



Kim Munson 2011

3.16 Cultural Resources

3.16.1 Affected Environment

3.16.1.1 Overview

Cultural resources are definite locations of human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The term includes archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and may include definite locations (sites or places) of traditional, cultural, or religious importance to specified social and/or cultural groups, including Indian tribes. Cultural resources are concrete, material places and things that are located, classified, ranked, and managed through the system of identifying, protecting, and utilizing for public benefit.

The analysis area for cultural resources is the APE, which is defined as “the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking” (36 CFR 800.16[d]).

For the proposed Project, the APE for direct effects includes the temporary and permanent ROWs, the footprint of groundwater-development areas, newly constructed or existing access roads that would need improvement, staging and storage areas, and areas that are identified for the excavation or deposition of borrow material. The APE for visual effects to aboveground historic properties includes areas within 1 mile of proposed ROWs, roads, and non-linear project facilities. At the discretion of the BLM, in consultation with the State Historic Preservation Office (SHPO), the visual APE for a given GWD Project facility or segment may be enlarged or diminished as may be reasonable and appropriate. For indirect effects associated with subsidence as a result of pumping, the APE encompasses the 35 hydrologic basins identified in the hydrologic study area (see Section 3.3, Water Resources). Expanded definitions of the APE can be found in the draft PA (**Appendix F3-16**), which is described later in this section.

Regulatory Framework

Federal historic preservation legislation provides a legal environment for documentation, evaluation, and protection of historic properties that might be affected by federal undertakings, including private undertakings that operate under federal license or on federally managed or private lands. The National Historic Preservation Act (NHPA) of 1966, as amended through 2006, established the ACHP and expanded the National Register of Historic Places (NRHP). The NHPA mandates that federal agencies consider the effect of an undertaking on cultural resources that are listed or are eligible for listing on the NRHP (i.e., historic properties). Section 106 of the NHPA establishes a four-step review process by which such resources are considered. The four steps are as follows:

1. Initiate the Section 106 process by establishing the undertaking, defining the APE, and consulting with the appropriate parties, including federal agencies, SHPO, ACHP, Indian tribes, local governments, and the public;

Quick Reference

ACHP Advisory Council on Historic Preservation

APE Area of Potential Effect

ACM Applicant-committed Protection Measure

ARPA Archaeological Resource Protection Act

BP Before Present

CCC Civilian Conservation Corps

CFR Code of Federal Regulations

CR Cultural Resources

NAGPRA Native American Graves Protection and Repatriation Act

NHPA National Historic Preservation Act

NPS National Park Service

NRHP National Register of Historic Places

PA Programmatic Agreement

SHPO State Historic Preservation Office

2. Identify historic properties through inventory and evaluation;
3. Assess adverse effects by applying the criteria of adverse effects; and
4. If adverse effects will occur, then take appropriate steps to resolve those effects.

Regulations in 36 CFR 800 outline the process through which historic preservation legislation under the NHPA is administered. Regulations in 36 CFR 800.14 allow federal agencies to adopt program alternatives to 36 CFR 800 and to tailor the Section 106 process to better fit agency procedures or a specific project. One type of program alternative is a PA, which is negotiated between the agency, SHPO, and ACHP. A PA for a complex project lays out the steps that the agency and the consulting parties agree to take to consider and resolve any adverse effects that the project might have on historic properties. A PA among the BLM Ely and Southern Nevada district offices, Nevada SHPO, ACHP, USACE, and SNWA currently is being developed for the GWD Project and can be found in **Appendix F3.16**. The draft PA outlines general and specific measures that the BLM will take to fulfill its objectives and responsibilities regarding the protection of historic properties under the NHPA.

As part of the PA process, the BLM sent letters to local governments, organizations, and agencies inviting them to be consulting parties to the agreement. Many of the groups accepted the BLM's invitation to participate as a consulting party. These groups include the following:

- Preserve Nevada;
- Nevada Rock Art Foundation;
- White Pine County Board of County Commissioners;
- National Park Service (GBNP);
- Bureau of Indian Affairs (BIA);
- Great Basin National Heritage Area Partnership;
- U.S. Fish and Wildlife Service (USFWS); and,
- Archaeo-Nevada Society (Department of Human Behavior).

Consulting parties are defined by the ACHP regulations as “Certain individuals and organizations with a demonstrated interest in the undertaking [who] may participate as consulting parties due to the nature of their legal or economic relation to the undertaking or affected properties, or their concern with the undertaking's effect on historic properties” (36 CFR 800.2[c][6]). The regulations emphasize that the “views of the public are essential to informed Federal decision-making in the Section 106 process” (36 CFR 800.2[d][1]). Each of the consulting parties has been afforded a reasonable opportunity to participate in the development and finalization of the PA and has been invited to participate as a concurring party. A concurring party concurs in the terms of the PA, and may participate in and benefit from the PA.

In addition to the organizations, local governments, and agencies listed above, the BLM has made a reasonable and good faith effort to identify and seek consultation with every federally-recognized Indian tribe with religious and cultural ties to the analysis area that “attaches religious and cultural significance to historic properties that may be affected by an undertaking” (Section 101[d][6][B] of the NHPA). “Such Indian tribes shall be a consulting party” (36 CFR 800.2[c][3]). The BLM provided draft copies of the PA to the Indian tribes and invited each of the tribes to comment on and suggest changes to any part of the agreement. Each of the identified Indian tribes also has been invited to participate as a concurring party. For a full discussion of the tribal consultation efforts for the proposed Project, the reader is referred to Section 3.17, Native American Traditional Values.

The next step in development of the PA is review by the public prior to execution of the agreement by the BLM, ACHP, SHPO, USACE, and SNWA.

Eligibility Criteria for Listing Cultural Resources on the NRHP

The NRHP, maintained by the National Park Service (NPS) on behalf of the U.S. Secretary of the Interior, is the nation's inventory of historic properties. In general, the NPS has established three main standards that a property must meet to qualify for listing on the NRHP: age, integrity, and significance. To meet the age criteria, a property generally must be at least 50 years old. To meet the integrity criteria, a property must "possess integrity of location, design, setting, materials, workmanship, feeling, and association" (36 CFR 60.4). To meet the significance criteria, a property must meet one or more of the following criteria:

- **Criterion A:** Be associated with events that have made a significant contribution to the broad patterns of our history.
- **Criterion B:** Be associated with the lives of persons who are significant in our past.
- **Criterion C:** Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic values; or represent a significant and distinguishable entity whose components might lack individual distinction.
- **Criterion D:** Have yielded or may be likely to yield information that is important in prehistory or history (NPS 1991).

To qualify for NRHP eligibility, a property must meet two separate types of requirements. It must exhibit integrity of location, design, setting, materials, workmanship, feeling, and association, and it must meet one or more of the four above-listed criteria. The NHPA makes clear that a site need not be of national historic significance to be considered eligible; sites of local or state significance also may be listed, and thus are significant in the legal sense. A site does not have to be included in the NRHP to receive protection under the law, but must only meet the requirements of eligibility.

Regional Overview

The following are brief summaries of the prehistoric and historic periods in the Great Basin. Information contained in the summaries was extrapolated from Baldrice (2003), d'Azevedo (1986), Lyneis (1982), and McBride (2002). For more detailed discussions of these periods, the reader is referred to the four listed sources.

Prehistory

Paleoindian (13,500–11,000 Before Present [B.P.]

