3.15 CULTURAL RESOURCES

3.15.1 Affected Environment

People and the environment are inextricably linked throughout time. Most human activities, such as resource extraction, occupation, and spirituality, leave traces that result in an archaeological record. Interpretation of these material remains characterizes the cultural history of a given area. Numerous authors have proposed cultural sequences for the Great Basin. Perhaps the best comprehensive work is D'Azevedo's (1986) *Great Basin* volume. He organizes the Great Basin into natural and cultural provinces that contributing authors use to synthesize the region's prehistory, ethnology and history. Elston (1986:135-148) describes the prehistory of the "Western Area" that encompasses all the geothermal assessment areas. Fowler and Liljeblad (1986:435-465) and Thomas et al. (1986:262-283) provide the ethnology for the area. Multiple authors describe the history. The following information is summarized primarily from these documents. In addition, Grayson's *The Desert's Past: A Natural Prehistory of the Great Basin* (1993) and other resources were utilized (e.g., Smith et al., 1983; Steward, 1938). These references should be consulted for information that is more comprehensive.

Numerous prehistoric archaeological sites with widely varying degrees of complexity, size, location, and densities occur within the geothermal assessment areas. These include rock shelters, occupation sites (with probable buried deposits), temporary camps, petroglyphs, hunting blinds, toolstone quarries, and lithic scatters. Similarly, historic sites express a great deal of variation reflective of the activities that drew historic period peoples into the area. Mining sites, historic trails, ranches, towns, and ethnic occupations are among them. The following cultural history provides a broad-based framework for understanding the area's cultural resources.

3.15.1.1 Cultural History

Early Man Tradition (11,500-11,200 B.P.). To date, no sites older than 11,500 years before present (B.P.) have been confidently dated within the Great Basin. While there have been claims of earlier dates, most have been rejected because of inadequate data or dating techniques. Advocates of Early Man believe that the lithic technology predated "well-flaked" bifaces and projectile points, making it difficult to recognize early sites.

Paleoindian (11,200-10,900 B.P.). To the east and south of the Great Basin, the earliest archaeological sites are named Clovis, because they are associated with distinctive fluted points dating to between 11,200-10,900 years ago. Found throughout the Great Basin, fluted points are typically associated with the earliest occupations of the New World. However, because all of these finds have been on the surface and have no stratigraphic association, these interpretations are still in question. While most archaeologists assume that the Great Basin fluted points are the same age as those found elsewhere, some argue that these claims are not justified. Another problem with the Great Basin fluted points is their variability. Some, but not all, of this variability may be the result of re-sharpening the points. In the past, many Great Basin archaeologists argued that the people who made these points were big game hunters. Again, these interpretations focus on the spectacular Clovis sites of the Southwest and Plains, where

fluted points were closely associated with the remains of extinct animals. However, in the Great Basin many fluted points are found along the shores of highly productive shallow-water environments above now extinct Pleistocene lakes.

Some of the oldest prehistoric occupation in the area, dating to as early as 10,000-12,000 years ago, includes artifact assemblages found in the Black Rock Desert. Although the Black Rock Desert is excluded from geothermal leasing, these finds have led to speculation that big game hunting sites may exist in the area. The region contains large deposits of Pleistocene megafauna (such as wooly mammoth and bison) in proximity to artifacts that may be associated with early occupation of the region. These finds have generated considerable scientific interest in the area. In particular, a large, concave base projectile point is characteristic. The so-called "Black Rock Concave Base" points are very similar to Clovis points, but do not feature the flutes that are typical of the Clovis culture. These points are similar in shape and feature the basal and edge grinding characteristic of Clovis points. In addition, unique "crescent" points/tools are typical; many of these are held by private collectors. Though these tools' functions are unknown, some archaeologists call them "Great Basin Transverse Points," and believe their function was to stun birds. This assumption stems from the fact that many feature grinding or steep retouch along the central portion of the tool. In the Mojave Desert, these tools are found in association with Lake Mojave and Silver Lake points along the shores of Pleistocene Lake Mojave (Campbell et al., 1937). Thus, it is unclear if they are associated with Paleoindian or subsequent Paleoarchaic occupations.

Paleoarchaic (11,200-7500 B.P.). The paleoarchaic tradition covers the period during which Pleistocene lakes were retreating and becoming a series of small, shallow lakes and marshy areas. The lithic traits include stemmed points variously termed Lake Mojave and Silver Lake; these named types are just some of the appellations Great Basin archaeologists have assigned to stemmed points of this tradition. In the area, one of these types is called Parman. Most of these points feature thick stems that contract to a rounded or square base. Many have distinct shoulders separating the stem from the blade portion of the point. Another trait typical of these points is edge grinding, a characteristic shared with fluted points. This grinding keeps the material binding the point to its shaft from fraying or breaking. Because these various points share so many characteristics, they are routinely grouped together as "Great Basin Stemmed" points. A Variety of other tools make up the Paleoarchaic kit. The previously defined "crescent" is a distinct trait of this tradition. Archaeologists have not shed much light on this tool's function. Charlotte Beck and George T. Jones (1990) analyzed 95 Great Basin Stemmed points and 174 crescents from seven sites in Nevada and Oregon. They found that obsidian was preferred for the points (85 percent), while chert was used to produce 94 percent of the crescents in their sample. This raw material preference suggests that whatever the function of crescents, they required a durable stone. Other tools forming the Paleoarchaic toolkit are large bifacial knives, gravers, punches, choppers, and several types of scrapers with steep, well-formed edges. Multifunction tools are common. Small numbers of grinding tools such as metates and manos also occur.

