LINCOLN COUNTY LAND ACT GROUNDWATER DEVELOPMENT AND UTILITY RIGHT OF WAY PROJECT BIOLOGICAL ASSESSMENT

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1.0 INTRODUCTION

1.1 PURPOSE OF THIS BIOLOGICAL ASSESSMENT

This Biological Assessment (BA) was prepared pursuant to Section 7(b) of the Endangered Species Act of 1973, as amended (Title 16, United States Code, Section 1531 et seq. [16 USC §§ 1531 et seq.]), to address potential effects by actions having a federal nexus on federally listed threatened and endangered species and, where applicable, their designated critical habitat. Specifically, this BA addresses the potential effects of actions associated with the Lincoln County Land Act (LCLA) Groundwater Development and Utility Right of Way Project (Proposed Action or Project) in response to a right-of-way (ROW) application submitted by the Lincoln County Water District (LCWD or Applicant) to construct and operate a system of regional water facilities in southern Lincoln County, Nevada (**Figure 1**). If granted, the ROW would allow LCWD to construct infrastructure required to pump and convey groundwater resources approved for pumping by the Nevada State Engineer (NSE) and located in Lincoln County to help meet anticipated future water needs in the LCLA development area, located north of Mesquite, Nevada. The project facilities would be located entirely on public lands that are presently managed by the Ely District of the U.S. Bureau of Land Management (BLM).

The objectives of this BA are to (1) provide a conceptual framework of the background and need for the project, (2) describe the Proposed Action, (3) provide detailed information on the natural history of federally listed species potentially occurring in the vicinity of the project, (4) evaluate the potential effects of the Proposed Action on these species, (5) provide a determination of effect for the listed species, and (6) describe any conservation measures that could be implemented as reasonable and prudent measures to reduce incidental take associated with the Proposed Action or to promote conservation and recovery of listed species pursuant to Section 7(a)(1) of the Endangered Species Act.

Under the direction of the BLM, ARCADIS U.S., Inc. (ARCADIS) conducted this BA pursuant to Section 7(c) of the Endangered Species Act. Concurrent with the development of the BA, the BLM's Ely District Office is preparing an environmental impact statement (EIS) to evaluate the potential impacts that would result from the approval of the issuance of a ROW under the Federal Land Policy and Management Act of 1976 for the construction and operation of the Proposed Action and associated facilities. The Draft EIS was distributed to the public in May 2008.

Species listed as endangered by the United States Fish and Wildlife Service (USFWS) are currently in danger of extinction throughout all or a significant portion of their range, and species listed as threatened are likely to become endangered within the foreseeable future throughout all or a significant portion of their range. In this BA, the determination of one of five possible effects for listed species is based on the best available scientific literature, biological surveys conducted for this project, a thorough analysis of the potential effects of the Proposed Action, and the professional judgment of the biologist(s) completing the evaluation.

The five possible effects determinations (USFWS and National Marine Fisheries Service 1998) are as follows:

- "No effect" – where no effect is expected;
- "May affect, but not likely to adversely affect" – where effects are expected to be beneficial, insignificant (immeasurable), or discountable (extremely unlikely);
- "Likely to adversely affect" – where effects are expected to be adverse or detrimental;
- "Is not likely to jeopardize the continued existence of the species" – where the effects are not likely to jeopardize the continued existence of a proposed species; and
- "Is likely to jeopardize the continued existence of the species" – where the effects are likely to jeopardize the continued existence of a proposed species.

1.2 PURPOSE AND NEED FOR THE PROPOSED ACTION

The Applicant is seeking a ROW from the BLM for the purpose of constructing groundwater facilities and ancillary utility infrastructure necessary to convey groundwater that has been permitted or may be permitted to the LCWD by the Nevada State Engineer in the Tule Desert and Clover Valley Hydrographic Areas for use by LCWD customers. The purpose of the BLM action is to provide ROW access for transporting water across areas of BLM-administered public land. In addition, Southwest Gas Corporation is proposing to construct and operate a natural gas line and metering facility within the southernmost portion of the water project corridor to serve planned development in the LCLA area. **Table 1-1** identifies the entities responsible for constructing and operating the various features of the Proposed Action.

Table 1-1 Features of the Proposed Action

Facility	Entity Responsible for Constructing and Operating Facility
Water Facilities	Lincoln County Water District
Groundwater production/monitoring wells (well fields in the Clover Valley and Tule Desert Hydrographic Areas)	
Water collection/transmission pipelines	
Water pipeline booster stations	
Water storage tanks	
Electric Utility Facilities	Lincoln County Water District or Lincoln County Power District No. 1
Electrical transmission/distribution lines	
Electrical substations	
Natural Gas Facilities	Southwest Gas
A natural gas pipeline and metering station	
Communication Facilities	Lincoln County Water District or Lincoln County Telephone Company
Buried telemetry system/fiber optic lines	
Ancillary Facilities	To be coordinated among the various utilities sharing the permitted ROW
Temporary and permanent access roads to wells and other facilities	
Staging/storage areas during construction	

The Proposed Action would assist in meeting a portion of the growing water demands of Lincoln County and is a component of Lincoln County's Water Plan. The three key elements identified in the 2001 Lincoln County Water Plan include:

- Assist and support the needs of local communities in Lincoln County.
- Meet the needs of future economic development within Lincoln County.
- Produce, purchase, wholesale, and transport water from sources inside of Lincoln County to meet customer water needs across the region.

1.3 CONSULTATION HISTORY

Informal consultation with the USFWS was initiated for the Project by the BLM in a letter dated April 10, 2006. The USFWS, BLM, and LCWD met on April 17, 2006 in Reno to discuss potential impacts to threatened and endangered species. The USFWS indicated during this meeting that a desert tortoise survey would likely be needed. ARCADIS submitted a Draft Desert Tortoise Survey Proposal (Draft Proposal) for the LCLA Project on August 28, 2006. The Draft Proposal was reviewed by the USFWS, and a conference call with all interested parties was held on September 13, 2006 to discuss revisions. ARCADIS then submitted a Final Desert Tortoise Survey Proposal and received an email approval from the USFWS on September 26, 2006 to proceed with the surveys.

