: pV7*). As a result of Griffith's efforts, the convention recommended that the Valley of Fire should be established as a National Monument (*LVA 6/24/1922: p8*).

Efforts to set the Valley aside for recreational use were further advanced by James G. Scrugham who was inaugurated as Governor of Nevada in 1923. Scrugham was familiar with the scenic and historic locations in the state and was dedicated to developing these areas for tourism. Among his areas of concern was the "Lost City" Pueblo Grande de Nevada. In 1923 he had the Lost City declared a state reservation and was instrumental in bringing the site to the attention of archaeologist Mark Raymond Harrington of the Museum of the Southwest (Miller 1971). The forward-looking Scrugham enacted statutes to protect prehistoric sites and artifacts. He stated, "It is my intention to issue a proclamation declaring the various prehistoric relics on the public domain to be the property of the state and forbid their removal except for deposit in State museums unless by permission of the museum authority" (Cox 1993). In 1923 Scrugham proposed that some public land be set aside as State Recreational Grounds and Game Refuges and in March of 1925, 15 areas had been designated as such and placed under the administration of the State Fish and Game Commission (Cox 1993, Weaver 1994).

During Scrugham's one-term governorship, his efforts to set aside scenic areas, archaeological sites and game preserves, provided a foundation on which to build a state park system. In 1925 the State legislature authorized the governor to exchange state lands for federally owned lands to be used as state owned recreational areas (Weaver 1994). Ironically, Scrugham's interest in conservation in general and Lost City specifically, contributed to the failure of his re-election bid in 1926. His republican opponent, Fred B. Balzar, capitalizing on a general lack of interest in conservation and historic preservation on the part of the electorate, used the slogan "Live cities instead of

dead ones". Balzar won the election and the incipient state park program quickly was shelved (Cox 1993).

In 1929 President Herbert Hoover signed an executive order temporarily withdrawing 144,000 acres to be evaluated by the Department of Interior as to its suitability as a National Monument. The withdrawn land included the Pueblo Grande de Nevada (*LVA 5/14/1929: p4*). In 1931, 27,003 acres of federal land, including the Lost City and the Valley of Fire and other scenic areas, were transferred back to the state of Nevada for recreation and game refuge. Equal amounts of state lands were exchanged for these federally owned properties (*LVERJ 7/29/1931: p2*).

In 1933 former governor Scrugham was elected to the United States Congress from where he renewed his efforts to create a park system for Nevada. At first, these efforts were stalled due to lack of funding (*LVERJ 4/16/1933: pD2*). However, the formation of the Civilian Conservation Corps in 1933 provided labor and funding for conservation projects throughout the country. Scrugham used his influence to arrange for CCC crews to be stationed in the State, including four camps in the Moapa Valley (Cox 1993). In 1933 the CCC camp at Overton was assigned to construct a 'highway' from Overton into the Valley of Fire (*LVERJ 10/12/1933: p1*). The original plan was a one-way gravel-surfaced highway into the valley from Overton. Later this plan was modified becoming a circular route which allowed visitors to traverse the area and return to the main highway without backtracking. The road was to leave the Arrowhead Trail/Salt Lake Highway at Crystal, wind through the entire Valley of Fire, intersecting with the Moapa Valley road near St. Thomas and return to highway 91 at Glendale. Two side tracks were planned providing access to Mouse's Tank and Atlatl Rock. The circuit added an approximate 30-mile side trip along the Salt Lake Route (*LVERJ 1/16/1934: p1*). The Valley of Fire highway was opened to public travel on April 1, 1934 with a formal dedication ceremony, and caravan of vehicles on the road. The ceremony was hosted by Colonel Tom Miller and the Overton CCC men who had worked on the road. Those invited to the celebration gathered at the Crystal turnoff and were escorted by Miller on the inaugural journey on the new highway (*LVA 4/6/1934: p2*).