Like the previous Clovis tradition, many Paleoarchaic sites are situated along the shores of lakes or marshes, or along streams that fed these lakes and marshes. However, the known distribution of stemmed point sites indicates Paleoarchaic people utilized a broad variety of resources from a

set of environments much wider than during previous times. Within the area, the Sadmat site artifact assemblage provides a good example of the Paleoarchaic toolkit. Located in the Carson Sink, the site comprises an area of about two square miles that is littered with weathered tools and flaking debris (Tuohy, 1968, 1981).

Early Archaic (7500-4000 B.P.). At about 7,000 years ago, most of the low-elevation valley lakes had dried up, which significantly reduced their biological productivity. Along with climatic change came dramatic cultural change. The so-called "good times" (Elston, 1982) were over and what came after was very different. During the Middle Holocene (7,500-4,500 years ago), a much more arid climate prevailed. In fact, this period may have been even drier than that of today (the Altithermal of Antevs). Broad-based subsistence practices become the norm, utilizing desert and mountain as well as lacustrine resources. One of the most archaeologically visible differences is the prevalence of grinding tools. Most have associated this prevalence with increasing dependence on plant foods, seeds in particular.

Very few archaeological sites can be reliably dated to the middle Holocene (see Grayson 1993, Table 9-1 for a list of some Great Basin middle Holocene sites). Grayson believes that one explanation for the lack of dated sites is that people made less use of caves during this time than they had in the past (1993:248-249), and of course, most radiocarbon dates come from cave deposits. Previously used cave sites adjacent to Pleistocene lakes became less attractive. As the lakes desiccated, people had no reason to remain at these locations. In fact, given the generally dry conditions, sites near springs or other permanent water supply made much better sense. Warren (1980) and others associate the beginnings of the early archaic with the appearance of Pinto projectile points. While some have confused these points with the "Gatecliff" style points defined by Thomas (1981), many have recognized that Pinto points are very different (Grayson, 1993:254-255). In the Mojave Desert Pinto points date to circa 7000-9000 B.P., but there is not enough evidence of their presence in the western Great Basin to firmly establish them as markers for the Early Archaic. This may be because the extreme aridity characteristic of the middle Holocene meant an extremely sparse population utilized many areas of the Great Basin.

In the Lahontan Basin, the evidence is scarce for the earliest parts of the Archaic. Originally considered the type-site for the "Humboldt Culture", work at Hidden Cave (Thomas, 1985) has failed to provide such evidence. Some sites along Winnemucca Lake returned dates within this range. At Shinners Site I in Falcon Hill, organic debris from Guano Cave yielded a date of 6550 B.P., while a cedar-bark robe from a desiccated burial in Cowbone Cave dated to 5720 B.P. (Heizer and Hester, 1978; Hattori 1982). An infant burial from Leonard Rockshelter dates to 5787 B.P. (Grosscup, 1958; Heize,r and Hester, 1978). First occupation at the Silent Snake Springs site occurs at about 6100 B.P., when the site served as a base camp for hunting mountain sheep. During later parts of the Early Archaic, archaeological evidence increases. Intermittent use of Lovelock Cave begins about 4630 B.P., although intensive occupation occurs later. Kramer Cave in Falcon Hill at Winnemucca Lake (Hattori, 1982) and Hidden Cave in the Carson Sink (Thomas, 1985) were used intensively during times when lakes filled the Winnemucca Basin and Carson Sink and lacustrine resources appeared. Both were occupied from about 3,900-3,600 years ago and most of the projectile points are in the Humboldt or Gatecliff Series. These sites, and others such as Lovelock Cave and Hanging Rock Cave, were not used as permanent residences, but instead for burials and caches of equipment and goods needed during

the seasonal round. Because of these locations were non-residential, little debitage or food waste was recovered during excavation. Instead large numbers of baskets, nets, fur and birdskin robes, atlatls and darts, mats, cordage and other perishable goods, finished lithic tools such as projectile points and knives, bone awls, and ornaments were found.

Middle Archaic (4000-1500 B.P.). Elston describes the climate for the Middle Archaic as cool and moist (1986:141). Some have defined it as neoglacial or neopluvial (Davis, 1982; Weide, 1982). While high altitude resources may have been inaccessible during this time, the formation of meadows, marshes, and shallow lakes where they had not been before surely offset this. Large technological shifts are not apparent during the transition from Early to Middle Archaic. The main changes seem to be in settlement and subsistence patterns, stylistic elaboration, and population density (Elston, 1986:142).