A formal response letter with a list of federally protected species that may occur in or near the project area was received from the USFWS on May 16, 2006 and is included in **Appendix A** (Williams 2006). This list was used in the preparation of this BA. The USFWS identified seven federally listed and one candidate species that may occur in or near the project area. These species include the endangered southwestern willow flycatcher (*Empidonax traillii extimus*), Virgin River chub (*Gila seminuda*), woundfin (*Plagopterus argentissimus*), and Yuma clapper rail (*Rallus longirostris yumanensis*); the threatened desert tortoise (*Gopherus agassizii*) (Mojave population), Big Spring spinedace (*Lepidomeda mollispinis pratensis*), and Ute ladies'-tresses (*Spiranthes diluvialis*); and the candidate yellow-billed cuckoo (*Coccyzus americanus*) (Western Distinct Population Segment). The desert tortoise is the only threatened species that occurs within the project area. Additionally, designated critical habitat for the desert tortoise occurs within portions of the project area.

In addition to the federally listed species, the USFWS recommended consideration of State of Nevada sensitive species, as listed by the Nevada Natural Heritage Program, BLM sensitive species, and birds covered under the Migratory Bird Treaty Act.

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2.0 DESCRIPTION OF THE PROPOSED ACTION

The LCWD is proposing to construct infrastructure required to pump and convey groundwater from the Clover Valley and Tule Desert Hydrographic Basins to help meet current and future municipal water needs in newly urbanizing areas in southeastern Lincoln County; specifically, the LCLA development area, north of Mesquite, Nevada. The project alignment would be oriented north to south; between the Clover Mountains in the northern reach and the Mormon Mountains to the west, and terminating in the LCLA development area at the southern terminus.

Table 2-1 lists estimated temporary and permanent disturbance acreage required for construction and operation of the Proposed Action. The estimated disturbance acreage is based on preliminary engineering plans, and does not account for areas of overlap among utilities. The disturbance acreage is likely to be reduced based on refinement of the project layout and design; however, all construction and operations activities would occur within the permitted ROW. The fiber optic lines would be installed within the surface disturbance area for groundwater extraction, transport, and storage. Final ground disturbance would be recalculated by the BLM when final design is complete and the exact locations of structures and roads are known. For purposes of this consultation and disclosure of possible environmental impacts, the acreages included in **Table 2-1** are considered the maximum required to construct and operate the Proposed Action.

Table 2-1 Estimated Surface Disturbance by Utility Type

	Temporary (acres)*	Permanent (acres)*
Groundwater Extraction, Transport, and Storage (including telecommunications)	1,417	33
Electrical Distribution Service Facilities	306	186
Natural Gas Distribution Facilities	155	21
Total	1,878	240

* Temporarily disturbed areas are those that would be reclaimed and revegetated following construction. Permanently disturbed areas are those that would be impacted for the life of the project by a facility footprint (e.g., well house, substation access road).

2.1 PROJECT COMPONENTS

The general locations of project components are illustrated on **Figure 1** and summarized below.

Water Facilities

- Water Pipelines: Approximately 75 miles of transmission pipeline (main water line) and well field collection pipelines for up to 30 wells total (main collection plus laterals to wells) are proposed.
- Well Field Collection System in the Clover Valley: up to 15 groundwater production wells and lateral pipelines are proposed.
- Well Field Collection System in the Tule Desert: up to 15 groundwater production wells and lateral pipelines are proposed.

- Storage Tanks (up to five storage tanks) are proposed.
  - Two (2) – 100,000-gallon storage tanks in the Clover Valley well field area
  - One (1) – 300,000-gallon storage tank in the Tule Desert well field area
  - One (1) – 500,000-gallon storage tank near the proposed Toquop Energy Project
  - One (1) – 4,000,000-gallon storage tank in the LCLA development area
- Eighteen production or monitoring wells are currently used to monitor groundwater levels in the Tule Desert Hydrographic Area. Additional monitoring wells may be constructed per terms and conditions associated with future water rights or Stipulation Agreements between the National Park Service and the LCWD.
- Water pipeline booster stations (up to four): each booster station would include an above ground-set forebay storage tank with a capacity of up to 200,000 gallons and aboveground piping and pumping equipment contained within a booster station building.

Electric Utility Facilities

- A new 138-kilovolt (kV) double-circuit overhead transmission line (currently estimated at 23.5 miles long) is proposed between the existing Mesa Substation located north of Mesquite and the proposed Tule Substation.
- A new substation in the Tule Desert (Tule Substation) is proposed.
- A new 22.8 kV double-circuit overhead distribution line (currently estimated at 20 miles long) is proposed between the proposed Tule Substation to groundwater facilities in the Clover Valley.
- New 22.8 kV and 4.16 kV overhead distribution lines are proposed to provide electric service to wells within the Tule Desert and Clover Valley Hydrographic Areas.
- New 22.8 kV – 4,160/480-volt aboveground substations are proposed at each well site, booster station, and flow control station.

Natural Gas Facilities

- A natural gas pipeline up to 16 inches in diameter is proposed between the proposed Toquop Energy Project and the LCLA development area.
- A new natural gas metering station (tie-in to the existing Kern River Natural Gas pipeline) is proposed immediately east of the proposed Toquop plant site.

Fiber Optic Lines

- Radio Telemetry or Fiber Optic Cable Control Systems (to be buried with the groundwater pipelines) would be used to monitor groundwater operating system information in addition to routine checks by maintenance personnel.

Ancillary Project Components

- Extra Work Space: Up to 50 acres (temporary): typical dimensions of 60 by 200 feet and

150 feet by 150 feet, located approximately every mile along the pipeline ROW. Some larger 1- to 2-acre extra work space areas may be designated to facilitate material storage or temporary offices.

- Construction Staging Areas: Up to 100 acres (temporary) assumes up to 20 five-acre sites.
- Temporary and permanent access roads are proposed.

2.1.1 Construction

Project construction is estimated to take between 18 and 24 months, and would begin upon completion of the National Environmental Policy Act process and acquisition of necessary permits and approvals. The groundwater production facilities, groundwater collection and transmission pipelines, electric transmission and distribution system, and fiber optic line would be constructed during the same construction spread. Southwest Gas' present project schedule indicates that construction of the natural gas pipeline would occur during early 2009. Construction of the natural gas pipeline and metering station is expected to take 4 to 6 months. Before starting construction, the final project design would be coordinated among the utility agencies and the BLM.