This period marks the transition from Pleistocene (geological epoch from 1.8 million to 12,000 years B.P.) to Holocene (geological epoch which began approximately 12,000 B.P.) climatic conditions. Paleoindian sites usually are associated with pluvial lakes, shoreline features, riparian areas, marshes, or along river terraces. Diagnostic tools include a variety of stemmed projectile points (Great Basin Stemmed series) as well as fluted Clovis and unfluted lanceolate types (Beck and Jones 1988). Paleoindian cultures hunted big game (e.g., mammoth, bison) and smaller game animals (e.g., rabbit, fox) and gathered easily processed lacustrine and marsh-related resources such as cattail pollen, shoots, and green seeds. Other plant resources utilized by Paleoindian groups include grasses, bulbs, nuts, roots, and berries.



Clovis

Early Archaic (11,000–4,000 B.P.)

This period is characterized by a transition to a warmer, drier Holocene environment that resulted in the drying out of lakes, streams, and springs; this change caused subsequent changes in vegetation patterns (Aikens and Madsen 1986). Archaeological investigations conducted at Early Archaic sites indicate a greater exploitation of diverse habitats, with less reliance on hunting and more reliance on plant resources. Groundstone tools became more widespread, suggesting greater reliance on plant resources such as seeds. Diagnostic projectile points of this period include Humboldt and Pinto Series points and Northern Side-notched points. Because of the generally warmer and drier conditions during the Early Archaic period, populations in the Great Basin seem to have shifted from lakeshore environments to a wider variety of locales, including those near drainages and remnant pluvial lakes, caves, and rock shelters.

Middle Archaic (4,000–1,500 B.P.)

This period is marked by a shift to cooler, moister conditions in which streams and springs began to flow again and in which marshes were re-established in some places. As a result of the increase in available surface water, there was a greater diversity of plant resources. Middle Archaic populations exploited a wide range of habitats and re-occupied residential sites and seasonal camps. Overall settlement patterns were relatively mobile, with movements timed to take advantage of resources maturing at different times in different elevation zones. Sites and camps contained features such as hearths, cache pits, food storage pits, and house depressions. Diagnostic tools of this period include Gatecliff Series projectile points, as well as the Humboldt, Pinto, and Elko Series projectile points. Milling equipment such as manos, metates, mortars, and pestles became a more prominent element of the Middle Archaic culture, suggesting an increased reliance on processing of plant foods.



Humboldt

Late Archaic (1,500–160 B.P.)

During the Late Archaic, the climate became warmer and drier, similar to the current climate. The period generally is characterized by a reduction in population and abandonment of pluvial lake-margin sites. Subsistence and settlement patterns varied and ranged from nomadic groups that used a variety of ecological zones to more sedentary groups that used primarily cultivated and locally-procured wild resources (Lyneis 1982). Groundstone artifacts such as manos and metates increased during this period, indicating an even greater reliance on plant resources than in previous times. Other artifacts associated with the Late Archaic period include drills, punches, manos, metates, basketry, slings, animal decoys, mats, and marine shell beads. The first half of the Late Archaic is marked by the appearance of the bow and arrow with accompanying smaller and lighter Rosegate Series points. Later, Rosegate Series points were replaced by Desert Side-notched and Cottonwood Series points. The introduction of brownware pottery at about 900 B.P. and better groundstone technologies led to the consumption of pine nuts and an increase in other plant foods (tubers, bunch grasses) throughout the Great Basin. Larger sites are located on the valley floors, with seasonal pine nut gathering and temporary hunting camps set up in higher altitudes where big game hunting and pine nut activities were a major part of daily activities.



Gatecliff



Rosegate

Fremont (1,600-700 B.P.)

During the Late Archaic, the eastern Great Basin saw the emergence of the Fremont Culture. The Fremont people manufactured well-made, thin-walled, black-on-grey carbon-painted pottery and frequently lived in sizable villages (Grayson 1993). Artifacts that have been found throughout the Fremont region include sandals that were made with deer-leg hides, using the dew claws as heels; basketry that was with a *one rod and bundle* weaving technique; and pottery that had unique patterns and tempers. Though a distinct culture, the Fremont Culture shared the development of corn agriculture and the expansion of organized sedentary villages with contemporary farming cultures, such as the Ancestral Puebloan (who lived throughout the southwest in the 11th and 14th centuries). For currently unknown reasons, the Fremont people abandoned the Great Basin after about 650 B.P., possibly because of environmental change and the migration of other groups into the area (Marwitt 1986).



Desert Side-Notched

Early and Late Ceramic Period (1,450-100 B.P.)

In the southern extension of the Great Basin, the Virgin Anasazi Culture emerged and concentrated around the Virgin and Muddy Rivers in the Moapa and Virgin valleys. Chronologically, the Virgin Anasazi Culture has been divided into four phases: Moapa Phase, Muddy River Phase, Lost City Phase, and Mesa House Phase. As with other Ancestral Puebloan cultures, the Virgin Anasazi is distinguished through ceramic technology. Graywares (Moapa and Logandale) are the initially identified ceramic types for the Virgin Anasazi Culture and are present throughout the cultural sequence. Tusayan Gray Ware, Virgin Series appears later in the ceramic period (Allison 2000). In lesser quantities across the region are San Juan Redware, Tsegi Orange Ware, and Tusayan White Ware, Kayenta Series. Shinarump wares are rare in the Moapa and Virgin valleys (Lyneis and Hays-Gilpin 2008). Architectural features that

remain from phases of the Virgin Anasazi occupation consist of aboveground square and rectangle structures of adobe and masonry (called “pueblos”) and circular, semi-subterranean pit-house structures; kivas or similar ceremonial structures are rare (Lyneis 1995).

Archaeological investigations at various sites within the Moapa Valley suggest that the inhabitants practiced irrigation farming in the river valleys and supplemented their diets by collecting wild foodstuffs; they cultivated pumpkins, corn, and tepary beans in fields along the riverbanks, and acquired natural foods such as agave, yucca, screwbeans, and pinyon seeds from the higher elevations (Lyneis 1996). The Virgin Anasazi culture declined and the appearance of Desert Side-notched projectile points and brownware ceramics indicates the possible movement of Numic-speaking peoples (Shoshone, Paiute, Ute) into the Great Basin around 1,000 B.P. Several rock shelters in the southern reaches of the Great Basin contain Southern Paiute brownware ceramics and Desert Side-notched projectile points.

Protohistoric Period

Protohistoric is defined as the period or stage of human development or of a particular culture immediately prior to the emergence of writing. The Protohistoric Period was a critical time in the evolution of indigenous populations. Encroachment by European explorers during the sixteenth century and their imposition of cultural values compromised the lifeways and traditions of Native Americans. At the time of European contact, the Great Basin was inhabited by hunters and gatherers who were related culturally and linguistically. Early descriptions of Nevada Native Americans describe them as a poor, starving people living in a barren land. The indigenous populations exploited their environment through a series of patterned movements from season to season based on information derived from traditional knowledge, input from their neighbors, and observations from individuals within the group. An expanded discussion of Nevada’s Native American groups can be found in Section 3.17, Native American Traditional Values.

History

Spanish Exploration (1776)

In 1776, Father Francisco Garces used Mojave Indian guides to travel from Sonora to Los Angeles, to initiate a route to Santa Fe. During the trip, he traced segments of an ancient trading route (the Old Mojave Trail), crossing what is believed to be the southern tip of Nevada. In the same year, Father Francisco Dominguez and Francisco Escalante set out to explore a route from Santa Fe to Monterey, but they never crossed the present-day border between Utah and Nevada.

Traders, Trappers, and Trails (1820s–1840s)

By the early 1800s, traders, fur trappers, and U.S. government-sponsored expeditions resulted in the exploration of the region. In 1826, Jedediah Strong Smith became the most prominent fur trader to cross into southeastern Nevada. On his second trip in 1827, Smith appears to have traveled across Nevada into White Pine County. In 1829, Antonio Armijo completed the first overland trade caravan between Santa Fe and Los Angeles, traveling by way of southern Las Vegas Valley. This trade route first came to be known as the Old Spanish Trail; however, the trading route that actually became the Old Spanish Trail was located farther north in northern Las Vegas Valley. By 1830, the Old Spanish Trail, which partially followed the Escalante and Dominguez route, became a major thoroughfare for organized caravans participating in extensive trade. In southern Nevada, physical evidence of the trail has been obscured by subsequent transportation development. The proposed Project would not cross any known segments of the Old Spanish Trail.

