4.0 ENVIRONMENTAL CONSEQUENCES

This chapter evaluates the environmental consequences that would result from implementation of the Proposed Action or Alternatives. The Proposed Action and Alternative 1 differ in the location of the 138 kV transmission line and fiber optic line between Highway 93 and the Emrys Jones Substation. The groundwater and electric utility facilities east of Emrys Jones Substation would be the same under both the Proposed Action and Alternative 1. Under the Proposed Action, the 138 kV transmission line and fiber optic line between Highway 93 and the Emrys Jones Substation would be located on private or leased lands along the Kane Springs Road ROW. Under Alternative 1, all electric utility facilities would be located within the 2,640-foot wide LCCRDA utility corridor on BLM-administered public lands (see **Map 2-1**).

The impact analysis for environmental consequences focuses on potential direct, indirect and cumulative effects on resources described in Chapter 3.0 - Affected Environment. Direct effects are impacts that are "caused by the Proposed Action and occur at the same time and place" (40 CFR 1508.8). For the Proposed Action, direct effects are those impacts resulting from the granting of the ROW by the BLM and subsequent construction and operation of the proposed facilities that would function to withdraw groundwater. The actual withdrawal of the groundwater is considered an indirect effect as explained below and in detail in Section 4.3.

Indirect effects are those impacts that are "caused by the Proposed Action and are later in time or farther removed in distance, but are still reasonably foreseeable" (40 CFR 1508.8). Indirect effects may include the effects of the withdrawal of groundwater, growth-inducing effects and other effects related to induced changes in the pattern of land use, changes to the population density or growth rate, and related effects on the physical attributes of associated ecosystems.

The cumulative effects analysis is focused on the potential effects (direct and indirect) of construction, operation and maintenance of the Proposed Action combined with other past, present and reasonably foreseeable future actions that could have effects in the ROI. As described in Chapter 3.0, the ROI varies depending on the resource being analyzed and the predicted locations of direct and indirect impacts from the Proposed Action.

Assumptions for Analysis

Certain assumptions were considered when analyzing effects of the Proposed Action on the environment. For example, the BLM has no jurisdictional authority over water rights, pumping rates, distribution, use, and volume of water to be pumped and conveyed through the Kane Springs Valley Groundwater Development Project. The Nevada State Engineer has addressed issues pertaining to groundwater withdrawal from the Kane Springs Valley Hydrographic Basin during his review of applications for the respective water rights. While the State Engineer has granted an appropriation of 1,000 AFY to the LCWD for groundwater withdrawal within the Kane Springs Valley Hydrographic Basin, the LCWD's ROW application to the BLM is for a project designed to develop and convey up to 5,000 AFY of groundwater from the Kane Springs Valley to the northern end of the Coyote Spring Valley. Therefore, the analysis in this EIS is reflective of how environmental, social, and economic resources would be affected as a result of the Proposed Action described in Chapter 2.

It is also important to note that project features described in Chapter 2 were designed only to the feasibility level, which represents reasonable approximations for assessing potential project impacts. When engineering designs are complete, the Applicant will submit a final Plan of Development (POD) that incorporates site-specific stipulations, and terms and conditions associated with the ROW grant.

Incomplete and Unavailable Information

The CEQ (1502.22) requires agencies to obtain information if it is "relevant to reasonably foreseeable significant adverse impacts;" if it is "essential to a reasoned choice among alternatives;" and if "the overall costs of obtaining it are not exorbitant." The costs are measured not only in money, but also in time.

Environmental resource data were collected and analyzed to the level of detail necessary to understand potential impacts and to distinguish project effects (both beneficial and adverse) among the Proposed Action and alternatives.

Due to the uncertainties related to natural systems, there are differences of opinion about regional groundwater flow and groundwater availability in the Kane Springs Valley Hydrographic Basin. Several authors have studied flow systems in the region; however, only limited site-specific data are available. Groundwater flow through Kane Springs Valley was approximated by CH2MHILL (2006a); however, the Nevada State Engineer did not accept several of the findings from this study and instead relied primarily on the older work of the State Engineer's Office (USGS 1971) and Eakin (1964).

The data analyzed in this EIS are the best available representation of current and predicted conditions at this time. However, there is a level of uncertainty associated with any set of data in terms of predicting impacts, especially where natural systems are involved.

4.1 GEOLOGIC RESOURCES

4.1.1 Proposed Action

4.1.1.1 Geology

Construction activities would be limited to shallow-depth trenching (up to 6 feet) within the granted ROW. Project construction would occur in three phases and would include drilling, testing and completion of up to six additional wells and appurtenant facilities. Exact locations for each well have not been determined; however, current project design indicates that each well would be spaced approximately 1.3 to 1.8 miles apart beginning at KPW-1. Final well locations would be based on additional geologic and hydrogeologic investigations. The Applicant would adhere to Nevada rules and regulations such as those listed in NRS Chapter 534 and applicable industry standards regarding drilling, testing and completion procedures during well construction. No direct or indirect impacts to geologic resources from construction activities would occur under the Proposed Action.

Groundwater withdrawal from the proposed wells and use of water for development would not affect geologic resources in the project area. No direct or indirect impacts to geologic resources from project operation and maintenance would occur under the Proposed Action.

4.1.1.2 Seismicity

Seismic activity occurs in the project area and would be expected to occur in the future in response to natural processes. Construction, operation and maintenance of the Proposed Action would have no direct or indirect impacts on seismic activity in the area. However, seismic activity may potentially impact project components.

All project components would be constructed and operated in accordance with applicable regulations and engineering protocols and safety standards to minimize potential impacts to structures (including pipeline) from seismic activity (**Table 1-2**). Environmental consequences related to pipeline breaks or leaks (such as those resulting from seismic activities) are addressed in Section 2.1.3.3.

4.1.2 Alternative 1

Impacts to geologic resources under Alternative 1 would be the same as those described under the Proposed Action.

4.1.3 No Action Alternative

Under the No Action Alternative, the ROW on federal lands would not be granted. No ground disturbance associated with either the Proposed Action or Alternative 1 would occur, and no facilities would be constructed on the BLM lands. No project-related impacts to geologic resources would occur under this alternative.

4.1.4 Mitigation

No mitigation is required.

4.2 SOIL RESOURCES

4.2.1 Proposed Action

Approximately 195 acres would be temporarily disturbed during construction of the Proposed Action, of which approximately 167 acres are managed by the BLM. Approximately 25 acres would be permanently impacted by project components (well yards, access roads and overhead poles). All disturbances would be located within the permitted 100- to 150-foot wide ROW.

Short-term direct impacts that would result from construction activities include increased soil compaction and erosion from wind and water, and chemical changes resulting from mixing surface soils with subsoil during salvage activities. These effects would be influenced by the extent of disturbance, surface soil texture, soil cover, slope steepness and intensity of storm events.

Soils would have an increased susceptibility to erosion after construction until vegetation can reestablish. This increased susceptibility to erosion would be compounded in areas within the area that was burned in 2005. Higher erosion rates after fires can result from 1) the decrease in litter and vegetative cover, 2) changes in soil properties including the loss of organic matter and formation of a water-repellent layer, and 3) increased rill erosion due to the increase in overland flow.

Shallow depth excavations may pose certain construction challenges depending on the depth to bedrock, slope and presence of cemented pans in a particular area. In these areas, special construction procedures may be required.

As described in Chapter 2.0 - Proposed Action and Alternatives, construction and operation of Phase 1 of the Proposed Action would provide up to 1,000 AFY of groundwater to the LCWD service territory. Procedures described in Section 2.1.3.3 - Operations and Maintenance would minimize impacts to soils during operation and maintenance of the Proposed Action. Full build out of the Proposed Action, under Phases 2 and 3, would maximize delivery up to 5,000 AFY to the LCWD service territory. Full build out would not generate additional impacts on soil resources. The environmental protection measures to minimize or avoid impacts to soil resources during construction are referenced in Section 2.1.4 - Applicant Proposed Environmental Protection Measures. These measures would be applied under Phase 1 of the Proposed Action and would be sufficient to minimize impacts of the build out condition.

The selected erosion and sediment control BMPs and environmental protection measures would be based on the type of disturbance expected, soil type and the location of the site relative to sensitive resources. Detailed environmental protection measures specific to soil resources can be found in **Appendix C** - Standard Construction and Operation Procedures (Reference Numbers ESC-1, ESC-2, ESC-3, ESC-4, ESC-5, ESC-6, ESC-7, PUCC-1, PUCC-2, PUCC-3 and V-3).

4.2.1.1 Landslides and Subsidence

Within the ROI, slopes are primarily level to gently sloping. The risk of landslides should not be significantly increased by the construction of the Proposed Action.

No caves or sinkholes have been identified in the ROI; however, the regional carbonate aquifer also can be highly fractured in some areas and might contribute to the formation of future cave features. Land subsidence can occur from compaction of the aquifer system, dissolution and collapse of rocks that are relatively soluble in water and dewatering of organic soils. Subsidence primarily occurs where groundwater drawdown occurs in unconsolidated sediments, namely valley fill deposits. Groundwater pumping associated with the Proposed Action would occur in the deep carbonate-rock aquifer at depths greater than 900 feet bgs. The Proposed Action would have no affect on valley fill deposits or contribute to land subsidence in the ROI.

4.2.2 Alternative 1

Under Alternative 1, the 138 kV transmission line and buried fiber optic line would be located within the designated LCCRDA utility corridor between Highway 93 and the Emrys Jones Substation. Map units along this alternative include Weiser-Tencee and Kurstan-Tencee soils in the upland areas and Arizo-Bluepoint soil within the drainages of the Kane Springs Wash.

Installation of the overhead power lines and buried communication line would require clearing and grading of the alignment. All construction would occur within a 100-foot wide construction easement, which would result in disturbing up to 36 acres of undisturbed desert lands. After construction, disturbed areas adjacent to the permanent access dirt road would be reclaimed to pre-construction conditions.

Routine maintenance activities may require cross-country travel along the reclaimed area. Motorized travel would be limited to the permanent ROW.

4.2.3 No Action Alternative

Soil resources on federal lands would not be disturbed under the No Action Alternative.

4.2.4 Mitigation

To ensure adequacy of the selected sediment and erosion control measures, including dust control measures, the BLM would monitor the effectiveness of the Environmental Protection Measures described in **Appendix C** and would recommend additional protection measures if deemed necessary.

4.3 WATER RESOURCES

4.3.1 Proposed Action

Potential impacts to water resources resulting from Proposed Action can be divided into two general categories:

- Direct and indirect impacts resulting from project construction, and
- Direct and indirect impacts resulting from project operation and maintenance.

4.3.1.1 Impacts to Surface Water

Use of heavy construction equipment would cause compaction of near surface soils that could result in increased runoff and sedimentation from disturbed areas during heavy rain events. As outlined in Chapter 2.0, the LCWD and its contractors would implement engineering controls and site-specific BMPs (presented in **Appendix C**) to minimize erosion and sedimentation during construction. In addition, the LCWD has developed a SWPPP that describes appropriate measures to minimize environmental impacts from sedimentation. Measures in **Appendix C** that would avoid adverse impacts on surface water quality from sedimentation and erosion include ESC 1-7, LP 1-7, R 13-15 and WP 3-5.

The proposed ROW would cross 11 ephemeral drainages including four crossings of Kane Springs Wash. One crossing of Kane Springs Wash would be located in the far upstream portion of the project area, and three would be halfway between the northern and southern extents of the project area. All ephemeral drainages within the project area are tributaries to Kane Springs Wash. These drainages are normally dry and only flow during periods of heavy rainfall, which are most often associated with summer thunderstorms. Potential impacts may result from

suspension of sediment caused by in-stream construction and erosion of cleared stream banks and ROWs. Construction activities within these drainages would be localized and short-term. All drainage crossings would be restored at the completion of pipeline construction, and no changes in drainage patterns would be anticipated. Restoration and reclamation measures are presented in **Appendix C**.

Water discharges from hydrostatic testing would be localized, and the rate would be controlled to minimize impacts. Excess water would be discharged into natural drainage areas around each site. A diffuser, rock rip-rap or other erosion control measure would be used to reduce discharge rates to prevent scouring. The discharged water is not anticipated to extend more than 500 feet from the discharge site because it would rapidly evaporate or percolate into the alluvial sediment in the area. No long-term ponding of water would occur. The LCWD would obtain a temporary NPDES permit prior to construction. In addition, the LCWD has developed a Hydrostatic Discharge Plan that describes appropriate measures to minimize environmental impacts.

Spills resulting from storage, handling and disposal of fluids from drilling boreholes present potential for surface contamination. These fluids would primarily be composed of water with additives or organic polymers. The drilling fluids would be disposed of through evaporation of the water and drying of the additives in shallow depressions. All drilling fluids would be stored and handled according to environmental protection measures outlined in the SPCCC Plan developed for the Proposed Action.

The potential for accidental spills and leaks of equipment fluids, such as gasoline and oil, increases during construction activities. Potential spills from vehicle refueling, equipment failure and storage of hazardous substances could cause surface contamination. The LCWD has developed an SPCCC for the Proposed Action which outlines spill prevention practices, emergency response and cleanup procedures, and storage protocols. All contractors involved with the construction of the Proposed Action would be required to adhere to the protocols outlined in the SPCCC. Impacts from accidental spills and leaks would be avoided by application of measures LP-5, WP-7 and HM 1-12 in **Appendix C.**

No direct or indirect impacts to surface water resources related to groundwater pumping are anticipated under the Proposed Action. In situations where pumped groundwater is connected to surface water, surface water quantity or quality from groundwater pumping could be affected. However, no such connection occurs in the Kane Springs Valley Hydrographic Basin, as the water to be withdrawn is located from the deep carbonate aquifer and is not hydraulically connected to surface water in the Kane Springs Valley.

The only perennial surface water features in the ROI and Hydrographic Basins of interest include the Pahranagat and Nesbitt Lakes in the Pahranagat Valley, Meadow Valley Wash, and Muddy River. Perennial surface water features in Pahranagat Valley would not be affected by groundwater pumping in Kane Springs Valley due to its location (upgradient) and distance from the pumping wells, as well as the presence of the Pahranagat Shear Zone, which according to Burbey (1997) represents a partial barrier to groundwater flow.

Similarly, no impacts from pumping would be anticipated to Meadow Valley Wash due to lack of hydraulic connection with the regional groundwater in the Kane Springs Valley. Regional

groundwater in the Lower Meadow Valley Wash Hydrographic Basin is part of a separate groundwater flow system.

The source of the Muddy River is a series of regional springs located approximately 28 miles southeast of the project area within the downstream Muddy River Hydrographic Area. Potential impacts on Muddy River Springs from the Proposed Action are discussed in Section 4.3.1.5.

4.3.1.2 Impacts to Groundwater

The depth to groundwater in the project area is 900 feet or greater bgs (URS 2006a). Surface disturbance associated with construction is not expected to impact groundwater.

According to the CH2MHILL (2006a) study, the average annual recharge to groundwater in the Kane Springs Valley Hydrographic Basin is estimated to be on the order of 5,000 AFY. The study concluded that at least 15,000 AFY of groundwater flows through the carbonate aquifer system within the Kane Springs Valley Hydrographic Basin, and the perennial yield was estimated to be on the order of 5,000 AFY based on the recharge analysis developed by Walker (2006). An older study by Harrill et al. (1988) reported an estimated perennial yield of 500 AFY. The perennial yield is defined by the Nevada Division of Natural Resources as the amount of usable water from a groundwater aquifer that can be economically withdrawn and consumed each year for an indefinite period of time. It cannot exceed the natural recharge to that aquifer and ultimately is limited to the maximum amount of discharge that can be utilized for beneficial use.

In February 2007, the Nevada State Engineer permitted the LCWD to pump up to 1,000 AFY of groundwater from the Kane Springs Valley Hydrographic Basin (NDWR 2007b). Up to 500 AFY would be pumped from the existing KPW-1 well, and a combined duty of an additional 500 AFY would be pumped from the three other permitted points of diversion (see section 3.3.3.3.1 for summary of the Nevada State Engineer Ruling 5712).

The Nevada State Engineer has sole authority for establishing perennial yields within each basin. The case for increasing the perennial yield from 500 to 5,000 AFY was presented by the LCWD (based on CH2MHILL studies summarized in CH2MHILL 2006a and 2006b) to the Nevada State Engineer in April 2006. The Nevada State Engineer originally recognized the perennial yield of the Kane Springs Valley Hydrographic Basin to be less than 500 AFY based on an older Eakin (1964) analysis. However, based on new information provided during the hearings, and the uncertainty in perennial yield calculations, the Nevada State Engineer limited groundwater extraction under the previously filed applications to 1,000 AFY (NDWR 2007b).

In April 2006, the LCWD submitted additional groundwater appropriation applications to the Nevada State Engineer for pumping up to 17,000 AFY in the Kane Springs Valley Hydrographic Basin. The hearings for these applications have not occurred. As described in Chapter 2.0 - Proposed Action and Alternatives, construction and operation of Phase 1 of the Proposed Action would provide up to 1,000 AFY of groundwater to the LCWD service territory. Full build out of the Proposed Action, under Phases 2 and 3, could maximize delivery up to 5,000 AFY to the LCWD service territory and would depend on the allocation of additional water by the State Engineer.

Depending on the accuracy of the perennial yield analysis, direct and indirect impacts could occur from groundwater withdrawals. Both the Applicant and various federal and state agencies are currently conducting additional studies to refine the accuracy of previous estimates of perennial yield. Potential indirect impacts would be related to lowered yields at local and regional springs and impacts to local water users. Potential direct and indirect impacts from groundwater withdrawals are described in the following sections.

4.3.1.3 Impacts to Groundwater Quantity

Impacts to groundwater quantity would consist of removing groundwater at the proposed volumes from the regional carbonate aquifer and transferring this water to the Coyote Spring Valley area. As described in Chapter 2.0 - Proposed Action and Alternatives, construction and operation of Phase 1 of the Proposed Action would provide up to 1,000 AFY of groundwater from four wells. Full build out of the Proposed Action, under Phases 2 and 3, could maximize delivery up to 5,000 AFY to the LCWD service territory.

Groundwater removal from soil results in a cone of depression (zone of influence) around the pumping wells. Extraction of groundwater from an aquifer can be described mathematically using equations, the purpose of which is to help predict the change in the groundwater elevation as a function of the extraction rate. For the purpose of analyzing systems where only preliminary aquifer data are available, it is common practice to use an equation derived by Theis (1935). This equation requires only two parameters (transmissivity and storativity) to permit calculation of the change in the groundwater elevation (also called drawdown) at some distance from an extraction well depending on the pumping rate and elapsed time.

To enable the calculation to be performed with only two parameters, certain assumptions concerning the geometry of the aquifer are required. These assumptions and their applicability to Kane Springs Valley include:

- The aquifer should be confined; in practice, this means that the sedimentary layer defined as the aquifer have other overlying sediments that restrict the inflow of water from a surficial aquifer. This assumption is met in the current case of extraction from the deep carbonate aquifer, for which the aquifer test yielded a storage coefficient of 1×10^{-4}.
- The aquifer is isotropic and homogeneous with respect to transmissivity and storativity, and the water flows toward the well in a circular, radially symmetric manner from an infinite distance. In the current situation, flow toward the well may not be radial due to the wells' locations within the Kane Springs Wash Fault Zone. In this case, the theoretical cone of depression (area subject to drawdown of the groundwater surface) may be oval rather than circular with less drawdown within the more permeable fault gauge and greater drawdown toward the center of the basin. Impermeable fault zones could also negate the infinite extent assumption by providing a barrier to flow. However, due to the unknown geometry of the Kane Springs Wash Fault system and the potential for further focusing by the Willow Spring Fault, it is believed that the Theis approach provides a reasonable method for estimating the maximum impacts (drawdown) prior to project development.

- A single well is used as a proxy for extraction from multiple wells. In order to achieve the desired extraction of 5,000 AFY, more than one well would be needed (four are proposed). For an infinite isotropic aquifer, the drawdown does not depend on the spacing of the pumping wells. It may result in less drawdown at each individual pumping well because of the lower rate at each, but the total effect is additive, and a monitor well at some distance will experience about the same drawdown as if the pumping were from a single well.
- The effect of the storage coefficient on the drawdown is greatest near a well or immediately after the start of pumping. At longer times or greater distances, an order of magnitude change in storage coefficient will result in a relatively small change in the drawdown. A storage value of 10^{-4} was calculated from the CH2MHILL (2006a) study. Storage terms likely vary within the carbonate aquifer on the scales we are assessing and an average value can only be obtained by observing water level response to long-term pumping stress. Although this storage value was from a 7-day test, it is reasonable based on the geologic conditions and is the only estimate derived from site-specific data.

The 100-year drawdown was predicted by CH2MHILL (2006a) for two transmissivity values, one representative of local aquifer conditions affected by the Willow Springs Fault (300,000 gpd/ft) and another representative of a lower value, which would be more applicable for a long-term pumping estimate (150,000 gpd/ft). Prudic et al (1995) estimated the regional transmissivity in the Coyote Spring area at 200,000 gpd/ft, indicating that the CH2MHILL transmissivity values are reasonable estimates. These two estimated values of transmissivity are used below to calculate a range of expected results from the proposed groundwater pumping.

As seen in **Table 4-1**, after 100 years, the expected drawdown 1 mile from the extraction point would vary between 4 and 30 feet depending on the extraction rate and the values of transmissivity selected. For an extraction rate of 1,000 AFY, the drawdown at 1 mile would be between 4 and 6 feet, while at an extraction rate of 5,000 AFY, the drawdown would increase to between 16 and 30 feet. Similar calculations were performed to calculate the effect at 10 miles from the pumping area (Bushner 2007). These are also shown in **Table 4-1**.

Table 4-1
Theis Solution for Drawdown Due to Aquifer Pumping for 100 Years

Transmissivity (gpd/ft)	Predicted maximum drawdown while pumping 1,000 AFY at distance		Predicted maximum drawdown while pumping 5,000 AFY at distance	
	1 mile	10 miles	1 mile	10 miles
150,000	6 feet	3 feet	30 feet	20 feet
300,000	4 feet	2 feet	16 feet	11 feet

Source: CH2MHILL 2006a
AFY – acre-feet per year gpd/ft – gallons per day per foot

These calculations suggest that, at 10 miles from the extraction area (approximate distance to the Coyote Spring Hydrographic Basin), the drawdown could be between 2 and 20 feet depending on the extraction rate. However, this calculation likely overestimates the extent of the drawdown

outside of the Kane Springs Valley because it is expected that the Kane Springs Wash Fault would act as a barrier to flow out of Kane Springs Valley, causing the effect to be less than calculated here (CH2MHILL 2006a).

4.3.1.4 Impacts to Groundwater Quality

Based on available groundwater data, groundwater quality from all three aquifers (alluvial, volcanic and carbonate) in the Kane Springs Valley is relatively good. The additional pumping under the Proposed Action would occur from the carbonate aquifer that is located at great depths with respect to the overlying volcanic and alluvial aquifers. Proposed groundwater pumping is not expected to deteriorate water quality from the mixing of waters from the various aquifers under the Proposed Action.

4.3.1.5 Impacts to Springs

Based on previous isotope studies conducted in the region, local springs in the Kane Springs Valley Hydrographic Basin are recharged by local precipitation and derive their water from localized groundwater flowing through the surrounding upland areas such as the Delamar Mountains and Meadow Valley Mountains (CH2MHILL 2006a, 2006b). Because these springs are not connected to the regional carbonate aquifer where the proposed pumping would occur, no impacts to local springs from groundwater withdrawals are anticipated under the Proposed Action.

Potential impacts to regionally significant springs were evaluated by reviewing the hydraulic data, water chemistry and published geologic interpretations of the hydrologic conditions in the lower portion of the White River Flow System. The potential effects of pumping on discharges from Muddy Springs were included in this evaluation primarily due to the high permeability and transmissivity of the carbonate aquifer underlying Kane Springs Valley and downgradient Coyote Spring Valley, which could connect the Proposed Action and the springs. Areas of high transmissivity, such as observed in Kane Springs Valley, generally develop a smaller drawdown cone. Long-term effects from groundwater extraction could, however, be propagated over great distances. Barriers to flow, such as faults or rock units with low permeability, also affect the extent of the drawdown.

Based on available water level data, a break in the regional hydraulic gradient has been observed at the location of the Kane Springs Wash fault zone with a steeper gradient north and a flatter gradient south of the fault zone. South of the fault zone, in Coyote Spring Valley, the Kane Springs Wash fault zone would likely impede the propagation of the cone of depression migrating south towards the Muddy Springs area. Until additional long-term pumping data are obtained in the area, the true range of influence can not be fully evaluated.

As described in Section 3.3 - Groundwater Resources, based on recent isotope data, regional springs appear to contain varying proportions of regional carbonate groundwater and a younger, non-carbonate water. Estimated percentages of regional carbonate groundwater indicate that the percentage of recharge water increases with distance downgradient from Pahranagat Valley. Muddy Springs are estimated to be composed of 60 percent regional carbonate groundwater and 40 percent water of non-carbonate origin, while Rogers Spring and Blue Point Spring, located further downgradient near Lake Mead, are estimated to contain 60 percent recharge and only

about 40 percent regional carbonate groundwater (see **Table 3-4**). This implies that groundwater in the regional aquifer is being continuously recharged by local sources along its flow path. The Office of the Nevada State Engineer (Ruling 5712) concurred that, while pumping at 1,000 AFY, "there is not substantial evidence that the appropriation of the limited quantity being granted under this ruling would likely impair the flow at Muddy River Springs, Rogers Springs or Blue Point Springs." As for the effect of pumping at the higher proposed rate of 5,000 AFY from Kane Springs Valley there is insignificant evidence to judge the effects at this time. The regional flow systems and effectiveness of faults as barriers to groundwater flow in Kane Springs Valley are currently being further evaluated by various state and federal agencies.

Based on the above discussion, the BLM does not anticipate noticable impacts to Muddy Springs related to groundwater pumping under the Proposed Action; however, the potential to affect the discharge rates at Muddy Springs does exist. The Stipulation Agreement between the LCWD and the USFWS, described in Section 1.4.2 and provided in **Appendix A**, outlines protection measures designed to protect aquatic resources within the Muddy River area. Impacts to flow rates in the Muddy River Springs area would be mitigated by reduction or cessation of pumping activities in the Kane Springs Valley if the water discharges in the Warm Springs area drops below 3.0 cfs.

No impacts to water levels within the upgradient Pahranagat and Delamar Valleys or within the Meadow Valley Wash Hydrographic Basin located to the east are anticipated. Water levels in Pahranagat and Delamar Valleys are controlled by the partial barrier created by the Pahranagat Shear Zone, and groundwater in the Meadow Valley Wash Hydrographic Basin is a part of a separate regional flow system.

4.3.1.6 Impacts to Local Water Users

Upon review of the Nevada State Engineer water rights database, no groundwater right applications within the Kane Springs Valley Hydrographic Basin, other than those filed by the LCWD were identified. Low-yield domestic wells are exempt from state water right permitting requirements; however, they do require a drilling permit. The search of the Nevada State Engineer well log database returned records for only three wells – the LCWD KMW-1/KPW-1 wells and a stock water well installed by Geyser Ranch in 1968.