Construction activities for each utility agency would generally follow a sequential set of activities performed by a number of small crews proceeding along the length of the ROW. Construction activities, including construction of temporary and permanent access roads, would be coordinated among the various utility agencies sharing the permitted ROW.

Construction of the electric utility and groundwater facilities, natural gas pipeline, and the fiber optic line would involve the following sequence and would be coordinated among all utilities:

- Engineering surveys and staking;
- Topsoil salvage and storage (applicable to all construction activities);
- Clearing and grading including access road construction;
- Trenching and blasting;
- (Electric Transmission Lines) - Prepare wire handling areas and laydown sites, structure holes, distributional structure assembly and erection, conductor shield wire stringing (electric facilities);
- (Substations) - Pouring of concrete foundations and ground grid; Installation of below-grade raceway; Installation of equipment, structural steel, and bus; Installation of above-grade raceway; Construction of control building; Installation of low-voltage wiring; Installation of security fencing; Yard surfacing; Equipment testing;
- (Groundwater Facilities) – Pipeline stringing/Installation; Installation of fiber optic line in common pipeline trench; Backfilling; Hydrostatic testing;
- Regrading and post-construction cleanup and reclamation (would be conducted by each utility at the end of each construction spread); and

- Reclamation monitoring.

2.1.2 Operation and Maintenance

Water facilities would be operated and maintained in accordance with standard procedures to ensure safe operation and integrity of the pipeline. The operation and maintenance of the pipeline would be performed by qualified and trained employees. Personnel would be capable of monitoring the operating conditions as well as controlling flows and pressures through the pipeline.

After the electric utility system has been energized, the electrical facilities would be in virtually continuous operation. Periodic inspection and maintenance of the transmission line and substation facilities are required to maintain safe and reliable operation. The electrical equipment and wood poles are anticipated to have a lifetime of approximately 50 to 60 years or more depending on the maintenance operations and climatic conditions. Emergency maintenance, such as repairing downed wires during storms and correcting unexpected outages, would be performed by Lincoln County Power District.

The proposed natural gas pipeline would be added to Southwest Gas' existing pipeline inspection program. Continuous surveillance of Southwest Gas' pipeline system is conducted according to the U.S. Department of Transportation (USDOT) requirements to determine the appropriate action concerning possible changes in class location, failures, USDOT notification, leakage history, corrosion, substantial changes in cathodic protection requirements, and other unusual operating conditions. Safety-related conditions would be reported as required to the USDOT and to other appropriate federal and state agencies.

The ROW would be accessed routinely. This would include utilizing existing trails and paths to gain access along the pipeline as close as possible to the permanent ROW. Pipeline markers would be installed along the pipeline route to notify the public that a pipeline is buried in the vicinity. The markers would provide a telephone number for contractors and individuals to call prior to digging on or near the pipeline ROW. Because most operation of facilities is by remote control, site visits would mainly be related to inspection and maintenance.

2.1.3 Abandonment

Should operation of the groundwater and natural gas facilities cease, the aboveground structures and equipment would be removed and salvaged to the extent feasible and, in most cases, the pipelines would be purged, capped, and abandoned in place. Any areas disturbed during abandonment would be revegetated and restored in accordance with BLM requirements in effect at the time.

The electric utility facilities would become a permanent portion of Lincoln County Power District's utility system. Facilities are planned for a 50- to 60-year life with anticipated indefinite extension enabled by repair and replacement of equipment and material. Voluntary abandonment of the groundwater or electric facilities is not anticipated.

3.0 AFFECTED ENVIRONMENT

The project area is located on light-to-moderately disturbed, undeveloped land administered by the BLM. Disturbances in the area consist of dirt roads (both maintained and unmaintained), electric transmission lines and natural gas pipelines (in southern end of project area), and active cattle grazing activities. Much of the project area has been subject to wildfires in the past, including portions of the proposed ROW near East Pass and large portions of the Tule Desert. The effects of these wildfire events are described later in this document.

3.1 VEGETATION

This section describes the vegetation resources within or potentially within the project area. The Region of Influence (ROI) for direct effects on vegetation resources consists of the entire width of the temporary disturbance corridor (300 feet). The ROI for indirect effects includes three hydrographic areas in which the project is located (Tule Desert, Clover Valley, and Virgin River Valley Hydrographic Areas) and a fourth Hydrographic Area of Interest (Lower Meadow Valley Wash Hydrographic Area). The Lower Meadow Valley Wash Hydrographic Area has been included as a Hydrographic Area of Interest because it is located downstream of Clover Creek, a creek in the Clover Valley Hydrographic Area, and directly to the west of the Tule Desert Hydrographic Area where groundwater pumping would occur.

The project area is located in the Great Basin and Mojave Desert biomes (**Figure 2**). The Mojave Desert biome can be distinguished from the Great Basin biome by the presence and abundance of its different plant species. The principal distinguishing feature of the two biomes is the presence of creosote bush (*Larrea tridentata*) in the Mojave Desert biome and its absence from the Great Basin biome. Alternatively, big sagebrush (*Artemisia tridentata*) dominates much of the Great Basin biome, but it is mostly absent from the Mojave Desert biome except at moderate to high elevations in the mountains. Vegetation communities within these biomes and represented in the project area can be further characterized as Mojave Desert Scrub, Mountain Shrub, Blackbrush, Pinyon-Juniper, Sagebrush/Perennial Grasses, Salt Desert Scrub, Desert Wash Scrub, and Non-Native Grassland.

3.1.1 Mojave Desert Biome

The southern portion of the LCLA project area is within the Mojave Desert biome. The portion of this biome within the project area begins around East Pass and extends south into the Tule Desert. The topography is characterized by high mountain ranges with intervening valleys and canyons featuring broad alluvial fans and bajadas. The climate in the Mojave Desert is typified by hot dry summers and cool dry winters with annual precipitation ranging between 4 and 12 inches.