The Overton CCC camp was also assigned to establish a camp ground, sanitary facilities and water developments and generally police the valley (*LVERJ 11/7/1933: p1*). The camp ground was said to be "the last word in comfort and convenience for the motoring public" (*LVERJ 1/ 26/1934: p6*). Amenities included stone cabins, stoves, tables, ramadas, and a dam around a natural tank to provide a water supply (*LVERJ 1/26/1934: p6; LVA 4/6/1934: p2*). These new improvements combined with the scenic beauty of the Valley of Fire, caused some to begin promoting the area as a national park. Review Journal editor, A. E. Cahlan was convinced that the Valley of Fire "has all the elements necessary for a national park" (*LVERJ 1/26/1934: p6*).

In 1935 Col. Thomas W. Miller, senior superintendent of National Park service camps in Nevada, proposed that 143,000 acres, including the Valley of Fire, be incorporated into the state reserve created in 1926 and designated Boulder Dam State Park (*LVERJ 2/20/1935: p1, LAT 7/5/1936: pF1*). In May 1935, Governor Richard Kirman approved a bill passed by both houses of the state assembly that established the first state parks in Nevada. These parks were: Cathedral Gorge State Park, Beaver Dam State Park and Kershaw Canyon-Ryan State Park in Lincoln County; the Ft. Churchill project in Lyon County; and the Boulder Dam-Valley of Fire State Park in Clark County.

With the demise of the CCC program in the early 1940s, Nevada's state parks were again under-funded and falling into disrepair. State legislature appropriations for the parks fell well below what was required to employ personnel to care for and maintain the designated parks (Cox 1993, Miller 1971). During the war years, park funding ceased altogether and the areas were effectually abandoned (Miller 1971). The state park system in Nevada did not resume until the 1950s (Cox 1993).

The disintegration of Nevada's parks was described in1943 by S. M. Wheeler. He inspected the parks and reported on the conditions he observed to Nevada State Highway Engineer Robert Allen (Wheeler 1943). His report describes a park system in a state of disrepair. He noted that the road into the Valley of Fire, while somewhat washed out over the winter, was passable. The camp grounds were in various states of disrepair. The road to Atlatl rock had been closed because it had become impassable, however the barricade had been removed and vehicles had been getting stuck in the sand. Signs in the park had been removed by vandals. Wheeler made 14 recommendations for repair and cleanup of the area (Wheeler 1943).

The situation at the Lost City Museum was even worse. The grounds were reported to be generally run down, the reconstructed pueblo and pit house needed cleaning out. The main building was not inspected because, although the ranger was in the building, he did not answer the door to the inspector. Among Wheeler's recommendation for the Museum:

> That the State of Nevada take back control even if funds do not permit of keeping it open. As far as the public is concerned, it is closed now. The present occupant has not the interest to take proper care of the exhibits and materials in storage. If the building is closed for the duration, all State property should be placed in proper storage where it can be taken care of. Loan collections should be returned to owners or properly stored (Wheeler 1943).

After the original outlay of $5,900 had been allocated from CCC funds for the erection of the Lost City Museum (*LVERJ 12/8/1933: p1*), funding for its upkeep was not forthcoming. The Nevada Legislature appropriated about $500 per year for two years for the park commission's use. Tom Miller and the CCC men acted as custodians while they were stationed in the valley, however, upon their leaving, the museum was kept open by citizens of Overton (*LVERJ 11/29/1938: p3*).

Because of the State's inability to fund and maintain the parks, in 1939 Congressman Scrugham spearheaded a campaign to have the Valley of Fire taken over by the Federal government for development as a National Park or to be incorporated into the Boulder Dam Recreational area (*LVERJ 11/14/1939: p1*). Addressing the Moapa Valley Chamber of Commerce, Scrugham stated:

> The state is without facilities to develop the attraction. It is far more extensive than is generally believed. Perhaps the most beautiful portions of the valley are those not accessible by any present roadway or trail.