In many places, reoccupation of winter sites and seasonal base camps through long periods is typical. Pit houses range from two to four meters in diameter, contain interior features such as hearths, storage pits, and burials. The diversity of resources utilized is greater during the Middle Archaic. Elston believes this may be attributed to the extensive exploitation of particular ecozones. While big game hunting remained important, grinding stones and bones of smaller animals suggest a wider variety of subsistence activities.

Characteristic Middle Archaic artifacts include Northern Side-notched, Elko and Gatecliff series points, along with knives, grinding tools, scrapers, and wooden darts and atlatls. A distinctive basketry known as Lovelock Wickerware first appears at this time. Heizer and Baumhoff have postulated that certain styles of rock art also date to this period (1962). Trade in exotic materials such as marine shell and obsidian also becomes important during the Middle Archaic.

Lowland areas seem little used, while higher elevations appear more extensively exploited. Lacustrine specialization continues and intensifies at the mouths of the Humboldt and Truckee rivers. Cache and burial sites such as Humboldt Cave, Lovelock Cave, and the Winnemucca Lake sites continue in use. Many of these sites feature well-defined pit houses with central hearths, cache pits, and sometimes burials in the floors. These date between 3065 and 2130 B.P. Other sites dating to this period include the Rye Patch Reservoir sites along the Humboldt River. These are a series of short-term base-camps where seed processing implements are common, as are the remains of a variety of fauna from minnows to large game animals. Conversely, at the Barrel Springs site mountain sheep bones are numerous, large bifaces production was a major activity, and relatively few seed processing tools were recovered (Cowan and Thomas, 1972).

Late Archaic (1500-200 B.P.). A warming and drying trend began sometime around 2,000 years ago. It reached its peak in this period, although it appears to have been relatively mild when compared with the Early Archaic. Important cultural changes occurred during the Late Archaic. Elston believes that, while climate change may have triggered cultural change, population stress probably provided the main impetus for change. Many archaeologists equate these cultural changes to a postulated "Numic expansion" out of the southwestern Great Basin. Others reject this hypothesis. Glottochronological theories first espoused by Swadesh (1952, 1954) and later elaborated by Lamb (1958) fueled the idea of a Numic expansion. Grayson (1993) provides a thorough discussion of problems associated with the postulated Numic spread.

He accepts that all Numic languages are closely related and that Numic-speakers expanded across the Great Basin, but he does not believe the data support the idea that the linguistic splits within the various Numic branches occurred only 1,000 years ago. Grayson argues that the causes driving the cultural changes at about 1000 B.P. are unclear.

During the Late Archaic, the bow and arrow replaced the atlatl and darts throughout the Great Basin. Previously, lithic technology focused on biface production and the use of quarried raw materials. Production of simple flake tools from locally available materials replaces the earlier technology. About 1,500 years ago, small, triangular arrow points (e.g., Rose Spring and Eastgate) are first used. After about 900 years ago, Desert Series projectile points are characteristic. At this same time, an elaborate plant processing technology develops. Subsistence strategies focus on increasingly diverse resource categories within a varied range of ecozones. In addition to the varied plant foods, small game animals become a focus of hunting strategies.

Villages occupied at the mouths of the Truckee and Humboldt Rivers continue during the Late Archaic, but houses are smaller, shallower, and lack internal features. Humboldt Cave, Granite Point Cave, and Granite Point Shelter continue in use, as do several of the Winnemucca Lake sites. Many of these sites are used for burials and to cache goods, rather than for permanent occupation. Various zones continue to be used, although certain sites, such as Barrel Springs, and Karlo, are abandoned. At Rye Patch Reservoir, Rusco and Davis (1982) document occupation at a series of temporary base camps, although they see considerable shifts in subsistence practices. The greatest variety of fauna recorded at any time in the prehistoric sequence is typical of the Late Archaic there.

Ethnographic (200 B.P. to c. A.D. 1940). The ethnographic Northern Paiute and Western Shoshone occupied the western Great Basin when historic-period peoples first ventured into the region. Julian Steward's influential monograph, *Basin-Plateau Aboriginal Sociopolitical Groups* (1938), documents the complex and diverse adaptive practices followed by these groups. Subsistence activities were very broad during this period exhibiting a diverse mixture of forager and collector strategies (Thomas et al., 1986:265-268). Gathered plant resources such as seeds, roots, and berries formed the caloric nucleus of the aboriginal diet, but bighorn sheep, antelope, deer, and smaller mammals provided much needed protein as well as hides for clothing and blankets. Whenever possible, both the Shoshone and Paiute incorporated reptiles, birds, insects, and fish into their systematic but flexible seasonal subsistence round (Fowler and Liljblad, 1986; Grayson 1993; Thomas et al., 1986).