The Mojave Desert biome covers approximately 54 percent of the project area. The southern portion of the LCLA project area can be further characterized as southern desert shrub. Vegetative communities found in southern desert shrub include Mojave Creosote Bush Scrub, Mohave Desert Wash Scrub, Blackbrush, and Non-Native Grassland. Southern desert shrubs generally occur between 1,500 and 5,000 feet in elevation.

The vegetation in the southern portion of the LCLA project area is representative of a more mesic portion of the Mojave Desert based on the dominance/presence of blackbrush on most sites and elevations mostly above 2,100 feet. Plants representative of the southern and northern Desert Shrub communities are listed in **Table 3-1.**

Table 3-1 Common Plant Species in the Southern and Northern Desert Shrub Communities in the Mojave Desert Biome

Common Name	Scientific Name
Southern Desert Shrub Community	
Creosote bush	*Larrea tridentata*
Shadscale saltbush	*Atriplex contertifolia*
White bursage	*Ambrosia dumosa*
Joshua tree	*Yucca brevifolia*
Mojave yucca	*Yucca schidigera*
Whitethorn acacia	*Acacia constricta*
Mormon tea	*Ephedra nevadensis*
Range ratany	*Krameria parvifolia*
Desert trumpet	*Eriogonum inflatum*
Desert sand verbena	*Abronia villosa*
Big galleta	*Hilaria rigida*
Indian ricegrass	*Oryzopsis hymenoides*
Spiny hopsage	*Grayia spinosa*
Northern Desert Shrub Community	
Blackbrush	*Coleogyne ramosissima*
Creosote bush	*Larrea tridentata*
Yucca	*Yucca* spp.
White bursage	*Ambrosia dumosa*
Rabbitbrush	*Chrysothamnus* spp.
Snake weed	*Gutierrezia* spp.
Big galleta	*Hilaria jamesii*
Indian ricegrass	*Achnatherum hymenoides*
Sand dropseed	*Sporobolus cryptandus*

Cactus species, such as beavertail (*Opuntia basilaris*), staghorn cholla (*Opuntia acanthocarpa*), hedgehog (*Echinocereus engelmannii*), and barrel cactus (*Ferocactus wislizenii*), are present throughout the project area. All species in the cactus family (Cactaceae) and members of the genus *Yucc*a and *Agave* are protected by Nevada State Law (Nevada Revised Statutes [NRS] 527.060-120).

3.1.1.1 Mojave Creosote Bush Scrub

This vegetation class includes Mojave mixed scrub and creosote-bursage vegetation that is characterized by 3- to 9-foot tall shrubs that are widely spaced and usually with bare ground between them. Dominant and associate species within this vegetation community are listed in **Table 3-2**.

Table 3-2 Dominant and Associate Plant Species in the Mojave Creosote Bush Scrub Vegetation Community	
Common Name	**Scientific Name**
Dominant Species	
Creosote bush	*Larrea tridentata*
Desert thorn	*Lycium* spp.
Shadscale	*Atriplex confertifolia*
Spiny hopsage	*Grayia spinosa*
Blackbrush	*Coleogyne ramosissima*
White brittlebush	*Encelia farinosa*
White bursage	*Ambrosia dumosa*
Desert saltbush	*Atriplex polycarpa*
Associate Species	
Agave	*Agave* spp.
Joshua tree	*Yucca brevifolia*
Mojave yucca	*Yucca schidigera*
Mormon tea	*Ephedra nevadensis*
California barrel cactus	*Ferocactus cylindraceus* var. *cylindraceus*
Beavertail cactus	*Opuntia basilaris*
Silver cholla	*Opuntia echinocarpa*
Diamond cholla	*Opuntia ramosissima*
Mojave prickly-pear	*Opuntia erinacea*
Range ratany	*Krameria parvifolia*
Desert trumpet	*Eriogonum inflatum*
Big galleta	*Pleuraphis rigida*
Cephalocereus	*Cephalocereus senilis*
Indian ricegrass	*Achnatherum hymenoides*

This vegetation community covers approximately 38 percent of the total project area. Approximately 41 percent of the Mojave Creosote Bush Scrub Community within the project area was burned in the 2005 wildfire.

This community exhibits a higher susceptibility to wildfires of increased size compared to other communities in years following high amounts of rainfall. This increased susceptibility is potentially related to the presence of abundant non-native grasses that provide a continuous fuelbed in years following high rainfall (Brooks and Matchett 2006). Additionally, the severity of wildfires in eastern Nevada has increased in recent years as a result of changes in land use practices (e.g., livestock grazing and fire suppression) and human-caused climate change (BLM 2000).

In 2005, wildfires burned approximately 739,000 acres of land in southern Nevada including approximately 589,000 acres in the Clover Mountain, Meadow Valley, and Tule Desert portions of the Southern Nevada Complex (Mizer, pers. comm. 2008). Of the 2005 fire complex, approximately 716 acres burned within the 300-foot temporary and permanent disturbance corridor (**Figure 2**). The disturbance caused by fire has allowed for an increased presence of non-native grassland. This non-native grassland provides a more continuous fuel load than that in

adjacent unburned areas. Overall, the change from native vegetation, such as scattered shrubs interspersed with forbs, perennial grasses, and some succulents, to a non-native annual grassland increases susceptibility of the area to future wildland fires.

3.1.1.2 Mojave Desert Wash Scrub

The Mojave Desert Wash Scrub community consists of low, scrubby vegetation, the occurrence of which is restricted to sandy arroyos along Toquop Wash. Dominant species of this community within the project area include creosote bush (*Larrea tridentata*), Mormon tea (*Ephedra nevadensis)*, and indigo bush (*Psorothamnus fremontii*); desert willow (*Chilopsis linearis*) and catclaw (*Acacia greggii*) are less common components of this community and are sparse in the project area.

Other species that occur in this community type in the project area include desert broom (*Baccharis sarothroides*) and big galleta (*Pleuraphis rigida*). Much of the surface area within this community is bare ground (ARCADIS 2007a). This community accounts for less than 1 percent of the project area.