> The land belongs to the state, now, and is a state park. It will be necessary to secure transfer for the area to the park service by legislative enactment, and I believe this can be done without much difficulty.
>
> Then we can proceed with the construction of first class highways, with side roads to everything of interest, including the Buried City. The cost will be about $1,000,000 and I am sure the Nevada Congressional delegation can be successful in securing the necessary appropriation. If you want a national park here, I believe it can be secured (*LVERJ 11/14/1939: p1*).

This transfer was supported by the Moapa Valley Chamber of Commerce (Morledge 1940) and by the State Park Commission itself. Commission chairman, C. W. West wrote to Robert Allen supporting the transfer and requesting that he state the necessary steps to introduce a bill to the assembly to transfer the land. He noted that Congressman Scrugham was looking at the Federally controlled Forty-Mile Canyon area of Nye County, and would like to see it removed from the military bombing range (West 1940). While it was not overtly suggested that this area should be acquired by the state should a land exchange be brokered with the Federal government, the implication is clear. Robert Allen was, however, more cautious about the divestiture of the Valley of Fire in his reply to West:

> I have talked this matter over with the Governor and it appears best that we study the matter of the transfer quite thoroughly. You know we acquired that land by a trade of other lands to the Federal Government in exchanges and now we should work out some method of another change or 'swap' in lands if we are going to turn over the Valley of Fire to the Federal Government. I am sure we would all be very much criticized if we made an outright grant to the Government of this land. There are too many acres involved and it will be too valuable for our people in future years to let it go for a mere song at this time (Allen 1941).

Discussion of the issue was temporarily stalled when it was discovered, according to NPS maps, that the most scenic areas of the valley, including Atlatl rock and the Petrified Forest, appeared to already be located on federal lands withdrawn by the Federal government in 1929, and may not have been returned to State control in 1931 as believed. This was disputed by John Perkins who, with Don Lou Shellbach, had surveyed the state park on the ground. The park service contended that their maps had been carefully prepared based on the 1935 Nevada Statute creating the park. A joint committee from the Moapa Valley and Las Vegas Chambers of Commerce were appointed to investigate the situation and arrange for a new survey. John Perkins, Fred Morledge and U. V. Perkins were appointed as the Moapa Valley Chamber's committee (*LVERJ 1/9/1940: p1*).

Subsequently, the National Park Service presented a bill to Congress to establish a national park in the Boulder Dam area. Under the proposed bill the park area would include Boulder Dam recreation area and extend north in the vicinity of Dry Lake, Crystal and Glendale, specifically to include the Valley of Fire (*LVERJ 3/1/1940 p1*). In

1941, the Baker Act was passed by the Nevada state legislature. This Act stipulated that state owned Valley of Fire lands could be transferred to the Federal government in exchange for land elsewhere in the state because the land was remote and was adjacent to Lake Mead. This action was shelved due to the outbreak of World War II; however, eventually 2,000 acres of the original 8760 acres was lost through trade (*LVERJ 5/23/1948: p8*, Weaver 1994). In 1948 the transfer of Valley of Fire State Park to Federal control was still being considered. The National Park Service proposed a cooperative agreement with the state to add 34,000 acres including the scenic parts of the Valley of Fire to the Lake Mead National Recreation Area (*LVERJ 5/23/1948: p8*). Opposition to this policy, lead by Gov. Charles Russell, Colonel Tom Miller, and the Perkins family of Overton, was effective in stopping further land exchanges and led to the rebirth of the Nevada State Park System (Miller 1971, Weaver 1994).

In 1952, Governor Charles H. Russell reactivated the park commission. The new commissioners were Max R. Wainwright, S. M. Wheeler, R. F. Perkins, W.C. Miller and Thomas W. Miller (who was elected chairman). No funds for state parks were appropriated by the legislature in 1953. In 1955, the State Park System was revitalized when the commission was granted a biennium appropriation of around $40,000. These funds enabled the hiring of a director, a ranger and an office stenographer. These monies also funded the planning and implementation of a "two-year program to clean up and reconstruct the facilities in the existing State Parks, and to sign areas throughout the state" (Miller 1971). The same year the State Park Commission unanimously voted to retain the Valley of Fire in the state park system and the director filed a protest to cancel all pending applications for land exchange. The director also applied for return of the lands designated in the original Valley of Fire deed which had been returned or traded back to the United States government between 1948 and 1951 under the Baker Act (Miller 1971). In 1969, a visitor center was completed and an interpreter was hired. By 1971 the Valley of Fire State Park exceeded 35,000 acres (Miller 1971). Today, the park continues to be a recreational resource for camping, hiking, photography, nature study and history for over 250,000 visitors annually.