Highly mobile, native populations constructed their houses of readily available materials. Usually temporary, the favored house form was a conical or dome-shaped hut constructed of poles and covered with brush, grass, or woven mats. Winter structures were typically more substantial than the shelters used during the warmer months (Wheat, 1967).

Because of the relatively harsh environment, these aboriginal groups organized around the nuclear family or extended family unit. The sparse and unpredictable resource bases supported these smaller groups most of the year, although multiple family units would gather 2-3 times a year for communal hunts and congregate in winter villages. The winter villages may have

contained as many as 15-20 families (100-150 individuals) and were usually located at the lower edge of pinyon-juniper zone, canyon mouths, or along valley bottom springs or streams. Winter village sites in the assessment area occurred near permanent water sources such as the Humboldt River (Elston, 1982:135-148; Smith et al., 1983:11). Steward (1974:70) references Park et al. (1938:622) who describes a Northern Paiute band that "usually wintered along the Humboldt River from the [Humboldt] lake to the present site of Winnemucca. Thus, PVAs, KGRAs or pending lease applications along the Humboldt River could contain the remains from winter villages. In addition, Paiutes would sometimes spend the winter in the mountains including the Stillwater Range (McGuckian, 1996:100; Park, 1989:10; Stewart, 1941:374; Wheat, 1967) where pending lease applications, the New York Canyon and Dixie Valley KGRAs, and PVA 12 are located. The Stillwater Range was, and continues to be, used by the Northern Paiutes for pine-nutting. There are pine nut camps in the Stillwater Range as well as a route used by the Native American Indians to access the Stillwaters from Lovelock (McGuckian, 1996). Pending lease applications, the New York Canyon KGRA, and PVA 12 may intersect these. The pine-nutting route is also in the Rye Patch KGRA and PVAs 7 and 9.

While Steward's research (1938) indicates that much of the traditional aboriginal life way persisted after European contact, other researchers (Grayson, 1993; Service, 1962) suggest that key aspects of native people's social and economic organization quickly fell into disarray. Disease, territorial encroachment, and introduction of new technologies and ideas significantly affected the cultural practices of aboriginal populations. Population decline caused by disease, depletion of native food sources, and access restrictions to traditional resource procurement and ceremonial areas resulted in the abandonment of many long-established sites. As Grayson (1993:39) notes "Great Basin natives quickly became peripheral hangers-on in American towns." Historic accounts record the establishment of Indian settlements on the outskirts of many of the mining and ranching communities in the Great Basin. Purser (1987) and Marshall (1995) recount the Paiute's establishment of seasonal camps near farms and cattle ranches in Paradise Valley. Indian people found employment as laborers or domestics gradually becoming part of the American wage-labor system.

The continuing influx of settlers into the Great Basin eventually led to hostilities resulting in the forced consolidation of native peoples into colonies or reservations, although many Shoshone and Paiute refused the resettlement efforts (Fowler and Liljeblad, 1986:457). There are no Indian colonies or reservations in the assessment areas. The following reservations, colonies, and rancharias are near the assessment areas: Fort McDermitt Reservation, the Winnemucca Colony, the Lovelock Paiute Colony, Pyramid Lake Paiute Reservation, the Summit Lake Reservation, the Fallon Paiute Reservation, and the Battle Mountain Shoshone Band. Fort McDermitt Reservation, established around 1892, also has Western Shoshone residents (Clemmer and Stewart, 1986:532-533). Reservation life and colonization further weakened connections with pre-contact practices especially subsistence strategies and political organization. Other traditional cultural practices remained strong. Fowler and Liljeblad (1986:460) note that social organization changed little among the Northern Paiutes. While shamanism has declined, most tribal groups still have traditional practitioners.

Historic (A.D. 1828-Present). In 1828 Peter Ogden entered the region. From 1828-1833 trappers frequented the Humboldt River, opening the way for the first emigrants who passed

through the area to reach California and Oregon. Settlement began in the 1860s as a result of the overflow from California mines, particularly around the Comstock Lode. In the WFO, the Humboldt Range drew the miners. Mining brought various support industries, which eventually fostered a permanent population base. Ranching and farming became major industries resulting in the creation of grazing laws, reclamation projects, and new technology.

Historic events within the area helped mold and change the course of American history on a national scale. Captain John C. Fremont led the first Federally-sponsored exploration of the area in 1843. Two years later, he divided his party sending the larger segment (led by Joseph Walker) down the Humboldt to its sink while he led his segment over the Sierras near Truckee. According to Smith et al. (1983:81), no physical traces of the Fremont route remain in the area.