3.1.1.3 Blackbrush

Typically a transitional vegetation class between Mojave Desert scrub and Great Basin shrubs, Blackbrush usually occurs in elevations of 4,000 to 5,000 feet. Blackbrush is associated with juniper and shrubs such as spiny hopsage (*Grayia spinosa)*, shadscale saltbrush (*Atriplex contertifolia)*, and creosote (*Larrea tridentata*). In the project area, this vegetation class occurs on slopes and in valleys in the Clover Mountains and covers approximately 15 percent of the project area (approximately 10 of the project area is covered by Mojave Desert Biome Blackbrush community). Approximately 67 percent of the Blackbrush community in the project area was burned in the 2005 wildfire.

3.1.2 Great Basin Biome

The northern portion of the LCLA project area is within the Great Basin biome, which begins around East Pass and extends north throughout the project area (**Figure 2**). Permanent water sources consist of small springs found in the canyons of the Clover Mountains. The Great Basin biome covers approximately 46 percent of the project area. The communities typical of the Great Basin biome include: Mountain Shrub, Pinyon-Juniper, Sagebrush/Perennial Grasses, and Blackbrush. Vegetation within the area is typical of the Great Basin types with big sagebrush, forest lands, and bunch grasses. The foothills and valley bottoms are dominated by sagebrush and rabbitbrush communities with grass in the understory. The south slope of the Clover Mountains contains communities (blackbrush and manzanita/ceanothus) that are common to the transition to the Mojave Desert. Common Great Basin vegetation associations are listed in **Table 3-3**.

The Clover Mountains contain extensive stands of pinyon-pine and juniper trees as well as the last remaining large stands of ponderosa pine trees within the area. These communities have an understory of sagebrush and other mountain shrubs and small amounts of grass. Large areas of the sagebrush and pinyon-juniper have been burned and then planted with grass species to

increase the forage capacity for livestock as well as wild horses and wildlife. Riparian habitats within the Meadow Valley Wash also are included in the Great Basin biome.

Table 3-3 Common Great Basin Vegetation Associations in the Project Area	
Common Name	**Scientific Name**
Big sagebrush	*Artemisia tridentata*
Singleleaf pinyon pine	*Pinus monophylla*
Utah juniper	*Juniperus osteosperma*
Ponderosa pine	*Pinus ponderosa*
Rabbitbrush	*Chrysothamnus* spp.
Blackbrush	*Coleogyne ramosissima*
Manzanita	*Arctostaphylos* spp.
Ceanothus	*Ceanothus* spp.

3.1.2.1 Mountain Shrub

The Mountain Shrub vegetation community occurs at the base of the Clover Mountains and covers approximately 8 percent of the project area. Approximately 23 percent of the Mountain Shrub community within the project area was burned in the 2005 wildfire. Dominant species for this community are listed in **Table 3-4**.

Table 3-4 Common Plant Species in the Mountain Shrub Community in the Great Basin Biome	
Common Name	**Scientific Name**
Oaks	*Quercus* spp.
Ceanothus	*Ceanothus* spp.
Silktassel	*Garrya* spp.
Manzanita	*Arctostaphylos* spp.
Snowberry	*Symphoricarpos* spp.

3.1.2.2 Pinyon-Juniper

The Pinyon-Juniper vegetation class is dominated by a canopy of singleleaf pinyon pine (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*). Juniper communities are widely distributed in open canopy stands, and typically occur at lower elevations below the pinyon-juniper zone. In southern Nevada, Pinyon-Juniper communities commonly appear with species listed in **Table 3-5**.

Table 3-5 Common Plant Species in the Pinyon-Juniper Community in the Great Basin Biome	
Common Name	**Scientific Name**
Singleleaf pinyon pine	*Pinus monophylla*
Utah Juniper	*Juniperus osteosperma*

Ponderosa Pine	*Pinus ponderosa*
Blackbrush	*Coleogyne ramosissima*
Sagebrush	*Artemisia* spp.
Bitterbrush	*Purshia tridentata*

This ecosystem also includes ponderosa pine, which appears in small cluster communities in the Clover Mountains on north and northwest-facing slopes and covers less than 0.5 percent of the project area.

3.1.2.3 Sagebrush/Perennial Grasses

Sagebrush and Sagebrush/Perennial Grasses occur mainly in the Great Basin in lowland steppes and valleys below 6,000 feet. This vegetation community covers approximately 9 percent of the project area. Sagebrush communities are often considered steppe or shrub steppe because of the role of grasses. In parts of the Great Basin, grasses are important understory elements in distinctly shrub-steppe communities. This vegetation class includes shrubs such as rabbitbrush (*Chrysothamnus* spp.), bitterbrush, cliffrose (*Cowania mexicana*), spiny hopsage (*Grayia spinosa)*, and shadscale. Principal grasses include wheatgrass (*Agropyron* spp.), bluegrass (*Poa* spp.), needlegrass (*Stipa* spp.), ricegrass (*Achnatherum hymenoides*), fescues (*Festuca* spp.), and galleta (*Hilaria jamesii*). One of the most significant changes in the sagebrush-grass zone has been the invasion of introduced plant species such as cheatgrass (*Bromus tectorum*), halogeton (*Halogeton glomeratus*), and other annuals, at the expense of the native bunchgrasses and forbs. This vegetation class includes shrubs and grasses listed in **Table 3-6.**

Table 3-6 Common Plant Species in the Sagebrush/Perennial Grasses Community in the Great Basin Biome

Common Name	Scientific Name
Shrubs	
Rabbitbrush	*Chrysothamnus* spp.
Bitterbrush	*Purshia tridentata*
Cliffrose	*Cowania mexicana*
Spiny hopsage	*Grayia spinosa*
Shadscale saltbush	*Atriplex contertifolia*
Grasses	
Wheatgrass	*Agropyron* spp.
Bluegrass	*Poa* spp.
Needlegrass	*Stipa* spp.
Ricegrass	*Achnatherum hymenoides*
Fescues	*Festuca* spp.
Big galleta	*Hilaria jamesii*

3.1.2.4 Blackbrush

Typically a transitional vegetation class between Mojave Desert scrub and Great Basin shrubs, Blackbrush usually occurs in elevations of 4,000 to 5,000 feet. Blackbrush is associated with juniper and shrubs such as spiny hopsage (*Grayia spinosa*), shadscale saltbrush (*Atriplex confertifolia*), and creosote (*Larrea tridentata*). In the project area, this vegetation class occurs

on slopes and in valleys in the Clover Mountains and covers approximately 15 percent of the project area (approximately 5 percent of the project area is covered by Great Basin Biome Blackbrush community). Approximately 67 percent of the Blackbrush community in the project area was burned in the 2005 wildfire.