EXISTING DATA REVIEW

Environmental Data

A search of the Nevada Natural Heritage Program[1] database reveals specific records of fifteen "at risk taxa" (seven plant, two invertebrate, one fish and five bird species) within the general project area (Table 3). Another three species of note (desert tortoise, Gila monster and the Las Vegas bearpoppy (*Arctomecon californica*), are considered possible residents here.

[1] 901 S. Stewart St., Carson City 89701-5245.

Table 3. At risk taxa known or considered likely to reside with the general project area of the proposed Moapa Valley Trail, Clark County, Nevada (NNHP 2009).

Common Name	Scientific Name	Status	
		State	Federal
Plants			
Threecorner Milkvetch	*Astragalus geyeri triquetrus*	CE	SoC
Littlefield Milkvetch	*Astragalus preussii laxiflorus*	S1	
Virgin River Thistle	*Cirsium virginense*	S1	SoC
Silverleaf Sunray	*Enceliopsis argophylla*	S1(?)	N
Dune Sunflower	*Helianthus deserticola*	S2	
Beaver Dam Breadroot	*Pediomelum castoreum*	S3	SoC
Rosy Twotone Beardtongue	*Penstemon bicolor roseus*	S3	SoC
Las Vegas Bearpoppy	*Arctomecon californica*	S1	
Invertebrates			
MacNeil Sooty Wing Skipper	*Hesperopsis gracielae*	S1	SoC
Red-Tailed Blazing Star Bee	*Megandrena mentzeliae*	S2	
Fish			
Virgin River Chub	*Gila seminuda*	SP	N
Reptiles			
Desert Tortoise	*Gopherus agassizii*	SP	T
Banded Gila Monster	*Heloderma suspectum cinctum*	SP	N
Birds			
Western Yellow-Billed Cuckoo	*Coccyzus americanus occidentalis*	SP	C
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	SP	E
Western Least Bittern	*Ixobrychus exilis hesperis*	SP	SoC
Phainopepla	*Phainopepla nitens*	SP	N
Yuma Clapper Rail	*Rallus longirostris yumanensis*	SP	E

CE: Critically endangered; SoC: Species of concern; S: Critically imperiled; S2: Imperiled; S3: Vulnerable; SP: State protected; N: Nevada special status species; T: Threatened; C: Candidate for listing as either threatened or endangered; E: Endangered

Cultural Resource Data

An existing archaeological data review and literature search was conducted from records on file at the Southern Nevada Archaeological Archive located at the HRC. In addition, Government Land Owner (GLO) maps and other historic period information relevant to the project area were consulted from the library Special Collections at the University of Nevada, Las Vegas. As a result, it was revealed that 201 cultural resource sites have been previously reported within the defined Moapa Valley Trails Study area (Table 4). One hundred and 61 of those sites are classified as prehistoric, 37 are historic period, and 3 are unknown. Archaeological site information, particularly locations, is privileged and released only under specific circumstances to qualified professional archaeologists and cultural resource managers. In accordance with State and Federal law, further specifics cannot be released, and only generalities will be discussed. However,

Map 2 presents zones of cultural resource sensitivity based on HRC's review of the existing data and literature.

Table 4. Number and Types of Previously Reported Cultural Resources Identified Within the Moapa Valley Trails Study Area.