Prior to Fremont, emigrants ventured through the area following routes established by trappers. However, in 1846, the Applegate-Lassen Trail was established. Initially, the Applegate party created a cutoff from Fremont's Humboldt route. Later the same year, Peter Lassen's cutoff modified the Applegate route. Although mostly outside the affected environment, the viewshed associated with the Applegate-Lassen Trail could be affected which, in turn, could affect integrity of setting. The same may be true for other trails in the area used by emigrants up through the late 1860s. The Oregon-California Trail Association has documented most of the physical traces of the California Trail in the area (McGuckian, 2002). Along the Humboldt River Route, Winnemucca, Pallen's Well, and Big Meadows of Lovelock stand out. The Carson River Route includes the Humboldt Dike, Double Wells, and the Humboldt Slough. Brady Hot Springs, Table Mountain, and White Plains stand out as markers along the Truckee River Route. In addition, a stop along the 1856 Nobles Route includes Trego Springs.

These early emigrant traces are interesting for migration studies but significant area settlement did not begin until the 1860s. Mining, particularly in the Humboldts, drew multitudes of prospectors. Ranching activities and other businesses followed shortly thereafter.

Among the earliest mining in the area were the copper operations at the south end of the Eugene Mountains. Starting in the early 1850s, copper ore extracted from the mines was shipped to San Francisco. The discovery of silver in the Humboldts in 1860 resulted in hoards of miners moving in from California and the Comstock Lode region. Mills established along the Humboldt and included Rye Patch, Torreytown, Oreana, and others. Unionville, Star City, and other smaller mining towns popped up almost overnight. But typical of boom and bust cycle of mining, many of the early towns folded with the mining strikes of the 1860s and most others failed by the 1890s. Several more booms followed including resurgences in the early 1900s, 1930s, and 1950s.

Following the Civil War, the United States created many military outposts in the West to absorb the standing army and protect mail and freight routes in an expanding country. Camp McKee at Granite Creek Station, and Fort McDermitt on the East Fork of the Quinn River were two such military facilities. Located north of Gerlach, Camp McKee was established in 1865 on the 1852 Nobles Route after an Indian raid. Primarily a tent compound, two major stone foundations still remain at the Camp McKee/Granite Creek Station site (Carlson, 1974:161). Like McKee, Fort McDermitt was created in 1865. The abandoned stone, adobe, and frame buildings from the

original compound were renovated when the land became part of the Fort McDermitt Indian Reservation in 1889. Several of these structures remain standing (Pahrer, 1970:151).

By the 1870s, large numbers of cattle, and later sheep, were driven throughout the region. Homesteaders followed the early ranchers. Some tried to farm low lands and others were agents for large ranching operations. Paradise Valley, established in the 1860s, was the site of some of the earliest ranches in the state (Marshall, 1995). Some of these are still in use by current ranching operations. A flourishing agricultural community, Paradise Valley attracted immigrants representing a variety of ethnic backgrounds. Initially, Germans, Italians, and Basques settled in the valley. Later, after work on the Transcontinental Railroad finished, Chinese immigrants found their way to Paradise Valley. The valley even had its own small "Chinatown" between 1875 and 1905 (Marshall, 1995:11). Traces from these early settlers remain as wood and stone houses, foundations, irrigation systems, and fences. Several buildings reflecting the work of an Italian stonemason are listed on the National Register of Historic Places (Smith et al., 1983:94).

Agricultural production in the area remained fairly stable until the 1929 stock market crash caused multiple bankruptcies. World War II revived agricultural production in the area. Cattle ranching dominated the livestock industry and it continues to be the primary livestock product.

Railroads were a key element in the growth of many of the communities and commercial centers in the WFO District. The influx of capital, goods, and people accompanying the establishment of a rail line or depot, helped many mining towns survive the boom and bust cycle. Winnemucca began as a small trading post in 1863, but flourished as a transportation hub and commercial center when the Central Pacific Railroad reached the community in 1868. Within a decade, Winnemucca became the Humboldt County seat. Lovelock and Golconda, also benefited from the Central Pacific's presence. Between 1907-1909, the Western Pacific Railroad built another transcontinental line through northern Nevada. Gerlach, established as a depot on this line at that time, remains largely supported by railroad activities today.

Transportation growth continued in the area and by 1917 the route now followed by Interstate 80 was established. Originally a combination of abandoned sections of the Central Pacific Railroad and parts of the California Emigrant Trail—much of it unpaved—became State Route 1 or U.S. 1 (also known as the Victory Highway). In 1926 it was designated U.S. 40.

Mining, ranching and railroad construction all helped draw significant numbers of immigrants to Northern Nevada. As Wilbur Shepperson (1970) notes "[o]n a percentage basis Nevada was the largest foreign-born state in America for two decades following the Civil War." Winnemucca, Lovelock, Golconda, Paradise Valley, and the surrounding regions all had substantial immigrant populations (see Marshall, 1995; Shepperson, 1970; and Smith et al., 1983 for a more detailed discussion).