Geologic observations during the installation of KPW-1 do not show a completely impermeable confining layer within the geologic column. However, the data indicate that most of the flow may occur within a narrow band of fractured material at a depth of approximately 1,350 feet below the surface. Thus, the amount of connection between the deep carbonate aquifer and any surficial aquifer is unknown at this time. Based on data evaluated to date, no effect from pumping on shallow water wells is anticipated under the Proposed Action.

In the Coyote Spring Valley Hydrographic Basin, no groundwater rights have been identified within 1 mile of the Proposed Action. Therefore, no wells would experience lowered water levels of 4 to 30 feet (**Table 4-1**) as predicted by the drawdown analysis provided in Section 4.3.1.3. Groundwater wells located within 10 miles of the Proposed Action include SNWA industrial wells, CSI municipal wells and Bedrock Limited, LLC wells associated with mining operations. Based on the drawdown analysis provided in Section 4.3.1.3., these wells could experience lowered groundwater levels by 2 to 3 feet for an extraction rate of 1,000

AFY, while at an extraction rate of 5,000 AFY, the drawdown may increase to between 11 and 20 feet (**Table 4-1**).

4.3.2 Alternative 1

Impacts to surface water and groundwater resources under this alternative would be the same as those anticipated under the Proposed Action.

4.3.3 No Action Alternative

Under the No Action Alternative, the ROW on federal lands would not be granted. No ground disturbance associated with the Proposed Action or Alternative 1 would occur, and no associated facilities would be constructed on BLM-administered public lands. No project-related impacts to water resources would occur under this alternative.

4.3.4 Mitigation

It is not anticipated that the Proposed Action would result in noticeable adverse impacts to discharges at Muddy Springs; nevertheless, several rulings by the Nevada State Engineer and agreements were drafted to protect the flows at Muddy River Springs. These rulings are presented in **Appendix A** and include:

- Nevada State Engineer Order 1169 (described in Section 4.20.3.3.5) which relates to groundwater applications in several adjacent groundwater basins, including Coyote Spring Valley, and holds various permits in abeyance pending the completion of a study of the regional carbonate aquifer system. Order 1169 requires major groundwater rights holders in the Coyote Spring Valley Hydrographic Basin to participate in a 5-year study to provide information on the effects of pumping existing permitted water rights in Coyote Spring Valley. These right holders include the Las Vegas Valley Water District, SNWA, CSI, Nevada Power Company, and the Moapa Valley Water District. Signatory agencies for Order 1169 include the BLM, Bureau of Indian Affairs, the USFWS and the NPS.
- Stipulation Agreement between the LCWD and the USFWS (described in Section 1.4.2); Parties agree to cooperatively manage the development of the LCWD water rights in the Kane Springs Valley Hydrographic Basin including reduction or cessation of pumping if specified spring flow trigger levels at Muddy River Springs are reached.
- Memorandum of Understanding (as described in Section 4.20.4.2) agreement between the SNWA, CSI, Moapa Valley Water District, and the USFWS requires the reduction or cessation of pumping if specified spring flow trigger levels are reached.

The BLM will continue to coordinate with the LCWD, major groundwater rights holders and other agencies in the region to ensure that groundwater development would not adversely impact the flows at Muddy River.

A series of monitoring wells would be utilized to monitor potential impacts to local water users related to increased depth to groundwater from proposed pumping. Even though no impacts on shallow water users are anticipated, water levels in the shallow aquifers would also be monitored

to better document the degree of hydraulic connection or isolation from the deep carbonate aquifer.

Studies suggest that the local springs in the Kane Springs Valley are not connected to the regional carbonate aquifer but rather are recharged by local precipitation. However, the LCWD will place appropriate monitoring devices in any free-flowing springs in the Kane Springs Valley to confirm that no impacts to local springs would result from the Proposed Action.

Additionally, the BLM would obtain and review all monitoring flow data collected from the Muddy River Springs as identified in the Stipulation Agreement between the LCWD and the USFWS. The BLM would work collaboratively with other state and federal agencies to ensure that all potential impacts associated with the Proposed Action would be appropriately mitigated.

4.4 VEGETATION RESOURCES

4.4.1 Proposed Action

Construction of project facilities would result in impacts to Mojave Creosote Bush Scrub and Mojave Desert Wash Scrub vegetation communities within the granted ROW. These impacts would include removal of vegetation resulting from grading and compaction of soils. All construction would occur within a 100- to 150-foot wide construction easement, which would result in approximately 25 acres of permanent disturbance and approximately 195 acres of temporary disturbance.

Any disturbance of existing vegetation would increase potential for invasive plant species and noxious weeds to become established within the project area, which would facilitate their spread into adjacent undisturbed areas. In addition, dust generated during construction activities in areas adjacent to or downwind from dust sources may temporarily reduce plant photosynthesis and water use efficiency for the affected plants (Sharifi et al. 1997). The construction phase of this project would last 3 to 6 months, so these habitats would not experience any long-term declines in productivity. Phases 2 and 3 would last 1 to 2 months each.

Vegetation in the project area is shrub-dominated, and these communities can take up to several decades to fully redevelop following disturbance. Consequently, the composition and diversity of vegetation that becomes established following completion of the project would differ from the existing vegetation for up to several decades. Grasses and forbs would likely dominate the vegetation community on reclaimed and disturbed areas for at least several years. The increase of invasive species, particularly of non-native grasses, would increase the susceptibility of these areas to wildland fires.

Reclamation of disturbed areas would begin immediately following construction. Reclamation would consist of reestablishing existing contours, planting approved desert scrub species, and monitoring the success of revegetation. Success criteria, rehabilitation standards and monitoring timeframes would also be developed by the BLM. These protocols are outlined in the Revegetation Plan prepared by the LCWD. Specific Applicant-Proposed Environmental Protection Measures are outlined in **Appendix C** - Standard Construction and Operation Procedures (Reference Numbers LP-1, ESC-1, PUCC-2, BR-5, BR-7, BR-9, BR-10, BR-14, BR-17, BR-19, BR-21, BR-22, R-1, R-2, R-3, R-4, R-5, R-6, R-7, R-8, R-9, R-10, R-13 and R-15).

The objectives of the Revegetation Plan include:

- Control erosion and sedimentation.
- Provide a self-perpetuating, drought-tolerant vegetative cover that is compatible with post-construction land use.
- Use adapted native species for revegetation that are beneficial to wildlife and that would reduce the visual effect of the ROW and other project components.
- Encourage native plant reinvasion by avoiding the use of highly competitive introduced species.
- Limit the introduction and spread of noxious and other annual weeds through prompt revegetation.
- Return disturbed land to a level of productivity comparable to pre-construction levels.
- Reestablish desert tortoise critical habitat.

Operation and maintenance of the Proposed Action would not result in impacts to vegetation resources. Operation of the project involves phased withdrawals of groundwater from the carbonate aquifer and occasional maintainance activities at the well heads and along the transmission line on established access roads. As described in Section 4.3.1.1 - Impacts to Surface Water and Section 4.3.1.5 - Impacts to Springs, no impacts to surface water or springs related to groundwater pumping would result; therefore, no impacts to vegetation resources are anticipated. Additionally, operation and maintance activities would occur on disturbed acreage that was accounted for under construction activities and no additional vegetation would be impacted.

The Proposed Action may have long-term beneficial effects on vegetation communities in the project area with the development of a reliable water supply and access point. The proposed fire hydrant to be installed adjacent to the 50,000-gallon forebay tank would improve the ability of firefighters to respond to wildland fires, thus potentially resulting in fewer acres of native vegetation burning in the event of a fire. However, it is also possible that the frequency of human-caused ignitions and wildland fires in this area will increase due to increased human presence on the landscape.

Impacts to vegetation resources from implementation of the Proposed Action would be avoided or minimized by implementing the Standard Construction and Operation Procedures set out in **Appendix C** - Standard Construction and Operation Procedures. These Applicant Proposed Environmental Protection Measures and those referenced in Section 2.1.4, would be applied under all three phases of the Proposed Action and Alternative 1 and would be sufficient to avoid or minimize impacts of the build out condition upon vegetation.

4.4.1.1 Non-native Invasive Species and Noxious Weeds

Disturbed areas created by implementation of the Proposed Action would be more susceptible to infestation by invasive and noxious weed species, such as red brome, cheatgrass, Sahara mustard and others that are present in surrounding shrubland communities. Invasive and noxious weed

invasion would hinder establishment of desirable vegetation. Additionally, any new areas of invasive or noxious weed occurrence within the granted ROW may act as a source for invasion of adjacent areas. Non-native annual grass species respond poorly to treatment programs, so proper management of disturbed soil is the best method of control. Invasive and noxious weed species are most likely to establish and spread along roadways and other disturbed areas that act as corridors for the transport of weed seeds. Invasive and noxious weeds also decrease habitat suitability for wildlife species because they provide little forage value for native wildlife. Additionally, invasive and noxious weeds species often out-compete native species and decrease habitat suitability for federally listed and sensitive plant and animal species (Whitson 2000). An increase in the fine, flashy fuels associated with several of the non-native invasive weed species found in the project area (red brome, cheatgrass, Mediterranean grass) could also alter the fire regime in the area.

A Risk Assessment for Noxious and Invasive Weeds was completed for this project and is included in **Appenix E-5**. A site-specific weed inventory would be completed prior to construction of this project to identify noxious weed and invasive species infestations to enable avoidance during construction or pre-treatment of these areas during construction and to reduce or eliminate the spread of these species. Specific environmental protection measures included as part of the Proposed Action are outlined in **Appendix C** - Standard Construction and Operation Procedures (Reference Number BR-22).

4.4.1.2 Federally Threatened, Endangered and Candidate Plant Species

There are no potential habitats for federally listed plant species within the Proposed Action ROW or the ROI. Therefore, construction, operation and maintenance of the Proposed Action would have no effect on any federally listed plant species.

4.4.1.3 Special Status Plant Species

The BLM identified 21 sensitive plants as potentially occurring within the project area (**Table 3-9**). The project area contains suitable habitat for three species - white bearpoppy, Meadow Valley sandwort and Las Vegas buckwheat. No individuals of these three species or of any other special status plant species were located during complete surveys within and immediately adjacent to the project area (ARCADIS 2006a). Consequently, there would be no impacts to special status plant species during construction, operation and maintenance of the Proposed Action.

All species of cactus and yucca that are native to the State of Nevada are protected and regulated (NRS 527.060-120). Surveys conducted during spring and fall of 2006 identified nine protected species of cactus and yucca in and adjacent to the Proposed Action ROW (ARCADIS 2006a). Construction activities would result in the removal of cactus within the permitted ROW. Salvage and restoration of cactus and yucca would be implemented as part of the Proposed Action and are described in the Applicant's Reclamation Plan.

As described in Chapter 2.0 - Proposed Action and Alternatives, construction and operation of Phase 1 of the Proposed Action would provide up to 1,000 AFY of groundwater to the LCWD service territory in Coyote Spring Valley. Full build out of the Proposed Action, under Phases 2 and 3, would maximize delivery of up to 5,000 AFY to the LWCD service territory. Phasing of

the project would not generate additional impacts on vegetation resources; water resource impacts to Phases 1, 2 and 3 are analyzed in this EIS.

4.4.2 Alternative 1

Under Alternative 1, the 138 kV transmission line and buried fiber optic line would be located within the designated LCCRDA utility corridor between Highway 93 and the Emrys Jones Substation. Installation of the overhead power lines and buried communication line would require clearing and grading of the alignment through undisturbed desert land. All construction would occur within a 100-foot wide construction easement, which would result in the temporary disturbance of up to an additional 32 acres of undisturbed desert lands. Disturbed areas would be reclaimed to pre-construction conditions following the end of construction activities except for the access road and pole footprints. However, the disturbance area would be more susceptible to the introduction and spread of invasive species and noxious weeds. Additionally, the creation of a new access road may increase the likelihood of OHV traffic, which could lead to the spread of invasive species and noxious weeds.

Routine maintenance activities may require cross-country travel along the reclaimed area. Motorized travel would be limited to the permanent access road (approximately 5 acres). These activities would increase the potential spread of invasive species and noxious weeds.

4.4.3 No Action Alternative

Under the No Action Alternative, the ROW would not be granted. No disturbance of federally managed lands associated with the Proposed Project or Alternative 1 would occur as a result of this project.

4.4.4 Mitigation

No additional mitigation is required.

4.5 WILDLIFE RESOURCES

4.5.1 Proposed Action

Impacts to wildlife resources, including Threatened, Endangered and Candidate species, result from ground disturbance caused by construction-related activities. Ground disturbance can impact wildlife habitat by removing vegetation, altering plant composition or structure, or altering soil characteristics. Loss of vegetative cover would adversely affect wildlife species that depend on that vegetation for food or shelter.

Activities that could result in additional effects on wildlife during construction include degradation of soil due to fuel contamination, harassment from human presence, and increased levels of noise and vibration due to construction, equipment movement or blasting. An additional impact could result from the increased perching opportunities for raptors and ravens, which would lead to increased predation within the project area. Long-term impacts can occur in the forms of loss of vegetation and wildlife habitat resulting from continued disturbance due to operation and maintenance activities. Approximately 195 acres of habitat would be temporarily disturbed, and 25 acres of habitat would be permanently removed in order to construct access

roads and other facilities. Wildlife species could also be temporarily displaced from areas of human activity during operation and maintenance activities. Environmental protection measures proposed by the LCWD, LCPD and the LCT as part of the Proposed Action to reduce these impacts are listed in **Appendix C** (Reference Numbers LP-1, LP-2, LP-3, PUCC-1, BR-5, BR-9, BR-11, BR-12, BR-13, BR-14, BR-15, BR-16, BR-17, BR-18, BR-19, BR-20, BR-21 and BR-23).

Potential for wildland fire ignition will increase as a result of the increased presence of humans and vehicles in the project area. However, the proposed fire hydrant to be installed adjacent to the 50,000-gallon forebay tank would improve the capabilities of emergency responders in wildland fire situations, potentially resulting in fewer acres of wildlife habitat being burned in the event of a fire.

The Proposed Action ROW parallels an existing disturbance corridor (Kane Springs Road), thereby reducing the amount of existing wildlife habitat that would be affected. The large expanses of undisturbed habitat surrounding the ROW provide adequate refuge for large mammal species in the area. Additionally, all construction within the permitted ROW would occur in phases, allowing adequate time and space for large mammals to move freely throughout the area.

Minimal impacts may occur to small mammals as a result of the Proposed Action. These impacts include direct mortality or injury from crushing by construction equipment and from being trapped in burrows during project construction. Impacts to reptile species in the project area would be similar to those described for small mammals. Overall, the impacts to small mammals and reptiles would be limited to permanent removal of habitats that would result from project construction.

Operation and maintenance of the Proposed Action involves phased withdrawals of groundwater from the carbonate aquifer. However, as described in Section 4.3.1.1 - Impacts to Surface Water and Section 4.3.1.5 - Impacts to Springs, no impacts to surface water or spring discharges related to groundwater pumping would result; therefore, no water-related impacts to wildlife resources are anticipated.

4.5.1.1 Federally Threatened, Endangered and Candidate Wildlife Species

4.5.1.1.1 Desert Tortoise

The desert tortoise is the only federally listed species that may occur within the Proposed Action ROW. Construction and operation of the Proposed Action have the potential to impact desert tortoise and its habitat. Using data from desert tortoise strip-transect surveys conducted during the fall of 2006, biologists estimated a density of 0 to 26 desert tortoises per square mile in the project area. Based on the acreage of temporary disturbance to desert tortoise habitat, construction of the Proposed Action may result in the take of between 0 and 8 tortoises.

Desert tortoises may be subject to direct mortality or injury from crushing by construction equipment, being trapped in burrows during initial site grading, vehicle strikes, or falling into open trenches during construction. The magnitude of impacts would depend on conditions such as the type and duration of the disturbance, time of year and density of tortoises within and adjacent to the affected area. Environmental protection measures designed to reduce impacts to

desert tortoises include imposing a project personnel speed limit, designing trenches and open pits with sloped sides for escape, and conducting a desert tortoise clearance survey prior to construction activities to remove tortoises from the ROW.

As shown in **Table 4-2**, approximately 25 acres of desert tortoise habitat would be permanently disturbed by construction of the Proposed Action. Approximately 195 acres of desert tortoise habitat would be temporarily disturbed. Of these totals, 21.6 acres (federal and private lands) of permanent disturbance would occur in the Mormon Mesa Critical Habitat Unit. Approximately 161.6 acres of temporary disturbance of desert tortoise habitat would occur in the Mormon Mesa Critical Habitat Unit. Permanent and temporary disturbance make up 0.005 and 0.04 percent of the Mormon Mesa Critical Habitat Unit, respectively. Most of the critical habitat disturbance would be on land that is within the Kane Springs Road ROW. Approximately 147.2 acres of desert tortoise critical habitat on federal land would be disturbed.

Other potential effects to desert tortoise from construction activities include degradation of soil due to fuel contamination, harassment from human presence, increased levels of noise and vibration due to construction equipment movement or blasting, loss of cover due to crushing or removal of vegetation, and loss of forage due to changed vegetation composition. Increased predation of desert tortoise from ravens and other species could potentially occur as a result of predators being attracted to the area by the garbage accumulation associated with human presence; however, construction crews would be required to remove refuse daily. The overhead transmission lines may also provide new perching opportunities for predators, which could lead to increased predation; however, anti-perching devices installed as part of the Proposed Action would help to minimize these impacts.

Table 4-2
Desert Tortoise Habitat Disturbed by the Proposed Action

Land Category	Permanent Impacts (acres)	Temporary Impacts (acres)
Public Land		
Desert Tortoise Critical Habitat	13.6	133.6
Desert Tortoise Habitat (non-critical)	3.4	33.4
Private Land		
Desert Tortoise Critical Habitat	8	28
Project Total Disturbance	25	195

Potential for wildland fire ignition would increase as a result of the increased presence of humans and vehicles in the project area. However, the proposed fire hydrant to be constructed adjacent to the 50,000-gallon forebay tank would improve the firefighting capabilities of emergency responders in wildland fire situations, potentially resulting in fewer acres of desert tortoise habitat being burned in the event of a fire.

In consultation with the USFWS and the BLM biologists, the LCWD, LCPD and the LCT and their contractors would incorporate desert tortoise protection measures to reduce the potential for effects associated with the Proposed Action. These Applicant Proposed Environmental Protection Measures are listed in **Appendix C** (Reference Numbers LP-1, LP-2, LP-3, PUCC-1,

BR-5, BR-9, BR-11, BR-12, BR-14, BR-16, BR-18, BR-19, BR-20, BR-21 and BR-23). Additional mitigation measures may be required by the USFWS through Section 7 or Section 10 consultation.

Habitat restoration would be conducted for all federal lands disturbed by construction of the Proposed Action with the exception of about 25 acres (public and private) that would be permanently impacted by the project footprint. Additional measures to minimize or mitigate incidental take of desert tortoise will be determined through consultation with the U.S. Fish and Wildlife Service through Section 7 or Section 10, as appropriate. Restoration on private or leased lands held by CSI would be consistent with the standards that would be implemented upon approval of the CSI MSHCP. The Coyote Spring - Lincoln County General Improvement District Service Plan describes potential impacts to Endangered and Threatened species within the GID service territory. The GID would require mitigation for any adverse impacts to habitat as a result of the Proposed Action, and initial funds for mitigation would come from a land disturbance fee assessed at the time of construction permitting.

Prior to issuance of any federal permit, lease or authorization for any surface-disturbing activity on public lands, the LCWD and the other utility agencies would be required to pay a remuneration fee for each acre of disturbed desert tortoise habitat. The amount of the fee would be calculated by the USFWS and would be used to fund conservation measures benefiting the desert tortoise.

Implementation of the Proposed Action "may affect, is likely to adversely affect" the desert tortoise in the project area. During Section 7 consultation, the USFWS will evaluate the data to determine if the Proposed Action will jeopardize the continued existence of the desert tortoise. The project is anticipated to directly affect habitats within the Mormon Mesa Critical Habitat Unit. However, because linear features will not be fenced and all areas not needed for O&M activities will be revegetated, it is expected that habitat conditions and movement corridors will primarily be affected during the construction phase of the project.

4.5.1.1.2 Moapa Dace

There is no habitat for Moapa dace within the project area. Within the ROI, there is habitat for this species in the Muddy River system, and impacts could occur to suitable habitat for the Moapa dace. This species has been documented in the Muddy Springs area, approximately 28 miles south of the project area.

Groundwater pumping associated with the Proposed Action would have the potential to impact flow rates in the Muddy River system. As a result, the LCWD and the USFWS have agreed to cooperatively monitor pumping of the LCWD water rights in the Kane Springs Valley Hydrographic Basin to avoid impairment of senior federal water rights or unreasonable adverse impacts to federal water resources. The Monitoring, Management and Mitigation Plan included in the Stipulation Agreement outlines "trigger points" that serve to minimize adverse impacts to the Moapa dace (and consequently, other riparian habitat) (**Appendix A**) including reduction or cessation of pumping if specified spring flow trigger levels at Muddy River Springs are reached.

The BLM will continue to coordinate with the LCWD and the USFWS to ensure that the Proposed Action would not adversely impact the Muddy River system.

While the Stipulation Agreement is designed to minimize adverse impacts to the Moapa dace, any decrease in flows may adversely impact the Moapa dace by decreasing pool and riffle habitat and causing a decrease in water temperature which would reduce the amount of habitat at the appropriate spawning temperature. The current flows are greater than the trigger points meaning that adverse impacts to the Moapa dace may still occur before flow rates reach the established trigger points. The Proposed Action would not result in direct impacts to the Moapa dace; however, the potential for indirect impacts associated with decreased flow levels resulting from groundwater pumping exists even though they would be mitigated using measures from the Monitoring, Management, and Mitigation Plan.

Implementation of the Proposed Action "may affect, is likely to adversely affect" the Moapa dace downstream of the project area in the Muddy River. During Section 7 consultation, the USFWS will evaluate the data to determine if the proposed project will jeopardize the continued existence of the Moapa dace. The project is not anticipated to directly affect Moapa dace habitat; however, indirect effects due to groundwater pumping may occur within Moapa dace habitat.

4.5.1.1.3 Southwestern Willow Flycatcher

There is no habitat for the southwestern willow flycatcher within the project area. Within the ROI, this species has been documented in riparian habitat in the Muddy Springs area, approximately 28 miles south of the project area. This riparian habitat is supported by surface water flow from springs, along stream reaches and in the shallow alluvial aquifer.

Groundwater pumping associated with the Proposed Action would have the potential to impact flow rates in the Muddy River system. As described in Section 4.5.1.1.2 Moapa Dace, "trigger points" have been established that serve to minimize adverse impacts to the Moapa dace (and consequently, other riparian habitat including southwestern willow flycatcher habitat) (**Appendix A**) including reduction or cessation of pumping if specified spring flow trigger levels at Muddy River Springs are reached. The BLM will continue to coordinate with the LCWD and the USFWS to ensure that the Proposed Action would not adversely impact the Muddy River system and to mitigate potential indirect effects to the Muddy River system, including impacts to riparian flycatcher habitat.

It is not anticipated that groundwater pumping in the Kane Springs Valley Hydrographic Basin will reduce flows in the Muddy River Springs area to the point that riparian vegetation would be impacted. Riparian vegetation, such as that along the Muddy River system, is phreatophytic, meaning that it is deep-rooted and it absorbs water from the water table or soil above it. Slight decreases in flow are not expected to impact riparian vegetation. Therefore, the Proposed Action would not result in direct or indirect impacts to the southwestern willow flycatcher or its habitat within the Muddy River system.

As a result of the potential for indirect impacts to the Muddy River system and the associated Stipulation Agreement, the BLM believes that implementation of the Proposed Action "may affect, not likely to adversely affect" the southwestern willow flycatcher. Any potential impacts to this species and its habitat would be mitigated according to the Stipulation Agreement.

4.5.1.1.4 Yellow-billed Cuckoo

There is no habitat for the western yellow-billed cuckoo within the project area. Within the ROI, this species has been documented in riparian habitat in the Muddy Springs area, approximately 28 miles south of the project area. This riparian habitat is supported by surface water flow from springs, along stream reaches and in the shallow alluvial aquifer.

Groundwater pumping associated with the Proposed Action would have the potential to impact flow rates in the Muddy River system. As described in Section 4.5.1.1.2 Moapa Dace, "trigger points" have been established that serve to minimize adverse impacts to the Moapa dace (and consequently, other riparian habitat including yellow-billed cuckoo habitat) (**Appendix A**) including reduction or cessation of pumping if specified spring flow trigger levels at Muddy River Springs are reached. The BLM will continue to coordinate with LCWD and USFWS to ensure that the Proposed Action would not adversely impact the Muddy River system and to mitigate potential indirect effects to the Muddy River system, including impacts to yellow-billed cuckoo habitat.

It is not anticipated that groundwater pumping in the Kane Springs Valley Hydrographic Basin will reduce flows in the Muddy River Springs area to the point that riparian vegetation would be impacted. Riparian vegetation, such as that along the Muddy River system, is phreatophytic meaning that it is deep-rooted and it absorbs water from the water table or soil above it. Slight decreases in flow are not expected to impact riparian vegetation. Therefore, the Proposed Action would not result in direct or indirect impacts to the yellow-billed cuckoo or its habitat within the Muddy River system.

As a result of the potential for impacts to the Muddy River system and the associated Stipulation Agreement, the BLM believes that implementation of the Proposed Action "would not contribute to the need to list" the yellow-billed cuckoo. Any potential impacts to this species and its habitat would be mitigated according to the Stipulation Agreement.

4.5.1.2 Special Status Wildlife Species

4.5.1.2.1 Mammals

Construction activities along Kane Springs Road may temporarily disrupt movement of large mammals between the Meadow Valley and Delamar Mountain Ranges. Construction activities are anticipated to be short-term. The ROW would be restored at the completion of construction, and there would be no long-term impacts (e.g., fencing of the pipeline corridor) that would restrict historic movement of wildlife among the mountain ranges. No measurable direct or indirect impacts to wildlife would occur from construction, operation and maintenance of the Proposed Action.

No maternal roost, colonial roosting habitats or winter roosts for bats are known to occur within the Proposed Action ROW. There is a potential for impacts to bats and other small mammals that could be harmed by entering substations and coming in contact with electrical systems.

4.5.1.2.2 Reptiles and Amphibians

During field surveys for desert tortoise and rare plants conducted in the spring and fall of 2006, no populations of Gila monsters or chuckwallas were found within the proposed ROW

(ARCADIS 2006a and 2006b); however, Gila monsters have historically been observed within the ROI. The project area contains suitable reptile habitat, which include deep, dissected washes along with natural cavities that may provide shelter for Gila monsters as well as boulders that may provide habitat for chuckwallas.