3.1.2.5 Riparian

There are no riparian areas within the proposed ROW. There are patches of riparian communities within the ROI for indirect effects along Clover Creek; however, riparian communities along Clover Creek have not been surveyed or characterized, so the locations and extents of these communities are unknown (Styles pers. comm. 2007). Bat surveys were conducted at two sites along Clover Creek in 2003 - one just east of Caliente and the other just north of Big Spring. Habitats at both sites were described as springs supporting willow riparian; however, no acreage data were provided (Kenney and Tomlinson 2005). Twelve woody riparian vegetation communities (approximately 763 acres) are present within Lincoln County downstream of the confluence of Clover Creek along Meadow Valley Wash. Riparian Forest, Fremont Cottonwood Forest, and Arrowweed Shrubland are the dominant native woody riparian vegetation communities, and Tamarisk Woodland is the dominant non-native riparian community within Meadow Valley Wash (Bio-West, Inc. 2005).

Riparian habitat associated with the Virgin River occurs approximately 3 miles south of the project area. This community consists primarily of coyote willow (*Salix exigua*), Gooding's willow (*Salix gooddingii*), arrowweed (*Pluchea sericea*), cottonwood (*Populus* spp.), cattail (*Typha* spp.), and various sedges and grasses. Tamarisk (or salt cedar [*Tamarix* spp.]) is rapidly becoming a dominant invasive species along this riparian corridor.

3.1.3 Non-Native Grassland

Non-native Grassland occurs in various locations within the project area as understory communities within shrublands and woodlands. Dominant species in this community are primarily red brome (*Bromus rubens*) and Mediterranean grass (*Schismus barbatus*). These species increase fire hazards, and controlling their spread is essential to fire management. In burned areas, this community typically gains dominance, perpetuating the burn cycle. Non-native grassland dominates much of the burned area in the Tule Desert.

3.2 WILDLIFE

This section describes the wildlife resources within or potentially within the project area. The ROI for wildlife resources, including threatened, endangered, and candidate wildlife species, consists of areas that may be affected by permanent and temporary features of the Proposed Action and also those areas where groundwater withdrawal may impact surface waters. The extent of the ROI for wildlife resources is based on the effects on surface waters using the analysis provided in the Lincoln County Land Act Groundwater Development and Utility Right-of-Way Project Draft Environmental Impact Statement. Based on these criteria, the ROI for direct impacts on wildlife resources includes those areas in the immediate vicinity of the Proposed Action construction, operation, and maintenance activities. The ROI for indirect effects includes three hydrographic areas in which the project is located (Tule Desert, Clover Valley,

and Virgin River Valley Hydrographic Areas) and a fourth Hydrographic Area of Interest (Lower Meadow Valley Wash Hydrographic Area). The Lower Meadow Valley Wash Hydrographic Area (particularly the Meadow Valley Wash) has been included as a Hydrographic Area of Interest because it is located downstream of Clover Creek, a creek in the Clover Valley Hydrographic Area, and directly to the west of the Tule Desert Hydrographic Area where groundwater pumping would occur.

A wide variety of wildlife resources typical of the Mojave Desert and Great Basin ecological systems is present in the project area. Fish are absent from the project area because of the lack of suitable aquatic environments. The vegetation types or communities that comprise the wildlife habitat in the project area include those listed in Section 3.1 Vegetation. Surface water sources potentially available to wildlife include isolated springs, stock ponds, ephemeral drainages, and wildlife water developments. Three big game wildlife guzzlers are located within 5 miles of the project area (Stevenson 2006).

3.2.1 Mammals

Several carnivores occupy the various habitats that occur throughout or near the project area. Bobcat (*Lynx rufus*), coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), gray fox (*Urocyon cinereoargentus*), and badger (*Taxidea taxus*) may be encountered in suitable habitats throughout the project area. The mountain lion (*Puma concolor*) and mule deer (*Odocoileus hemionus*) utilize all of the mountain ranges around the project area and most likely use or traverse the project area. Elk (*Cervus* elaphus) are known to occur in the Clover Mountains and most likely use or traverse the project area where it occurs in the Clover Mountains. The Nelson (Desert) bighorn sheep (*Ovis canadensis nelsoni*) utilizes all of the mountain ranges around the southern portions of the project area in the Tule Desert and most likely use or traverse the project area. Various other mammals also inhabit the project area. Typical species include the black-tailed jackrabbit (*Lepus californicus*), desert cottontail rabbit (*Sylvilagus audobonii*), desert wood rat (*Neotoma lepida*), rock squirrel (*Spermophilus variegatus*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), round-tailed ground squirrel (*Spermophilus tereticaudus*), pocket gopher (*Thomomys bottae*), Merriam's kangaroo rat (*Dipodomys merriamii*), various cricetid mice (*Onychomys* sp., *Reithrodontomys megalotis, Peromyscus sp.*), pocket mice (*Perognathus* sp., *Chaetodipus* sp.), ringtail (*Bassariscus astutus*), and spotted skunk (*Spilogale gracilus*).

A variety of bat species, such as the western pipistrelle (*Pipistrellus hesperus*), several species of myotis (*Myotis* sp.), and others, make use of the project area either as foraging residents or migrants. Roosting habitat varies among species, but typically is characterized by steep rocky outcrops with crevices, caves, abandoned mines, or large trees. Rare plant and desert tortoise field surveys were conducted in 2006 (ARCADIS 2007a and 2007b); surveyors searched opportunistically for caves or mines that could provide habitat for bats, but no such potential habitat occurred within the project area. However, potential day roosts for bats may exist in the form of cracks and crevasses in rock formations near the project area as well as mature trees in the Clover Mountains. In 2004, 11 species of bats were identified during surveys conducted in Beaver Dam State Park, Clover Creek (north of Big Spring), Meadow Valley Wash (south of Elgin), Snow Spring, and Meadow Valley Wash (near Carp) (Kenney and Tomlinson 2005). The California myotis (*Myotis californicus*), fringed myotis (*Myotis thysanodes*), western pipistrelle

(*Pipistrellus hesperus*), pallid bat (*Antrozous pallidus*), long-legged myotis (*Myotis volans*), small-footed myotis (*Myotis ciliolabrum*), big brown bat (*Eptesicus fuscus*), Yuma myotis (*Myotis yumanensis*), silver-haired bat (*Lasionycteris noctivagans*), Big free-tailed bat (*Nyctinomops macrotis*), and Brazilian free-tailed bat (*Tadarida brasiliensis*) were detected during these surveys (Kenney and Tomlinson 2005).