Available Data. The affected environment encompasses cultural resource sites within lease applications, KGRAs, and PVAs. These are organized geographically by hydrographic regions. The following data were compiled from records maintained at the WFO and electronically formatted data from the Nevada State Museum (provided for this project courtesy of the Nevada State Historic Preservation Office). The latter is part of an on-going project to digitize the state's

cultural resources database and has not yet been subject to a quality assurance review. Combined these data provide information on the sites and surveys within the specific units of analysis. Table 3.15-1 summarizes the available data. See Appendix D for additional detail.

TABLE 3.15-1
SURVEYS AND SITES WITHIN GEOTHERMAL ASSESSMENT AREA

Hydrographic Basin	Analysis Unit	Surveys (Acres/Percent)		Cultural Resources		
		Class II	Class III	Eligible	Ineligible	Undeterm.
Northwest Region	PVA 1	2,870 (1.5%)	88,874 (48.9%)	-	29	44
	N Lease App	50 (0.1%)	6,442 (92.7%)	2	3	12
	S Lease App	5 (<0.1%)	456 (9.8%)	-	11	11
	E Lease App	none	641 (100%)	-	-	-
Black Rock Desert Region	PVA 2	11,567 (7.8%)	23,026 (15.6%)	-	10	26
	PVA 3	none	58.5 (0.3%)	-	2	-
	Lease App	none	none	-	-	-
	PVA 4	4,002 (18.9%)	117 (0.5%)	-	19	5
	PVA 5	57 (<0.1%)	3,053 (4.1%)	-	12	32
	Gerlach KGRA	none	2,190 (22.7%)	2	16	27
	Lease App	none	3,007 (14.4%)	9	5	65
	San Emidio KGRA	none	1,247 (16.2%)	6	21	6
	Lease App	none	2,005 (6.5%)	10	27	62
Humboldt River	PVA 6	none	444 (0.4%)	-	4	41
	Lease App	none	34 (1.3%)	-	1	9
	PVA 7	1,260 (0.1%)	46,971 (6.9%)	13	186	313
	N Lease App	none	617 (96.8%)	-	2	-
	S Lease App	none	8 (0.6%)	-	-	1
	E Lease App	none	none	-	-	-
	W Lease App	none	37 (0.7%)	-	-	-

Hydrographic Basin	Analysis Unit	Surveys (Acres/Percent)		Cultural Resources		
		Class II	Class III	Eligible	Ineligible	Undeterm.
	PVA 8 Lease App near Brady KGRA	4,466 (62.6%)	151 (2.1%)	-	-	-
	PVA 9	10,907 (5.4%)	15,667 (7.8%)	28	132	195
	Rye Patch KGRA	none	6,535 (33.6%)	16	56	38
	Lease App	3,147 (24.7%)	4,948 (38.8%)	7	15	38
	PVA 11	none	6,403 (6.8%)	-	11	9
	Lease App	none	216 (4.1%)	-	1	1
West Central Region	PVA 8	27,397 (2.0%)	27,626 (2.1%)	21	265	124
	Brady KGRA	none	2,596 (5.3%)	3	3	18
	Lease App	none	862 (6.0%)	1	18	7
	Hazen KGRA	none	none	-	-	-
Truckee River	PVA 8 Lease App	none	71 (1.5%)	-	-	-
Central Region	PVA 10	84 (0.1%)	523 (0.8%)	-	-	1
	Lease App	24 (0.9%)	41 (1.5%)	-	-	-
	PVA 12	none	994 (1.9%)	-	10	1
	NY Canyon KGRA	none	286 (3.8%)	-	-	-
	N Lease App	none	18 (2.7%)	-	-	-
	S Lease App	none	none	-	-	-
	PVA 13	1,987 (0.7%)	4,726 (1.7%)	5	34	43
	Dix Valley KGRA	1,987 (1.0%)	481 (0.2%)	1	3	22
	N Lease App	none	none	-	-	-
	S Lease App	none	25 (0.9%)	-	-	3

3.15.1.2 High Sensitivity Model for Cultural Resources

To develop a more full understanding of the occurrence of significant cultural resources, a model of high sensitivity areas for National Register of Historic Places (NRHP)-eligible properties was created (see Figure 3.15-2). The model focused on three factors associated with recorded NRHP-eligible properties: distance to permanent/semi-permanent water, elevation (as reflective of environment) and slope. An additional sensitivity for viewshed associated with historic trails was also created and mapped.

In the desert environment, permanent and semi-permanent water sources are perhaps the most significant environmental factor in cultural settlement patterning. Prehistoric and historic peoples depended on them directly for hydration and other uses. They also depended on these water sources indirectly for their association with other resources (i.e., game). The strength of association between cultural sites and water led to using a 500m buffer around all permanent and semi-permanent water sources regardless of other factors.