Potential effects to banded Gila monsters, chuckwallas and other reptiles include direct mortality or injury from vehicle strikes, crushing by construction equipment and being trapped in burrows during project construction. The magnitude of impacts would depend on conditions such as the frequency of the maintenance, time of year and density of reptiles within and adjacent to the operations. Implementation of these measures would help to reduce direct impacts to reptile species within the project area. Adherence to these environmental protection measures would limit the extent of direct impacts to reptile species. Environmental protection measures outlined in **Appendix C** (Reference numbers BR-3, BR-4, BR-9, BR-10, BR-12, BR-14, BR-15 and BR-21) would help to reduce direct impacts to reptile species within the project area. Adherence to these measures would limit the extent of direct impacts to reptile species and reduce any potential direct impacts.

Additional impacts which may affect banded Gila monsters, chuckwallas and other reptiles during construction activity include degradation of soil due to fuel contamination, harassment from human presence, increased levels of noise and vibration due to construction equipment movement or blasting, increased predation from ravens, and the potential to fall into open trenches and pits. Specific environmental protection measures for these species are included in **Appendix C** (Reference numbers BR-11, BR-16, BR-18, BR-20 and BR-23). These measures would reduce the potential for indirect impacts from raptor predation, fall and entrapment hazards, and soil contamination.

4.5.1.2.3 Migratory Birds

Most of the bird species that occur within the project area are protected by the MBTA. Impacts to birds in the vicinity of the project area include direct mortality from increased human traffic in the area; direct disturbance of nests as a result of construction, operation and maintenance activities destroying a nest; and nest abandonment as a result of construction, operation and maintenance noise. If construction of the project occurs during the breeding season, a migratory bird nesting survey would be conducted prior to construction in order to identify any active migratory bird nests. Any occupied nests would be monitored and avoided until the fledglings have left the nest. Undertaking environmental protection measures outlined in **Appendix C**, including BR-1, would limit the potential for impacts to migratory bird species by identifying, monitoring and avoiding known nests if construction occurs within the breeding season. Therefore, the MBTA would not be violated as a result of construction of the Proposed Action, and impacts to migratory birds and their nests would be avoided/minimized.

Suitable habitat for the western burrowing owl occurs throughout the project area. During field surveys conducted in the spring and fall of 2006, one burrowing owl was found in the project area (ARCADIS 2006b). The project area would be surveyed for burrowing owl nesting cavities prior to the nesting season and during construction if ground-disturbing activities are scheduled between mid-March and August. Assuming burrows are not desert tortoise burrows, empty nest site burrows could be collapsed within the construction zone so that owls would not enter the ROW during construction and set up a nest. Before collapsing the burrows, they would be

inspected to prevent the trapping of desert tortoises, Gila monsters and other wildlife species. If empty nest site burrows that are desert tortoise burrows are identified, prior authorization from the USFWS through a Section 7 take statement or a Section 10 take permit would need to be obtained before collapsing these burrows.

Any occupied burrows would be surrounded by a 250-foot buffer zone, within which no construction activities would occur, to prevent nest abandonment. The nesting cycle for burrowing owls takes 74 days, so construction activities would cease in the area until after this allotted time has passed or until a qualified biologist confirmed that nesting was completed. This would mitigate direct impacts that may otherwise occur to burrowing owls. This would be accomplished, where appropriate, as part of the surveys for the desert tortoise. If owl-occupied burrows are located during their nesting or brooding season, they would be avoided until the young owls leave the nest or it is determined that the nesting attempt failed.

Direct effects to the burrowing owl may include the destruction of nest burrows or other occupied satellite burrows, direct mortality or injury from crushing by construction equipment, and from being trapped in burrows during project construction. Undertaking environmental protection measures outlined in **Appendix C** (Reference number BR-1) would limit the potential for impacts to migratory bird species by identifying, monitoring and avoiding known nests if construction occurs within the breeding season. Therefore, the MBTA would not be violated as a result of constructing the Proposed Action, and impacts to migratory birds and their nests would be reduced to less than significant levels.

Additional impacts to the western burrowing owl may occur as a result of degradation to soil due to fuel contamination, harassment and potential nest abandonment from human presence; increased levels of noise and vibration due to construction equipment movement or blasting; and loss of prey base as a result of direct mortality of small mammals and reptiles.

It is not anticipated that operation and maintenance activities associated with the Proposed Action would have any impacts on western burrowing owls because measures described above and listed in **Appendix C** would be implemented.

There is no riparian habitat within the project area. Riparian bird species, including blue grosbeak (*Guiraca caerulea*), summer tanager (*Piranga rubra*), vermilion flycatcher (*Pyrocephalus rubinus*), and others, are known to occur in the Muddy Springs area, approximately 28 miles south of the project area. As described previously, any potential impacts to surface water flows in the Muddy River system would be minimized through the Stipulation Agreement between the LCWD and the USFWS.

Raptors and other large aerial perching birds are most susceptible to electrocution when coming in contact with power line structures because of their size, distribution and behavior (Olendorff et al. 1981; APLIC 1996). Because raptors and other large aerial perching birds often perch on tall structures that offer optimal views of potential prey, the design characteristics of transmission poles appear to be a major factor in raptor electrocutions (APLIC 1996). Electrocution occurs only when a bird simultaneously contacts two energized phase conductors or an energized conductor and grounded hardware. This happens most frequently when a bird attempts to perch on a transmission pole with insufficient clearance between these elements. Any transmission structures constructed for the Proposed Action would have clearances between

phase conductors or between phase conductors and grounded hardware (as recommended by APLIC [1996]) that are sufficient to protect even the largest birds, and therefore would present little to no risk of bird electrocution. With the application of appropriate construction designs for all transmission lines and their towers, impacts associated with bird electrocution should be minimized.

There would also be an increased potential for collisions with transmission lines and poles. If bird collisions become an issue with the new transmission line, strike indicators (visual markers for birds) could be installed to help reduce impacts (as recommended by APLIC [1994]; Avery et al. [1978]; Brown [1973]).

4.5.1.2.4 Fisheries

There is no fish habitat within the project area. Within the ROI, suitable habitat for sensitive fish species occurs within the Muddy River system. The Virgin River chub and Moapa speckled dace are known to occur in the Muddy Springs or Muddy River areas, approximately 28 miles south of the project area. As described in Section 4.3.1.5 - Impacts to Springs, no impacts to discharges at Muddy Springs are anticipated. While no impacts to discharges are anticipated, groundwater pumping associated with the Proposed Action would have the potential to impact flow rates in the Muddy River system. As a result, the LCWD and the USFWS have agreed to cooperatively monitor pumping of the LCWD water rights in the Kane Springs Valley Hydrographic Basin to avoid impairment of senior federal water rights or unreasonable adverse impacts to federal water resources. The Monitoring, Management and Mitigation Plan included in the Stipulation Agreement outlines "trigger points" that serve to minimize adverse impacts to the Moapa dace (and consequently, other fish species) (**Appendix A**) including reduction or cessation of pumping if specified spring flow trigger levels at Muddy River Springs are reached. The BLM will continue to coordinate with the LCWD and the USFWS to ensure that the Proposed Action would not adversely impact the Muddy River system.

While the Stipulation Agreement is designed to minimize adverse impacts to the Moapa dace, any decrease in flows may adversely impact the Virgin River chub and Moapa speckled dace by decreasing pool and riffle habitat and causing a decrease in water temperature which would reduce the amount of habitat at the appropriate spawning temperature. The current flows are greater than the trigger points meaning that adverse impacts may still occur before flow rates reach the established trigger points. The Proposed Action would not result in direct impacts to these species; however, potential for indirect impacts associated with decreased flow levels resulting from groundwater pumping exists even though they would be mitigated using measures from the Monitoring, Management and Mitigation Plan.

There would be no direct or indirect impacts to the BLM sensitive or state protected fish species related to construction, operation and maintenance activities within the immediate project area.

4.5.1.2.5 Invertebrates

The grated tryonia and Moapa Warm Spring riffle beetle are known to occur in the Warm Springs area near the Muddy River. Impacts to sensitive invertebrate species in the Muddy River system could occur as a result of surface water drawdown resulting from groundwater pumping; however, the Monitoring, Management, and Mitigation Plan in the Stipulation Agreement (**Appendix A**) would mitigate potential effects to the Muddy River system. This would most

likely eliminate any potential impacts to sensitive invertebrate species and their habitat in the Muddy River system. There would be no direct or indirect impacts to the BLM sensitive or state categorized invertebrate species related to construction, operation and maintenance activities within the immediate project area.

4.5.2 Alternative 1

Under Alternative 1, the 138 kV transmission line and buried fiber optic line would be located within the designated LCCRDA utility corridor between Highway 93 and the Emrys Jones Substation. Installation of the overhead power lines and buried communication line would require clearing and grading of the alignment through undisturbed desert land. All construction would occur within a 100-foot wide construction easement, which would result in the temporary disturbance of up to 32 acres of undisturbed desert lands. Disturbed areas would be reclaimed to pre-construction conditions following the end of construction activities except for the access road and pole footprints.

Disturbance to desert tortoise habitat under Alternative 1 would be slightly greater than that under the Proposed Action. Approximately 30.2 acres (5.2 acres more than the Proposed Action) of desert tortoise habitat would be permanently disturbed by construction of Alternative 1. Approximately 195 acres would be temporarily disturbed. Of these totals, 21.6 acres (federal and private lands) of permanent disturbance would occur in the Mormon Mesa Critical Habitat Unit. Approximately 161.6 acres of temporary disturbance would occur in the Mormon Mesa Critical Habitat Unit. Permanent and temporary disturbance would make up 0.005 and 0.04 percent of the Mormon Mesa Critical Habitat Unit, respectively. Most of the critical habitat disturbance would be on land that is within the Kane Springs Road ROW. Approximately 147.2 acres of critical habitat on federal land would be disturbed. As described for the Proposed Action, the environmental protection measures that would be implemented as part of this Alternative would reduce potential direct impacts to fish and wildlife species.

Increased predation from raptors as a result of increased perching opportunities created by development of a transmission line away from the road would constitute an indirect impact associated with Alternative 1. This indirect impact would be minimized with the adoption and implementation of Reference Measure BR-18 (Appendix C). Additionally, the creation of a new access road may increase the likelihood of OHV traffic, which could facilitate the spread of invasive species of plants, noxious weeds and the chances of collisions with wildlife.

Because the location and volume of groundwater pumping under the Alternative 1 would be the same as that for the Proposed Action, potential indirect effects to federally listed and other species of concern in the Muddy Springs area would be the same as those described for the Proposed Action. As described for the Proposed Action, conservation measures developed for the Moapa dace would reduce potential indirect impacts from groundwater pumping to federally listed and other special status species.

4.5.3 No Action Alternative

Under the No Action Alternative, the BLM would not grant ROWs allowing construction and operation of the Proposed Action or Alternative 1, and the impacts described above would not occur as a result of this project. The No Action Alternative would not affect the biological

viability of local, regional or national populations of wildlife species of concern/interest. The No Action Alternative would have no impact on Endangered, Threatened, Candidate and other sensitive species.

4.5.4 Mitigation

No additional mitigation is required; however, additional mitigation measures may be required by the USFWS through Section 7 or Section 10 consultation.

4.6 LAND USE

4.6.1 Proposed Action

Construction of the Proposed Action would require approximately 195 acres (167 acres public; 28 acres private). Following construction, approximately 25 acres (17 acres public; 8 acres private) would be maintained as permanent ROW and aboveground facilities. The remaining acreage would be restored and allowed to revert to former use. Most of the ROW would parallel Kane Springs Road within the designated LCCRDA utility corridor. While land ownership would remain unchanged, grazing and public use (including access to the surrounding Wildernesses) and use of Kane Springs Road may be disrupted for short durations during construction.

The 138 kV transmission line, Emrys Jones Substation, terminal storage tank and portions of the fiber optic lines would be located on private or leased lands in northern Coyote Spring Valley. Land use plans have been adopted, ordinances enacted and agreements have been signed between Lincoln County and CSI for development of these lands. These documents include:

- Coyote Spring Development Agreement (June 9, 2005)
- Coyote Spring Planned Unit Development (Lincoln County Ordinance 2004-04) (July 1, 2005)
- Lincoln County–Coyote Spring GID Service Plan (May 4, 2005)
- Coyote Spring Fire Protection and Emergency Medical Service GID Service Plan for Lands Located within Lincoln County (May 3, 2005).

Indirect impacts of the Proposed Action would include conversion of undeveloped desert land to utility-related uses. Title III of the LCCRDA designated utility corridors on the BLM lands to encourage consolidation of utilities within a common corridor. The LCWD intends to use the LCCRDA corridor as a means to convey groundwater to the Coyote Spring Valley within the LCWD service territory. During Phase 1, up to 1,000 AFY would be conveyed to the LCWD service territory. During Phases 2 and 3, and depending on additional water demands and acquisition of additional water rights, up to 5,000 AFY may be conveyed to the LCWD service territory. The affects of conveyance of 1,000 AFY of groundwater on land use would be the same as those for conveyance of 5,000 AFY of groundwater.

Operation and maintenance of the Proposed Action would not conflict with existing federal, state or county land use plans, policies or regulations applicable to the project area. All future land

use changes associated with urban growth in the Coyote Spring Valley area would be required to comply with Clark County, Lincoln County and Coyote Spring GID land use plans and development requirements. Land use on federal lands would continue to be managed under the Caliente MFP (as amended) until the RMP/EIS for the Ely District is approved. The USFWS would continue to coordinate with the BLM, Lincoln County and CSI to protect wildlife and their habitats in the area.

4.6.1.1 Mineral Resources

There are no active mining claims or oil and gas leases within the project area. The Proposed Action would not affect access to, or availability or development of, oil and gas or any locatable/saleable mineral resources in the project area. Western Elite, Inc. operates a sand and gravel operation on private lands west of the intersection of Kane Springs Road and Highway 93. If sand and gravel are needed during the construction and operation of the Proposed Action, Western Elite would most likely provide those materials.

4.6.1.2 Range Resources

The project area includes portions of the Grapevine and Delamar grazing allotments. Both allotments were affected by wildland fires in 2005. Currently, 45 percent of the burn area in the Delamar Allotment is temporarily closed to livestock grazing (Johnson 2006). A portion of the Grapevine Allotment is also under review for temporary closures due to the 2005 fires (Johnson 2006). The proposed pipelines would be buried and would not permanently restrict movement of cattle among grazing areas.

Implementation of the Proposed Action, and the resultant groundwater pumping activities, would not cause a reduction in forage levels in the project area that would lead to a decrease in permitted AUMs in either the Delamar or Grapevine allotments.

4.6.1.3 Transportation

Highway 93 and Kane Springs Road would provide the primary access into the project area. Traffic flow in the project area could be intermittently slowed by vehicles turning from Highway 93 onto Kane Springs Road. Traffic volumes would vary as construction progresses from one area to another. These impacts would be short-term (3 to 4 months during construction activities) and would not change the service level of Kane Springs Road. The LCWD has prepared an Access Road Plan, which describes measures to be taken by the LCWD or its contractors to access project facilities and the ROW, reclaim temporary access roads, and prevent unauthorized vehicle use of the project ROW. It includes descriptions of access routes and standard operational procedures for transportation-related activities.

Construction activity could contribute to increased levels of dust, which is generated from travel on gravel and dirt roads. The LCWD has prepared a Dust Control Plan, which outlines dust control measures the LCWD and which its construction and reclamation contractors would implement during project construction in accordance with local regulations. The Dust Control Plan is designed to comply with the NDEP – Bureau of Air Pollution Control SAD Permit requirements.

Use of Kane Springs Road during construction would contribute to roadway deterioration in the short term and would increase maintenance costs to Lincoln County. The county would continue to maintain the roadway during and after construction of the Proposed Action.

The Proposed Action would cause no impacts to the UP Railroad, located east of the project area, or any local or municipal airports in the region.

4.6.2 Alternative 1

Under Alternative 1, the 138 kV transmission line and buried fiber optic line would be located within the designated LCCRDA utility corridor between Highway 93 and the Emrys Jones Substation. Installation of the overhead power lines and buried communication line would require clearing and grading of the alignment through undisturbed desert land. All construction would occur within a 100-foot wide construction easement, which would result in the temporary disturbance of up to 32 acres of undisturbed desert lands. With the exception of the permanent access road and electric pole footprints, all disturbed areas would be reclaimed to pre-construction conditions. Land use in this area would change from undeveloped desert to utility-related uses.

4.6.3 No Action Alternative

Under the No Action Alternative, there would be no impacts to land use on federal lands within the project area associated with the Proposed Action or Alternative 1. However, land use would continue to change on private or leased lands resulting from construction of the Emrys Jones Substation and associated transmission lines. Land use planning on these lands would be subject to Lincoln County or local GID regulations.

4.6.4 Mitigation

To restrict OHV use in unauthorized areas, restrictive barriers would be used to limit public access of new maintenance roads adjacent to the Wilderness. Barrier control methods would be coordinated with the landowner/manager and may include locked gates and fencing.

4.7 AREAS OF CRITICAL ENVIRONMENTAL CONCERN, WILDERNESS AND OTHER SPECIAL USE AREAS

The Proposed Action would be located in the Kane Springs ACEC; however, all components on federal lands would be constructed within the 2,640-foot wide LCCRDA corridor. Per the BLM Manual 8560 – Section 19, "No buffer zones are created around Wilderness areas to protect them from the influence of activities on adjacent land." As such, no project component would be located closer than 100 feet from a Wilderness boundary. Project facilities located on private lands in the Coyote Spring Valley area would be subject to the applicable land use plan (e.g., CSI MSHCP, Lincoln County Master Plan, Lincoln County – Coyote Spring General Improvement Service Area Plan).

Construction activities may temporarily restrict access roads into the surrounding Wildernesses. However, these impacts would be localized and short-term. Operation of the Proposed Action

would not, in and of itself, increase recreation use in the area. Permanent project facilities would not restrict access to the surrounding Wildernesses.

4.7.1 Alternative 1

Construction activities associated with Alternative 1 would result in the disturbance of approximately 32 acres of land within the Kane Springs ACEC (assuming a 100-foot wide construction and permanent ROW). After construction, the permanent access road between Highway 93 and the Emrys Jones Substation would be maintained by the LCPD for routine maintenance activities. The permanent ROW would convert previously undisturbed desert within the Kane Springs ACEC to utility-related uses. All disturbed lands would be located within the designated LCCRDA utility corridor.

4.7.2 No Action Alternative

Under the No Action Alternative, there would be no impacts to ACECs, Wildernesses or other special use areas on federal lands within the project area associated with the Proposed Action or Alternative 1.

4.7.3 Mitigation

No mitigation is recommended.

4.8 RECREATION

4.8.1 Proposed Action

Due to its remoteness, the project area currently does not experience a high level of recreation use, although the BLM reports that usage has increased over the last several years (BLM 2006b). The surrounding Delamar Mountain and Meadow Valley Range Wildernesses support dispersed recreation activities such as hiking, sightseeing, camping, hunting and wildlife viewing. Construction activities along portions of Kane Springs Road may temporarily restrict access into these areas. Conducting OHV competitions along Kane Springs Road would continue to require a Special Recreation Permit from the BLM. The Proposed Action would not preclude the use of these areas, but rather would temporarily displace recreational users to surrounding recreation areas if access roads are restricted due to construction. Operation and maintenance of the project facilities would not limit public access to recreation opportunities in the surrounding area.

Implementation of the Proposed Action would not, in and of itself, increase recreation use in the area. Permanent project facilities would not restrict access to the surrounding Wilderness.

4.8.2 Alternative 1

Construction activities associated with Alternative 1 would convert previously undisturbed desert to utility-related uses. A permanent (dirt) road would be required between Highway 93 and the Emrys Jones Substation for routine maintenance activities. Unless restricted by some type of barrier control, such as a locked gate, fences or boulders, any new access road along this corridor could increase public accessibility, including OHV use, into a previously undisturbed area. Use

and maintenance of the new access road would require coordination between the land manager (BLM) and public utility (e.g. LCWD, LCPD and LCT).

4.8.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed or operated, and the impacts described above would not occur.

4.8.4 Mitigation

No additional mitigation required.

4.9 AIR QUALITY

4.9.1 Proposed Action

Nearly all air emissions and air quality impacts associated with the Proposed Action would be temporary and would occur as the result of project construction. Construction activities can be grouped into those occurring on site and off site. Air pollutant emissions during on-site construction would principally consist of dust generated from travel on unpaved surfaces and material handling and exhaust emissions from mobile diesel and gasoline-powered construction equipment. Off-site exhaust emissions would result from the workers commuting to staging areas, transporting workers from staging areas to the work sites, trucks hauling materials to the work sites, and dump trucks hauling away construction debris.

Diesel-fired portable engines and equipment would likely provide temporary power during construction. Operation of any stationary internal combustion engine that has a rating for output greater than 250 hp would require an operating permit from the NDEP. Diesel-fired electrical generators would be subject to regulation through state and local air quality permitting programs. Permitted equipment would be required to meet applicable emission standards and control requirements.

Construction of pipelines, transmission lines and associated facilities (including new substations) would result in temporary emissions of fugitive dust containing PM_{10} and $PM_{2.5}$. These emissions would dissipate following completion of construction. Particulate matter from construction would be emitted at ambient temperature and at ground level. Fugitive dust emissions from construction activities would be minimized through common construction and BMPs, such as application of water to disturbed areas. Environmental protection measures (NA-1 through NA-10), listed in Appendix C would be used to reduce air quality impacts.

Dust would not be expected to travel great distances from the generation site. Emissions from construction activities would not likely impact measurements at ambient PM_{10} and $PM_{2.5}$ monitors located in Las Vegas and surrounding suburban areas, nor would they travel far enough to impact the Grand Canyon (nearest Class I airshed).

Temporary gaseous emissions would be generated during construction, including SO_2, CO, NO_x, and volatile organic compounds (VOCs) from diesel-powered well-drilling and construction equipment. SO_2 emissions would be limited by state and federal regulations, which limit the

amount of sulfur in diesel fuel. Other gaseous emissions from diesel engines would be minimized through proper operation and maintenance. If blasting is used during pipeline construction, ammonium nitrate and fuel oil (ANFO) would be a source of gaseous pollutants. ANFO blasting can cause fugitive emissions of NO_x, CO and SO_2. Emissions from blasting agents would be limited by restricting its use to the smallest area possible. The EPA emission estimating software NONROAD2005 was used to estimate emissions from the construction equipment. **Table 4-3** presents the estimated annual construction exhaust emissions.

Table 4-3
Estimated Construction Equipment Exhaust Emissions

Phase	Equipment	Emissions per Unit (ton/year)				
		VOC	CO	NO_x	SO_2	PM
Site Preparation	Bulldozer	0.04	0.33	0.79	0.12	0.05
	5-yard Dump Truck	0.08	0.97	1.87	0.33	0.12
	Front-end Loader	0.04	0.31	0.69	0.09	0.05
	Backhoe	0.02	0.09	0.14	0.02	0.02
Site Excavation (in areas where ripping or trenching are required)	Bulldozer	0.04	0.33	0.79	0.12	0.05
	Backhoe	0.02	0.09	0.14	0.02	0.02
	Trencher	0.02	0.11	0.30	0.04	0.02
	5-Yard Dump Truck	0.08	0.97	1.87	0.33	0.12
	Jackhammer/Rock Saw	0.00	0.03	0.05	0.01	0.01
Plowing	Bulldozer	0.04	0.33	0.79	0.12	0.05
	Backhoe	0.02	0.09	0.14	0.02	0.02
	Tractor-Trailer	0.08	0.97	1.87	0.33	0.12
Backfilling, Grading, and Restoration	Bulldozer	0.04	0.33	0.79	0.12	0.05
	Backhoe	0.02	0.09	0.14	0.02	0.02
All Operations	Pick-up Trucks (4)	0.18	0.76	2.37	0.47	0.18
	Refueling Truck	0.08	0.97	1.87	0.33	0.12
	Water Truck	0.08	0.97	1.87	0.33	0.12
Total		0.88	7.74	16.48	2.82	1.14

Fugitive PM_{10} emissions were estimated using the following emission factor from EPA's AP-42 Chapter 13.2.3, Heavy Construction Operations:
Emissions = 1.2 tons/acre-month of activity
VOC – volatile organic compound CO – carbon monoxide NO_x – oxides of nitrogen
SO_2 – sulfur dioxide PM – particulate matter

During construction, the PM_{10} emissions are estimated at 11.1 tons per month and 66.4 tons for the entire construction period (or for the year).

Operation and maintenance of project pipeline and power transmission facilities may generate small amounts of fugitive dust from travel on unpaved surfaces by maintenance and inspection crews as well as associated vehicle emissions. This would occur infrequently and for a very short duration.

The projected annual power needs of the Kane Springs Valley Groundwater Development Project are estimated at 2,000 MWh or .22 MW for wells pumping 1,000 AFY and 10,000 MWh or 1.1 MW for wells pumping 5,000 AFY. Assuming that all electrical energy required by the project wells was derived from a coal fired power plant (although most of the LCWD's current supply allocation is hydroelectric from Hoover Dam), the energy requirements for the project

equate to the emission of an estimated 1,650 tons (at 1,000 AFY) and 8,250 tons (at 5,000 AFY) of CO_2 (a "greenhouse" gas) per year (IPCC 2007). Because CO_2 emissions are evaluated on a global scale, the direct and indirect additions of CO_2 would be added to the global total. The Intergovernmental Panel on Climate Change (IPCC) estimate CO_2 global total emissions from the land and ocean at approximately 855 billion tons per year and existing CO_2 global totals from fossil fuels at approximately 29 billions tons per year (IPCC 2007). The electrical energy demand associated with the Kane Springs Valley Groundwater Development Project could represent 1,650 to 8,250 tons of CO_2 per year, or 0.00000019 to 0.00000096 percent of the total global CO_2 emissions.

During scoping, comments were received about the potential for mobilization of radioactive dust during construction activities. The presence or absence of radioactive particulates in the soil substrate within the project area is unknown. During construction, the Applicant would implement site-specific BMPs, including dust suppression measures, to minimize fugitive dust. Applicant-proposed environmental protection measures referenced in Section 2.1.4 - Applicant Proposed Environmental Protection Measures and **Appendix C** - Standard Construction and Operation Procedures would be applied during all phases of construction.

4.9.2 Alternative 1

Impacts resulting from implementation of Alternative 1 would be similar to those described for the Proposed Action.

4.9.3 No Action Alternative

The No Action Alternative would have no air quality impacts associated with public land use.

4.9.4 Mitigation

During construction, the BLM will monitor the effectiveness of the proposed dust control measures and recommend additional air quality protection measures if deemed necessary.

4.10 NOISE

4.10.1 Proposed Action

Sound levels would be temporarily elevated by the Proposed Action's construction activities and are predicted to be below levels of concern. The EPA has established sound levels that are identified as protective of public health and welfare. The L_{dn} is the day/night sound level that was adopted by the EPA as a measure of community sound level exposure (Crocker 1982). EPA identified an L_{dn} of 55 dB for residential areas as an outdoor sound level above which the public health and welfare would be affected (EPA 1974). Noise levels from construction would be below 55 dBA at a distance of 4,000 feet from construction activities.

Long-term noise levels associated with operation of wellhead, pump station and pipeline operations would generally be steady and continuous and are predicted to be at levels lower than construction noise. Typical noise levels from field pumps and pump stations would be

approximately 15 dBA (at a distance of 50 feet) lower than typical noise levels from construction. Ambient noise levels in rural areas are typically in the 35 to 40 dBA range.