U.S. Government-Sponsored Expeditions (1834–1871)

During the 1840s, John C. Fremont became a significant American explorer and traveled with Kit Carson and Joseph Walker through Las Vegas Valley and again just northwest of the analysis area. In 1859, the U.S. War Department sent Captain James H. Simpson (Corps of Topographic Engineers) and a group of mapmakers on a surveying expedition from Provo, Utah, through Nevada. Simpson’s return route to Utah crossed the area southeast of Ely, in the middle of Spring Valley, approximately where present-day Highway 50 is located. The return route became known as the Central Route, which was used as the main transportation and settlement artery of central and eastern Nevada through the 1860s. In 1869, First Lieutenant George M. Wheeler undertook a major military reconnaissance and scientific expedition into eastern and southern Nevada. Wheeler’s party might have crossed through the Steptoe Valley or Schell Creek Range.

Emigration and Settlement (1850s–1870s)

In 1848, a Mormon wagon train under the leadership of Lewis Manly set off in search of a shortcut from the Old Spanish Trail on its way to Los Angeles. The Manly party might have crossed the area west of Caliente in Dry Lake Valley. Emigrants began to settle in Nevada in the 1850s after the California Gold Rush. Panaca was eastern Nevada's first permanent settlement, founded as a Mormon colony in 1864. The town originally was part of Washington County, Utah, but the Congressional redrawing of boundaries in 1866 shifted Panaca into Nevada.

Development of Industry (1850–1950)

Mining

The mining boom hit eastern Nevada during the late 1860s. By 1869, earlier discoveries of silver (at the site of the Monte Cristo Mine in 1865 and Treasure Hill in 1867) generated a rush of prospectors and capital to the area. Toward the late 19th and early 20th centuries, numerous mines had been developed in the analysis area. The Nevada mining district was developed southeast of Ely in 1869 and produced manganese, silver, gold, lead, and copper. In that same year, the Cooper mining district, which is crossed by the northern extension of the analysis area, also was established. Other mining districts were soon established, including those in or near the Snake Range and southern Spring Valley.

A number of mining districts were established in or near the Snake Range. The Sacramento mining district was developed during the initial 1869 boom and yielded tungsten, gold, and silver. South of the Sacramento district, the Osceola district was established in the Snake Range after placer gold was discovered there in 1872; the mine closed in 1920. The analysis area may cross the western portion of the Osceola district (Paher 1970).

Located several miles east of the analysis area, at the southern rim of Dry Lake Valley in Lincoln County's Delamar Mountains, the mines of the Ferguson District were Nevada's most productive ore extraction sites during the 1890s. The mines were sold in 1902 to a mining operation headed by Simon Bamberger, and in 1906, the mines generated Nevada's third highest yield. Operation of the mines ceased in 1909 (Hulse 1971; Paher 1970). In Lincoln County, Pioche developed as one of Nevada's more famously lawless boomtowns after a silver strike there in the winter of 1863–1864. In 1874, prospectors established mining districts along the extreme southern rim of Cave Valley.

Mormons pioneered mining in Clark County, beginning with the Potosi mine in 1856. Around 1871, mining declined in Clark County as local Mormons left the area; mining resumed in the 1890s after the Mormons returned from Utah. Mining activity in the county was boosted by the 1905 completion of the San Pedro, Los Angeles & Salt Lake Railroad.

Ranching, Agriculture, and Irrigation

In 1864, a small contingent of Mormon emigrants from Utah began settling cooperative farms and ranches in present-day Panaca, in eastern Nevada. Commercial agriculture and ranching in the central and southern portions of eastern Nevada initially developed in response to the mining boom that began in 1869. In irrigable locales of southeastern Nevada, agricultural production from the 1870s fluctuated in response to changing local markets and access to markets outside of the region. By the 1890s, livestock had become a mainstay of the region's economy.

From the turn of the century through World War I (WWI), many eastern Nevada agricultural producers and ranchers benefited from new state and federal legislation and land use initiatives, as well as from infrastructure development that improved productivity and market access. In 1906, completion of the Nevada Northern Railroad line to Ely gave local farmers access to distant markets. At the same time, development of the Ruth copper mines and the smelter operation of William McGill helped revitalize the local market for livestock and farming products in southern White Pine County.

The 1894 Carey Act and the 1902 Newlands Act made an increasing amount of public land available for irrigation development, which increased farming activity in White Pine County and in the Panaca area. As a result, the region experienced a boom in the first two decades of the 20th century. After WWI, farmers and ranchers struggled as market prices began to decline. Regional drought in 1930 increased the economic problems. Raising livestock rebounded in the mid-1930s; however, by 1939, many small producers had become dependent on wage-paying jobs with the Work Projects Administration. The Taylor Grazing Act, which established federally regulated grazing districts, brought a new

measure of land-use management to eastern Nevada ranching lands during the late 1930s and early 1940s. The region also saw gains from projects by the Civilian Conservation Corps.

Enacted by Congress in 1933, the Civilian Conservation Corps was one of the most popular New Deal programs to be implemented by the federal government during the Great Depression. Especially active in Nevada, the Civilian Conservation Corps provided the state with multiple forms of resource development and conservation work. Initially, the Civilian Conservation Corps employed men between the ages of 18 and 25 (the upper age limit was later extended to 28), as well as older out-of-work WWI veterans, who served as physical conditioning coaches and drivers. Civilian Conservation Corps workers planted trees, thinned forests for fire control, stocked fisheries, built wildlife shelters, dug ditches, constructed canals, controlled erosion, improved recreational facilities, and fought insect invasions. By 1942, the project was terminated due to WWII's demand for manpower.

Transportation and Communication (1850s–1950s)

Railroad Development

In 1880, the Wells depot on the transcontinental line of the Southern Pacific marked the closest railroad shipping point to the area around present-day Ely. A narrow-gauge line from the Southern Pacific to the mines in the Eureka area was completed by the Eureka & Palisades Railroad in 1875, only to be abandoned and then reactivated when mining activity in the area waned and then rebounded around the turn of the century. An Ely connection was not constructed until the early twentieth century, when railroad service became necessary for copper mining operations launched by Mark Requa, son of the owner of the Eureka & Palisades Railroad. Requa secured investments for the Nevada Northern Railroad, which extended northward approximately 140 miles, when completed, to a connection with the Southern Pacific Railroad at Cobre. In 1905, a line of the Salt Lake, Los Angeles & San Pedro Railroad was completed through southeastern Nevada. The Las Vegas and Tonopah Railroad extended northwest from Las Vegas through Goldfield to Tonopah but went out of business in 1918.

Highway Development: Lincoln Highway and Arrowhead Trail Highway

Modern highway development in Nevada was supported by the creation of the Lincoln Highway and by subsequent controversies surrounding its construction. For decades after its initial creation, the Lincoln Highway had extensive portions that remained dirt road. The original Nevada section of the route wound through Tippets Ranch, Shelburne Pass, Ely, Eureka, Austin, Fallon, Wadsworth, Carson City, and Reno. By 1917, frustrated county-based attempts to improve the highway led to the creation of the Nevada Department of Highways (now known as the Department of Transportation), which made the state eligible for federal highway funds under the Federal Aid Road Act of 1916. During the early 1920s, Lincoln Highway construction was delayed by Utah's attempt to improve a southerly transatlantic route that would keep travelers in the state for longer periods and direct traffic to Los Angeles. In response, the town of Ely and the Nevada Consolidated Copper Company joined in a boycott of Salt Lake City businesses.