Number of Prehistoric Sites	Number of Historic Period Sites	Number of Unknown Type Sites	Total Number of Sites
161	37	3	201

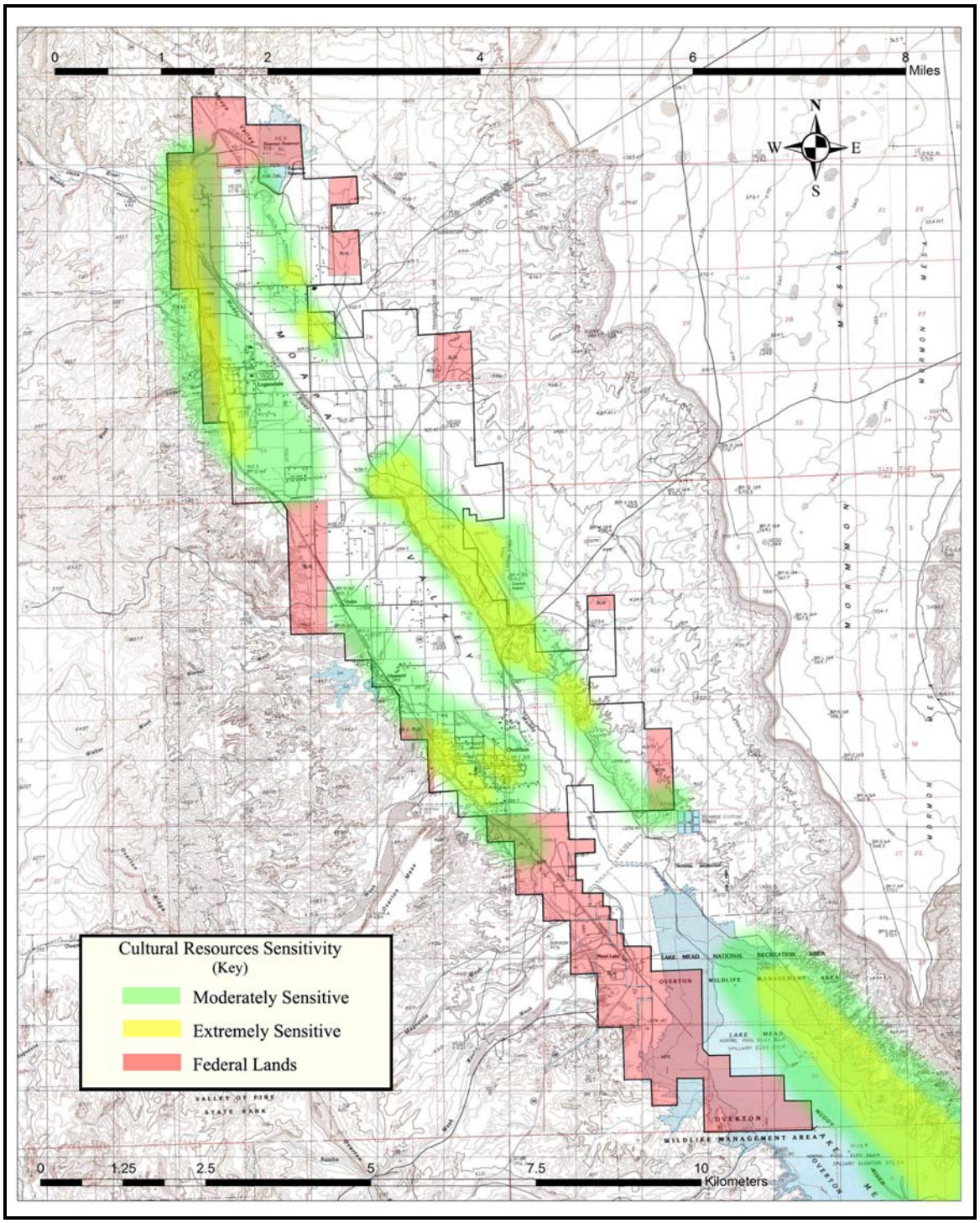
Prehistoric site types are dominated by those once occupied by Ancestral Puebloan (Virgin Branch Anasazi) which include the ruins of pit structure and pueblo communities. Pit structures or pithouses are the earliest form of architecture constructed by Ancestral Puebloan people. Pithouses or pit structures are essentially semi-subterranean single room dwellings. The structures are constructed by excavating a hole or depression into the ground, which is then covered by an aboveground superstructure made from various sized timbers, reed, brush, and mud. Entry was through either an opening in the wall or through a hatchway in the roof. Pueblos on the other hand are rectangular buildings of adobe and rock or waddle-and-daub surface structures. Pueblos are generally built forming semi-circular arcs of conjoined rooms that encircle defined courtyard areas were Virgin Branch Anasazi would have performed everyday tasks such as food preparing, tool manufacture, etc. Other prehistoric site types include isolated artifacts, scatters of ceramics, stone tools, and/or stone tool manufacturing waste material, quarries, and campsites which are attributed to Archaic period occupations, Virgin Branch Anasazi or Southern Paiute people.