Equipment used during construction activities would include standard construction and earth-moving equipment (scrapers, excavators, backhoes, graders, trenchers, bulldozers, rock drills, diesel-fired generators and dump trucks) and well development equipment such as drill rigs. Assuming that all equipment operates concurrently at the same location, the combined construction noise level would be approximately 92 dBA at a distance of 50 feet from the equipment. Standard sound level calculations predict that sound levels would decrease 6 dBA for every doubling of distance from the source. Beyond 4,000 feet from the construction, this noise level would be below 55 dBA. Additionally, the closest residential area is located well beyond 4,000 feet from the project site, and noise from construction would be intermittent and short-term.

If blasting is employed during construction, the estimated sound level at 50 feet would be 94 dBA. Noise from blasting would be an impulse (short-term peak) and would drop below 55 dBA at distances beyond 4,500 feet. Most of the sound pressure generated by blasting is absorbed by the formations being blasted (i.e., it is not like an open-air explosion). Unlike a charge placed in the ground or in rock, an open-air explosion, such as a bomb being exploded above the earth's surface, has less immediate surrounding material to absorb the sound.

There are no established guidelines or standards to predict long-term effects of elevated sound levels on wildlife. It can be assumed that any wildlife in the area have habituated to existing sound levels generated by low-flying military aircraft, vehicular traffic on Kane Springs Road and OHVs in the project area. However, wildlife may be affected by construction activity noise, causing wildlife to temporary avoid the area during construction. Nonetheless, noise form construction activities would be intermittent and short-term.

Operation of the proposed well field pumps and pump station would emit lower sound levels than those powered by diesel generators. The production wells operating on electric power would emit a sound level of approximately 77 dBA at a distance of 50 feet. For these wells, the EPA L_{dn} 55 dBA guidelines would be met at a radius of 645 feet. The closest residential area is located well beyond 645 feet from the project site. Maximum sound levels generated by transmission line corona discharge would only be perceptible in the immediate vicinity of the transmission lines. Elevated sound levels from maintenance vehicles or activities would be no higher than those predicted for the construction activities.

4.10.2 Alternative 1

Noise impacts resulting from implementation of Alternative 1 would be similar to those described for the Proposed Action.

4.10.3 No Action Alternative

Under the No Action Alternative, the ROW would not be granted on federal lands, thereby eliminating the potential for noise impacts from the Proposed Action. However, noise-generating construction activities are expected to continue on private lands.

4.10.4 Mitigation

Applicant proposed measures to reduce or minimize construction-related impacts are described in Section 2.1.4 - Applicant Proposed Environmental Protection Measures and **Appendix C** - Standard Construction and Operation Procedures. No additional mitigation beyond those implemented as part of the Proposed Action would be required.

4.11 VISUAL RESOURCES

The indicators for effects on existing scenic integrity and scenic attractiveness in the ROI are:

- Visibility from nearby Wilderness areas,
- Visibility from travel routes,
- Visibility from recreation facilities or recreational use areas, and
- Compliance with the BLM VRM objectives for facilities located on public lands administered by the Ely District.

4.11.1 Proposed Action

Direct visual effects generated by construction and operation of the Proposed Action would be experienced by viewers at sensitive viewing areas within the ROI. The only sensitive viewing area within the project area includes the portion of the Proposed Action adjacent to Highway 93, as this area is viewed by the highest number of people on a daily basis.

As described in Section 3.11.2, one KOP (located along Highway 93 near the junction of Kane Springs Road) was selected to analyze typical visual impacts imposed by the Proposed Action on the greatest number of observers. The analysis of the KOP presented in the following paragraphs concluded that, because the viewer exposure is so low, the overall visual sensitivity of the project area within the utility corridor is low as seen from the KOP or other locations along Highway 93. In general, views from the road would be from moving vehicles.

Because there are only minor human modifications in the area, construction of any additional modifications would change the character of the landscape. Views of most of the project area are blocked from the highway by intervening landforms. The duration of views towards the project area would typically be very brief, as motorists would travel beyond the area in a few minutes.

The proposed 700,000-gallon terminal water storage tank would be on private property next to the LCCRDA utility corridor, approximately 3 miles east of Highway 93. The storage tank would be approximately 24 feet tall and 61 feet in diameter. Due to the undulating topography of the local terrain, the visibility of the tank from any existing sensitive viewing area would be limited. The closest highway viewpoint that would most likely provide a view of the tank is about 0.4 mile south of Kane Springs Road. The view towards the storage tank faces east-northeast towards a flat, sparsely vegetated sandy wash. However, the wash meanders through hilly terrain, which would restrict full views of the water tank.

The proposed 138 kV transmission line would span Highway 93 to interconnect with an existing 138 kV transmission line located on the west side of highway. The wood poles of the distribution line would be in the foreground views of travelers along Highway 93. The wooden pole structures would be in the foreground views at the junction of Kane Springs Road and Highway 93 as viewed by travelers along this stretch of the highway. In addition, the lines would be visible from the private parcel west of the highway.

The Emrys Jones Substation would be constructed at the terminus of the 138 kV transmission line, and would be located on private property east of Highway 93 and south of Kane Springs Road in the vicinity of the terminal storage tank. As described for the terminal storage tank, the substation would not be visible from the highway because of distance and from the intervening terrain.

Short-term (3 to 4 months) visual impacts would occur during construction, as views of construction equipment, increased traffic and construction activities are introduced into the local viewshed. Most of the project disturbance would be within the Kane Springs Road ROW. Clearing and excavation activities associated with the installation of project components would remove vegetation communities within the pipeline alignment. Immediately following installation, these areas would be reclaimed and revegetated to pre-construction levels. Construction-related visual impacts would continue to occur in these areas until vegetation has reestablished on disturbed areas. The visual impact of vegetation removal would be minimal because of low color contrast associated with the characteristic vegetation and the underlying soils.

4.11.1.1 Sensitive Viewing Areas

The proposed overhead transmission line would be constructed within the foreground distance zone of sensitive viewing areas, which is limited to Highway 93. No other proposed facilities would be visible from sensitive viewing areas, as they are isolated from views by distance or intervening terrain (seldom seen distance zone).

None of the proposed facilities on the BLM-administered public lands would be within the unobstructed viewshed of the KOP or other segments of the highway because proposed facilities on the BLM lands are in the seldom-seen distance zone.

The 138 kV transmission line would span Highway 93 at Kane Springs Road to interconnect with an existing electric transmission line located on the west side of the highway ROW. The wood poles of the distribution line would be in the foreground views seen by travelers on Highway 93. The wood poles would be small in scale relative to the existing electric transmission line and would not change the character of the rural landscape. In addition, electric distribution lines on single wood poles are a common human modification of rural landscapes. The impact to viewers would be low.

The viewers with the most sensitivity to changes in the existing natural landscape from the Proposed Action would be those traveling the Kane Springs Road. The Proposed Action would add an industrial element to the existing natural landscape in the foreground distance zone as viewed from Kane Springs Road.

4.11.1.2 BLM Visual Management

With the exception of the proposed terminal storage tank, the proposed Emrys Jones Substation and overhead utilities located on private lands, the proposed project facilities would be located on BLM-administered public lands currently managed with VRM Class III objectives. The level of change from the Proposed Action would be moderate, as the natural character of the landscape would be partially retained. The Proposed Action would meet the BLM VRM Class III objectives because these objectives provide for a moderate level of change to the characteristic landscape (BLM 1986). The VRM Class within the utility corridor changed to VRM Class IV with the passage of the LCCRDA. The Proposed Action would meet VRM Class IV objectives, which provide for a high level of change to the characteristic landscape.

As described in Chapter 2.0 - Proposed Action and Alternatives, construction and operation of Phase 1 of the Proposed Action would provide up to 1,000 AFY of groundwater to the LCWD service territory produced from up to four wells. The wells would be located within the LCCRDA utility corridor and would not be visible from any sensitive viewing area. Full build out of the Proposed Action, under Phases 2 and 3, would maximize delivery up to 5,000 AFY to the LCWD service territory. The number of wells proposed for Phases 2 and 3 would depend primarily on the well output from Phase 1 but could include two to four additional wells. There would be no additional impact to visual resources from Phases 2 and 3 as viewed from sensitive viewing areas from additional wells located within the VRM Class IV utility corridor. The environmental protection measures referenced in Section 2.1.4 - Applicant Proposed Environmental Protection Measures and **Appendix C** - Standard Construction and Operation Procedures would be applied under Phase 1 of the Proposed Action and would be effective to minimize impacts of the build out condition.

4.11.2 Alternative 1

Impacts to visual resources under Alternative 1 would be similar to those described for the Proposed Action. However, under Alternative 1, the overhead power line would stay entirely within the LCCRDA corridor between Highway 93 and the Emrys Jones Substation. The only sensitive viewing area for this alternative would be along Highway 93. The proposed power lines would be partially screened from view by existing topography along the highway.

4.11.3 No Action Alternative

Under the No Action Alternative, the proposed water development facilities would not be installed and operated within the project area; however, the proposed Emrys Jones Substation and the 138 kV transmission line would still be constructed on private or leased lands. There would be no effect on the existing visual condition from the proposed water development facilities including transmission and collection pipelines, wells and associated tie-in roads, well substations and associated tie-in roads, and storage tanks. The BLM-administered public lands would continue to be managed to protect and maintain existing improvements and uses. Development of private and leased lands within and adjacent to the project area would continue.

4.11.4 Mitigation

Mitigation measures are meant to minimize undesirable contrasts of project facilities with the existing landscape. Mitigation would enable proposed project facilities to harmonize with the surrounding landscape to the extent feasible and to meet VRM objectives for visual resources. In general, implementation of resource protection measures proposed for erosion control, road construction, rehabilitation and revegetation, and wildlife protection would also mitigate effects to visual quality. As presented in Section 2.1.4 - Applicant Proposed Environmental Protection Measures, the Applicant would implement environmental protection measures as presented in **Appendix C** – Standard Construction and Operation Procedures. Measures presented in **Appendix C** that would minimize impacts on visual resources presented in this section are measures V-1 through V-7, LP-1 through LP-3, ESC-2, ESC-3, ESC-5, ESC-6 PUCC-1, R-1 through R-3, R-8, and R10 through R-15. No additional mitigation beyond those implemented as part of the Proposed Action would be required.

4.12 SOCIOECONOMICS

The ROI for the socioeconomic analysis encompasses Lincoln and Clark Counties, Nevada. Additional labor data are provided for communities located closest to the ROI, as it is likely that the project workforce would reside in the outlying communities of Las Vegas and Mesquite. The communities of Alamo and Caliente in Lincoln County, and Las Vegas and Mesquite in Clark County, are the foci of the analysis for housing, public and other community services; recreation; county and municipal finances; crime; and the local transportation network, as these are the jurisdictions that would experience effects on these aspects of the social and economic environment. Demographic data for Nevada are included to set the Proposed Action in a regional context.

4.12.1 Proposed Action

Implementation of the Proposed Action would have a minimal affect on the social and economic resources from the associated increase in the level of economic activity. Increased economic activity would result from increased payroll earnings during project construction, which would be spent on items such as housing, food, goods and services. These social and economic effects would occur where the Proposed Action workforce would reside, primarily in Clark County.

The Proposed Action would not have any direct growth-inducing effects because it is estimated to take from 90 to 180 days to complete and require a construction workforce of no more than 160 workers. Indirect effects would result from continuing planned developments in Clark and Lincoln Counties.

4.12.1.1 Population and Housing

Most construction workers that would be required to construct the Proposed Action facilities would commute from the Las Vegas area, which is within a daily commute distance. It is not anticipated that construction of the Proposed Action would result in an influx of new residents into the region. Therefore, there would be no local or regional population impacts and no demand for new permanent housing. In the event that workers migrate into Lincoln County and

the Las Vegas area for the construction period, the relatively small number of such workers is unlikely to affect temporary housing stock. There are 43 motel rooms in Alamo and 76 motel rooms in Caliente. While temporary housing in Lincoln County is limited, there are nearly 150,000 hotel rooms in the Las Vegas metropolitan area. Construction of the project would result in no more than 160 temporary jobs that would last for no more than 180 days. Therefore, construction of the Proposed Action facilities would not have a measureable effect on population or housing.

4.12.1.2 Economy and Employment

In 2005, there was an average of 17 construction workers in Lincoln County. At an average 2005 unemployment rate of 5.1 percent, it was estimated that one construction worker was unemployed in Lincoln County in 2005. Therefore, assuming that the 2007 scenario is similar to that of 2005, most of the project workforce would be based in Clark County, primarily in the Las Vegas area. There were an estimated 101,550 construction workers in Clark County in 2005. This represents more than an ample construction labor force in the Las Vegas area to meet the construction requirements of the Proposed Action.

The development of the project facilities would require approximately 160 workers for up to 120 days. This would provide employment for construction workers primarily from the Las Vegas area, resulting in a minimally positive effect on payroll earnings during project construction. The new construction would benefit the Lincoln County tax base from increased sales and use taxes and from project-related purchases of goods and services. The construction and operation of the Proposed Action would not have any measurable influence on the Clark County economy.

4.12.1.3 Public Utilities and Services

Solid wastes would be generated primarily by construction. Disposal of the amount of wastes generated from construction and operation would not affect the life expectancy of the municipal solid waste facilities currently operating in regional area. Any hazardous materials would be disposed at an EPA-approved hazardous waste facility.

Because an influx of in-migrating employees and their families is not anticipated to meet the Proposed Action construction labor needs, there would be no effect on public utilities and services, fire protection, police protection, schools or parks and recreation facilities in Lincoln County resulting from increased population.

4.12.2 Alternative 1

The socioeconomic characteristics and potential impacts of Alternative 1 are similar to those of the Proposed Action.

4.12.3 No Action Alternative

Under the No Action Alternative, the ROW on federal lands would not be granted to the LCWD. No ground disturbance would occur from the Proposed Action, and there would be no associated direct or indirect impacts.

4.12.4 Mitigation

As described in Chapter 2.0 - Proposed Action and Alternatives, construction and operation of Phase 1 of the Proposed Action would provide up to 1,000 AFY of groundwater to the LCWD service territory. Full build out of the Proposed Action, under Phases 2 and 3, would maximize delivery up to 5,000 AFY to the LCWD service territory. Full build out would not generate additional impacts on socioeconomics. The environmental protection measures referenced in Section 2.1.4 - Applicant Proposed Environmental Protection Measures and **Appendix C** - Standard Construction and Operation Procedures (Reference Number HM-7) would be applied under Phase 1 of the Proposed Action and would be sufficient to minimize impacts of the build out condition.

4.13 ENVIRONMENTAL JUSTICE

Executive Order 12898 requires an analysis of impacts of a federal action on disproportionate minority and low-income population. There are no such populations within the vicinity of the project area. The Moapa River Indian Tribe is the closest minority community and is located approximately 30 miles south of the project area.

4.13.1 Proposed Action

Potential direct and indirect impacts associated with the Proposed Action would not have a disproportionate effect on low-income or minority populations because these populations are not present in the vicinity of the project area. Based on the information gathered from the U.S. Census Bureau, minority populations comprise less than 5 percent of the population in Lincoln County (see Table 3-16 in Chapter 3.0). This is 1) less than the 50 percent definition of a minority population and 2) not a meaningfully greater percentage than the minority population of the county or state, as cited in the CEQ's Environmental Justice Guidance under the National Environmental Policy Act (CEQ 1997). Therefore, implementation of the Proposed Action would have no impact on environmental justice issues.

4.13.2 Alternative 1

The environmental justice characteristics and potential impacts of Alternative 1 are similar to those of the Proposed Action.

4.13.3 No Action Alternative

Under the No Action Alternative, the ROW would not be granted. No impacts associated with the Proposed Action or Alternative 1 would occur to minority or low-income populations under the No Action Alternative.

4.13.4 Mitigation

No mitigation is required.

4.14 HAZARDOUS MATERIALS AND SOLID WASTES

4.14.1 Proposed Action

Hazardous and toxic materials, such as fuels and solvents, would be transported, used and stored in the project area during both the construction and operation phases of the Proposed Action. Accidental release of hazardous and toxic materials could cause harm to human health and the environment if not handled properly. Measures to minimize potential for accidental spills or hazardous materials are outlined in the Environmental Management Plan and SPCCC Plan prepared by the LCWD. The LCWD, LCPD and the LCT would each employ on-site Construction and Environmental Inspectors who would ensure compliance with all regulatory requirements. Solid wastes would be generated primarily by construction activities. Disposal of the amount of wastes generated from construction and operation would not affect the life expectancy of the municipal solid waste facilities currently operating in the region. Any hazardous materials would be disposed at an EPA-approved hazardous waste facility. Therefore, there would be no impact from the Proposed Action on existing waste facilities in the region.

4.14.2 Alternative 1

The impacts of hazardous materials and solid waste potential under Alternative 1 would be similar to those for the Proposed Action for both construction and operation activities.

4.14.3 No Action Alternative

Under the No Action Alternative, the ROW would not be granted, and the potential impacts described above would not occur.

4.14.4 Mitigation

Applicant proposed measures to reduce or minimize construction-related impacts are described in Section 2.1.4 - Applicant Proposed Environmental Protection Measures and **Appendix C** - Standard Construction and Operation Procedures. These environmental protection measures would be applied during all phases of construction. No additional mitigation beyond those implemented as part of the Proposed Action would be required.

4.15 PALEONTOLOGICAL RESOURCES

4.15.1 Proposed Action

There are no known impacts on paleontological resources that would result from construction, operation and maintenance of the Proposed Action. However, construction activities (e.g., excavation of pipeline trenches) may result in unanticipated exposure of Holocene and late Pleistocene fossils. If fossil flora and fauna are discovered during construction, the BLM would be contacted, according to the standard operating procedures presented in **Appendix C** (CR-1 to 8 and 10), to determine steps necessary to evaluate the need to preserve the fossils.

4.15.2 Alternative 1

Implementation of Alternative 1 would result in impacts similar to those described for the Proposed Action for construction of the 138 kV transmission line and buried fiber optic line (between Highway 93 and the Emrys Jones Substation) only. If fossil flora and fauna are discovered during construction, the BLM would be contacted, according to the SOPs presented in **Appendix C** (CR-1 to 8 and 10), to determine steps necessary to evaluate the need to preserve the fossils.

4.15.3 No Action Alternative

Under the No Action Alternative, the ROW would not be granted. No impacts associated with the Proposed Action or Alternative 1 would occur to paleontological resources.

4.15.4 Mitigation

No mitigation is required for the Proposed Action or Alternative 1.

4.16 ARCHAEOLOGICAL RESOURCES AND HISTORIC PROPERTIES

Compliance with Section 106 of the NHPA requires definition of an APE specific to the proposed undertaking and specific to the nature of the historic properties that may be affected. Historic properties are those archaeological or historical sites and traditional cultural concerns that are listed on or eligible for the NRHP. Both direct and indirect effects are considered, and the APE may be different for each class of effects. Direct effects include physical damage to the historic properties and indirect effects may occur farther away in space or time and include diminished integrity of the setting for which contributed to the significance of a historic property. Areas of direct effect would be associated with production well development; construction of well yards, pipeline and power line; and storage tanks and associated components. The APE for the Proposed Action consists of the proposed pipeline corridor (300 feet wide) which begins at the intersection of U.S. Highway 93 and Kane Springs Wash Road and extends approximately 16.7 miles east and northeast along the southern edge of the existing graded road. An additional proposed alternative corridor (300 foot wide) begins at the existing Kane Springs Wash Road and extends approximately 3 miles west along the northern boundary of the CSI development area within BLM managed lands, ending at the edge of the U.S. Highway 93 ROW.

The principal measure of effects on historic properties is the potential adverse diminishment of the integrity or significant characteristics that make the property eligible for the NRHP. These effects may result from direct construction ground-disturbing activities or the introduction of visual, atmospheric or audible elements that would diminish the integrity of the historic setting, feeling or association of the property as a result of construction, operation and maintenance of the proposed project.

4.16.1 Evaluation of Effects on Historic Properties

The National Register Criteria for Evaluation (36 CFR 60.4) lists criteria that need to be considered when evaluating the eligibility of a site, district, building, structure or object. If a

resource possesses integrity of location, design, setting, materials, workmanship, feeling and association, it would be eligible to the NRHP if any one of the following criteria is applicable:

a. It is associated with significant events or patterns in history or prehistory;
b. It is associated with the specific contributions of individuals significant in our past;
c. It has engineering, artistic or architectural values or is representative of a distinctive type or style; or
d. It has yielded or is likely to yield important information to address research questions in history or prehistory.

Normally, resources less than 50 years old are not eligible for the NRHP.

4.16.2 Proposed Action

The Proposed Action would result in no direct effects to National Register eligible properties or Native American traditional cultural concerns or significant properties (Section 5.2). One non-eligible historic site (Old Highway 93) that crosses the APE would be affected by construction. However this is not a historic property.

The Proposed Action crosses an extensive lithic procurement landscape. The landscape is an extensive area of obsidian procurement that also includes areas of chert procurement. At least three archaeological localities within this landscape that may be considered eligible for the NRHP may be affected. The localities are concentrations of toolstone procurement and reduction activity that may have the potential to yield information on lithic technology that contributes to significant research questions in prehistory (Criterion d). Additional detailed documentation of these localities and agency consultation concerning their eligibility is ongoing. If these surface sites are determined to be historic properties, adverse impact by the Proposed Action may be mitigable by detailed documentation of the important information that they contain.

Construction would have no indirect effects on any historic landscape or known rock art site, geoglyph or toolstone quarry eligible under Criteria a, b or c (State Protocol Agreement between the BLM and the SHPO, VII C. 2), as these sites have not been identified in the project area.

Operation and maintenance of the Proposed Action would have no direct or indirect effects on any historic landscape or known rock art site, geoglyph or toolstone quarry eligible under Criteria a, b or c (State Protocol Agreement VII C. 2), as these sites have not been identified in the project area.

Unanticipated subsurface archaeological resources may be discovered during ground-disturbing activities associated with implementation of the Proposed Action. In addition, though unlikely, human remains may be discovered during ground-disturbing activities. Stipulations for identification and treatment of unanticipated discoveries are presented in **Appendix C** (CR-1 to 9).

4.16.3 Alternative 1

Alternative 1 would result in no direct or indirect effects to known historic properties or traditional cultural concerns or significant properties (Section 5.2). One non-eligible historic site (Old Highway 93) crosses the APE and would be impacted by construction. Ground-disturbing activities proposed for this alternative are somewhat less than the Proposed Action; however, unanticipated subsurface archaeological resources and human remains may be discovered during ground-disturbing activities. Stipulations for identification and treatment of unanticipated discoveries are presented in **Appendix C** (CR-1 to 9).

4.16.4 No Action Alternative

No historic properties would be affected under the No Action Alternative.

4.16.5 Mitigation

If the archaeological lithic procurement localities in the APE of the Proposed Action are determined to be historic properties, treatment measures will be implemented to avoid, minimize or mitigate adverse impact to these resources. The detailed documentation that is underway to evaluate the eligibility of these localities could be adequate to mitigate adverse impact within the APE. If previously unidentified cultural resources (including human remains) are discovered, the procedures outlined in State Protocol Agreement, Section VIII (Discovery Situations) would be adhered to. Under the agreement, all related construction activities would cease within 100 meters of the find, and the LCWD representative would notify the BLM authorized officer. The BLM, in coordination with the SHPO, interested persons and Tribal representatives, would determine if construction activities can proceed or if mitigation is required. If mitigation is required, the BLM (in consultation with the SHPO, interested persons and Tribal representatives) would notify the LCWD of the need for mitigation, and mitigation measures would be implemented. The BLM would ensure that reports of mitigation efforts for discovery situations are completed in a timely manner and conform to the Department of Interior's Formal Standards for Final Reports of Data Recover Program (42 FR 5377-79). Activities may resume after the BLM notifies the LCWD that the mitigation process is complete.

4.17 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

Unavoidable impacts are those that would occur after implementation of all committed and recommended additional mitigation measures. Unavoidable impacts do not include temporary or permanent impacts associated with the Proposed Action, which would be mitigated. Neither do they include impacts from speculative events such as hazardous waste spills that are not cleaned up promptly in accordance with accepted mitigating measures or future wildland fire events.

The Proposed Action would result in the permanent conversion of approximately 25 acres from undeveloped desert to utility-related use, of which approximately 17 acres would be public lands within the LCCRDA utility corridor. These lands are located within the Kane Springs ACEC and support habitat for desert tortoise and other wildlife. Most of the disturbance would be located along the Kane Springs Road ROW. The introduction of aboveground features would

change the visual characteristics of the surrounding landscape, which includes the Delamar Mountains and Meadow Valley Range Wildernesses.

The LCWD has committed to minimizing potential short-term and long-term environmental and social impacts of the Proposed Action through project design and development of site-specific measures. Design, construction and operation features of the Proposed Action that are intended to avoid or minimize impacts are described in Section 2.1.4 – Applicant Proposed Environmental Protection Measures and outlined in **Appendix C** - Standard Construction and Operation Procedures.

If additional mitigation requirements are identified through the NEPA or water rights application process, the Applicant would develop appropriate measures in consultation with the requesting agency (e.g., USFWS, Army Corps of Engineers, Nevada State Engineer) and include these in their project design. The USFWS may identify additional measures ("terms and conditions") to minimize the incidental take of listed species during the Section 7 consultation process; the Applicant would be required to implement these to be in compliance with the incidental take permit.

4.18 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

This section describes the irreversible and irretrievable commitments of resources associated with implementing the Proposed Action. A commitment of resources is irreversible when primary or secondary impacts limit the future options for a resource. An irretrievable commitment refers to the lost production or use of a resource that would cause the resource to be unavailable for use by future generations. Examples of these types of resources include nonrenewable resources, such as minerals and cultural resources, and renewable resources that would be unavailable for the use of future generations such as loss of production, harvest or habitat.

Constructing, operating and maintaining the Proposed Action would require committing land, soil and vegetation to place aboveground facilities including well yards, access roads and overhead electric power lines. While it is possible that these components could be removed and the natural landscape restored, it is unlikely in the foreseeable future. Therefore, these structures would constitute an irretrievable commitment of land. Construction of Alternative 1 would require the use of similar amounts of land, soil and vegetation.

The areas occupied by aboveground features would be irreversibly removed from natural habitat. Potential habitat for the desert tortoise would be lost from placing aboveground facilities and access roads. However, implementation of Applicant-proposed environmental protection measures will minimize the number of individual tortoises that would be affected. Alternative 1 would result in a greater disturbance to desert tortoise habitat than the Applicant's Proposed Action because its features (including a temporary access road) would use more undisturbed lands for the placement of the overhead lines during construction.

Construction of the Proposed Action would require an irretrievable and irreversible commitment of building materials and fuel for construction equipment. Materials used for constructing the

groundwater facilities are ultimately recyclable but would remain an irreversible commitment of resources. Implementation of the Proposed Action would require an irreversible commitment of a limited amount of sand and gravel resources extracted from local sources. As described in Chapter 2.0, it is anticipated that a large portion of the excavated native subsoils encountered during construction would be suitable backfill material. If deemed appropriate, the excavated subsoil would be screened and used as pipe bedding material during installation. Topsoil would not be used for backfill. The use of native material would reduce the amount of imported material hauled into the area and also minimize the disposal of excavated spoils and the amount of truck traffic on access roads and along the ROW.