The conflict was further complicated when San Francisco interests promoted development of a northern route through Nevada. Known as the "Victory Highway," this route, which follows present-day U.S. 40 and I-80, was designated SR 1, while the Lincoln Highway was designated SR 2. Construction on the Lincoln Highway continued into the 1930s. By 1936, the Lincoln Highway route from Robinson Summit through Ely to McGill was fully paved with asphalt and/or asphaltic gravel. In White Pine County, the original Lincoln Highway route and subsequent early twentieth century realignments generally follow present-day U.S. 93 between McGill and Ely. From Ely, they turn to the northwest, intermittently paralleling and intersecting present-day U.S. 50 (Franzwa and Petersen 2004). These eastern Nevada portions of the Lincoln Highway lie northwest of the analysis area and would not be intersected by the proposed Project.

The Arrowhead Trail or Arrowhead Highway was the first all-weather road connecting Los Angeles to Salt Lake City by way of Las Vegas. Built primarily in the late 1910s and viable roughly contemporaneously with Route 66, the road has since been supplanted by U.S. Route 91 and subsequently, by Interstate 15. Small portions of the route in California and Las Vegas (Las Vegas Boulevard) are sometimes still referred to as Arrow Highway.

3.16.1.2 Right-of-way Areas and Groundwater Development Areas

Cultural Resources Investigations

Files Search

In the summer of 2008, a files search was completed to identify all previously conducted cultural resources investigations and known cultural resources within 1 mile of the proposed pipeline and power line ROWs, which included proposed pumping stations, electrical substations, the buried storage reservoir and water treatment facility (Jones & Stokes 2008). At this time, no files search has been conducted for the locations of future facilities. The current files search was conducted through numerous sources, including the Harry Reid Center for Environmental Studies at the University of Nevada, University of Las Vegas Library, BLM Ely District Office, and Nevada Cultural Resources Information System. Additional information was collected from General Land Office survey plats and historic maps; county assessor offices in Clark, Lincoln, and White Pine counties; and Nevada historical societies and museums. A total of 327 cultural resources investigations previously were conducted in the files search study area. Of these, 207 investigations fall completely or partially within 300 feet of the proposed ROWs or facilities listed above. Based on the files search, approximately 11 percent of the files search study area has been previously surveyed for cultural resources.

The files search resulted in the preliminary identification of 657 cultural resources that had been previously recorded within the files search study area. Of these 657 resources, 488 resources are prehistoric, comprising 310 sites and 178 isolated finds; 117 resources are historic, comprising 82 sites and 35 isolated finds; and 22 resources are multi-component sites that contain both prehistoric and historic components. No information is available for 30 resources that have been assigned site numbers.

Of the 657 previously recorded cultural resources identified in the files search study area, 184 are within 300 feet of the proposed ROWs or facilities listed above. Twenty-two of the sites are eligible for listing on the NRHP. These 22 sites include nine lithic scatters, four artifact scatters, three rock shelters, two habitation sites, a military installation, mining camp, quarry/camp, and lithic scatter/road.

Class III (Pedestrian) Inventory

Per the terms of the draft PA, a combination of means of inventory and consultation would be used to determine the presence of historic properties in the APE. Archaeological resources would be identified by means of intensive pedestrian Class III inventory; identification and evaluation of archaeological resources would be accomplished by persons meeting the Secretary of the Interior's qualifications. Architectural resources (e.g., buildings, structures) also may be identified initially during this Class III archaeological inventory, or as a result of documentary research; evaluation of architectural resources would be accomplished by persons meeting the Secretary of the Interior's qualifications. In recognition of their particular expertise, Indian tribes and their designated knowledgeable representatives would be consulted to establish the locations and importance of properties of cultural and religious importance. The BLM would be responsible to review the results of inventory, determine NRHP eligibility, assess effects, and seek resolution of adverse effects in consultation with the SHPO and consulting parties, including Indian tribes, per terms of the PA.

3.16.2 Environmental Consequences

3.16.2.1 Rights-of-way

Issues

The following issues for cultural resources are discussed as part of the impact analysis of construction and facility maintenance.

- Construction of the GWD Project and its associated facilities could affect historic properties if they cannot be avoided.
- Previously undiscovered archaeological deposits, including burials and associated funerary objects, could be discovered and directly affected during ground-disturbing activities that are associated with project construction.
- Potential indirect effects, such as unauthorized artifact collection and vandalism, could occur.
- Introduction of visual or auditory elements could diminish the integrity of a historic property's significant historic features, including setting.

Assumptions

The impact analysis of cultural resources is based on the following assumptions:

- A Class III inventory will be conducted within the APE for direct effects and all sites located during the inventory will be evaluated for eligibility to the NRHP.
- If possible, all historic properties will be avoided by project construction. For those historic properties that cannot be avoided by project construction, a Historic Properties Treatment Plan will be prepared by SNWA's archaeological subcontractor and reviewed and approved by the BLM and SHPO. Historic properties that cannot be avoided by project construction will be mitigated in accordance with the Historic Properties Treatment Plan.
- A Notice to Proceed will be issued after the on-the-ground portion of mitigation (e.g., data recovery) has been completed and reviewed by the BLM.

Methodology for Analysis

Surface disturbance impacts were evaluated for each alternative using the following method:

- The analysis of potential impacts to cultural resources is based on review of the existing literature and site information that were collected during the files and records search.
- Potential effects are quantified where possible. Where quantitative data are unavailable, best professional judgment or qualitative assessments are used to describe impacts.

Historic property, as defined by the regulations that implement Section 106, means "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the NPS." The term includes properties of traditional religious and cultural importance to any Native American tribe that meet the National Register criteria.

Section 106 requires that potential impacts to historic properties are assessed by using the "criteria of adverse effect" (36 CFR 800.5[a][1]): "An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." Adverse effects to historic properties include, but are not limited to:

- 1) Physical destruction or alteration of a property or relocation from its historic location;
- 2) Isolation or restriction of access;

- 3) Change in the character of the property's use or of physical features within the property's setting that contribute to its historic significance, or the introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;
- 4) Neglect of a property which leads to deterioration or vandalism; and
- 5) Transfer, sale, or lease from federal to non-federal control, without adequate and legally enforceable restrictions or conditions to ensure the preservation of the historic significance of the property.

3.16.2.2 Proposed Action, Alternatives A through C

Construction and Facility Maintenance

All Construction and Facility Maintenance Impact Issues

Ground-disturbing activities, such as excavation, construction of access roads, improvement of existing access roads, grading, and the use of staging areas for storage equipment and supplies, have the highest potential to affect historic properties directly. Of particular concern are direct impacts associated with pipeline trenching, which would constitute the greatest amount of ground disturbance. These physical impacts could occur to both known sites and subsurface sites that could be discovered during ground-disturbing activities.

Vehicular traffic and crushing of vegetation in areas that would not be graded or excavated also could directly affect historic properties by compacting soils, crushing artifacts, disturbing historic features (e.g., historic roads), or displacing cultural material from its original context. These types of activities also could affect areas of interest to Native Americans, such as sacred areas or areas used for harvesting traditional resources (e.g., medicinal plants).

Indirect effects to historic properties often are not quantifiable and can occur both within and outside of the APE. Potential indirect effects could include changes in erosion patterns caused by construction, soil compaction, or vegetation removal; fugitive dust; off-road vehicle traffic associated with construction or facility maintenance activities; and vandalism, inadvertent damage, and illegal artifact collection because of increased access. Other potential indirect effects could include the introduction of visual or auditory elements that diminish the integrity of the property's significant historic features, including setting. These effects could result from introducing modern structures and associated auditory emissions into an otherwise rural or natural setting.