Historic Period sites include a number of structures associated with pioneering families and the Euro-American development of the Moapa Valley. Civilian Conservation Corps campsites, the Boulder Dam/Lost City Museum, the Leland Whitmore House/Mead Lake Post Office, Perkins House, Sandy Town, Mormon Headquarters/St. Joseph (Mills Ranch) and the St. Thomas Branch of the Union Pacific Railroad are just of the few of the notable sites. Other types of historic sites include can scatters, glass scatters, and/or trash scatters.

PERCEIVED POSSIBLE IMPACTS AND SUMMARY RECOMMENDATIONS

Pre-Project Assessment of Possible Impacts to Local Biological Communities

Until an actual trail route is under consideration, it will not be possible to other than generally assess potential project impacts. But because several of the locally occurring "at risk" species might reasonably be regarded as "habitat specialists," incorporating up-front avoidance of special habitats during project planning phases will go a long way toward reducing potential adverse impacts to some of the local, sensitive taxa.



Map 2. Cultural Resources Sensitivity Map.

For example, at least four of the five "at risk" bird species here are typically associated with riparian corridors. Thus, minimizing the extent to which the trail enters riparian areas, or lessening disturbance factors associated with trail use, will simultaneously reduce the likelihood of project-related disturbance to these birds. Similarly, judicious trail placement that avoids specialized soil types, e.g., gypsum-rich soils necessary for propagation and support of the Las Vegas bearpoppy, could reduce potential impacts to this species.

The value of controlling potential adverse impacts may conflict to some degree with the opportunity to educate trail-users about the Valley's bio-resources. While strict avoidance of biologically sensitive areas has its benefits, promoting some contact with these locales and their inhabitants can also provide benefits by increasing public awareness about these same resources.

Although the scope of anticipated trail uses (i.e., foot traffic, cycling, off-road vehicles) is not clear at this point, consideration should be given to limiting certain activities at certain times. Bird nesting, for example, can be disrupted by excessive noise, thus care should be taken to avoid inadvertently promoting use-patterns that might foster such disturbance.

Pre-Project Environmental Recommendations

At this phase of the planning process, few specifics can be offered. As a result, it might be best to offer some general recommendations that promote flexibility and allow adjustment as the process moves ahead:

1) Incorporate into trail route-planning recognition that various sensitive species may exist along any proposed route;
2) Be prepared to alter a proposed route if necessary to avoid critical habitats;
3) Consider the possibility of instituting limits, both physically and temporally, on the extent to which a given trail segment might be available for use;
4) Recognize the educational potential of trail placement and integrate an educational component (e.g., signage at various points) into trail design.

Pre-Project Assessment of Possible Impacts to Cultural Resources

Archaeological sites, historic buildings and structures, cultural landscapes, and physical objects are the fabric of our national heritage. Collectively known as cultural resources (or sometimes heritage assets), they are our tangible links with the past. Archaeologists are responsible for, and committed to, protecting and managing these irreplaceable resources in a spirit of stewardship for future generations to understand and enjoy. An assortment of legislative mandates requires archaeologists (particularly on Federal lands or in conjunction with Federal undertakings) to:

1) Identify, evaluate, and encourage preservation of cultural resources;
2) Manage museum property collections;
3) Consult with a broad array of interested parties;
4) And promote heritage education.