Small quantities of fossil fuels would be irretrievably consumed during the construction and maintenance of the project. The consumption of fuel would be of relatively short duration and would not constitute a long-term drain on local resources.

4.19 SHORT-TERM AND LONG-TERM PRODUCTIVITY

This section discusses the short-term use of the local environment and the maintenance and enhancement of long-term productivity as a result of implementation of the Proposed Action. For the purposes of this discussion, "short-term" is defined as the 3- to 4-month period during construction and up to 1 year following initial operation. "Long-term" is defined as the entire operational life of the Proposed Action, which is anticipated to be indefinite. Facilities associated with the Proposed Action are expected to be in place for long-term use to move groundwater to the Coyote Spring Valley area and may be replaced or upgraded in the future.

4.19.1 Short-Term Uses

During construction of Phase 1, up to 195 acres would be temporarily disturbed. Of this amount, approximately 167 acres are BLM-admininstered public lands. Short-term impacts to physical resources would result from land-clearing and construction activities. Personnel and equipment moving around the project area would disperse wildlife and temporarily eliminate habitats. Effects to air quality and ambient noise would be short-term and localized during construction. Up to 500,000 gallons of water would be required for hydrostatic testing of the entire water transmission pipeline.

Impacts to social and economic resources would be primarily short-term (3 to 4 months) effects to the local economy. During construction activities, revenue would likely increase for some local businesses such as construction suppliers, hotels, restaurants, gas stations and grocery stores.

4.19.2 Long-Term Uses

Approximately 25 acres would be permanently disturbed by utility-related uses. The remaining acreage would be reclaimed to pre-construction levels. Although the Proposed Action would not require a major amount of land to be taken out of production, construction-related disturbances of previously undisturbed biological habitats could result in long-term reductions in the biological productivity of the area, as biological communities in arid regions tend to recover very slowly from disturbances. As described in Chapter 2.0 - Proposed Action and Alternatives, up to

1,000 AFY of groundwater would be pumped from the Kane Springs Valley Hydrographic Basin and transported to the LCWD service territory within the Coyote Spring Valley Hydrographic Basin. Full build out of the Proposed Action, under Phases 2 and 3, would maximize delivery up to 5,000 AFY within the LCWD service territory. Assuming a 0.5 AFY allocation per dwelling unit, the 1,000 AFY would accommodate 2,000 dwelling units and 5,000 AFY would enable development of 10,000 dwelling units within the CSI project.

The LCWD would provide a fire hydrant for access/use to support fire suppression activities. Construction of the Proposed Action would contribute long-term socioeconomic benefits to Lincoln County including business development and regional growth.

4.20 CUMULATIVE IMPACTS

4.20.1 Regulations and Guidance

The CEQ Regulations for Implementing the Procedural Provisions of NEPA define a cumulative impact as:

> "...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7).

Past, present and reasonably foreseeable future actions (RFFAs) are analyzed to the extent that "they are relevant and useful in analyzing whether the reasonably foreseeable effects of the agency proposal for action and its alternatives may have an additive and significant relationship to those effects."

The CEQ regulations require including a discussion of cumulative actions and connected actions in the scope of the environmental review. These terms are defined as follows:

- Cumulative actions are those "which when viewed with other proposed actions have cumulatively significant impacts and would therefore be discussed in the same [environmental review]" [40 CFR 1508.25(a) (2)].
- Connected actions are those closely related. "Actions are connected if they: (i) automatically trigger other actions which may require environmental review; (ii) cannot or would not proceed unless other actions are taken previously or simultaneously; or (iii) are interdependent parts of a larger action and depend on that larger action for their justification" [40 CFR 1508.25(a) (1)].

Cumulative effects can result from individually minor, but collectively significant, actions taking place over time. Cumulative effects can also result from spatial (geographic) and temporal (time) crowding of environmental impacts. Said another way, the effects of human activities would accumulate when a second impact occurs at a site before the system can fully rebound from the effect of the first impact. For the purposes of this analysis and under federal regulations, "impacts" and "effects" are assumed to be interchangeable.

While there is not a universally accepted framework for cumulative effects analysis, eight general principles identified in Considering Cumulative Effects under the National Environmental Policy Act (CEQ 2005) have gained acceptance. These eight principles are based on the premise that resources, ecosystems and the human community each can experience effects. For each of these, there are thresholds, or levels, of stress beyond which their desired conditions degrade. The following is a summary of the CEQ's eight principles of cumulative effects analysis:

1) Cumulative effects are caused by the aggregate of past, present and reasonably foreseeable future actions. These include any other actions that affect the same resources.
2) Cumulative effects are the total effect, including both direct and indirect effects, on a given resource, ecosystem or human community of all actions taken, no matter who (federal, non-federal or private) has taken the actions. Effects of individual activities may interact to cause additional effects that are not apparent when looking at individual effects one at a time.
3) Cumulative effects need to be analyzed in terms of the specific resource, ecosystem or human community being affected, as opposed to from the perspective of the Proposed Action. Analyzing cumulative effects involves developing an understanding of how the resources are susceptible to effects.
4) It is not practical to analyze the cumulative effects of an action on the universe; the list of environmental effects must focus on those effects that are truly meaningful. The boundaries for evaluating cumulative effects should be expanded to the point at which the resource is no longer affected significantly or the effects are no longer of interest to affected parties.
5) Cumulative effects on a given resource, ecosystem or human community are rarely aligned with political or administration boundaries. Cumulative effects analysis on natural systems must use natural ecological boundaries; analysis of human communities must use actual socio-cultural boundaries to ensure inclusion of all effects.
6) Cumulative effects may result from accumulation of similar effects or from the synergistic interaction of different effects. In some cases, the net adverse cumulative effect is less than the sum of the individual effects; in other cases, the net adverse cumulative effect is greater.
7) Cumulative effects may last for many years beyond the life of the action that caused the effects. Cumulative effects analysis needs to apply the best science and forecasting techniques.
8) Each affected resource, ecosystem or human community must be analyzed in terms of its capacity to accommodate additional effects, based on its own time and space parameters. The most effective cumulative effects analysis focuses on what is needed to ensure long-term productivity or sustainability of the resource.

4.20.2 Methodology for Assessing Cumulative Impacts

The environmental consequences of the Proposed Action were evaluated earlier in this chapter. Based on the analysis of the environmental resources, cumulative impacts were assessed by combining the potential effects of the Proposed Action (direct effects) with the effects of past actions, present actions (including the Proposed Action), and RFFAs (indirect effects) in the cumulative resource ROI. The extent of the cumulative resource ROI varies with each resource, based on the geographic or biologic limit of that resource. For the purposes of this analysis, the cumulative resource ROI includes the following areas:

- The area adjacent to the proposed ROW, nearby off-site areas subject to disturbance from the Proposed Action or alternatives, and those areas beneath new facilities that would remain inaccessible for the life of the project;
- As appropriate, the affected watersheds including Kane Springs Valley, Coyote Spring Valley, Muddy River Springs Area and the Lower Moapa Valley. In the context of this EIS, these watersheds are synonymous with the Hydrographic Basins recognized by the Nevada State Engineer and U.S. Geological Service; and
- Mormon Mesa Critical Habitat Unit.

In addition, the length of time for cumulative effects analysis varies according to the duration of impacts from the Proposed Action on the particular resource. The timeframe for the cumulative impact analysis encompasses past and present activities in the areas described above, and future activities that may extend up to 20 years in the future.

Information about past, present and reasonably foreseeable future activities in the cumulative resource ROI were gathered from the BLM, USFWS, Lincoln and Clark Counties, and other agencies, adopted plans, environmental documents and personal communications with public agencies and utility companies. Project-related actions that were considered include the following:

- Applications have been submitted to the BLM or other agencies and are in various stages of the approval/permitting process as of April 2007;
- Actions that have been approved or are currently discussed in the public realm and have a reasonable likelihood of being implemented;
- Actions included in an adopted capital improvement program, general plan, regional transportation plan or similar plan;
- Actions anticipated as later phases of approved activities; or
- Actions funded by money budgeted by a public agency.

The resources to be analyzed and the potential interrelated projects that may have cumulative effects are summarized in **Table 4-4**. The locations of interrelated projects relative to the project area for the Proposed Action are depicted on **Map 4-1.**

Table 4-4
Interrelated Project Analysis for Cumulative Impacts

Resource	Interrelated Projects Analyzed (see legend)
Soil Resources	1, 2 and 5
Water Resources	1, 2, 3, 6 through 13
Vegetation Resources	1 through 7, 10, 11, 12
Wildlife Resources	1 through 7, 10, 11, 12
Land Use	1-6, 8, 11, 13, 14
Areas of Critical Concerns (ACECs)	1, 2, 4, 6, 11
Visual Resources	2, 4, 6, 11
Socioeconomic Resources	1 through 14

1 – Lincoln County Conservation, Recreation, Development Act
2 – Coyote Spring Development – Lincoln County
3 – Coyote Spring Development – Clark County
4 – LS Power Electric Transmission Project (500 kV transmission line in the designated Southwest Inter-tie Corridor)
5 – Coyote Spring 138 kV Transmission Line Project
6 – Ely Energy Center Project (500 kV transmission line in the designated LCCRDA corridor)
7 – Coyote Spring Well and Moapa Transmission System Project
8 – Lincoln County Land Act Groundwater Development Project
9 – Toquop Energy Project
10 – Additional Moapa Valley Water District Groundwater Pumping in Upper Moapa Valley
11 – Clark, Lincoln, and White Pine Counties Groundwater Development Project
12 – Pumping of Other Existing Undeveloped Coyote Spring Valley Groundwater Rights
13 – Alamo Industrial Park and Community Expansion Land Sale
14 – Build-Out of the Lincoln County Land Act Area (Toquop Township Planning Area)

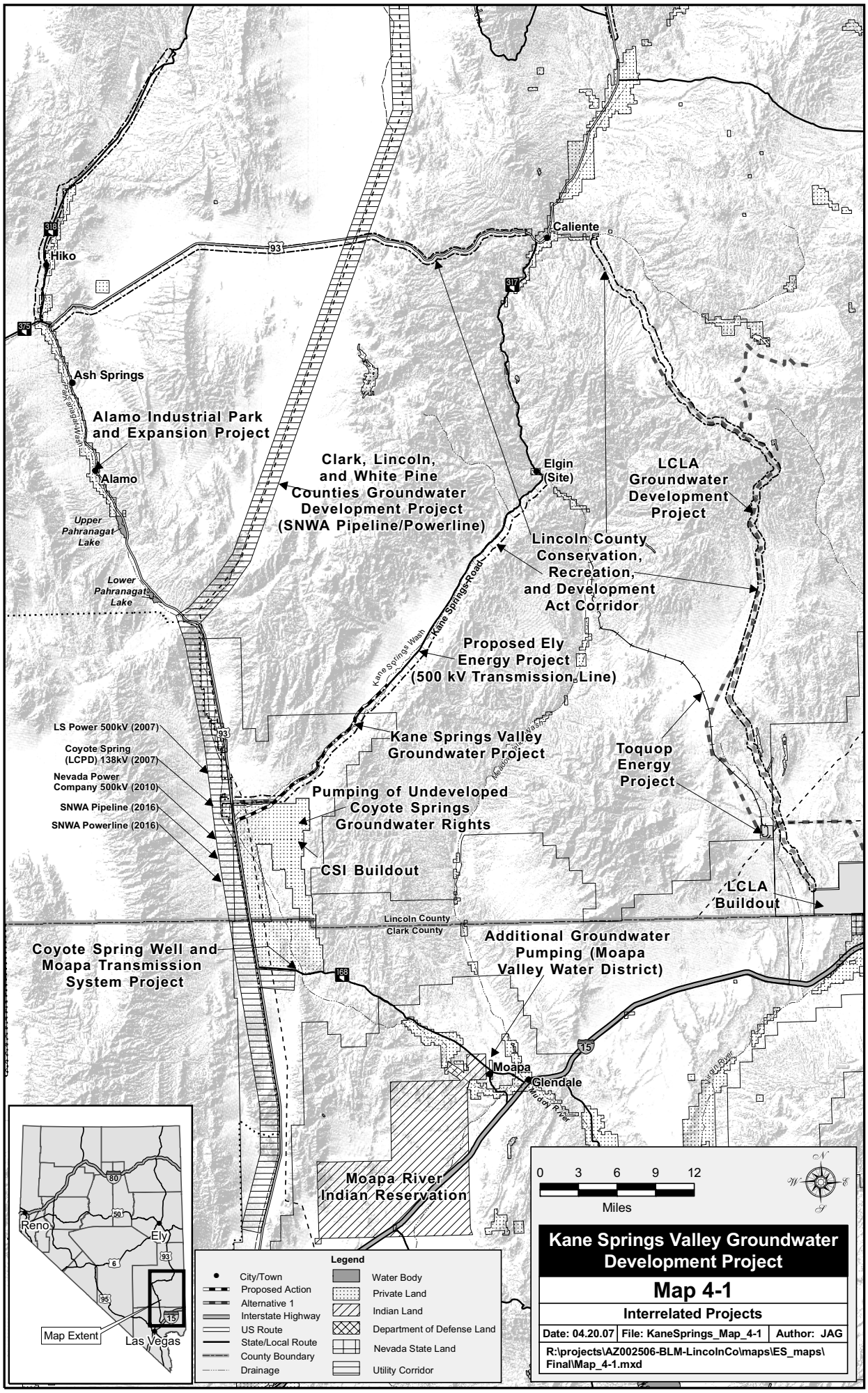
4.20.3 Cumulative Projects Considered

4.20.3.1 Past Actions

Past human actions in the project area include livestock grazing, isolated mining exploration in the surrounding mountains, construction of Kane Springs Road and Highway 93, OHV recreation use, and the installation of fiber optic and electric transmission lines along Highway 93.

Past natural processes in the project area include wildland fire, flooding, drought, and the spread of invasive species and noxious weeds. In June 2005, a total of 739,000 acres of land in southern Nevada burned over 19 days, with approximately 148,000 acres of the fire occurring in the Meadow Valley portion of the complex, adjacent to Kane Springs Valley.

Intense flooding occurred in the Kane Springs Wash in January 2005 and July 2006. Flood intensity was exacerbated by the loss of vegetative cover as a result of wildland fires in the Kane Springs Valley in 2006 and ongoing drought conditions in the western United States. A consequence of wildland fires is the increased potential for flashflood runoff from surrounding mountain ranges. Until vegetative cover is established, post-fire erosion rates are expected to increase. In addition, these burn areas represent an area of disturbance that favors the spread and establishment of noxious and invasive weed species (Wagonner 2007). Without proper treatment, the proliferation of these species will increase the risk of wildland fire events in the future.


Hiko
Caliente
Ash Springs
Alamo Industrial Park and Expansion Project
Alamo
Upper Pahranagat Lake
Lower Pahranagat Lake
Clark, Lincoln, and White Pine Counties Groundwater Development Project (SNWA Pipeline/Powerline)
Elgin (Site)
LCLA Groundwater Development Project
Lincoln County Conservation, Recreation, and Development Act Corridor
Kane Springs Road
Kane Springs Wash
Proposed Ely Energy Project (500 kV Transmission Line)
Kane Springs Valley Groundwater Project
Toquop Energy Project
LS Power 500kV (2007)
Coyote Spring (LCPD) 138kV (2007)
Nevada Power Company 500kV (2010)
SNWA Pipeline (2016)
SNWA Powerline (2016)
Pumping of Undeveloped Coyote Springs Groundwater Rights
CSI Buildout
LCLA Buildout
Lincoln County
Clark County
Coyote Spring Well and Moapa Transmission System Project
Additional Groundwater Pumping (Moapa Valley Water District)
Moapa
Glendale
Moapa River Indian Reservation
Reno
Ely
Las Vegas
Map Extent
Legend
City/Town
Proposed Action
Alternative 1
Interstate Highway
US Route
State/Local Route
County Boundary
Drainage
Water Body
Private Land
Indian Land
Department of Defense Land
Nevada State Land
Utility Corridor
0 3 6 9 12
Miles
Kane Springs Valley Groundwater Development Project
Map 4-1
Interrelated Projects
Date: 04.20.07
File: KaneSprings_Map_4-1
Author: JAG
R:\projects\AZ002506-BLM-LincolnCo\maps\ES_maps\Final\Map_4-1.mxd

Global climate change, commonly referred to as global warming, has been cited for these changes in the regional area. Ongoing scientific research into global climate change correlates increasing atmospheric concentrations of greenhouse gases (including carbon dioxide, methane, nitrous oxide, water vapor, and several trace compounds) with observed trends of increasing temperatures and changes in the amount and seasonal variability precipitation. The assessment of greenhouse gas emissions and climate change is in its formative phase, and the net impact to climate cannot yet be determined with an acceptable degree of certainty. Although uncertainty exists as to whether observed climate changes reflect natural variations or may be caused by increasing emissions of greenhouse gases, there is consensus that global temperatures have been increasing and will continue to increase in the future. As global warming trends continue into the foreseeable future, Chambers (2006) indicates that the following changes may be expected to occur within the Great Basin, which includes the project area.

The amount and seasonal variability of precipitation will increase over most areas. IPCC (2001) climate model scenarios indicate that by 2100, precipitation will increase about 10 percent in summer, about 30 percent in fall, and 40 percent in winter. Less snowfall will accumulate in higher elevations, more precipitation will occur as rain, and snowmelt will occur earlier in the spring because of higher temperatures.

- Streamflow patterns will change in response to reduced snowpacks and increasing precipitation. Peak flows in spring are expected to occur earlier and be of lower magnitude because of snowpack changes. Runoff from greater amounts of winter rainfall will cause higher winter flows. Summer flows will be lower, but with higher variability depending on the severity of storm events.
- Some populations of native plants, invasive species, and pests will expand. Increasing amounts of atmospheric carbon dioxide and precipitation during the growing season provide favorable growth conditions for native grasses, perennial forbs, woody species, and invasive annuals such as cheatgrass. Insect populations also will likely increase because milder winter temperatures will improve reproduction and survival rates.
- Fire frequency, severity, and extent will increase because of the increased availability of fine fuels (grasses, forbs, and invasives) and accumulation of fuels from previous growing seasons. Higher temperatures will extend the length of fire seasons. Expansion of pinyon-juniper species and increasing tree densities could increase the number of high severity crown fires. Higher rates of insect damage and disease also may increase fuel accumulations.
- Sensitive species and overall biodiversity will be reduced. High-elevation habitats will shrink in area or disappear as lower-elevation plant communities expand. It is probable that some mammalian, avian, and other species that currently inhabit these high-elevation habitats may become extinct. Higher rates of disease and insect damage also may pose threats to other sensitive plant and animal species.

4.20.3.2 Present Actions, Including the Proposed Action

Present actions include the Proposed Action, which is described in Chapter 2.0 and analyzed earlier in this chapter. Other projects or events, which are currently underway or may occur in the area, include:

Present Natural and Human Processes

- OHV and other recreational use
- Livestock grazing
- Wildland fire
- Drought
- Flooding in Kane Springs Wash

Energy Development Projects

- LS Power Electric Transmission Project

Land Development Projects

- CSI Development – Clark County
- Alamo Industrial Park and Community Expansion Land Sale

OHV activities and other recreational use within the project area are ongoing. The Kane Springs Road provides access to the Delamar and Meadow Valley Wildernesses and continues on to SR 317. The Lincoln County Transportation Department conducts periodic maintenance (grading and leveling) as needed.

Livestock grazing activities have been limited due to the 2005 fire events and drought conditions. However, some grazing continues at a reduced stocking rate. Stocking rates are coordinated between the BLM and lease holders to maintain a sustainable forage level.

Wildland fire events are expected to occur in the area due to the increased incidence of invasive and noxious weed species. In addition, flashflood runoff from high-magnitude rain events would be exacerbated by existing landcover conditions and any future wildland fires in the area.

Projects that are currently funded and underway are described in the following section. Impact characteristics of each project are summarized in **Table 4-5**. The environmental impacts associated with these projects have been analyzed.

4.20.3.2.1 Coyote Spring Development - Clark County

CSI is developing a master planned community encompassing approximately 6,881 acres of private land and approximately 6,219 acres of leased land within Clark County, Nevada. The northern end of this development is approximately 9 miles south of the proposed ROW.

The Clark County community is entitled for 49,000 residential units and approximately 1,220 net acres of commercial development. Notwithstanding the entitlements, the Clark County community is currently being planned and developed for 29,000 residential units; 710 acres of mixed use; 270 acres of commercial development; and 1,210 acres of golf, parks, open space, public facilities and preserve areas.

Table 4-5
Impact Characteristics of Present Actions

Project	Project Type	Project Description	Project Location and Distance from Proposed Action
Coyote Spring Investment Development - Clark County Timing: Under construction	Residential / Commercial Development	6,881/ 6,219 acres of private/leased land; up to 49,000 residential units; approximately 1,220 net acres of commercial development. Development located near the Mormon Mesa and Coyote Spring ACECs, and the Meadow Valley Wilderness.	Clark County development approximately 9 miles south of project area
LS Power Electrical Transmission Project To be located in the previously permitted SWIP corridor. Timing: Construction late 2007	Multi-State Transmission Line	540-mile long 500 kV transmission line between Twin Falls, Idaho and the Dry Lake area northeast of Las Vegas. Approximately 383 miles to be located in the BLM Ely District that would parallel the west side of U.S. Highway 93 near the project area.	Parallels the west side of. Highway 93; portions of the transmission line would be located west of the project area Transmission line to be located in the permitted SWIP Corridor
Alamo Industrial Park and Community Expansion Land Sale Timing: Fall 2007	Industrial Park and Residential Development	Industrial park including infrastructure: water, sewer, drainage and highway access improvements. 638 acres of residential development.	Alamo, Nevada, along U.S. Highway 93 in Sections 4, 5, 8 and 9 of T7S, R61 E. Located ~25 miles northwest of the project area

ACEC – Area of Critical Environmental Concern BLM – Bureau of Land Management SWIP – Southwest Inter-tie Project

The leased land is designated as the Coyote Spring Resource Management Area and would not be developed. Initial development plans identify a variety of housing options, golf courses, commercial centers, heliport(s), industrial sites, schools and governmental facilities. CSI selected Pardee Homes of Nevada as the master residential developer for the Clark County community. The ground breaking for the Clark County community occurred in late 2005. Golf course, road and utility improvements are under construction. The first phase is anticipated to be completed within 2 to 7 years.

Conservation measures have been incorporated into the proposed development including perpetual conservation easements, preservation and restoration of waters of the United States, dedication of water rights to the survival and recovery of the Moapa dace, desert tortoise conservation measures, and natural wash buffer zones (Lincoln County 2006). Reclaimed wastewater would be utilized for golf course, park and common area landscape irrigation to the maximum reasonable extent.

CSI intends to pump its permitted groundwater rights in the Coyote Spring Valley to serve the initial demand of the Clark County community. It is anticipated that an additional 15,000 AFY would be needed to serve the community at build out. CSI anticipates the additional water rights would be obtained from existing certificated rights owned by an affiliate of CSI further to the north in Lincoln County or new appropriations of groundwater in Lincoln County.

4.20.3.2.2 LS Power Electrical Transmission Project

The LS Power Electrical Transmission (LS Power) Project involves the proposed construction, operation and maintenance of a 540-mile long 500 kV transmission line between Midpoint Substation near Twin Falls, Idaho and the Dry Lake area northeast of Las Vegas. Approximately 383 miles of this project would be located in the BLM Ely District within the approved SWIP corridor, located on the west side of Highway 93. The ROW for the SWIP corridor was granted by the BLM in the 1990s. LS Power is currently developing final engineering and construction plans for the project, with construction anticipated to begin in late 2007.

4.20.3.2.3 Alamo Industrial Park and Community Expansion Land Sale

Lincoln County, under the LCCRDA, proposed the sale of certain parcels of lands administered by the BLM. The public land consists of four parcels located near the Town of Alamo, Nevada, along Highway 93 in Sections 4, 5, 8 and 9 of Township 7 South, Range 61 East (Township 7 South, Range 61 East); Mount Diablo Base; and Meridian. All four parcels (A through D) have been included for disposal in the Draft RMP/EIS for the Ely District. The proposed use of the lands includes light industrial and housing. An Environmental Assessment (NV-040-07-35) was prepared by the BLM Ely District Office in March 2007.

The BLM anticipates that the proposed land sale would occur in fall 2007. Lincoln County expects to begin construction of the utility infrastructure for the Industrial Park (i.e., water, sewer, drainage and highway access improvements) during early winter 2008. It is anticipated that the initial industrial park tenant would begin construction in early winter 2008. Development of the first phase of the 638 acres of residential land is anticipated in late 2008 (Baughman 2006).

4.20.3.3 Reasonably Foreseeable Future Actions

The RFFAs within the cumulative resource ROI include the following:

Reasonably Foreseeable Natural and Human Processes

- OHV and other recreational use
- Livestock grazing
- Wildland fire
- Drought
- Flooding in Kane Springs Wash

Groundwater/Energy Development Projects

- LCCRDA
- Coyote Spring Well and Moapa Transmission System Project
- Lincoln County Land Act Groundwater Development and Utility Right-of-Way Project

- Clark, Lincoln, and White Pine Counties Groundwater Development Project

Groundwater Development Projects

- Additional Moapa Valley Water District Groundwater Pumping in Upper Moapa Valley
- Pumping of Other Existing Undeveloped Coyote Spring Valley Groundwater Rights

Energy Development Projects

- Coyote Spring 138 kV Transmission Line Project
- Toquop Energy Project
- Ely Energy Center Project (500 kV transmission line in the LCCRDA corridor)

Land Development Projects

- CSI Development – Lincoln County
- Build-Out of the Lincoln County Land Act Area (Toquop Township Planning Area)

Natural processes and events that are expected to occur in the future include OHV and other recreational use within the project area and surrounding Wilderness, livestock grazing based on sustainable conditions, wildland fires, drought, and flooding of Kane Springs Wash during high magnitude rain events.

RFFAs within the cumulative impacts ROI are described in the following section. Impact characteristics of these projects are summarized in **Table 4-6**. Analysis of the environmental impacts associated with these projects has either been completed, is underway or is planned by an agency.

4.20.3.3.1 Lincoln County Conservation, Recreation and Development Act

The LCCRDA contains six titles, or key provisions. They include: 1) Land disposal; 2) Designation of Wilderness areas, 3) Establishment of 2,640-foot wide corridor for utilities, 4) Management of the Silver State Off-Highway Vehicle Trail, 5) Conveyance of the BLM-administered public lands to the State of Nevada for the conservation of natural resources or public parks, and 6) Transfer of administrative jurisdiction of land between the BLM and the USFWS. Title I (Land Disposal) and Title III (Establishment of a designated utility corridor) apply to the cumulative impacts analysis of the Proposed Action.

Title I directed the Secretary of the Interior to dispose of up to an additional 70,000 acres of federal land in Lincoln County for privatized development initiatives with 10 percent of the revenues going to Lincoln County for economic development, 5 percent to the State of Nevada for education, and 85 percent being retained by the federal government. RFFAs related to Title I include the Alamo Industrial Park and Community Expansion Land Sale (see Section 4.20.3.2.3) and Toquop Township Planning Area (see Section 4.20.3.3.11).