Historic properties located outside the APE, but within close proximity to the pipeline ROW would not be mitigated under the PA. These sites could be adversely affected if a rupture in the pipe were to occur near the sites. Subsequent effects of a rupture, such as flooding and erosion, could damage or destroy archaeological sites/historic structures and/or displace surface artifacts.

The potential for the discovery of unanticipated archaeological deposits during construction activities exists within proposed disturbance areas and could result in direct effects. Unanticipated discoveries could result in displacement or loss (either complete or partial) of the discovered material. Displacement of archaeological deposits affects the potential to understand the context of the site and limits the ability to extrapolate data regarding prehistoric settlement and subsistence patterns.

Resolution of Construction and Facility Maintenance Impacts

The PA currently being developed for the proposed Project outlines the steps to be taken to: 1) identify cultural resources; 2) evaluate them for eligibility for listing on the NRHP; 3) identify potential adverse effects; 4) develop measures to avoid, reduce, or mitigate adverse effects; and 5) address inadvertent discoveries. Additionally, the PA assigns roles and responsibilities for its implementation, which ensures that all interested parties are given an opportunity to comment on the effects of an undertaking on historic properties and any mitigation for such effects. Finalization of the PA is pending additional input from interested Tribes, consulting parties, and the public. A copy of the PA can be found in **Appendix F3-16**.

In consultation with the Nevada SHPO, interested Tribes, and other consulting parties to the PA, the BLM would determine whether construction and facility maintenance of the proposed Project would have an adverse effect on any historic properties listed or eligible for listing on the NRHP. If the BLM determines that a property would be adversely affected, measures to avoid, minimize, or mitigate such effects would be proposed in accordance with the PA.

Measures to avoid, minimize, or mitigate effects may include, but would not be limited to, one or more of the following:

- Avoidance through changes in the construction or operational design;
- Data recovery, which might include the systematic professional excavation and removal of archaeological resources;
- The use of landscaping or other techniques that would minimize or eliminate visual effects on a site's setting;
- Development of site-specific interpretive materials (e.g., leaflets, brochures);
- Historic American Buildings Survey/Historic American Engineering Record/Historic American Landscapes Survey or other agreed upon historic recordation process; or
- Other mitigation determined by the BLM through consultation with the SHPO, interested Tribes, and other consulting parties.

Mitigation measures would be based on the types of impacts relevant to the site type. Unavoidable adverse effects to historic properties would be mitigated through implementation of a Historic Properties Treatment Plan. For sites that are eligible under National Register Criteria A, B, or C, other forms of mitigation (e.g., oral history, historic markers, exhibits, interpretive brochures, or publications) may be considered in the Historic Properties Treatment Plan in lieu of, or in addition to, data recovery. If data recovery is the preferred treatment option for a site, then the BLM would ensure that the developed treatment is based on an appropriate research design and is reviewed and approved by the BLM, SHPO, interested Tribes, and other consulting parties. Following approval by the BLM, SHPO, interested Tribes, and other consulting parties, the BLM would ensure that the Historic Properties Treatment Plan is implemented within the timelines set forth in the plan. If data recovery is proposed for a site of tribal importance, notification, and, as appropriate, consultation with interested Tribes would be conducted prior to issuance of the Archaeological Resource Protection Act (ARPA) permit for removal/excavation of archaeological resources. All ranch complexes located in the direct effects and visual APEs, and more than 40 years old, would be inventoried and recorded to the BLM standards. SNWA would develop a Historic Properties Treatment Plan for any of the ranch complexes adversely affected by the proposed Project and that meet the criteria for NRHP eligibility for state or local importance. For other historic properties from which the proposed Project would be visible, SNWA would document, assess, and make recommendations to the BLM regarding eligibility of these properties for the National Register under Criteria A, B, or C. For those historic properties that the BLM determines are potentially eligible under one or more of the three criteria, SNWA would record the properties with full descriptions and photo-documentation to current SHPO standards as outlined in the PA.

If a rupture and subsequent flooding were to occur, direct impacts to a historic property located outside of the pipeline ROW most likely would be immediate. In most instances, emergency response measures would be implemented after the site has been damaged or destroyed, thereby reducing the possibility of salvaging the site and its context. Mitigation of effects caused by a rupture and subsequent flooding and erosion would be determined on a site-specific basis by the BLM in consultation with the SHPO, interested Tribes, and other consulting parties.

To minimize potential effects such as illegal collection of artifacts and vandalism due to increased access, SNWA, in cooperation with the BLM and SHPO, would ensure that all its personnel, and all personnel of its contractors and their subcontractors are directed not to engage in the illegal collection, damage, or vandalism of historic and prehistoric resources as outlined in the PA. SNWA would cooperate with the BLM to ensure compliance with the ARPA for facilities and segments of the proposed Project located on public lands, and with the provisions of Nevada Revised Statute (NRS) 383.

As provided in the PA, if any previously unknown archaeological deposits are discovered during construction on BLM administered lands, all construction activities would cease within 325 feet of the discovery and the BLM would be notified of the find. Steps would be taken to protect the site from vandalism or further damage until the BLM could evaluate the nature of the discovery, as outlined in the PA. Construction would not resume in the area of the discovery until the BLM has issued a notice to proceed.

If construction or other project personnel discover what might be human remains, funerary objects, or items of cultural patrimony on federal land, then construction would cease within 325 feet of the discovery and the BLM would be

notified of the find. Any discovered Native American human remains, funerary objects, or items of cultural patrimony found on federal land would be handled in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA) and the procedures detailed in the PA. Non-Native American human remains on federal land would be handled in accordance with Nevada law. Construction would not resume in the area of the discovery until the BLM has issued a notice to proceed.

If human remains and associated funerary objects are discovered on private land during construction activities, construction would cease within 325 feet of the discovery and the county coroner or sheriff would be notified of the find. Treatment of any discovered Native American human remains and associated funerary objects found on private land would be handled in accordance with the provisions of NRS 383; non-Native American human remains would be handled in accordance with Nevada state law.

Conclusion. Approximately 12,300 acres would be disturbed as a result of construction activities. Direct impacts to historic properties would be proportional to the amount of ground disturbance associated with project construction. At this time, the number of historic properties that could be affected by the proposed Project is unknown. Intensive Class III inventories of all proposed disturbance areas would be conducted prior to project construction and with enough lead time to allow for evaluation of sites located during the inventories, assessment of impacts, and mitigation, if necessary. Unavoidable adverse effects to historic properties located within proposed disturbance areas or within the viewshed of proposed aboveground facilities would be mitigated in compliance with the PA. Any previously unknown archaeological sites discovered during construction activities would be handled as detailed in the PA.

Residual impacts include:

- Project construction would result in the loss of cultural resources that are ineligible for the NRHP and located in proposed disturbance areas. Although these sites would be recorded to BLM standards and the information integrated into local and statewide databases, the sites ultimately would be destroyed by project construction.
- How many historic properties would be adversely affected by the proposed Project is currently unknown. If historic properties are identified within proposed disturbance areas, impacts would be avoided where possible by means such as project redesign or rerouting; if avoidance is not feasible, the impacts would be mitigated in compliance with the PA. Because some of the cultural value that is associated with these sites cannot be fully mitigated, residual impacts to these resources most likely would occur.
- Accidental disturbance, vandalism, and illegal collecting most likely would occur where the proposed Project may result in increased public access.
- Impacts to historic properties as a result of a rupture and subsequent flooding would be immediate. Reactive mitigation may not be sufficient to restore the damage. Damage to or loss of these resources would occur prior to their recordation and evaluation, thereby complicating mitigation procedures.

3.16.2.3 Alternative D

The same ROW construction and operation issues discussed for the Proposed Action and Alternatives A through C would apply to Alternative D, which would involve 225 miles of pipeline and 208 miles of power lines in Clark and Lincoln counties only.