Beyond 500m, slope and elevation were analyzed for their contribution to a sensitivity model. An analysis of eligible historic and prehistoric properties indicated that significant groupings of properties occur at distances of up to 1,500m from water sources between 3,800 feet and 6,300 feet elevation and at a slope of less than 15 degrees. Field checks at two lease applications support the model. The lease application at Leach Hot Springs (serial number NVN 074276) indicated evidence of historic use at the springs (within the 500m radius). It included the foundation of a structure built over one of the springs, purple and blue glass shards, glazed ceramic sherds, and a scatter of metal fragments. A few flakes also were observed indicating prehistoric use of the area though not substantial. The lease application at The Hot Springs in Paradise Valley (serial number NVN 074656) yielded evidence of historic and prehistoric use within 500m of the springs. Due north of the springs, a casual inspection revealed chert and obsidian flakes as well as metal fragments, cans and glazed ceramics (whiteware). West of the springs, but within 500m of a stream, a carved rock house (listed on the USGS 7.5' quadrangle as a gauging station) appears to have been a home. The number "1891" is carved in the rock above the door and presumably refers to the date of construction. At a further distance from the water (500-1,500m), where the elevation and slope lie within the parameters of the model, two flaked tools (probably scrapers), debitage, and a historic ditch were observed.

A field check was also performed at distance of 2,500-3,500m from the Leach Hot Springs in an area that lies within the elevation and slope parameters because an earlier version of the model suggested a relationship between historic period sites and that distance. However, that relationship appears to be spurious. No cultural materials greater than 50 years old were observed in the area. The 2,500-3,500m distance from water was dropped from the model.

This model does not account for significant cultural resources independent of these environmental factors. Geologic data, for instance, may be useful in analyzing rockshelter locations, mining activities, and/or prehistoric quarry sites. Archival research can specify trails, town sites, ranches, etc. Table 3.15-2 provides sensitivity issues by geothermal analysis units.