Table 4-6
Impact Characteristics of RFFAs

Project	Project Type	Project Description	Project Location and Distance from Proposed Action
Lincoln County Conservation, Recreation and Development Act (LCCRDA) Timing: The LCCRDA contains six titles. Establishment of utility corridors is subject to NEPA. Environmental analysis conducted on a case-by-case basis.	Federal action	The LCCRDA designated approximately 770,000 acres of Wilderness and designated utility corridors in Lincoln County for the SNWA and the LCWD. The LCCRDA also directed the Secretary of the Interior to dispose of up to an additional 70,000 acres of federal land in Lincoln County for privatized development initiatives with 10 percent of the revenues going to Lincoln County for economic development, 5 percent to the State of Nevada for education, and 85 percent being retained by the federal government.	Within project area. Portions of the LCCRDA corridor traverse Lincoln County.
Coyote Spring Investment Development – Lincoln County Timing: Pending. No construction to date. Awaiting completion of the Coyote Spring Investment Multiple Species Habitat Conservation Plan. Agreements in place with Lincoln County.	Residential / Commercial Development	22,174/7,548 acres of private/leased land; up to 111,000 residential units; up to 4,500 acres of commercial development. Development located in or near portions of the Kane Springs ACEC, and the Delamar and Meadow Valley Wildernesses.	South of, and immediately adjacent, to Proposed Action
Coyote Spring 138 kV transmission line Timing: Plan of Development submitted to Ely District Office in October 2006. In-service date anticipated Spring 2008.	Electric Transmission Project	A new 138 kV transmission line would interconnect into the proposed Scott Substation, located approximately 5 miles south of the intersection of Kane Springs Road and Highway 93. Ancillary facilities: five new substations, new distribution facilities and upgrade of existing facility.	Portions of the transmission line would be co-located in the SWIP corridor.
Ely Energy Center and Electric Transmission Project Timing: EIS under development. Applicant proposed in-service date 2011 – 2013.	Transmission Line and Coal-fired Power Plant	500 kV Transmission line from northeast Nevada to the Las Vegas area, mostly within existing BLM ROW	Due to limited capacity within the SWIP corridor, a portion of the transmission line may be constructed through the Delamar Valley south into Kane Springs Valley. Phase II may include construction of the proposed 500 kV line along Kane Springs Road within the LCCRDA corridor.

Table 4-6 (continued) Impact Characteristics of RFFAs			
Project	**Project Type**	**Project Description**	**Project Location and Distance from Proposed Action**
Coyote Spring Well and Moapa Transmission System (Coyote Spring Project) Timing: Under development / Final EA and FONSI issued June 22, 2007	Development of existing groundwater rights in Coyote Spring Valley Hydrographic Basin.	Withdrawal of up to 9,000 AFY of groundwater in Coyote Spring Valley Hydrographic Basin using new and existing facilities.	~ 11 miles due south of proposed project area
Lincoln County Land Act Groundwater Development and Utility Right-of-Way Project Timing: EIS under development.	Groundwater Development Project	Construction and operation of groundwater facilities to withdraw up to 9,340 AFY from the Tule Desert Hydrographic Basin and up to 14,481 AFY from the Clover Valley Hydrographic Basin	Tule Desert and Clover Valley Hydrographic Basins; east of the project area. Portions of the proposed ROW are located within the designated LCCRDA utility corridor.
Toquop Energy Project Timing: EIS under development	Coal-Fired Power Plant in Lincoln County	750 megawatt (MW) coal-fired power plant in southeastern Lincoln County on lands administered by the BLM Ely District. Use of up to 2,100 AFY (permitted) groundwater from the Tule Desert Hydrographic Basin. Project includes construction of a 31-mile rail from existing UP Railroad track in Meadow Valley Wash.	~28 miles southeast of the project area.
Additional Groundwater Pumping by the Moapa Valley Water District Timing: Unknown at this time.	Groundwater Development (existing rights)	The existing water right permit allows for phased increases in groundwater pumping from wells in the Upper Moapa Valley Hydrographic Basin (aka Muddy River Springs). Currently pumping up 2,400 AFY; up to 7,200 AFY is allowed.	Upper Moapa Valley; More than 30 miles southeast of project area.
Clark, Lincoln, and White Pine Counties Groundwater Development Project Timing: EIS under development; anticipate project would be constructed after 2010.	Groundwater Development	The proposed facilities include approximately 285 miles of pipeline, three pumping stations, six regulating tanks, a buried storage reservoir and a water treatment facility, Withdrawal of up to 168,000 AFY (pending)	Project facilities to be located in Spring, Snake, Cave, Dry Lake, Delamar, Lake Valley and Coyote Spring Valleys. Portions of the water transmission pipeline would be located immediately west of U.S. Highway 93.
Clark, Lincoln, and White Pine Counties 230 kV Transmission Line Timing: EIS under development; anticipate constructed after 2010.	Multi-State Transmission Line	315 miles of overhead power lines, two electrical substations and two hydro-turbine energy recovery facilities.	A portion of the transmission line would parallel the west side of U.S. Highway 93; west of the project area Transmission line to be co-located in the SWIP Corridor

Table 4-6 (continued)
Impact Characteristics of RFFAs

Project	Project Type	Project Description	Project Location and Distance from Proposed Action
Pumping of Other Existing Undeveloped Coyote Spring Valley Groundwater Rights Timing: Unknown at this time	Groundwater Withdrawal	Nevada Power Company has approved groundwater rights for 2,500 AFY. No groundwater facilities for development of these rights have occurred.	Located ~ 11 miles south of project area.
Build-out of the Lincoln County Land Act Development (Toquop Township Planning Area)	Residential / Commercial Development	Development of up to 13,100 acres in southeastern Lincoln County. Preliminary build out is expected at 3.3 dwellings per gross acre over a 6,478-acre area, for a total build out of 21,377 dwellings. The build out is expected to proceed over a 20-year period.	Southeast corner of Lincoln County; north of the City of Mesquite. More than 50 miles southeast of the project area.

ACEC – Area of Critical Environmental Concern
AFY – acre-feet per year
BLM – Bureau of Land Management
EA – Environmental Assessment
EIS – Environmental Impact Statement
kV – kilovolt
LCWD – Lincoln County Water District
MW – megawatt
NEPA–National Environmental Policy Act
RFFA – Reasonably Foreseeable Future Action
ROW – right-of-way
SNWA – Southern Nevada Water Authority
SWIP – Southwest Inter-tie Project
FONSI – Finding of No Significant Impact
LCCRDA – Lincoln County Conservation, Recreation, and Development Act

Title III of the LCCRDA established a utility corridor for use by the SNWA and the LCWD contingent upon the successful compliance with requirements of NEPA. The legislation designates ROWs for the roads, wells, pipelines and other infrastructure needed for the construction and operation of a water conveyance system in Clark and Lincoln Counties. Another provision of Title III is the relocation of an existing utility corridor from the east to the west side of Highway 93 between the Highway 93-Highway 168 junction and the Kane Springs Road-Highway 93 junction. The owners of the private property to the east of Highway 93 would pay the federal government fair market value for the appreciation of their property due to this provision.

4.20.3.3.2 Coyote Springs Development - Lincoln County

CSI proposes to develop a master planned community encompassing approximately 22,174 acres of private land and approximately 7,548 acres of leased land within Lincoln County, Nevada. A portion of the Proposed Action between Highway 93 and the Emrys Jones Substation would be located on private or leased lands held by CSI.

The Lincoln County community is entitled for approximately 111,000 residential units and 4,500 acres of commercial development. Initial development plans identify a variety of residential housing, mixed-use urban villages, public buildings such as schools, and other public facilities. Commercial and light industrial development would occur to support the local community. Hotels, resorts, and casinos are proposed as well recreational facilities (e.g., golf courses, parks, and open space areas). Utilities and other infrastructure would be developed to serve the master planned community including electric, natural gas and propane, and potentially renewable energy sources (e.g., solar or geothermal facilities). Other utility infrastructure would include sanitary sewer and wastewater treatment facilities with corresponding reclaimed water storage,

distribution, and disposal facilities; stormwater facilities (on and off site); solid waste transfer facilities; and telecommunication facilities. Water suppy infrastructure and management facilities, including treatment and production facilities, monitoring wells, storage facilities, and transmission and distribution facilities, would be developed to serve the community.

CSI is seeking a Section 404 permit from the Army Corps of Engineers and a Section 10 permit from the USFWS for the incidental take of Threatened or Endangered species protected by the ESA. CSI is currently developing a Multiple Species Habitat Conservation Plan (MSHCP) that will identify measures to minimize and mitigate incidental take of federally listed species that could occur as a result of CSI's planned development. The Lincoln County community would not be developed until some time after these authorizations are obtained.

Conservation measures are being incorporated into the proposed development, including perpetual conservation easements, open space, preservation and restoration of waters of the United States, dedication of water rights to the survival and recovery of the Moapa dace, desert tortoise conservation measures, and natural wash buffer zones (Lincoln County 2006). Reclaimed wastewater would be utilized for golf course, park and common area landscape irrigation to the maximum reasonable extent.

CSI developers anticipate up to 55,000 AFY of water would be needed to serve the CSI Lincoln County development's water needs at full build out. The Proposed Action would allow delivery of the initial water supply appropriated by the LCWD within the Kane Spring Valley to the community. Additional water rights would be obtained by CSI developers from existing certificated rights owned by an affiliate of CSI further to the north in Lincoln County or new appropriations of groundwater in Lincoln County. CSI anticipates that this need being met in multiple phases by groundwater produced from various basins within Lincoln County rather than being identified at one time or produced from one location. The utilization of all such water rights within the community is and would be subject to the jurisdiction of an authorization by the Nevada State Engineer.

4.20.3.3.3 Coyote Springs 138 kV Transmission Line Project

In order to provide reliable electrical service to the CSI development, the LCPD is proposing to upgrade a portion of its existing transmission system from 69 kV to 138 kV and construct up to five new substations to accommodate the upgrade. Up to 11.2 miles of transmission line would be upgraded between the proposed Scott Substation to the proposed Sheep Mountain Substation. The proposed Scott Substation would be located on private property east of Highway 93 (within Lincoln County), approximately 5 miles south of the intersection of Kane Springs Road and Highway 93. The proposed Sheep Mountain Substation would be located on BLM-administered public land west of Highway 93. Ancillary facilities would include three additional substations, step-down transformers for fiber optic and cellular tower facilities and related electrical components. These facilities would be primarily located along Highway 168.

4.20.3.3.4 Ely Energy Center

Nevada Power Company, in conjunction with Sierra Pacific Power Company, has applied to the Public Utility Commission of Nevada to construct and operate a new coal-fired electrical generation facility and associated transmission, switching station and communication facilities.

These facilities would primarily be located on federal land administered by the BLM, Ely, Elko and Las Vegas Offices. A portion of the 500 kV transmission line, between the Robinson Summit Switching Station near Ely and the Harry Allen Switching Station northeast of the intersection of Highway 93 and I-15, is proposed to be constructed through the Delamar Valley to Kane Springs Valley and west along the Kane Springs Road within the 2,640-foot wide LCCRDA corridor to Highway 93. A separate EIS is being prepared for this project. Scoping meetings were held in February 2007.

4.20.3.3.5 Coyote Spring Well and Moapa Transmission System Project

The SNWA is proposing to develop its existing groundwater rights in Coyote Spring Valley Hydrographic Basin. The Nevada State Engineer has permitted 16,300 AFY of groundwater in Coyote Spring Valley, of which 9,000 acre-feet are owned by SNWA. The Coyote Spring Well and Moapa Transmission System Project (Coyote Spring Project) would develop and convey 9,000 AFY of groundwater from Coyote Spring Valley in northeastern Clark County using new and existing facilities. The final EA and Finding of No Significant Impact (FONSI) were issued for this project on June 22, 2007.

Development of groundwater resources for this project will first use existing permitted water rights. Additional water rights applications are pending and will be subject to Nevada State Engineer Order 1169, which relates to groundwater applications in several adjacent groundwater basins, including Coyote Spring Valley, and holds various permits in abeyance pending the completion of a study of the regional carbonate aquifer system. In addition to Coyote Spring Valley, Hydrographic Basins included in Order 1169 include Black Mountains Area (Basin 215), Garnet Valley (Basin 216), Hidden Valley (Basin 217), Muddy River Springs (aka Upper Moapa Valley) (Basin 219), and Lower Moapa Valley (Basin 220). While the California Wash (Basin 218) was not included in Order 1169 (March 2002), the Nevada State Engineer, in Ruling 5115 (April 2002), held applications in California Wash in abeyance pending completion of the Order 1169 study.

The Order 1169 requires major groundwater rights holders in the Coyote Spring Valley Basin to participate in a 5-year study to provide information on the effects of pumping existing permitted water rights in Coyote Spring Valley. As of December 2006, only about 4,600 AFY of the permitted 16,300 AFY of water rights in Coyote Spring Valley have been pumped. Order 1169 requires that at least 8,150 AFY (at least half of the permitted groundwater rights in Coyote Spring Valley) be pumped for at least 2 consecutive years. Funding is being provided by the Las Vegas Valley Water District, SNWA, CSI, Nevada Power Company and the Moapa Valley Water District.

In addition to the conservation measures that would be implemented by SNWA as part of the proposed action for the Coyote Spring Project, SNWA (in addition to CSI, USFWS, Moapa Band of Paiute Indians, and the Moapa Valley Water District) has entered into an MOA for the protection and recovery of the Moapa dace and its habitat. The following section outlines specific conservation measures described in the MOA. For a full listing, see **Appendix** A.

- Establishment by all parties of a Recovery Implementation Program for the protection and recovery of Moapa dace;

- Dedication by the Moapa Valley Water District of its entire 1.0 cfs Jones Spring water right to provide in-stream flows beneficial to Moapa dace;
- Both the USFWS and SNWA have agreed to provide funding in the amount of $125,000 to develop an ecological model for the Moapa dace; and SNWA agreed to provide funding in the amount of $50,000 to construct fish barriers for USFWS/SNWA in consultation with the other parties to the Stipulation;
- Construction of a set of fish barriers on the Muddy River by the BLM and the USFWS to prevent further migration of non-native fishes;
- Establishment of a Hydrologic Review Team by all parties;
- Operational coordination among the USFWS, SNWA, CSI and Moapa Valley Water District;
- Carrying out adaptive management measures by the parties including funding preparation and implementation of biological and hydrological studies and activities supporting recovery of Moapa dace; establishing a regional monitoring and management plan; assessing the feasibility of augmenting and restoring in-stream flows; and continuing to reevaluate necessary measures to protect and recover Moapa dace; and
- If flow levels, as measured at the Warm Springs West flume, reach 3.0 cfs during the Order 1169 pumping study, the Moapa Valley Water District would shut down the Arrow Canyon well.

4.20.3.3.6 Lincoln County Land Act Groundwater Development and Utility Right-of-Way Project

The LCWD has submitted ROW applications for development of up to 15 production water wells to be located in the previously permitted Toquop Energy Project proposed well field area located in the Tule Desert Hydrographic Basin and up to 15 production water wells to be located in the Clover Valley Hydrographic Basin of southeastern Lincoln County. Collectively, wells in the Tule Desert basin would pump up to 9,340 AFY. Wells in the Clover Valley would pump up to 14,480 AFY. A system of pipelines would collect pumped water for conveyance through a main transmission pipeline southeast to the LCLA development area following, in part, the 2,640-foot wide LCCRDA corridor. Other utilities, including natural gas, telecommunications and electrical power, would be brought into the LCLA area along portions of the water pipeline alignment.

The existing Tule Desert well field is currently permitted to produce and export 2,100 AFY of groundwater. The LCWD has applications pending before the Nevada State Engineer for an additional 7,240 AFY in the Tule Desert Basin.

The BLM Ely District is preparing a separate EIS to identify and disclose the direct and indirect effects associated with this project. The decision about how much additional water would be permitted, if any, rests with the Nevada State Engineer.

4.20.3.3.7 Toquop Energy Project

Toquop Energy, LLC (a subsidiary of Sithe Global Power, LLC), a privately held, independent power company is proposing to construct a 750 megawatt (MW) coal-fired power plant in

southeastern Lincoln County on lands administered by the BLM Ely District. The power plant would be constructed on the same site as and instead of a natural gas-fired power plant for which a ROW was approved by the BLM Ely District in April 2003. In April 2003, BLM Ely District Office issued a Final EIS for the Toquop Energy Project, proposed by Toquop Energy, Inc. The current EIS will assess the potential impacts of a ROW for the proposed coal-fired facility and a new railroad line to transport coal to the facility.

4.20.3.3.8 Additional Moapa Valley Water District Groundwater Pumping in Upper Moapa Valley

The Moapa Valley Water District's existing water right permit allows for phased increases in groundwater pumping from wells in the Upper Moapa Valley Hydrographic Basin (aka Muddy River Springs). Current pumping by the Moapa Valley Water District is approximately 2,400 AFY (up to 7,200 AFY are allowed). Similar to the Stipulation Agreement between the USFWS and the LCWD, Moapa Valley Water District has agreed to restrict groundwater pumping if the 2.7 cfs "trigger level" at the Warm Springs West flume is reached.

4.20.3.3.9 Clark, Lincoln, and White Pine Counties Groundwater Development Project

In August 2004, the SNWA filed an application with the BLM Ely District for ROWs for a proposed system of regional groundwater production, conveyance and treatment facilities and power conveyance facilities in Clark, Lincoln, and White Pine Counties. The proposed facilities include approximately 327 miles of pipeline, five pumping stations, six regulating tanks, a buried storage reservoir, a water treatment facility, 14 groundwater production wells, 349 miles of overhead power lines, eight electrical substations and four hydro-turbine energy recovery facilities (SNWA 2007). Portions of these project facilities (i.e., water transmission pipeline and electric transmission lines) would be located west of the Kane Springs Valley project area. The SNWA anticipates major facility construction between 2009 and 2014.

The proposed facilities would develop groundwater located in the following valleys: Spring, Snake, Cave, Dry Lake, Delamar and Coyote Spring. The SNWA holds water rights and applications for approximately 167,000 AFY in Spring, Snake, Cave, Dry Lake, Delamar and Coyote Spring Valleys. On April 16, 2007, the Nevada State Engineer approved a portion of SNWA's groundwater rights applications submitted for the Spring Valley in White Pine County, enabling the SNWA to develop a maximum of 60,000 AFY from the basin. The remaining applications are being adjudicated through the Nevada State Engineer's water rights process.

4.20.3.3.10 Pumping of Other Existing Undeveloped Coyote Spring Valley Groundwater Rights

Nevada Power Company holds 2,500 AFY of existing permitted water rights in the Coyote Spring Valley Hydrographic Basin. Although these are existing permitted rights, Nevada Power has not identified any projects or proposals to develop these rights. Because there is no proposed project to develop these water rights, there is no information to analyze potential cumulative effects of project construction and operation. However, because these are existing permitted rights, the potential hydrologic effects of groundwater pumping are considered in the analysis of cumulative impacts to water resources.

4.20.3.3.11 Build-Out of the Lincoln County Land Act Area (Toquop Township Planning Area)

The LCLA of 2000 was finalized through provisions in the LCCRDA of 2004. In February 2005, the BLM sold 13,300 acres of land in eight parcels in southeastern Lincoln County for $47.5 million. The parcels varied in size from 666 to 4,257 acres. Lands are currently undeveloped but are being planned by Lincoln County as a Planned Unit Development referred to as the Toquop Township Planning Area (Lincoln County 2006). The Toquop Township Planning Area "will be developed in village settings to maximize the scenic attributes of the area, provide for a connected transportation system and become self sufficient through its provisions of services" (Lincoln County 2006).

Development and Conveyance Agreements among the developers and Lincoln County will require development plans outlining proposed uses of the acquired property. Preliminary build out density for the LCLA development area is expected at 3.3 dwellings per gross acre, for a total build out estimated at 44,000 dwelling units. The build out is expected to proceed over a 30-year period.

4.20.4 Cumulative Impacts Analysis

As described in Chapter 4.0 - Environmental Consequences, the Proposed Action would not impact the following resources: Geological Resources, Mineral Resources, Livestock Grazing, Transportation, Wilderness, Recreation, Air Quality, Noise, Environmental Justice, Hazardous and Solid Waste, Paleontological Resources, and Heritage Resources and Historical Properties. Therefore, there would be no cumulative impacts to these resources from the Proposed Action.

4.20.4.1 Soil Resources

The ROI for the cumulative resource analysis for soil resources is the area adjacent to the proposed ROW, nearby off-site areas subject to disturbance from the Proposed Action or Alternatives, and those areas beneath new facilities that would remain inaccessible for the life of the project. RFFAs evaluated for soil resources include the Proposed Action and future development in the northern portion of the CSI development area in Lincoln County; the proposed 500 kV transmission line associated with the Ely Energy Center; and future OHV use, livestock grazing, wildland fire, drought and flooding.

Past actions associated with OHV use, livestock grazing, wildland fire, drought, and flooding have caused impacts to the soils within the cumulative impact ROI. Construction activities occurring at the same time, and within the same drainage, have the potential to cumulatively increase the amount of disturbed land subject to erosion and sedimentation. However, impacts to soil resources from the Proposed Action and other RFFAs within the cumulative impacts ROI would be minimized by erosion and sediment control measures incorporated in their respective development designs and construction methods. Therefore, no cumulative impacts to soil resources would occur as a result of the Proposed Action.

4.20.4.2 Water Resources

The cumulative resource analysis area for water resources includes the following Hydrographic Basins: Kane Springs Valley (No. 206), Coyote Spring Valley (No. 210), and Muddy River Springs Area (No. 219) – See Map 3-2.

Cumulative impacts to water resources and hydrology are primarily related to groundwater withdrawals that could result in a decline in groundwater levels and flows at downgradient locations, specifically the Muddy Springs Area, which is a major regional discharge point for White River Flow System.

Global climate change as noted in section 4.20.3.1 could influence these effects; however there is no agreement from the scientific community on what these impacts may be.

RFFAs with potential effects on water resources and hydrology include the actions associated with the implementation of the LCCRDA including the Proposed Action; the Clark, Lincoln, and White Pine Counties Groundwater Development Project; the build out of the CSI development area and associated water rights development in southern Lincoln County; the Coyote Spring Project; pumping of existing undeveloped Coyote Spring Valley groundwater rights by the Nevada Power Company; and additional groundwater pumping by the Moapa Valley Water District in Upper Moapa Valley. **Table 4-7** summarizes existing water rights in the cumulative impacts area.

Table 4-7
Existing Water Rights and Applications in the Cumulative Impacts Area

Hydrographic Basin	Perennial Yield[1] (AFY)	NDWR Permitted Annual Duty[3] (AFY)
Kane Springs Valley	1,000[2]	1,000[2]
Coyote Spring Valley	18,000	16,304
Muddy River Springs	37,000	13,328

[1]NDWR 1992
[2] Nevada State Engineers Ruling 5712 February 2007 (NDWR 2007b)
[3] Permitted water rights reported as Annual Duty in AFY (NDWR 2007a)
AFY – acre-feet per year

Cumulative effects from existing permitted rights in combination with proposed future groundwater pumping have been evaluated within the last 5 years. All of these studies focused on impacts to reduced flow at the Muddy Springs area.

The SNWA, in conjunction with the Las Vegas Valley Water District, sponsored an analysis which included a portion of the Clark, Lincoln, and White Pine Counties Groundwater Development Project (up to 27,512 AFY in the Coyote Spring Valley Hydrographic Basin – still pending); the CSI development (4,600 AFY); the Nevada Power Company groundwater rights (2,500 AFY); and the Moapa Valley Water Districts pumping in Upper Moapa Valley (7,200 AFY). The cumulative analysis predicted a decline in the carbonate aquifer levels in the Muddy Springs area of less than 10 feet, and a decrease of about 4 cfs of flow from the Muddy Springs, after pumping over a 61-year period (LVVWD 2001).

Another model was developed by Department of Interior agencies (BLM, NPS and USFWS) and included the Coyote Spring Valley portion of the Clark, Lincoln, and White Pine Counties Groundwater Development Project (the pending applications for 27,512 AFY); the CSI development (4,600 AFY); and the Nevada Power Company groundwater rights (2,500 AFY). The cumulative analysis predicted a reduction in Muddy River stream flows of about 33 and 22 percent at the Moapa gauge and Muddy River Narrows, respectively, after pumping over a 50-year period (GeoTrans 2001).

The USFWS analyzed the potential cumulative effects of groundwater development of up to 16,100 AFY from Coyote Spring Valley and California Wash (USFWS 2006). This analysis predicted that, after 5 years of pumping, groundwater levels would decline about 8.5 feet, a possible loss of 31 percent of flow on the Pederson Unit, and an overall reduction in flow of the Moapa Valley Wildlife Refuge Area at its confluence with the Muddy River of 6 percent, compared to 1998 conditions (USFWS 2006).

No detailed cumulative effects modeling has been completed for the Proposed Action or other groundwater development projects in the ROI. The SNWA/LVVWD applications in Coyote Spring Valley would depend on the results of Order 1169 pumping study addressing effects on groundwater levels in Coyote Spring and Upper Moapa Valleys and spring flow of the Muddy Springs.

The Nevada State Engineer has granted the SNWA groundwater rights in Spring Valley, and SNWA has applications pending for Snake Valley. These basins are located in a separate flow system (Great Salt Lake Desert flow system); therefore, groundwater developments in those basins are not anticipated to have a cumulative affect on the Kane Springs Valley, Coyote Spring Valley or Muddy Springs Hydrographic Basins. Cumulative impacts of the Clark, Lincoln, and White Pine Counties Groundwater Development Project, in conjunction with existing permitted rights, would be analyzed in detail in the EIS being prepared for that project.

A large-scale modeling study by Schaefer and Harrill (1995) simulated effects of proposed groundwater pumping (180,800 AFY) on regional groundwater flow, as well as on large regional springs in 17 basins in east-central and southern Nevada. Analysis included pumping from the White River Flow System including Cave, Dry Lake, Delamar and Coyote Spring Valleys. No pumping was simulated within the Kane Springs Valley, but 5,000 AFY was extracted from the Coyote Spring Valley. The simulation of pumping in the carbonate-rock province of the Great Basin indicated that water levels, the flow of regional springs and groundwater discharge by evapotranspiration would be affected. They concluded that approximately 10 feet of drawdown in the deep carbonate aquifer would occur in the Coyote Spring area after 100 years of pumping. The simulations also showed that discharge from several regional springs could be affected. After about 100 years of simulation, flow from Muddy River Springs would be reduced by about 6 cfs (11 percent).

The SNWA, CSI and Moapa Valley Water District hold rights to withdraw up to 20,800 AFY from the Coyote Spring and Upper Moapa Valleys, which could cumulatively affect flow of the Muddy Springs. These potential effects are offset, however, by the conservation commitments from an MOA entered in April 2006 between these major groundwater right holders and USFWS (**Appendix A**). Similar to the Stipulation Agreement between the USFWS and the LCWD, the

potential effects of groundwater production would be managed to protect instream flow levels, as measured at Warm Spring West flume (part of Muddy Springs). Groundwater pumping would have to be reduced or completely restricted if predetermined "trigger levels" are reached at Warm Spring West flume.