Conclusion. Approximately 8,800 acres would be disturbed as a result of construction activities. Direct impacts to historic properties would be proportional to the amount of ground disturbance associated with project construction. At this time, the number of historic properties that could be affected by the proposed Project is unknown. Intensive Class III inventories of all proposed disturbance areas would be conducted prior to project construction and with enough lead time to allow for evaluation of sites located during the inventories, assessment of impacts, and mitigation, if necessary. Unavoidable adverse effects to historic properties located within proposed disturbance areas or within the viewshed of proposed aboveground facilities would be mitigated in compliance with the PA. Any previously unknown archaeological sites discovered during construction activities would be handled as detailed in the PA. Residual impacts would be the same as identified for the Proposed Action and Alternatives A through C.

3.16.2.4 Alternative E

The same ROW construction and operation issues for the Proposed Action and Alternatives A through C would apply to Alternative E, which would involve 263 miles of pipeline and 280 miles of power lines within Spring, Delamar, Dry Lake, and Cave valleys.

Conclusion. Approximately 10,700 acres would be disturbed as a result of construction activities. Direct impacts to historic properties would be proportional to the amount of ground disturbance associated with project construction. At this time, the number of historic properties that could be affected by the proposed Project is unknown. Intensive Class III inventories of all proposed disturbance areas would be conducted prior to project construction and with enough lead time to allow for evaluation of sites located during the inventories, assessment of impacts, and mitigation, if necessary. Unavoidable adverse effects to historic properties located within proposed disturbance areas or within the viewshed of proposed aboveground facilities would be mitigated in accordance with the PA. Any previously unknown archaeological sites discovered during construction activities would be handled as detailed in the PA. Residual impacts would be the same as identified for the Proposed Action and Alternatives A through C.

3.16.2.5 Alignment Options 1 through 4

Impacts for the alignment options (1 through 4) are identified in relation to the relevant segment of the Proposed Action (Table 3.16-1).

Table 3.16-1 Cultural Resources Impact Summary for Alignment Options 1 through 4

Alignment Option	Analysis
<p>Alignment Option 1: (Humboldt-Toiyabe Power Line Alignment) Option Description: Change the location of a portion of the 230-kV power line from Gonder Substation near Ely to Spring Valley. Applicable To: Proposed Action and Alternatives A through C and E.</p>	<ul style="list-style-type: none"> Impacts (direct and visual) associated with Alignment Option 1 would be less than the comparable Proposed Action segment because there would be fewer acres of disturbance and Alignment Option 1 would be shorter in length.
<p>Alignment Option 2 (North Lake Valley Pipeline Alignment) Option Description: Change the locations of portions of the mainline pipeline and electrical transmission line in North Lake Valley. Applicable To: Proposed Action and Alternatives A through C and E.</p>	<ul style="list-style-type: none"> Direct impacts associated with Alignment Option 2 would be greater than the comparable Proposed Action segment because there would be more acres of disturbance; visual impacts would be less than the comparable Proposed Action segment because portions of Alignment Option 2 would parallel an existing visual intrusion (Highway 93).
<p>Alignment Option 3 (Muleshoe Substation and Power Line Alignment) Option Description: Eliminate the Gonder to Spring Valley transmission line, and construct a substation with an interconnection with an interstate, high voltage power line in Muleshoe Valley. Applicable To: Proposed Action and Alternatives A through C and E.</p>	<ul style="list-style-type: none"> Direct impacts associated with Alignment Option 3 would be less than the comparable Proposed Action segment because there would be fewer acres of disturbance; visual impacts would be less than the comparable Proposed Action segment because the 230kV transmission line from Gonder to Spring Valley would be eliminated.
<p>Alignment Option 4 (North Delamar Valley Pipeline and Power Line Alignment) Option Description: Change the location of a short section of mainline pipeline in Delamar Valley to follow an existing transmission line. Applicable To: All alternatives.</p>	<ul style="list-style-type: none"> Impacts (direct and visual) associated with Alignment Option 4 would be less than the comparable Proposed Action segment because there would be fewer acres of disturbance and Alignment Option 4 would parallel an existing transmission line.

3.16.2.6 No Action

Under the No Action Alternative, the proposed GWD Project would not be constructed or operated. No project-related surface disturbance would occur. As a result, none of the potential impacts to historic properties as identified for the Proposed Action or alternatives A-E would occur.

3.16.2.7 Groundwater Development and Groundwater Pumping

Issues

Groundwater Development Construction and Facility Maintenance

The same cultural resources issues discussed for ROW construction and facility maintenance would apply to groundwater development areas.

Groundwater Pumping

Subsidence associated with groundwater pumping could adversely affect subsurface archaeological sites and historic standing structures.

Assumptions

Groundwater Development Construction and Facility Maintenance

The same cultural resources assumptions discussed for ROW construction and facility maintenance would apply to areas identified for future facilities.

Groundwater Pumping

Subsidence impacts to NRHP-eligible historic standing structures and surface and subsurface archaeological sites could occur.

Methodology for Analysis

Groundwater Development Construction and Facility Maintenance

The analysis of potential impacts to historic properties is based on the same methods described for ROW construction and facility maintenance.

Groundwater Pumping

- No data is available on the number and type of historic properties that could be affected by groundwater pumping. Best professional judgment or qualitative assessments are used to describe impacts.
- Subsidence impacts to historic properties would be assessed by using the “criteria of adverse effect.”
- Subsidence has occurred and is attributable to SNWA’s pumping. (The reader is referred to Section 3.3, Water Resources, Mitigation Measure GW-G-3 for a discussion of subsidence monitoring.)

3.16.2.8 Proposed Action

Groundwater Development Area

Full development of the GWD Project would require groundwater production wells, collector pipelines, and associated facilities. Ground disturbance associated with construction of the wells, pipelines, and ancillary facilities could directly affect historic properties. Also of concern are direct effects associated with construction traffic and crushing of vegetation in areas that would not be graded or excavated. Indirect effects, such as illegal collecting of artifacts, vandalism, and inadvertent damage could occur where the proposed Project may result in increased public access. Proposed aboveground facilities located within the viewshed of a historic property could affect the integrity of the site’s setting. Subsurface archaeological sites may be unearthed during project construction activities and result in displacement or loss of associated artifacts or the site itself.

Conclusion. Under the Proposed Action, as much as 5,537 acres of permanent ROW and as much as 2,875 acres of temporary ROW would be required within groundwater development areas. Direct impacts to historic properties would be proportional to the amount of ground disturbance associated with permanent and temporary ROWs (i.e., wells, pipelines, ancillary facilities). At this time, the number of historic properties that could be affected by groundwater development is unknown. As stipulated in the PA, intensive Class III inventories of all future facility locations would be required prior to construction and with enough lead time to allow for NRHP evaluation of identified sites, impact assessments, and mitigation, if necessary. Unavoidable adverse effects to historic properties located within proposed disturbance areas or within the viewshed of proposed aboveground facilities would be mitigated in compliance with the

PA. Subsurface cultural material discovered during ground-disturbing activities would be handled as outlined in the PA.

Residual impacts include:

- Project construction would result in the loss of cultural resources that are ineligible for the NRHP and located in proposed disturbance areas. Although these sites would be recorded to BLM standards and the information would be integrated into local and statewide databases, the sites ultimately would be destroyed by project construction.
- How many historic properties would be adversely affected by the proposed Project is currently unknown. If historic properties are identified within proposed disturbance areas, impacts would be avoided; if avoidance is not feasible, impacts would be mitigated as appropriate. Because some of the cultural value that is associated with these sites cannot be fully mitigated, residual impacts to these resources most likely would occur.
- Accidental disturbance, vandalism, and illegal collecting most likely would increase in the analysis area as a result of increased public access.
- Impacts to cultural resources as a result of a rupture and subsequent flooding would be immediate. Reactive mitigation may not be sufficient to restore the damage. Damage to or loss of these resources would occur prior to their recordation and evaluation, thereby complicating mitigation procedures.