3.2.2 Birds

The project area potentially provides suitable nesting habitat for the burrowing owl (*Athene cunicularia*). Other raptors may regularly utilize the project area to forage. Raptors likely to use the area include golden eagles (*Aquila chrysaetos*), red-tailed hawks (*Buteo jamaicensis*), American kestrels (*Falco sparverius*), prairie falcons (*Falco mexicanus*), barn owls (*Tyto alba*), and great-horned owls (*Bubo virginianus*) (Peterson 1990). Additional avian species which may occur in or near the project area include black-chinned sparrow (*Amphispiza bilineata*), cactus wren (*Campylorhynchus brunneicapillus*), horned lark (*Eremophila alpestris*), greater roadrunner (*Geococcyx californianus*), ash-throated flycatcher (*Myiarchus cinerascens*), Say's phoebe (*Sayornis saya*), verdin (*Auriparus flaviceps*), loggerhead shrike (*Lanius ludovicianus*), mourning dove (*Zenaida macroura*), burrowing owl (*Athene cunicularia*), and Gambel's quail (*Callipepla gambelii*). In the forested areas of the Clover Mountains, the northern flicker (*Colaptes auratus*), dark-eyed junco (*Junco hyemalis*), mountain bluebird (*Sialia currucoides*), mountain chickadee (*Poecile gambeli*), piñon jay (*Gymnorhinus cyanocephalus*), and western scrub-jay (*Aphelocoma californica*) can also likely be considered locally nesting species.

3.2.3 Amphibians

Amphibian species potentially occurring in or near the project area include the Great Basin spadefoot (*Spea intermontana*), western toad (*Bufo boreas*), red-spotted toad (*Bufo punctatus*), and Great Plains toad (*Bufo cognatus*). These highly desert-adapted species occur throughout the region. The somewhat less desert-adapted Woodhouse's toad (*Bufo woodhousei*) and bullfrog (*Rana catesbeiana*) might also be expected within moist areas in the Clover Mountains (Stebbins 2003).

3.2.4 Reptiles

In addition to the desert tortoise, a wide variety of reptile species are likely to occur in the region of the project area. Southern Nevada deserts support at least 16 lizard species, many of which may occupy the project area. These include the side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus* [=*Aspidosceles*] *tigris*), zebra-tailed lizard (*Callisaurus draconoides*), desert horned lizard (*Phrynosoma platyrhinos*), desert iguana (*Dipsosaurus dorsalis*), chuckwalla (*Sauromalus* (*obesus*) *ater*), long-nosed leopard lizard (*Gambelia wislizenii*), Great Basin collared lizard (*Crotaphytus bicinctores*), western banded gecko (*Coleonyx variegatus*), desert spiny lizard (*Sceloporus magister*), and Gila monster (*Heloderma suspectum).*

Eighteen snake species occur locally and, as with the lizards, several may be found in the project area. These include the western blind snake (*Leptotyphlops humilis*), ground snake (*Sonora semiannulata*), spotted leaf-nose snake (*Phyllorhynchus decurtatus*), coachwhip (*Masticophis flagellum*), patch-nosed snake (*Salvadora hexalepis*), gopher snake (*Pituophis catenifer*), glossy

snake (*Arizona elegans*), long-nosed snake (*Rhinocheilus lecontei*), common kingsnake (*Lampropeltis getula*), night snake (*Hypsiglena torquata*), lyre snake (*Trimorphodon biscutatus*), southwestern black-headed snake (*Tantilla hobartsmithi*), sidewinder or horned rattlesnake (*Crotalus cerastes*), Mojave rattlesnake (*C. scutulatus*), and speckled rattlesnake (*C. mitchellii*) (Stebbins 2003).

3.3 WATER RESOURCES

Water resources are briefly described within this document in order to characterize the ROI for biological resources. The ROI for water resources (both groundwater and surface water) includes two separate areas: 1) the area adjacent to the proposed ROW and immediate vicinity and 2) the Hydrographic Areas or watersheds where the project would be located (Clover Valley #204, Tule Desert #221, and Virgin River Valley #222). A nearby Hydrographic Area of interest includes the Lower Meadow Valley Wash (#205) located west of the project area.

The LCWD's ROW application to the BLM is for a project designed to develop and convey groundwater from the Tule Desert and Clover Valley Hydrographic Areas to the proposed LCLA development north of Mesquite. As of January 2008, the NSE has granted an appropriation of 2,100 AFY to the LCWD for groundwater withdrawal within the Tule Desert Hydrographic Area. Water rights applications for additional groundwater withdrawal in the Clover Valley and Tule Desert Hydrographic Areas are still pending before the NSE. The exact amount of groundwater ultimately granted to the LCWD will be determined through a separate process established by the NSE.

The bounded analysis described in the Lincoln County Land Act Groundwater Development and Utility Right of Way Project EIS is to pump up to 14,480 acre-feet/year (AFY) of groundwater in the Clover Valley Hydrographic Area and up to 9,340 AFY of groundwater from the Tule Desert Hydrographic Area subject to the terms and conditions imposed by the granting agencies. Although the BLM has the authority and responsibility to coordinate with agencies and water rights applicants to manage the federal land resources, it is the responsibility of the NSE to approve and control the amount and location of groundwater pumped from basins in Nevada, regardless of ownership. Actions connected to the Proposed Action but outside the BLM jurisdiction include the location of groundwater diversions and amount of groundwater permitted by the NSE; groundwater monitoring and management agreements between the Applicant and the NSE; wildlife and groundwater monitoring and management; and mitigation agreements between the Applicant and the NPS.