Based on the MOA, if water flows reach 3.0 cfs during the pump test, the MVWD shall cease pumping from the Arrow Canyon well, and SNWA will provide the MVWD with water quantity to meet their municipal demands. If water flows reach 3.0 cfs or less, SNWA and CSI will restrict groundwater pumping from wells identified in the MOA. At the 2.7 cfs or less trigger level, SNWA and CSI will restrict groundwater pumping from wells identified in the MOA, and the Moapa Band of Paiute Indians will restrict their pumping in California Wash.

Regardless of which groundwater development project or whether potential future climatic conditions are the source of effects, the commitments under the MOA require the reduction or cessation of pumping the groundwater rights which are the subject of the MOA if specified spring flow trigger levels are reached. The measures included in the MOA, including reductions in groundwater pumping and movement of groundwater production to locations more distant from the Muddy Springs, would also alleviate potential cumulative impacts of other more distant projects.

The LCWD groundwater development project in Tule Desert and Clover Valley Hydrographic Basins that would collectively pump up to 23,820 AFY would not contribute to cumulative impacts in conjunction with groundwater pumping under the Proposed Action. These two Hydrographic Basins are not part of the White River Flow System; therefore, groundwater development in these basins would not affect the flows at the Muddy River Springs. Additionally, The Nevada State Engineers Ruling 5181 (2002) requires additional study to estimate the amount of groundwater available from Tule Desert Groundwater Basin, recharge to the area, and the direction of groundwater flow. Groundwater modeling is currently being performed by the NPS to evaluate the regional flow systems in the area and to determine if cumulative pumping in the region would influence spring flows in the Virgin River Hydrographic Basin.

As discussed in the previous paragraphs, in the absence of conservation and mitigation measures, groundwater development in the cumulative impact area could potentially affect flow rates in the Muddy River System. However, several rulings and agreements were drafted to protect the flows at Muddy River Springs. These rulings are presented in **Appendices A and B** and include:

- Nevada State Engineer Order 1169 which relates to groundwater applications in several adjacent groundwater basins, including Coyote Spring Valley, and holds various permits in abeyance pending the completion of a study of the regional carbonate aquifer system. Order 1169 requires major groundwater rights holders in the Coyote Spring Valley Basin to participate in a 5-year study to provide information on the effects of pumping existing permitted water rights in Coyote Spring Valley. These right holders include the Las Vegas Valley Water District, SNWA, CSI, Nevada Power Company and the Moapa Valley Water District. Signatory agencies for Order 1169 include the BLM, Bureau of Indian Affairs, the USFWS and the NPS.

- Nevada State Engineer Order 5712 in which it was concluded that "there is not substantial evidence that the appropriation of the limited quantity being granted under this ruling will likely impair the flow at Muddy River Springs, Rogers Springs or Blue Point Springs".
- The Stipulation Agreement between the LCWD and the USFWS agrees to cooperatively manage the development of the LCWD water rights in the Kane Springs Valley Hydrographic Basin including reduction or cessation of pumping if specified spring flow trigger levels at Muddy River Springs are reached.
- The MOA agreement among SNWA, CSI, Moapa Valley Water District and USFWS requires the reduction or cessation of pumping if specified spring flow trigger levels are reached.

Additionally, the LCWD would provide for BLM review of all monitoring flow data collected from the Muddy River Springs as identified in the Stipulation Agreement between the LCWD and the USFWS. The BLM would continue to coordinate with the LCWD and the USFWS to ensure that the Proposed Action would not adversely impact the flows at Muddy River Springs. The BLM would also identify and monitor any free-flowing springs in the Kane Springs Valley to confirm that no impacts to local springs would result from the Proposed Action.

4.20.4.3 Vegetation Resources

The cumulative resource analysis area for vegetation includes the Kane Springs Valley, Coyote Spring Valley, and the area adjacent to the Muddy River and associated springs. Ten of the 14 interrelated projects are located within the cumulative resource analysis area (**Table 4-4**). Cumulative impacts on vegetation resources are generally additive and proportionate to the amount of ground disturbance within specific habitat areas.

Construction of the interrelated projects analyzed in this EIS would result in the loss of native vegetation, potential loss of special status species, and the increased potential for the spread of invasive and noxious weeds. For projects located on federal lands, specific mitigation measures to minimize these impacts would be a requirement of their approval. Projects located on private lands would be subject to either the approved Lincoln County Habitat Conservation Plan (Lincoln County 2006) or the CSI MSHCP.

Cumulative impacts of groundwater pumping on vegetation resources include potential impacts to riparian vegetation in the Muddy Springs area. These potential effects are minimized, however, by the monitoring and mitigation commitments, such as the LCWD Stipulation Agreement with the USFWS, and others described in Section 4.20.4.2 – Water Resources. While the BLM does not have the authority to mandate certain monitoring and mitigation strategies, they would work collaboratively with other agencies under existing agreements to ensure the there would be no cumulative impacts on vegetation resources from the Proposed Action or that actions would be taken to minimize/mitigate cumulative impacts.

Both Lincoln County and the developers of the CSI development area are preparing separate Habitat Conservation Plans that would address cumulative effects on biological resources for development and construction activities within Lincoln County and CSI lands. The Southeastern

Lincoln County Habitat Conservation Plan and the CSI MSHCP would address sensitive and protected biological resources on private and public lands in Lincoln County. In addition, the BLM and USFWS are responsible for the management of critical and sensitive habitats under their jurisdiction. Through a cooperative agreement, the federal, state and local agencies are working to ensure conformance of any action that would impact the biological viability of the region.

4.20.4.4 Wildlife Resources

The cumulative resource analysis area for wildlife resources (with the exception of the desert tortoise) includes the Kane Springs Valley, Coyote Spring Valley, and the area adjacent to the Muddy River and associated springs. Ten of the 14 interrelated projects are located within cumulative resource analysis area (**Table 4-4)**. As described in the previous section, cumulative impacts on biological resources are generally additive and proportionate to the amount of ground disturbance within specific habitat areas. The Lincoln County Habitat Conservation Plan and CSI MSHCP would address sensitive and protected wildlife resources on private and public lands in Lincoln County.

Potential cumulative impacts from construction of interrelated projects analyzed in this EIS include loss and fragmentation of wildlife habitat and disturbance to special status wildlife species. Because impacts to sensitive biological resources are regulated by the USFWS, NDOW and other resource management agencies, potential impacts resulting from project development would require consultation with responsible agencies and implementation of mitigation measures. The evaluation of project impacts would take into account the cumulative nature of impacts to wildlife resources through loss of habitat, severance of wildlife corridors and disturbance by human activities. Implementation of mitigation measures for impacts to these resources would be required for each project as a condition of approval. Specific estimates of impact acreages to wildlife species resulting from cumulative actions within the cumulative resource analysis area would be greater than those for the desert tortoise (Table 4.8) because the cumulative resource area is larger for wildlife resources.

The following section addresses potential cumulative impacts to sensitive species known to occur in the cumulative resource analysis area.

4.20.4.4.1 Desert Tortoise

The cumulative resource analysis area for the desert tortoise is the Mormon Mesa Critical Habitat Unit. Interrelated projects that could have cumulative effects on desert tortoise include those which would be developed within desert tortoise critical habitat, which includes portions of southern Lincoln County and northern Clark County. Ten of the 14 interrelated projects are located within the Mormon Mesa Critical Habitat Unit (Table 4-4). As such, development activities in southern Lincoln County would be subject to the applicable MSHCP and would require consultation with the appropriate resource management agency (BLM, USFWS NDOW) to implement site-specific desert tortoise protection measures. For projects on federal lands, any disturbance would be required to undergo consultation under Section 7 of the ESA. Projects on private lands would undergo Section 10 or Section 7 consultation as appropriate. Specific acreages of impact to desert tortoise critical habitat resulting from cumulative actions within the Mormon Mesa Critical Habitat Unit are estimated in Table 4.8.

Table 4.8
Acres Disturbed or to be Disturbed of Desert Tortoise Critical Habitat within the Mormon Mesa Critical Habitat Unit (Cumulative Resource Analysis Area)

Project	Desert Tortoise Habitat Disturbed (Acres)
Lincoln County Conservation, Recreation, Development Act	Unknown
Coyote Spring Development – Lincoln County	29,002 acres[1]
Coyote Spring Development – Clark County	6,881 acres[1]
LS Power Electrical Transmission Project	Unknown
Coyote Springs 138-kV Transmission Line Project	165.5 acres of permanent disturbance and 125.1 acres of temporary disturbance
Coyote Spring Well and Moapa Transmission System Project	121.7 acres
Ely Energy Center Project (500 kV transmission line in the designated LCCRDA corridor)	Unknown
Additional Moapa Valley Water District Groundwater Pumping in Upper Moapa Valley	Unknown
Clark, Lincoln, and White Pine Counties Groundwater Development Project	Unknown
Pumping of Other Existing Undeveloped Coyote Spring Valley Groundwater Rights	Unknown
Total	**Greater than 36,170 acres of desert tortoise designated critical habitat disturbed in the Mormon Mesa Critical Habitat Unit**

[1] USFWS 2007b

4.20.4.4.2 Special Status Species

Construction of the interrelated projects analyzed in this EIS would result in the loss of habitat occupied by special status species including the western burrowing owl, the banded Gila monster and the chuckwalla. Cumulative loss of wildlife habitat in the region would affect the special status species that utilize that habitat. For projects located on federal lands, specific mitigation measures to minimize these impacts would be a requirement of their approval. Projects located on private lands would be subject to either the Southeastern Lincoln County Habitat Conservation Plan or CSI MSHCP.

Cumulative groundwater pumping could affect habitat for special status fish and aquatic species or special status species that rely on riparian habitats in the Muddy Springs area. These potential effects are offset, however, by the conservation commitments, such as the LCWD Stipulation Agreement with the USFWS, and others described in Section 4.20.4.2 – Water Resources. While the BLM does not have the authority to mandate certain monitoring and mitigation strategies, they would work collaboratively with other agencies under existing agreements to ensure there would be no cumulative impacts from the Proposed Action. The cumulative effect of these projects should be no greater than the individual effect of the Proposed Action. The conservation measures identified under the MOA for the Moapa dace, including the additional flows from the dedication of the Jones Spring water right and the restoration of habitat, would improve habitat conditions for these species.

4.20.4.4.3 Migratory Birds

Construction of the interrelated projects analyzed in this EIS has the potential to disturb or destroy migratory bird nests and fledglings. In addition, the proliferation of overhead

transmission lines in the region increases the potential for transmission line collisions and electrocution to migratory birds. For projects located on federal lands, specific mitigation measures to minimize these impacts would be a requirement of their approval. Projects located on private lands would be subject to either the Southeastern Lincoln County Habitat Conservation Plan or CSI MSHCP.

4.20.4.5 Land Use

The cumulative resource ROI for land use is the southern portion of Lincoln County from Alamo to the southern extent of the CSI development area, which extends to SR 168 in Clark County, and the LCLA area. RFFAs evaluated for land use include the LCCRDA, CSI development in Lincoln and northern Clark Counties, the sale and build out of the Alamo land disposal area, the build out of the LCLA area in southeastern Lincoln County, the transmission line projects proposed to be constructed within the permitted SWIP corridor, and the 500 kV transmission line associated with the Ely Energy Center.

Because most private lands within Lincoln County are located adjacent to or near federal lands, it is anticipated that future development would likely affect land use on both private and public lands. Approximately 29,000 acres of privately owned land would be converted from uninhabited desert space to multi-use residential/commercial uses in the CSI area. The LCLA development area would convert approximately 13,000 acres of privately owned land with similar habitat to multi-use residential/commercial uses in southeastern Lincoln County. Both the CSI and LCLA developments are expected to occur over a 30- to 50-year period. Nearly 850 acres near Alamo would be converted to residential/commercial as early as 2008.

The electric transmission projects proposed by LS Energy, LCPD and the SNWA within the permitted SWIP corridor, in addition to the electric transmission projects within the 2,640-foot wide LCCRDA along Kane Springs Road, would increase the density of utility-related land use in the area. Collectively, these projects would have a cumulative impact on future land use in Lincoln County. Increased population and economic growth would likely result in an increased number of projects on adjacent federal lands including water development projects, recreation and non-recreation special uses, utility corridors and infrastructure, road improvements, travel management plans, rangeland management and grazing, and additional recreation/tourism facilities. Any future action on federal land would require compliance with applicable federal laws and regulations.

Lincoln County planning agencies, in cooperation with federal resource managers (e.g., BLM, USFWS, Army Corps of Engineers) and newly formed municipal agencies (e.g., CSI GID, LCLA GIDs), would be responsible for long-range planning of future development and resource management within Lincoln County.

4.20.4.6 Areas of Critical Environmental Concern

The cumulative impact analysis area for ACECs includes the Kane Springs ACEC. Cumulative impacts to ACECs would occur from the Proposed Action and other planned projects within the ACEC. These RFFAs include the actions associated with the implementation of the LCCRDA including the Proposed Action, the Clark, Lincoln, and White Pine Counties Groundwater Development Project, the construction of the 500 kV transmission line associated with the Ely

Energy Center, the build out of the CSI development in Lincoln County, and the LS Power transmission line in the SWIP corridor.

The Kane Springs ACEC currently contains 65,900 acres of public lands. The primary resource value of the ACEC is the protection of desert tortoise critical habitat. As described in section 4.20.4.4 – Wildlife Resources, the interrelated projects would have a cumulative effect on desert tortoise and their habitat. All development activities within the ACEC require consultation with resource management agencies including the BLM, USFWS, NDOW, Lincoln County Planning Department and the local GID to implement site-specific desert tortoise protection measures in their development plans. For projects on federal lands, any disturbance would be required to undergo consultation under Section 7 or Section 10 of the ESA and implement reasonable and prudent measures to minimize take of desert tortoise.

4.20.4.7 Visual Resources

The cumulative impact ROI includes the project area and areas that would be affected by the Proposed Action or Alternative 1 that would be visible from off-site viewpoints. Potential cumulative impacts to visual resources would result from other planned or foreseeable development activities which are planned to occur within the ROI.

Historically, the project area has been managed for grazing and recreational use. Other management activities that have occurred within the ROI include road construction, water development facilities, power lines and utility corridors (water and gas lines). Concurrent management activities, which are taking place at the present time, are a continuation of existing uses.

The RFFAs that would be located in the cumulative impacts ROI include a 500 kV transmission line proposed by Nevada Power along Kane Springs Road (Ely Energy Center Project), five electric transmission projects, and one water pipeline project along the permitted SWIP corridor west of Highway 93. If approved, the 500 kV transmission line proposed by Nevada Power would be located with the 2,640-foot wide LCCRDA corridor and would be the dominant human element within the corridor once it has been installed. The cumulative effect of these projects would be an increase in the number of electric transmission facilities that are visible from Highway 93.

The LCCRDA corridor is located on lands managed under the BLM VRM Class III. The objective of VRM Class III is to provide for management activities that may contrast with the basic landscape elements but remain subordinate to the existing landscape character. The nearby Delamar Mountains and Meadow Valley Range Wildernesses are managed under VRM Class I objectives.

With the passage of the LCCRDA, the VRM Class has changed to VRM Class IV. VRM Class IV objectives provide for management activities which require major modification of the existing character of the landscape. The Proposed Action, in addition to RFFAs within the cumulative impact ROI, would increase the visual impacts within the project area. Design and visual impacts of future development activities within the cumulative impact ROI would be regulated by the BLM on federal lands and Lincoln County or the local GID on private lands.

4.20.4.8 Socioeconomics

The cumulative impact ROI for social and economic resources encompasses Lincoln and Clark Counties.

The cumulative effects of past, ongoing and reasonably foreseeable future activities in and near communities to the social and economic structure of Lincoln and Clark Counties would be substantial; more so for Lincoln County than Clark County because Lincoln County's population is so small compared to that of Clark County. Some social conflict and lifestyle changes are unavoidable as the long-term residential and commercial developments expand over much of the available private land in the counties. Construction and operation of the Proposed Action or Alternative 1 would supply a small, but initially substantial, portion of the total water requirements for the CSI development projects in Lincoln County. Development of CSI does not depend on the Proposed Action because CSI has its own permitted groundwater rights, and it would be constructed regardless of the approval of the Proposed Action. The indirect effect of the withdrawal and transport of groundwater by itself would not have growth-inducing effects and other effects related to induced changes in the pattern of land use, changes to population density or growth rate. There would be no cumulative effects from construction, operation and maintenance of the Proposed Action when combined with other past, present and reasonably foreseeable future actions because those effects would occur with or without Proposed Action. The Proposed Action would have no additive and significant relationship to those effects.

Other planned and foreseeable projects with a potential effect to the social and economic structure of Lincoln and Clark Counties are being developed in response to the rapidly growing population and economy of Las Vegas and the surrounding metropolitan area. Community services and infrastructure would need to be increased as a result of ongoing residential and commercial development in the region to keep pace with the growing population and economy of the area.

4.20.5 Other Actions Not Analyzed

The Draft RMP/EIS for the Ely District describes construction of a road from Caliente to Mesquite and paving of Kane Springs Road as RFFAs. There are multiple dirt roads between Caliente and Mesquite. These roads, along with the Kane Spring Road, are located on lands managed by both the BLM and Lincoln County. According to the Lincoln County Planning Department, the county has not allocated funds, nor do they anticipate future funding for these actions (Dixon 2006). There is anecdotal discussion about widening of Highway 93 between I-15 and Ely; however, at this time, the NDOT has not included this action in any regional transportation plan.

5.0 CONSULTATION AND COORDINATION

This chapter describes the consultation and coordination activities the BLM has carried out with interested agencies, organizations and individuals while preparing the Draft and Final EIS. The NEPA and CEQ regulations require the public's involvement in the decision-making process as well as allowing for full environmental disclosure. Guidance for implementing public involvement is outlined in Title 43 CFR, Part 1610.2.

During the early phases of the scoping process, the BLM determined that an EIS would be required to comply with NEPA prior to taking action on the LCWD's ROW application. An EIS is the most detailed and complex of NEPA documents, and it includes requirements for significant public coordination and involvement throughout its preparation and review. NEPA and CEQ require the BLM to identify any potential environmental impacts associated with the Proposed Action so the BLM can consider them when making its final decision.

5.1 PUBLIC INVOLVEMENT PROCESS

Public involvement in the EIS process includes the steps necessary to identify and address public concerns and needs. The public involvement process assists agencies in: (1) broadening the information base for decision-making, (2) informing the public about Proposed Actions and potential long-term impacts that could result from implementation of the Proposed Action, and (3) ensuring that public needs are understood by the agencies. Public participation in the EIS process is required by NEPA at four specific points: 1) issue scoping, 2) review of the Draft EIS, 3) review of the Final EIS, and 4) receipt of the Records of Decision.

Scoping: The public was provided a 30-day scoping period to disclose potential issues and concerns associated with the Proposed Action. The BLM collected stakeholder comments at public meetings as well as comments sent via fax or mail. Six public meetings were held during the public comment period. These meetings were held in mid-April, 2006 in Caliente, Alamo, Mesquite, Las Vegas, Reno and Baker with a total attendance among all meetings of 70 people. The scoping period ended on May 1, 2006. Information obtained by the agencies during public scoping was combined with issues identified by the BLM and forms the scope of this EIS.

Draft EIS Review: The 60-day comment period for public review of the Draft EIS began with the publication of the Notice of Availability in the Federal Register on June 22, 2007. The BLM distributed press releases announcing the dates, locations, and times of the public meetings to local and regional print and broadcast media. The Draft EIS was distributed to individuals and agencies who requested copies (see Chapter 5.3), and posted on the BLM's website at www.blm.gov/nv/st/en/prog/planning/groundwater_projects. Four public meetings were held during the public comment period (June 22 to August 20, 2007) to receive comments on the Draft EIS. Dates and locations of these meetings, and the number of attendees, are as follows:

Carson City, Nevada - 0 Attendees
Date: July 30, 2007
Time: 4:00 – 6:00 p.m.
Location: Plaza Hotel

Pioche, Nevada – 1 Attendee
Date: July 31, 2007
Time: 6:00 – 8:00 p.m.
Location: Pioche Town Hall

Alamo, Nevada – 3 Attendees
Date: August 1, 2007
Time: 6:00 – 8:00 p.m.
Location: Alamo Ambulance Barn

Las Vegas, Nevada – 10 Attendees
Date: August 2, 2007
Time: 6:00 – 8:00 p.m.
Location: Atrium Suite Hotel

During the 60-day public comment period, the BLM received 19 comment documents (e.g. letters, emails, faxes) from individuals, private companies, and federal and state agencies commenting on the Draft EIS. A list of comment documents received, the content of each letter, and BLM's responses to comments are contained in Appendix F of the Final EIS. Each comment letter was assigned a reference number, and each comment was identified with a number. The BLM's responses are listed next to the comment. Where appropriate, changes and additions, are reflected in the Final EIS to respond to comments.

Final EIS Review: This Final EIS has been distributed with the publication of the Notice of Availability in the Federal Register. Copies of this Final EIS have been distributed to those parties requesting the Draft EIS including those entities listed in Chapter 5.3. In addition, the Final EIS has been posted on the BLM website.

5.2 FORMAL CONSULTATION WITH INTERESTED AGENCIES

Federal and state agencies were contacted individually to gather input for preparation of the EIS. Other resource management agencies were consulted at the federal and state levels to identify common concerns related to the Proposed Action or Alternatives. Cooperating agencies on this EIS include the USFWS, the NDOW and the Moapa Valley Water District. In addition, the USGS has provided technical guidance related to water resources issues.

A Biological Assessment has been prepared for the Proposed Action and submitted to the USFWS as required by Section 7 of the ESA (1973). A species list was requested from the USFWS at the beginning of EIS development. The species list identified any plant and wildlife species listed as Threatened, Endangered or Candidate species within the project area. At the request of the USFWS, rare plant and desert tortoise surveys have been conducted within the project area. The BLM will continue to coordinate with the USFWS throughout the EIS process.

The BLM consulted with Native American Tribes that claim ancestral ties to, or traditional culture use of, project area lands. In March 2006, BLM mailed copies of an "interested parties" letter under the NEPA guidance, to the following Tribal groups:

- Moapa Band of Paiutes
- Paiute Indian Tribe of Utah
- Las Vegas Paiute Tribe
- Kaibab Paiute Tribe (Arizona)
- Yomba Shoshone Tribe
- Ely Shoshone Tribe
- Duckwater Shoshone Tribe
- Shoshone Paiute Business Council

The consultation letter briefly described the Proposed Action and requested 1) Tribal input regarding any concerns about traditional cultural practices or other issues that might be affected by the Proposed Action, 2) information on how they would like to be involved in the planning process, 3) names of other individuals or organizations that should be notified or consulted about the project, and 4) an invitation to the Tribal Coordination Meeting at the BLM Ely District Office, Ely, Nevada, on May 18, 2006. A copy of the NOI, a map of the project area, and a brief description of the preliminary issues to be considered in the plan was enclosed with each of these letters.

The BLM received responses to this request from three Tribes: Las Vegas Paiute Tribe, the Paiute Tribe of Utah, and the Ely Shoshone Tribe. The Las Vegas Paiute Tribe did not provide input regarding any concerns about the Proposed Action, but wished to be kept informed of the project; the Paiute Indian Tribe of Utah had no interest in the project; and the Ely Shoshone Tribe wished to continue consultations for the Proposed Action directly with the BLM.

On May 18, 2006, representatives from the Ely Shoshone Tribe and the Duckwater Shoshone Tribe attended a Tribal Coordination Meeting at the BLM Ely District Office in Ely, Nevada. Information about the Proposed Action was presented to Tribal representatives. The Ely Shoshone Tribe and the Duckwater Shoshone Tribe expressed their concerns and interest in continued consultation regarding the Proposed Action.

In a further effort to elicit Tribal issues and concerns, the Moapa Band of Paiutes and the Las Vegas Paiute Tribe were invited by the BLM to visit the project area in person. This visit occurred on November 30, 2006. Representatives from the Moapa Band of Paiutes indicated they would submit written comments to the BLM expressing their concerns and interest in continued consultation regarding the Proposed Action. As of the writing of this Final EIS, the BLM has received no formal responses from the Moapa Band of Paiutes or Las Vegas Paiute Tribe following the site visit. There are no known effects to the integrity of resources of concern or interest to the Tribes in the area or any specific expressions of concern for the Proposed Action. The Draft and Final EIS were provided to each of the aforementioned interested Tribes for review and comment.

5.3 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE EIS WERE SENT

This section lists the agencies, officials and other interested parties who received copies of the Draft and Final EIS. The BLM filed copies with the EPA, who publishes a Notice of Availability of the EIS in the Federal Register. The BLM also distributed paper and electronic (on CD-ROM) copies to federal agencies, key state agencies, elected officials, local libraries and other requesting parties. The BLM will provide copies to other interested organizations or individuals on request.

5.3.1 Federal Government

U.S. Department of Agriculture – Natural Resources Conservation Service
U.S. Army Corps of Engineers – St. George Regulatory Office
U.S. Department of Energy
U.S. Environmental Protection Agency
U.S. Department of the Interior – Bureau of Indian Affairs
U.S. Department of the Interior – National Park Service
U.S. Department of the Interior – U.S. Fish and Wildlife Service
U.S. Department of the Interior – U.S. Geological Survey
Nellis Air Force Base

5.3.2 State Government

Nevada Bureau of Mines
Nevada Department of Agriculture
Nevada Department of Transportation
Nevada Division of Energy
Nevada Division of Environmental Protection
Nevada Division of State Lands
Nevada Division of State Parks
Nevada Division of Water Resources
Nevada Department of Wildlife
Nevada Office of the Governor
Nevada State Clearinghouse
Nevada State Historic Preservation Office
Nevada Department of Conservation
Nevada Natural Heritage Program
Nevada Division of Forestry

5.3.3 Local Governments

Lincoln County
Clark County
White Pine County
Nye County

5.3.4 Tribal Governments

Duckwater Shoshone Tribe
Ely Shoshone Tribe
Kaibab Paiute Tribe (Arizona)
Las Vegas Paiute Tribe
Moapa Band of Paiutes
Paiute Indian Tribe of Utah
Shoshone Paiute Business Council
Yomba Shoshone Tribe

5.3.5 Other Organizations

Center for Biological Diversity
Friends of Nevada Wilderness
Nevada Bighorn Unlimited
Sierra Club
Southern Nevada Water Authority
The Nature Conservancy
Natural Resource Defense Council
Wild Utah Project
Western Environmental Law Center
Desert Research Institute
Trout Unlimited
American Lands Alliance
Eastern Nevada Landscape Coalition
Audubon Society

5.3.6 Elected Government Officials

State of Nevada Governor, Jim Gibbons
Jon Porter, U.S. House of Representatives
Shelly Berkley, U.S. House of Representatives
Dean Heller, U.S. House of Representatives
John Ensign, U.S. Senate
Harry M. Reid, U.S. Senate

5.3.7 Availability

Copies of the Kane Springs Valley Groundwater Development Project Draft and Final EIS's were provided to the following public libraries and the BLM offices for public inspection.