Groundwater Pumping

The groundwater pumping scenario for the Proposed Action assumes pumping at the full quantities (i.e., approximately 177,000 afy) listed on the pending water rights application for the five proposed project pumping basins (Spring, Snake, DDC valleys). Potential effects to archaeological sites as a result of groundwater pumping could include subsidence. Subsidence could damage archaeological sites, including historic standing structures; adversely affect the integrity of a site's setting; and, affect the stratigraphic integrity of buried archaeological deposits. In addition, subsidence could affect surface drainage flow resulting in undesirable diversion and impoundment of water which could additionally impact surface archaeological sites by relocating artifacts resulting in a secondary deposit of archaeological material that contains no contextual integrity.

Conclusion. Impacts to subsurface archaeological sites could occur as a result of groundwater pumping; however, the extent and significance of those impacts are difficult to ascertain and quantify given the unpredictable nature of buried sites. Surface sites, including standing structures, currently are exposed to natural elements which would continue to affect the structural integrity of these sites regardless of human interference. Subsidence effects to NRHP-eligible standing structures and other historic properties would be mitigated on a case-by-case basis as discovered. The reader is referred to Section 3.2, Geologic Resources, for an expanded discussion of subsidence impacts, and for a list of those areas considered at most risk for subsidence.

3.16.2.9 Alternative A

Groundwater Development Area

Full development of the GWD Project would require groundwater production wells, collector pipelines, and ancillary facilities. Direct, indirect, and visual impacts to historic properties could occur as a result of constructing these future facilities. Subsurface archaeological sites may be unearthed during project construction activities and result in displacement or loss of associated artifacts or the site itself. Subsequent NEPA analyses would be required to identify potential impacts of groundwater development facilities.

Conclusion. Under this alternative, as much as 3,171 acres of permanent ROW and as much as 1,643 acres of temporary ROW would be required within groundwater development areas. As stipulated in the PA, intensive Class III inventories would be conducted for all groundwater production wells, collector pipelines, and ancillary facilities. Unavoidable adverse effects to historic properties would be mitigated in compliance with the PA. Unanticipated discoveries would be handled as outlined in the PA. Residual impacts would be the same as the Proposed Action.

Groundwater Pumping

The groundwater pumping scenario for Alternative A assumes pumping at reduced quantities (approximately 115,000 afy) from those listed on the pending water rights application for the five proposed project pumping basins (Spring,

Snake, and DDC valleys). Subsidence could occur as a result of groundwater pumping. Impacts associated with subsidence could include damage to the stratigraphic integrity of subsurface archaeological sites and to historic standing structures. The reader is referred to Section 3.2, Geologic Resources, for a list of those areas considered at most risk for subsidence under this alternative.

Conclusion. Subsidence impacts to subsurface archaeological sites and historic standing structures could occur as a result of groundwater pumping. These types of impacts would be mitigated on a case-by-case basis as discovered.

3.16.2.10 Alternative B

Groundwater Development Area

Full development of the GWD Project would require groundwater production wells, collector pipelines, and associated facilities. Direct, indirect, and visual impacts to historic properties could occur as a result of constructing these future facilities. Subsurface archaeological sites may be unearthed during project construction activities and result in displacement or loss of associated artifacts or the site itself. Subsequent NEPA analyses would be required to identify potential impacts of groundwater development facilities.

Conclusion. Under this alternative, as much as 3,077 acres of permanent ROW and as much as 1,587 acres of temporary ROW would be required in groundwater development areas. As stipulated in the PA, intensive Class III inventories would be conducted for all groundwater production wells, collector pipelines, and ancillary facilities. Unavoidable adverse effects to historic properties would be mitigated in compliance with the PA. Unanticipated discoveries would be handled as outlined in the PA. Residual impacts would be the same as the Proposed Action.

Groundwater Pumping

The groundwater pumping scenario for Alternative B assumes pumping at the full diversion rates (i.e., approximately 177,000 afy) listed on the pending water rights application for the five proposed project pumping basins (Spring, Snake, and DDC valleys). Subsidence could occur as a result of groundwater pumping. Impacts associated with subsidence could include damage to the stratigraphic integrity of subsurface archaeological sites and to historic standing structures. The reader is referred to Section 3.2, Geologic Resources, for a list of those areas considered at most risk for subsidence under this alternative.

Conclusion. Subsidence impacts to subsurface archaeological sites and historic standing structures could occur as a result of groundwater pumping. These types of impacts would be mitigated on a case-by-case basis as discovered.

3.16.2.11 Alternative C

Groundwater Development Area

Full development of the GWD Project would require groundwater production wells, collector pipelines, and associated facilities. Direct, indirect, and visual impacts to historic properties could occur as a result of constructing these future facilities. Subsurface archaeological sites may be unearthed during project construction activities and result in displacement or loss of associated artifacts or the site itself. Subsequent NEPA analyses would be required to identify potential impacts of groundwater development facilities.

Conclusion. Under this alternative, as much as 3,171 acres of permanent ROW and as much as 1,643 acres of temporary ROW would be required in groundwater development areas. As stipulated in the PA, intensive Class III inventories would be conducted for all groundwater production wells, collector pipelines, and ancillary facilities. Unavoidable adverse effects to historic properties would be mitigated in compliance with the PA. Unanticipated discoveries would be handled as outlined in the PA. Residual impacts would be the same as the Proposed Action.

Groundwater Pumping

Under Alternative C, the maximum pumping rate would be the same as Alternative A (approximately 115,000 afy). Subsidence could occur as a result of groundwater pumping. Impacts associated with subsidence could include damage to the stratigraphic integrity of subsurface archaeological sites and to historic standing structures. The reader is referred to Section 3.2, Geologic Resources, for a list of those areas considered at most risk for subsidence under this alternative.

Conclusion. Subsidence impacts to subsurface archaeological sites and historic standing structures could occur as a result of groundwater pumping. These types of impacts would be mitigated on a case-by-case basis as discovered.

3.16.2.12 Alternative D

Groundwater Development Area

Full development of the GWD Project would require groundwater production wells, collector pipelines, and associated facilities. Direct, indirect, and visual impacts to historic properties could occur as a result of constructing these future facilities. Subsurface archaeological sites may be unearthed during project construction activities and result in displacement or loss of associated artifacts or the site itself. Subsequent NEPA analyses would be required to identify potential impacts of groundwater development facilities.

Conclusion. Under this alternative, as much as 2,635 acres of permanent ROW and as much as 1,370 acres of temporary ROW would be required in groundwater development areas. As stipulated in the PA, intensive Class III inventories would be conducted for all groundwater production wells, collector pipelines, and ancillary facilities. Unavoidable adverse effects to historic properties would be mitigated in compliance with the PA. Unanticipated discoveries would be handled as outlined in the PA. Residual impacts would be the same as the Proposed Action.

Groundwater Pumping

The groundwater pumping scenario for Alternative D assumes that no pumping would occur in Snake Valley, and pumping in Spring Valley would be restricted to the southern portion of the valley within Lincoln County. The maximum groundwater production rate under this scenario is approximately 79,000 afy for the four pumping basins (Spring and DDC valleys) is the same as the maximum pumping rate assumed for these basins under Alternatives A, C, and E. Subsidence could occur as a result of groundwater pumping. Impacts associated with subsidence could include damage to the stratigraphic integrity of subsurface archaeological sites and to historic standing structures. The reader is referred to Section 3.2, Geologic Resources, for a list of those areas considered at most risk for subsidence under this alternative.