FIGURE 3.15-1
CULTURAL RESOURCES SENSITIVITY AREAS

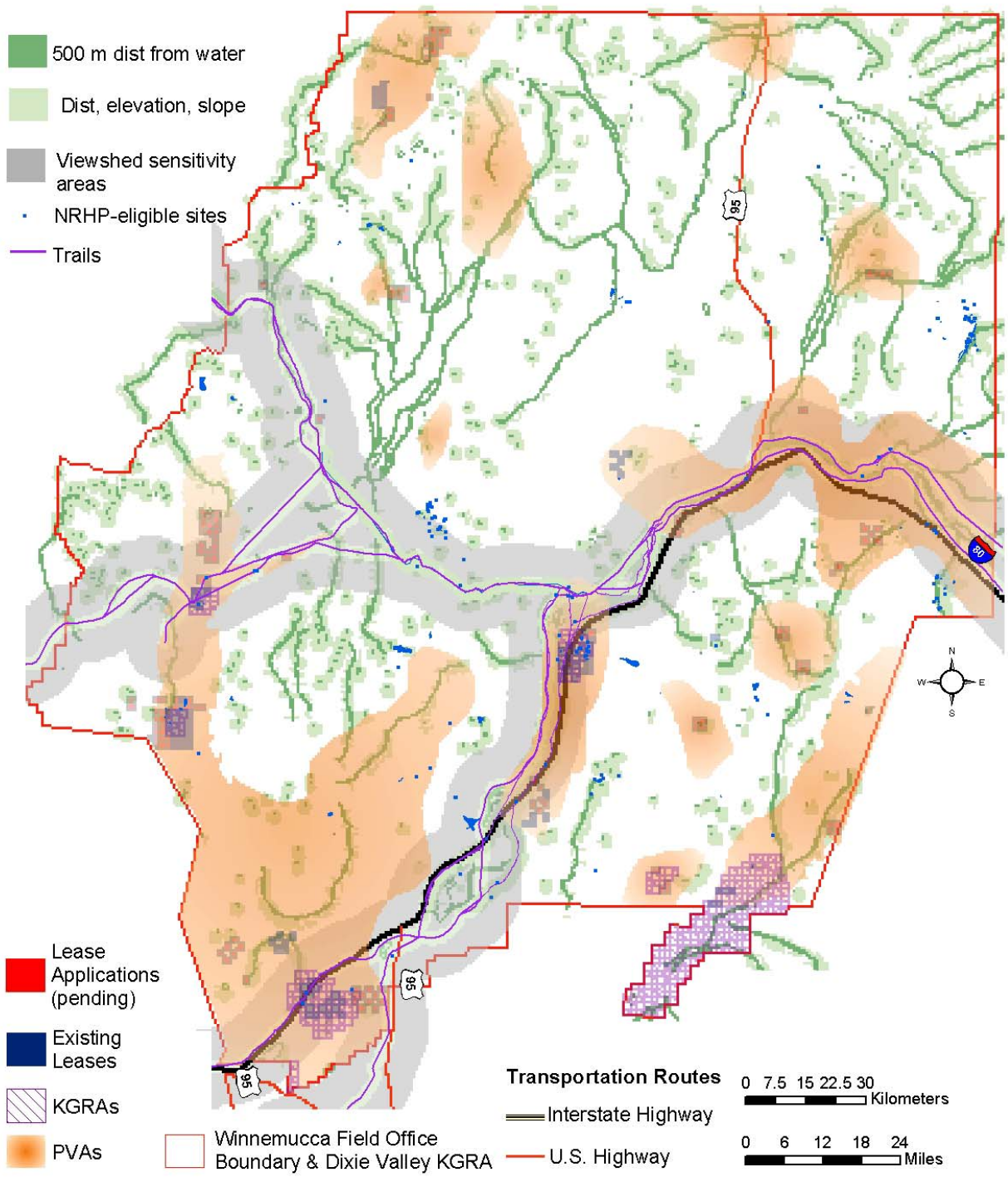

TABLE 3.15-2
PERCENT OF HIGH SENSITIVITY AREAS
FOR SIGNIFICANT CULTURAL RESOURCES

Region	Analysis Unit	H^2O 0-500 M	Elevation + Slope + H^2O	Viewshed	
				1 mile	5 miles
Northwest Region	PVA 1	10%	3%	-	-
	N Lease App	14%	3%	-	-
	S Lease App	10%	3%	-	-
	E Lease App	-	-	-	-
Black Rock Desert Region	PVA 2	5%	2%	-	-
	PVA 3	6%	2%	-	-
	Lease App	18%	62%	-	-
	PVA 4	2%	2%	-	-
	PVA 5	21%	7%	-	-
	Gerlach KGRA	2%	6%	75%	25%
	Lease App	6%	5%	13%	47%
	San Emidio KGRA	8%	1%	-	-
	Lease App	4%	4%	-	-
Humboldt River	PVA 6	11%	10%	-	-
	Lease App	75%	25%	-	-
	PVA 7	16%	3%	5%	75%
	N Lease App	-	-	-	100%
	S Lease App	15%	15%	-	-
	E Lease App	12%	1%	-	-
	W Lease App	12%	12%	-	100%
	PVA 8 Lease App near Brady KGRA	2%	9%	2%	98%
	PVA 9	12%	2%	35%	65%
	Rye Patch KGRA	13%	2%	70%	30%
	Lease App	6%	3%	50%	50%
	PVA 11	6%	4%	-	-
	Lease App	37%	10%	-	-
West Central Region	PVA 8	4%	2%	2%	30%
	Brady KGRA	9%	4%	3%	95%

Region	Analysis Unit	H^2O 0-500 M	Elevation + Slope + H^2O	Viewshed	
				1 mile	5 miles
	Lease App	14%	10%	-	-
	Hazen KGRA	-	-	-	20%
Truckee River	PVA 8 Lease App	-	1%	-	-
Central Region	PVA 10	1%	3%	-	-
	Lease App	6%	60%	-	-
	PVA 12	4%	4%	-	-
	NY Canyon KGRA	-	2%	-	-
	N Lease App	-	-	-	-
	S Lease App	-	-	-	-
	PVA 13	3%	2%	-	-
	Dix Valley KGRA	15%	1%	-	-
	N Lease App	12%	32%	-	-
	S Lease App	-	12%	-	-

3.15.2 Environmental Impacts

3.15.2.1 Proposed Action

Direct Impacts – There would be no direct impacts as a result of the proposed action.

Indirect Impacts – Most impacts to cultural resources under the "reasonably foreseeable development scenario" would be prevented through the Section 106 process of the National Historic Preservation Act[24] and no surface occupancy stipulations for National Register listed and National Register eligible sites. The following are indirect impacts that could occur under this scenario:

Exploration. Repeated off-road traffic along seismic lines creates roads and could inadvertently open access to previously inaccessible areas that could result in unauthorized collecting/excavation. New access roads to wells could also lead to increased accessibility of new areas to vandalism and illegal collecting/excavation. There could be minor impacts to the integrity of setting of the California Trail, Central Pacific Railroad, and other National Register listed/eligible sites where integrity of setting is critical to their listing/eligibility.

Development. Impacts to the integrity of setting of the California Trail, the Central Pacific Railroad, and other National Register listed/eligible sites where integrity of setting is critical to

[24] Natural Historic Preservation Act of 1966 (P.L. 890655 (16 USC §470; 36 CFR §§79 and 800))

their listing/eligibility could occur from construction of roads, drill site development, geothermal pipelines, power plants, and electric transmission lines. Roads could increase the likelihood of vandalism and illegal collecting/excavation of cultural sites.

Production. Most, if not all impacts to cultural resources would have occurred prior to the production phase. Very few changes affecting cultural resources would occur during this scenario phase.

Close-Out. If reclamation is complete, impacts to setting of cultural sites and impacts from increased accessibility which occurred under previous phases would be mitigated. Otherwise, these impacts would continue.

3.15.2.2 No Action Alternative

Direct Impacts – There are no direct impacts from issuing leases for future geothermal exploration, development, and production activities.

Indirect Impacts – Indirect impacts from the No Action Alternative would be similar to those described in the Proposed Action; however, updated mitigation measures and stipulations would not apply using the 1982 Geothermal EA.