Lincoln County – Alamo Branch Library
100 North 1st Street
Alamo, Nevada 89001

Lincoln County Library
93 Main Street
Pioche, Nevada 89043

Lincoln County – Caliente Branch Library
100 Depot Avenue
Caliente, Nevada 89008

White Pine County Library
950 Campton Street
Ely, Nevada 89301

BLM, Ely District Office
702 North Industrial Way
Ely, Nevada 89301-9408

BLM, Nevada State Office
1340 Financial Blvd
Reno, Nevada 89502-7147

BLM, Las Vegas Field Office
4701 N. Torrey Pines Drive
Las Vegas, NV 89130

BLM – Caliente Field Office
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GLOSSARY

Access (road)	Road used for passage to project sites and along utility corridors for purposes of construction, operation, and maintenance.
Acre-foot	The volume of water required to cover one acre to a depth of one foot: 43,560 cubic feet, 325,851 U.S. gallons, or 1,233 cubic meters.
Advisory Council on Historic Preservation	A 19-member body appointed to advise the President and Congress in the coordination of actions by federal agencies on matters relating to historic preservation.
Aeolian	Of or caused by the wind; wind-blown.
Aesthetic quality	Referring to the perception of beauty of a natural or cultural landscape.
Affected environment	Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as the result of a proposed human action.
Air quality	Measure of the health-related and visual characteristics of the air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.
Air quality classes	Classifications established under the Prevention of Significant Deterioration portion of the Clean Air Act that limit the amount of air pollution considered significant within an area. Class I applies to areas where almost any change in air quality would be significant; Class II applies to areas where the deterioration normally accompanying moderate well-controlled growth would be permitted; and Class III applies to areas where industrial deterioration would generally be allowed.
Air Quality Standards	The level of pollutants prescribed by regulation that may not be exceeded during a specified time in a defined area.
Alkaline	Having a pH value greater than 7.
Alluvial fan	Cone-shaped deposits of alluvium made by a stream. Fans generally form where streams emerge from mountains onto the lowland.
Alluvial, alluvium	Relating to material deposited by running water, such as clay, silt, sand, and gravel. Sedimentary material transported and deposited by the action of flowing water.

Alluvium	A geologic term describing beds of sand, gravel, silt, and clay deposited by flowing water.
Alternative (action)	An option for meeting the stated purpose and need.
Ambient	The surrounding natural conditions (or environment) in a given place and time.
Animal Unit Month (AUM)	The amount of forage necessary for the sustenance of one cow or its equivalent (one cow, bull, steer, heifer, horse, burro, mule, five sheep, or five goats over the age of 6 months at the time of entering the public lands or other lands administered by BLM) for a period of 1 month.
Applicant	Lincoln County Water District
Aquatic	Growing or living in or near the water.
Aquifer	A water bearing formation that provides a ground water reservoir; a formation, a group of formations, or part of a formation that contains sufficient permeable material capable of yielding significant quantities of water to wells and springs.
Archaeology	The scientific study of the life and culture of ancient peoples, as by excavation of ancient cities, relics, or artifacts.
Area of Critical Environmental Concern	A BLM designation for an area within public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources, or other natural systems or processes; or to protect life from natural hazards.
Artifact	Any object showing human workmanship or modification, especially from a prehistoric or historic culture.
Artifact Scatters (Historic)	Historic artifact scatters are a common type of site and include individual artifacts that may or may not include features. Artifacts include a variety of glass, ceramics, porcelain, and metal fragments.
Artifact Scatters (Prehistoric)	Artifact scatters commonly include chipped and ground stone debitage and possibly ceramics. Artifact scatters are the most common prehistoric sites. These sites are invaluable for data on interpreting subsistence strategies, settlement patterns, trade, and chronology.

Assessment (environmental)	An evaluation of existing resources and potential impacts on them from a proposed act or change to the environment.
Basaltic	Composed of, containing, or characteristic of basalt (the dark, dense igneous rock of a lava flow or minor intrusion, composed essentially of labradorite and pyroxene and often displaying a columnar structure).
Basic	Of or relating to a base; Containing a base, especially in excess of acid; Alkaline.
Burials	Burials refers to human inhumations may occur away from habitation sites in isolated areas such as rocky outcrops, talus slopes, crevices, caves, and under ledges.
Calcareous	Composed of, containing, or characteristic of calcium carbonate, calcium, or limestone; chalky.
Caldera	Volcanic feature formed by the collapse of land following a volcanic eruption.
Caliche Cave	Small cave, generally used by desert tortoise and other small reptiles and mammals, formed in calcium carbonate crust that forms on stony soils in arid regions.
Cambrian	The earliest geologic period in the Paleozoic Era, spanning the time of 570 to 500 million years ago, and marked by a profusion of marine animals.
Campsites (Prehistoric)	These sites represent a short-term occupation that may have occurred to procure food or raw material. Typically, these sites consist of chipped and ground stone debitage, and possibly ceramics. Fire pits or burned areas are common features associated with these sites.
Candidate species	A plant or animal species not yet officially listed as threatened or endangered, but which is undergoing status review by the USFWS.
Capture	Water withdrawn artificially from an aquifer is derived from a decrease in storage in the aquifer, a reduction in the previous discharge from the aquifer, an increase in the recharge, or a combination of these changes. The decrease in discharge plus the increase in recharge is termed capture.

Carbonate rock	Most carbonate rocks originate as sedimentary deposits in marine environments. Compaction, cementation, and dolomitization processes act on the deposits as they lithify and greatly change their porosity and permeability. The principal postdepositional change in carbonate rocks is the dissolution of part of the rock by circulating slightly acidic ground water. Solution openings in carbonate rocks range from small tubes and widened joints to caverns that may be tens of meters wide and hundreds to thousands of meters in length. Where they are saturated, carbonate rocks with well-connected networks of solution openings yield large amounts of water to wells that penetrate the openings (see carbonate aquifer), although the undissolved rock between the large openings may be almost impermeable.
Carbonate aquifer	Most carbonate-rock aquifers consist of limestone, but dolomite and marble locally yield water. The water-yielding properties of carbonate rocks vary widely; some yield almost no water and are considered to be confining units, whereas others are among the most productive aquifers known.
Clastic Rocks	Rocks formed by fragments of pre-existing rocks
Clay lens	A soil mantle consisting of a layer of clay of variable thickness.
Clean Water Act	Provides for pollution control activities and funding at the federal level including grant programs, research and related programs, as well as provisions for setting standards and enforcement actions.
Cone of Depression	A depression in the water table or potentiometric surface of a ground water body that is in the shape of an inverted cone and develops around a well which is being pumped. It defines the area of influence of the pumping well.
Cooperating agency	Any Federal agency other than a lead agency which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major federal action significantly affecting the quality of the human environment. The selection and responsibilities of a cooperating agency are described in 40 CFR 1501.6. A State or local agency of similar qualifications or, when the effects are on a reservation, an Indian Tribe, may by agreement with the lead agency become a cooperating agency.
Council on Environmental Quality	An advisory council to the President established by Title II of the National Environmental Policy Act of 1969. It reviews federal programs for their effort on the environment studies, and advises the President on environmental matters.

Cryptobiotic	Of or related to the state of cryptobiosis (a state in which an animal's metabolic activities come to a reversible standstill).
Cubic feet per second	Unit of discharge, or volume rate of flow, equal to 0.0283 cubic meters per second. As a rate of streamflow, a cubic foot of water passing a referenced section in 1 second. A measure of a moving volume of water (1 cfs = 0.0283 m3/s).
Cultural resources	A broad, general term meaning any cultural property reflecting past human activity or use that has a definite location, and any traditional lifeway value important to a contemporary social and/or cultural group's traditional systems of religious belief, cultural practices, or social interaction.
Cumulative impact	The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions—regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time (40 CFR 1508.7).
Deuterium	Also called heavy hydrogen, is a stable (non radioactive) isotope of hydrogen with a natural abundance in the oceans of Earth of approximately one atom in 6500 of hydrogen. Measurements of small variations in the natural abundances of deuterium, along with those of the stable heavy oxygen isotopes 17O and 18O, are of importance in hydrology, to trace the origin of Earth's waters. The heavy isotopes of hydrogen and oxygen in rainwater are enriched as a function of the environmental temperature of the region in which the precipitation falls. Evaporative and other processes in water also alter the ratios of heavy hydrogen and oxygen isotopes in characteristic ways. For example, precipitation falling in areas with lower temperatures or at higher latitudes will tend to have lower deuterium values. On the other hand, water from springs originating from deep regional aquifer systems would have different deuterium values due to different geographical origin as well as geochemical processes acting along its path.
Direct effect	See effects.
Draft Environmental Impact Statement	A detailed written statement as required by Section 102(2)(c) of NEPA.
Drawdown	The vertical distance the free water elevation is lowered, or the reduction of the pressure head due the removal of free water.

Effects	(a) Direct effects, which are caused by the action and occur at the same time and place; (b) Indirect effects, which are caused by the action and are later in time or farther time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects and impacts as used in [the CEQ] regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.
Endangered species	Any species in danger of extinction throughout all or a significant portion of its range.
Endemic	Plants or animals that are native to a particular region or country.
Environment	The surrounding conditions, influences or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.
Environmental Impact Statement	A formal public document prepared to analyze the impacts on the environment of the proposed project or action and released for comment and review. An EIS must meet the requirements of NEPA, CEQ guidelines, and directives of the agency responsible for the proposed project or action.
Environmental Impact Statement, Final	The final version of the public document required by NEPA.
Ephemeral	Present only during a portion of the year. Generally refers to water courses.
Ephemeral Stream	An ephemeral stream is one that remains dry during most of the year, flowing only during a few days or weeks in response to direct runoff. Ephemeral streams do not intercept ground water flow and therefore, have no baseflow.
Evapotranspiration (ET)	The combined processes by which water is transferred from the earth's surface to the atmosphere; evaporation of liquid or solid water plus transpiration from plants.

Fault	A fracture or fracture zone in the earth's surface along which there has been displacement of the sides relative to one another.
Fault Zone	A fault that is expressed as a zone of numerous small fractures or of breccia or fault gouge. A fault zones may be hundreds of feet wide.
Fauna	The wildlife or animals of a specified region or time.
Federal Land Policy and Management Act of 1976	Public Law 94-579 signed by the President on October 21, 1976. Established public land policy for management lands administered by the Bureau of Land Management (BLM). FLPMA specifies several key directions for the BLM, notably: 1) management on the basis of multiple use and sustained yield; 2) land use plans prepared to guide management actions; 3) public lands for the protection, development, and enhancement of resources; 4) public lands retained in federal ownership; and 5) public participation used in reaching management decisions.
Floodplain	That flat portion of a river or stream valley adjacent to the river channel that is built of sediments and is inundated with water when the stream overflows its banks.
Fossil	The remains or traces of an organism or assemblage of organisms that have been preserved by natural processes in the earth's crust.
Geologic formation	A rock unit distinguished from adjacent deposits by some common physical characteristic, such as its composition, origin, color, or age.
Geology	The science that studies the earth. The materials, processes, environments, and history of the planet, especially the lithosphere, including the rocks and their formation and structure.
Ground Water	1) That part of the subsurface water that is in the saturated zone; or 2) loosely, all subsurface water as distinct from surface water.
Ground Water Flow	Ground water flow takes place below the ground water table in the form of saturated flow through alluvial deposits and other water-bearing formations beneath the soil mantle.
Habitat	The region where a plant or animal naturally grows or lives. A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and home range.

Head	1) The pressure of a fluid on a given area, at a given point represented by the height of the fluid above the point; 2) the water-level elevation in a well, or elevation to which water of a flowing well rises in a pipe extended high enough to stop the flow.
Historic Roads and Trails	Historic trails/roads have been identified within Nevada. A few of the historic trails include the Old Spanish Trail/Mormon Road, which connected Santa Fe to Los Angeles.
Human environment	Interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment. (See the definition of "effects" (1508.8).) This means that economic or social effects are not intended by themselves to require preparation of an environmental impact statement. When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment.
Hydraulic Conductivity	For an isotropic porous medium and homogeneous fluid, the volume of water at the existing kinematic viscosity that moves in unit time under a unit hydraulic gradient through a unit area measured at right angles to the direction of flow.
Hydraulic Gradient	Slope of the water or potentionmetric surface. The change in static head per unit of distance in a given direction. If not specified, the direction generally is understood to be that of the maximum rate of decrease in head.
Hydraulic Head	The height above a datum plane (such as sea level) of the column of water that can be supported by the hydraulic pressure at a given point in a ground water system. For a well, the hydraulic head is equal to the distance between the water level in the well and the datum plane. See Head.
Hydrology	The science that studies the properties, distribution, and circulation of natural surface water and ground water.
Impact	A modification in the status of the environment brought about by a proposed action.
Indirect effect	See effects.
Infrastructure	The basic installations and facilities on which the continuance and growth of a community depend (for example, roads, schools, sewers, power plants, transportation, and communication systems).

Isolate/Isolated Artifact	A single artifact, feature, or object not associated with other cultural resources. An isolate is not normally considered a property.
Isolated Occurrences / Small Concentrations (Prehistoric)	Isolated artifacts are common finds on the landscape. Isolated artifacts and small site concentrations may consist of projectile points, ground stone, flakes, and cores as well as pot busts or a small discrete cluster of chipped stone debitage.
Karst topography	A three-dimensional landscape shaped by the dissolution of a soluble layer or layers of bedrock, usually carbonate rock such as limestone or dolomite.
Kilovolt	1,000 volts (a volt is a measure of electrical potential difference that would cause a current of 1 ampere to flow through a conductor whose resistance is 1 ohm).
Kilowatt	A unit of power equivalent to 1,000 watts.
Lacustrine	Of or relating to lakes; Living or growing in or along the edges of lakes.
Landform	A term used to describe the many types of land surfaces that exist as a result of geologic activity and weathering (for example, plateaus, mountains, plains, and valleys).
Lead agency	The agency or agencies preparing or having taken primary, responsibility for preparing the environmental impact statement.
Lithic	Pertaining to stone or a stone tool (for example, lithic artifact).
Lithology	The appearance, structure, and composition of rocks as determined by study with the unaided eye or with little magnification.
Megawatt	1,000 kilowatts or 1 million watts (a watt is a unit of electrical power equal to 1/756th horsepower).
Mesa	An isolated, nearly level land mass, formed of nearly horizontal rocks, standing above the surrounding country and bounded with steep sides.
Migratory	Birds, animals, or people, that migrate or move from one region or country to another.
Mineral resource	Any inorganic or organic substance occurring naturally in the earth that has a consistent and distinctive set of physical properties. Examples of mineral resources include coal, nickel, gold, silver, and copper.

Mining	There are several components to a mine, from the early stages of prospecting and laying claims with rock cairns, shafts, and adits to the development of mining towns with grocery and merchandise stores, saloons, tailors, churches, meat markets, bakeries, barber shops, jails, blacksmiths, law offices, cemeteries, schools, and brothels.
Mississippian	A period of the Paleozoic Era, spanning in time from about 345 to 320 million years ago.
Mitigate	To alleviate, reduce, or render less intense or severe.
Mitigation	(a) Avoiding the impact altogether by not taking a certain action or parts of an action. (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation. (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment. (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action. (e) Compensating for the impact by replacing or providing substitute resources or environments.
National Ambient Air Quality Standards	Air quality standards established by the Clean Air Act. The primary NAAQS are intended to protect the public health with an adequate margin of safety; the secondary NAAQS are intended to protect the public welfare from any known or anticipated adverse effects of a pollutant.
National Environmental Policy Act of 1969	Public Law 91-190. Establishes environmental policy for the nation. Among other items, NEPA requires federal agencies to consider environmental values in decision-making processes.
National Register Criteria	The National Register's standards for evaluating the significance of properties were developed to recognize the accomplishments of all peoples who have made a significant contribution to our country's history and heritage. The criteria are designed to guide State and local governments, Federal agencies, and others in evaluating potential entries in the National Register.
National Register of Historic Places	A listing of architectural, historical, archaeological, and cultural sites of local, state, or national significance, established by the Historic Preservation Act of 1966.
Native vegetation	Vegetation originating in a certain region or country.

Nonattainment area	An air quality control region (or portion thereof) in which the U.S. Environmental Protection Agency has determined that ambient air concentrations exceed national ambient air quality standards for one or more criteria pollutants.
100-year flood	A flood with a magnitude that may occur once every 100 years on average. An area has a 1-in-100 chance of being inundated during any single year.
Orogeny	The process of mountain formation.
Ozone	A form of oxygen, O3, produced especially when an electric spark is passed through oxygen or air.
Paleontology	The science that deals with the life of past geological ages through the study of the fossil remains of organisms.
Paleozoic	The geologic era between the Precambrian and Mesozoic eras covering the time between 550 million and 225 million years ago. The era was characterized by the development of the first fishes, amphibians, reptiles, and land plants.
Particulates	Minute, separate particles, such as dust or other air pollutants.
Pennsylvanian	A period of the Paleozoic Era, spanning from about 320 million to 280 million years ago.
Perennial	Lasting, or active through the whole year. May refer to rivers, streams, or plants.
Perennial Stream	A perennial stream is one that always has flow. During low-flow periods, the flow of perennial streams is baseflow.
Perennial Yield	The maximum quantity of water that can be withdrawn annually from a ground water supply under a given set of conditions without causing and undesirable result.
Permeability	The measure of the ease with which a fluid can diffuse through a particular porous materials.
Permian	The seventh and last period of the Paleozoic Era, spanning from about 280 to 225 million years ago, characterized by increased reptile life and major mountain building in North America.
Petroglyph	A symbolic design or drawing or an animal or human pecked or carved into a rock or cliff face—generally prehistoric.

Physiographic Province	A large area characterized by distinctive topography, geologic structure, and other features and phenomena of nature.
Piezometer	A facility emplaced to measure and record ground water levels.
Plateau	An elevated tract of relatively level land, such as a tableland or large mesa.
Playa	The shallow central lake basin of a desert plain, in which water gathers after a rain and is evaporated.
Pleistocene	The first geologic epoch during the Quaternary period, spanning from 1.8 million years ago to approximately 10,000 years ago, characterized by extensive continental glaciation in the Northern Hemisphere.
Policy	A guiding principle upon which is based a specific decision or set of decisions.
Pore space	The open spaces or voids within a soil or rock. It is a measure of the amount of liquid or gas that may be absorbed or yielded by a particular formation.
Porosity	1) An index of the void characteristics of a soil or rock material; degree of perviousness. 2) The ratio usually expressed as a percentage of the volume of the interstices, whether isolated or connected, in a given quantity of material to the total volume of the material.
Potentiometric Surface	An imaginary surface representing the elevation and pressure head of ground water and defined by the level to which water rises in a well or piezometer. The water table is a particular potentiometric surface.
Precambrian	The earliest geologic era covering all time from the formation of the earth and ending at the Paleozoic Era, which began about 520 million years ago.
Primitive	An area that is not developed; a pristine natural area.
Quaternary	The geologic period following the Tertiary in the Cenozoic Era, beginning about 1.8 million years ago, composed of the Pleistocene and Holocene epochs, characterized by the evolution of Hominids into modern humans.
Range	A large, open area of land over which livestock can wander and graze.

Raptor	A bird of prey.
Recharge	Replenishment of ground water by a downward infiltration of water from rainfall, streams, and other sources.
Recharge Area	The area that contributes water to an aquifer.
Reclamation	Returning disturbed lands to a form and productivity that will be ecologically balanced.
Region	A large trace of land generally recognized as having similar character types and physiographic types.
Revegetation	The reestablishment and development of self-sustaining plant cover. On disturbed sites, this normally requires human assistance such as reseeding.
Right-of-way	Strip of land acquired by legal means, over which the utility corridors and access roads would pass.
Rill erosion	Rill erosion refers to the erosion process on sloping fields in which numerous and random small channels are formed by water; occurs mainly on recently cultivated soils.
Roasting Pits	These sites are common within the Prehistoric and Ethnohistoric American Southwest. Roasting pits may be associated with large habitation sites or within close proximity of resource procurement areas.
Rock Alignments	These sites are rocks that have been intentionally placed in a circular, semi-circular, or linear alignment. The alignments may have been constructed as hunting blinds, walls, or possibly game drives.
Rock Art Site	Rock art sites are relatively common in the Great Basin, and they come in a variety of styles and substyles. Rock art styles vary from geomorphic, zoomorphic, to anthropomorphic designs. Rock art sites include petroglyphs and pictographs. Rock art sites are known to exist within the region of Kane Springs Valley.
Rockshelters/Caves	Rockshelters/caves are an important component of the cultural resource assemblage in the southwest, including Nevada. Rockshelters/caves have been occupied during all time periods; some caves appear to have considerable antiquity. In general, most rockshelters / caves were typically used for short periods of time, possibly as temporary camping locations.

Sacred site	Any specific, discrete, narrowly delineated location on Federal land identified by an Indian Tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the Tribe or appropriately authoritative representative has informed the agency of the existence of such a site.
Scenic quality class	The designation (A, B, or C) assigned a scenic quality rating unit to indicate the visual importance or quality of a unit relative to other units within the same physiographic province (BLM designation).
Scenic quality rating unit	A portion of the landscape that displays primarily homogeneous visual characteristics of the basic landscape features (landform, water, vegetation, and structures and modifications) that separate it from the surrounding landscape.
Scree	A steep mass of detritus on the side of a mountain; Loose rock debris covering a slope.
Sediment	Solid fragmental material, either mineral or organic, that is transported or deposited by air, water, gravity, or ice.
Seep	An area, generally small, where water, or other liquid such as oil, percolates slowly to the land surface. For water, it may be considered as a synonym of a seepage spring, but it is used by some for flows, too small to be considered a spring.
Seismicity	The relative frequency and distribution of earthquakes.
Semiarid	A climate or region characterized by little yearly rainfall and by the growth of a number of short grasses and shrubs.
Sensitive species	Species whose populations are small and widely dispersed or restricted to a few localities. Species that are listed or candidates for listing by the state or federal government.
Sensitivity	The state of being readily affected by the actions of external influence.
Sheet erosion	Sheet erosion refers to the removal of a relatively uniform thin layer of soil from the land surface by rainfall and surface runoff.
Siliceous	Containing, resembling, relating to, or consisting of silica.
Site	In archaeology, any locale showing evidence of human activity.

Socioeconomic	Of or involving both social and economic factors.
Soil mantle	A layer of soil with a greater hydrologic conductivity than the layer above.
Species	A group of individuals of common ancestry that closely resemble each other structurally and physiologically, and in nature interbreed to produce fertile offspring.
Spring	A place where ground water flows naturally from a rock or the soil onto the land surface or into a body of surface water.
Storage Sites	Storage sites are structures or caches that were constructed to store food and other items. These sites include aboveground storage structures constructed of masonry or adobe and belowground storage pits.
Strata	Plural of stratum, which is a layer of sedimentary rock that was originally deposited horizontally.
Study area	A given geographical area delineated for specific research.
Subspecies	Any natural subdivision of a species that exhibits small, but persistent morphological variations from other subdivisions of the same species living in different geographical regions or times.
Substrate	Sediment that lies beneath the surface of the earth.
Take	A prohibited action under federal law, except where authorized. To harass, harm, pursue, hunt, wound, kill, trap, capture, or collect a federally listed threatened or endangered species, or to attempt to do so. Take may include disturbance of the listed species, nest, or habitat, when disturbance is extensive enough to disrupt normal behavioral patterns for the species, although the affected individuals may not actually die.
Talus	A sloping mass of rocky fragments at the base of a cliff.
Telegraph and Telephone Lines	These features are identified with the themes of communication, development, and commerce and are often associated with ranching, mining, and development of towns.
Tertiary	The first period in the Cenozoic Era, spanning from 65 to 1.8 million years ago characterized by the development of mammals.

Theis Method	Theis analytical solution is a widely accepted method in hydrology for analyzing effect on an aquifer of groundwater withdrawal from a well. The Theis method calculates the expected drawdown assuming uniform radial flow in an confined aquifer of infinite extent.
Threatened species	Any species likely to become endangered within the foreseeable future throughout all or a significant part of its range.
Toolstone Sources and Quarries	These sites are areas that may contain toolstone material (e.g., obsidian, chert, basalt, and quartzite), discarded cores, blanks, or a dominance of decortication flakes. Hammerstones, hammerstone spalls, anvil stones, fire-cracked rock (heat treatment), flaked cobble scatters, and spatially discrete knapping areas may also be present. Toolstone sources are known in the project in the vicinity of a known obsidian source, the Kane Springs Wash Caldera.
Topography	The relative positions and elevations of surface features of an area.
Total Dissolved Solids (TDS)	The quantity of mineral (salts) in solution in water, usually expressed in milligrams per liter.
Traditional cultural property	A term referring to a tangible site, district, structure, building, or object with defensible boundaries that is important to a contemporary human community and has been for 50 years or more, that has significance under one or more criteria of the National Register of Historic Places, and with integrity of location, design, setting, materials, workmanship, feeling, and association in the perspective of those who value the place.
Transmissivity	The rate of which water of the prevailing kinematic viscosity is transmitted through a unit width of the aquifer under a unit hydraulic gradient; equal to the hydraulic conductivity times the aquifer thickness.
Triassic	The first period in the Mesozoic Era, spanning from 225 to 190 million years ago and following the Permian Period of the Paleozoic Era; characterized by the first appearance of many reptiles, including the dinosaurs.
Tributary	A stream or river that flows into a larger stream or river.
Trigger point	A threshold value that is established by the NV State Engineer.
Tuffaceous	Composed of, containing, or characteristic of a tuff (fragmental rock consisting of the smaller kinds of volcanic detritus, as ash or cinder, usually more or less stratified).

Unsaturated Zone	The zone between the land surface and the water table. It includes the capillary fringe and may contain water under pressure less than that of the atmosphere.
Utility corridor	A route used by a utility for pipelines and transmission lines.
Vegetation community	Species of plants that commonly live together in the same region or ecotone.
View shed	Visible portion of the specific landscape seen from a specific viewpoint, normally limited by landform, vegetation, distance, and existing cultural modifications.
Visual resource management class	Classification of landscapes according to the kinds of structures and changes that are acceptable to meet established visual goals (BLM).
Water Table	1) The upper surface of a saturated zone except where that surface is formed by an impermeable body, 2) locus of points in soil water at which the pressure is equal to atmospheric pressure; or 3) the surface where ground water is encountered in a well in an unconfined aquifer. The water table is a particular potentiometric surface.
Waters of the United States	All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce including adjacent wetlands and tributaries to waters of the United States; and all waters by which the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce.
Well Log	1) A record made by the driller, geologist, or engineer of a well which lists geologic materials encountered during drilling and information on the construction of the well (such as casing perforations and sanitary seal); or 2) a log obtained from a special device lowered in a well, showing such information as resistivity, radioactivity, spontaneous potential, and acoustic velocity as a function of depth; especially a lithologic record of the rocks penetrated.
Wetlands	Lands or areas exhibiting hydric soils, saturated or inundated soil during some portion of the plant growing season, and plant species tolerant of such conditions (includes swamps, marshes, bogs).