As such, as the trails project proceeds, appropriate cultural resource surveys should be included. Furthermore, a Cultural Resources Management Plan (CRMP) should be developed in cooperation with the appropriate land owners or respective Federal agencies to manage the potentially rich array of cultural resources present within the bounds of the Moapa Valley Trails study area. Both courses of action would help to further identify cultural resources within the project area, and minimize potential impacts.

With that said, impacts to cultural resources could relate to the project footprint (e.g., site disruption due to land disturbance, increased erosion) and project emissions (e.g., dust and water releases during construction), in addition to impacts from introducing a trails system to the valley (e.g. increased public access resulting in looting or vandalism). Many impacts can be reduced or avoided when considered during the siting and design phase.

Pre-Project Cultural Resources Recommendations

Like the environmental recommendations, few specifics can be offered at this stage of pre-planning. Again, some general recommendations can be provided.

1) Incorporate into trail route-planning recognition that various cultural resources may exist along any proposed route;
2) Be prepared to alter a proposed route if necessary to avoid critically significant archaeological sites or other historic properties;
3) Consider the possibility of instituting limits, both physically and temporally, on the extent to which a given trail segment might be available for use and how much access is granted to cultural resources;
4) Recognize the educational potential of trail placement and integrate an educational component (e.g., signage or kiosks at various points) into trail design.

The following are examples of measures that could be applied to reduce cultural resource impacts of a trails project depending upon site- and project-specific conditions. A final set of mitigation measures for the project should be developed in consultation with the appropriate Federal resource management agencies, private landowners and other stakeholders. Conduct these consultations early in the project development process and preferably prior to final project siting and design.

Siting and design considerations that can mitigate impacts include:

1) Conduct a records search to determine the presence of known archaeological sites and historic structures within the area of potential effect (a step partially fulfilled by this document). Identify the need for an archaeological and/or architectural survey, which would be required if the project involves Federal lands or funding. Conduct surveys, if needed.
2) Determine whether sites and structures within the area of potential effect meet the significance criteria for listing as eligible sites on the *National Register of Historic Places* (NRHP).
3) Consult with Native American governments early in the planning process to identify traditional cultural properties, sacred landscapes, and other issues and

concerns regarding the proposed trails project. Native American consultations are required if the project involves Federal lands or funding, and would be conducted by the Federal agencies.

4) Evaluate the visual impacts to archaeological sites or other historic properties. If the project is located within the viewshed of a National Register Site, or includes or is within the viewshed of a property eligible for listing on the NRHP, include mitigation measures for visual impacts as stipulations in the Plan of Development.
5) Prepare a cultural resources management plan (CRMP), if cultural resources are present in the area of potential effect or if areas with a high potential to contain cultural material have been identified.
6) Use existing roads and trails to the maximum extent feasible to avoid additional surface disturbance.

General mitigation practices and principles that could apply to any or all phases of any development project include:

1) Develop guidelines in a CRMP. For example:
    a) If resources eligible for listing on the NRHP are present, modify the Plan of Development to avoid significant cultural resources. If avoidance is not possible, conduct appropriate cultural resource recovery operations or alternate mitigations as determined in consultation with the State Historic Preservation Office (SHPO) and appropriate Native American tribes, as required under the National Historic Preservation Act.
    b) Periodic monitoring of significant cultural resources in the vicinity of the development (including areas where new trail access has been provided) may be required to reduce the potential for looting and vandalism. Should loss or damage be detected, consult with the appropriate State Historic Preservation Offices (SHPOs) and Native American tribes immediately to determine additional protective measures or further action to mitigate the impact.
    c) An unexpected discovery of cultural resources during any phase of the project shall result in a work stoppage in the vicinity of the find until the resources can be evaluated by a professional archaeologist.
2) Educate workers and the public on the consequences of unauthorized collection of artifacts.
3) During all phases of the project, keep equipment and vehicles within the limits of the initially disturbed areas.

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