Conclusion. Subsidence impacts to subsurface archaeological sites and historic structures could occur as a result of groundwater pumping. These types of impacts would be mitigated on a case-by-case basis as discovered.

3.16.2.13 Alternative E

Groundwater Development Area

Full development of the GWD Project would require groundwater production wells, collector pipelines, and associated facilities. Direct, indirect, and visual impacts to cultural resources could occur as a result of constructing these future facilities. Subsurface archaeological sites may be unearthed during project construction activities and result in displacement or loss of associated artifacts or the site itself. Subsequent NEPA analyses would be required to identify potential impacts of groundwater development facilities.

Conclusion. Under this alternative, as much as 2,683 acres of permanent ROW and as much as 1,396 acres of temporary ROW would be required in groundwater development areas. As stipulated in the PA, intensive Class III inventories would be conducted for all groundwater production wells, collector pipelines, and ancillary facilities. Unavoidable adverse effects to historic properties would be mitigated in compliance with the PA. Unanticipated discoveries would be handled as outlined in the PA. Residual impacts would be the same as the Proposed Action.

Groundwater Pumping

The groundwater pumping scenario for Alternative E assumes that no pumping would occur in Snake Valley. The maximum groundwater production rate under this scenario is approximately 79,000 afy for the four pumping basins (Spring, Snake, DDC valleys) is the same as the maximum pumping rate assumed for these same basins under Alternative A, C, and D. Subsidence could occur as a result of groundwater pumping. Impacts associated with subsidence could include damage to the stratigraphic integrity of subsurface archaeological sites and to historic standing structures. The reader is referred to Section 3.2, Geologic Resources, for a list of those areas considered at most risk for subsidence under this alternative.

Conclusion. Subsidence impacts to subsurface archaeological sites and historic standing structures could occur as a result of groundwater pumping. These types of impacts would be mitigated on a case-by-case basis as discovered.

3.16.3 Cumulative Impacts

3.16.3.1 Issues

Rights-of-way and Groundwater Development Area Construction and Maintenance

- Potential damage to and loss of historic properties may have already occurred from past and present actions.
- Construction of the GWD Project and its associated facilities may result in incremental loss of historic properties in addition to past and present actions.
- RFFAs have the potential to cause the loss of historic properties.
- Previously undiscovered archaeological deposits, including burials and associated funerary objects, could be discovered and directly affected during ground-disturbing activities that are associated with project construction.
- Potential indirect effects, such as unauthorized artifact collection and vandalism, could occur.
- Introduction of visual or auditory elements could diminish the integrity of a historic property,, including setting.

Groundwater Pumping

- Subsidence associated with groundwater pumping could adversely affect subsurface archaeological sites and historic standing structures.

3.16.3.2 Assumptions

Rights-of-way and Groundwater Development Area Construction and Maintenance

- A Class III inventory will be conducted within the APE for direct effects and all sites located during the inventory will be evaluated for eligibility to the NRHP.
- Class III inventories were conducted for past and present actions involving federal lands or requiring a federal permit.
- Class III inventories would be required for RFFAs involving federal lands or requiring a federal permit.
- If possible, all historic properties will be avoided by project construction. For those historic properties that cannot be avoided by project construction, a Historic Properties Treatment Plan will be prepared by SNWA's archaeological subcontractor and reviewed by the BLM SHPO, ACHP, interested Tribes, and other consulting parties. Historic properties that cannot be avoided by project construction will be mitigated in accordance with the Historic Properties Treatment Plan.
- A Notice to Proceed for the GWD Project and other RFFAs on federal land or requiring a federal permit will be issued after the on-the-ground portion of mitigation (e.g., data recovery) has been completed and reviewed by the BLM.

Groundwater Pumping

Subsidence impacts to NRHP-eligible historic standing structures and subsurface archaeological sites could occur.

3.16.3.3 Methodology for Analysis

Rights-of-way and Groundwater Development Area Construction and Maintenance

- Review the past and present actions and RFFAs and assess the level of incremental impacts that the proposed GWD Project is likely to incur on historic properties in the defined cumulative effects study area.
- Potential effects are quantified where possible. Where quantitative data are unavailable, best professional judgment or qualitative assessments are used to describe impacts.
- Section 106 requires that potential impacts to historic properties are assessed by using the "criteria of adverse effect" (36 CFR 800.5[a][1]): "An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a

manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.”

Groundwater Pumping

- No data is available on the numbers and types of historic properties that could be affected by groundwater pumping. Best professional judgment or qualitative assessments are used to describe impacts.
- Subsidence impacts to historic properties would be assessed by using the “criteria of adverse effect.”

3.16.3.4 Proposed Action

The cumulative effects study area for cultural resources corresponds to the area within the groundwater modeling boundary (see **Figure 3.3.1-1** in Section 3.3, Water Resources). Past and present actions and RFFAs are identified in **Tables 2.8-1** through **2.8-4**, and **Figures 2.8-1** and **2.8-2**. Any other ground-disturbing activities within the cumulative effects study area could affect historic properties in those areas. As directed by law, cultural resources inventories and consultation would be conducted for any future federal undertakings, including private undertakings that operate under federal license or on federally managed or private lands. Adverse effects to historic properties would be avoided or mitigated as appropriate.

At this time, Class III inventories have not been conducted within the APE of the proposed Project. Therefore, no information currently is available on the numbers and types of historic properties potentially affected by the proposed Project. Following the Class III inventories, the BLM, in consultation with the Nevada SHPO, ACHP, interested Tribes, and other consulting parties would determine whether construction and facility maintenance of the proposed Project would have an adverse effect on any historic properties. If the BLM determines that a property would be adversely affected, measures to avoid, minimize, or mitigate such effects would be proposed in accordance with the PA. However, if data recovery is necessary to mitigate unavoidable adverse effects, the process would recover a significant amount of data but ultimately the site would be destroyed. Over time, this represents a cumulative loss.

Currently, no information is available on the numbers and types of sites or structures that have been or could be adversely affected by subsidence in the cumulative effects study area. Therefore, no quantitative assessment of cumulative effects to these resources can be provided at this time. Subsidence as a result of groundwater pumping potentially could adversely affect the stratigraphic integrity of subsurface archaeological sites and damage or destroy historic standing structures. Impacts to these sites or structures would be mitigated on a case-by-case basis as discovered. However, if these sites are not located in proposed disturbance areas, most likely they would not be recorded and evaluated during Class III inventories. As such, any measures to mitigate effects of subsidence may prove ineffective. The reader is referred to Section 3.2, Geological Resources, for a discussion of cumulative impacts associated with subsidence.

Indirect effects, such as illegal collecting of artifacts, have occurred and most likely would continue to occur in the cumulative effects study area through increased access, development, and increased human presence, as a result of past, present, and reasonably foreseeable future actions.

3.16.3.5 Alternative A

Under Alternative A, cumulative effects to historic properties as a result of rights-of-way and groundwater development area construction and maintenance, and groundwater pumping would be the same as described for the Proposed Action.

3.16.3.6 Alternative B

Under Alternative B, cumulative effects to historic properties as a result of rights-of-way and groundwater development area construction and maintenance, and groundwater pumping would be the same as described for the Proposed Action.

3.16.3.7 Alternative C

Under Alternative C, cumulative effects to historic properties as a result of rights-of-way and groundwater development area construction and maintenance, and groundwater pumping would be the same as described for the Proposed Action.

3.16.3.8 Alternative D

Under Alternative D, cumulative effects to historic properties as a result of rights-of-way and groundwater development area construction and maintenance, and groundwater pumping would be the same as described for the Proposed Action.

3.16.3.9 Alternative E

Under Alternative E, cumulative effects to historic properties as a result of rights-of-way and groundwater development area construction and maintenance, and groundwater pumping would be the same as described for the Proposed Action.