3.3.1 Clover Valley Hydrographic Area

In August 2001, the LCWD and Vidler Water Company (Vidler) filed water rights applications to the NSE for the appropriation of up to 14,480 AFY of groundwater in the Clover Valley Hydrographic Area. Available information on local surface water/groundwater interaction in the Clover Valley is limited. To date, no studies have been done to identify the recharge and discharge from the fractured-rock aquifer and its interconnection with surface water in the Clover Valley. In the absence of these data, it was not feasible to conduct groundwater modeling to predict impacts from the Proposed Action. The current understanding of subsurface

conditions in the Clover Valley Hydrographic Area is based on analogy with similar flow systems in the region and a conceptual groundwater model of the hydrogeological conditions in Clover Valley based on known geologic and hydrogeologic data.

Conceptually surface water could be susceptible to groundwater withdrawal (Elliot et al. 2006). However, in Clover Valley, potential hydraulic connection with the surface water could be hindered by a layer of volcanic material, more than 3,000 feet thick, overlying the regional fractured-rock aquifer. Conversely, the presence of numerous faults in the area could also serve as conduits for groundwater movement.

Water chemistry data from two local springs, Sheep Spring and an unnamed spring located in the southern and western part of the Clover Valley Hydrographic Area, were sampled to determine isotope deuterium values (CH2MHill 2002). Isotope deuterium can be used for tracing the origin of the water discharging from local water features. Both springs yielded a deuterium value (expressed using the unit of measure "permil") of -87 permil, which indicate that the recharge is from local precipitation. For comparison, values of deuterium from the deep fractured-rock aquifer are typically on the order of -100 permil. These data suggest that the spring water source is local and is not hydraulically connected to the deep regional fractured flow system beneath Clover Valley (Vidler 2007).

Similarly, limited information is available on the interaction between the fractured-rock groundwater in the Clover Valley and surface water in the Meadow Valley Wash Hydrographic Area. Deuterium abundance from a surface water sample collected at Cottonwood Creek and a spring sample from Mudhole Spring, located in the northeastern part of the Meadow Valley Wash Hydrographic Area were -91 and -86 permil, respectively (CH2MHill 2002). These values contrast with values of deuterium on the order of -100 permil that correspond to deep, regionally flowing groundwater. Accordingly, the limited data available suggest that surface water in this part of the Meadow Valley Wash is not connected with the deep regional aquifer system.

The Applicant has prepared a Water Resources Monitoring and Management Plan (**Appendix D**) to address uncertainties from future pumping in the Clover Valley Hydrographic Basin. The Clover Valley Monitoring and Management Plan consist of four principle components:

Monitoring Requirements - related to production wells, monitor wells, elevation control, spring flow, water quality, precipitation stations, quality of data, reporting, including locations of existing supply and monitor wells, groundwater extraction rates, groundwater level measurements, flow from springs, water quality, precipitation data, and wetland/riparian conditions. The Plan includes commitments from the Applicant to install monitoring wells at selected springs (including Big Spring, East Settling Spring, and Sheep Spring) and associated riparian areas to ensure that the Proposed Action would not adversely impact riparian and aquatic habitats in the Meadow Valley Wash system.

Management Requirements – related to the creation and role of the Technical Review Panel (TRP), establishment of action criteria and details of the decision-making process. The TRP would be established to provide technical scientific expertise necessary to impartially develop, evaluate and analyze data. The TRP will be established with membership created from

representatives from cooperating agencies and may include, but would not be limited to, the BLM, LCWD, U.S. Geological Survey (USGS), and the NSE.

Mitigation Measures – related to potential mitigation measures that could be implemented if "unreasonable adverse impacts" occur as a result of groundwater extraction associated with the Proposed Action. Specific quantitative criteria (action criteria) will be developed by the TRP for use to "trigger" management actions. The triggers would provide early warning of the potential for unreasonable adverse impacts to public resources and senior water rights of other appropriators. These criteria would be based on changes in groundwater levels, flow of springs, water quality, and / or changes in wetland / riparian habitat that can be attributable to groundwater extractions by the Proposed Action.

Modification of the Plan – related to procedures that could be followed to modify the Plan if future changing conditions or mitigations warrant modification.

The BLM expects that adherence to the Monitoring and Mitigation Plan would ensure that groundwater pumping in the Clover Valley Hydrographic Area associated with the Project would not impact flow rates in the Meadow Valley Wash system or in springs in the Clover Valley Hydrographic Area (such as Big Springs). However, due to the limited hydrologic data currently available, a degree of uncertainty currently exists regarding future impacts from groundwater pumping on sensitive resources in the Clover Valley drainage area. The BLM, in consultation with the USFWS and the Applicant will continue to refine the Clover Valley Monitoring and Management Plan as additional information becomes available. Forthcoming data associated with the monitoring requirements established in the Clover Valley Monitoring and Management Plan, including data collected from stream gages, selected streams, and riparian areas, are expected to reduce these uncertainties.

3.3.2 Tule Desert Hydrographic Area

To date, the NSE has appropriated 2,100 AFY of groundwater from the Tule Desert Hydrographic Area to the LCWD. Application by LCWD for an additional 7,240 AFY in the basin is being held in abeyance until further data are collected and submitted to the NSE pursuant to Ruling No. 5181 dated November 26, 2002. As stated in Ruling 5181, the NPS, LCWD, and Vidler entered into a settlement agreement for pending water rights applications in the Tule Desert which committed the parties to implement a ground water monitoring, management, and mitigation plan. This plan, referred to as the Monitoring, Management, and Mitigation Plan for Future Permitted Groundwater Development in Tule Desert (**Appendix C**) would assist the NSE in managing the development of the regional aquifer systems by LCWD and Vidler without resulting in unreasonable adverse impacts to the water rights and resources of the NPS, including flow rates in the Virgin River and riparian habitat supported by the Virgin River.

The LCWD and Vidler continue to conduct groundwater investigations to comply with Ruling 5181. Eighteen production or monitoring wells are currently used to monitor groundwater levels in the Tule Desert Hydrographic Area. More recently, in order to estimate the impacts of various levels of groundwater pumping from the Proposed Action in the Tule Desert, a groundwater study using MODFLOW-2000 was performed (Mock 2008). The model simulated pumping from wells in the carbonate rock system for 100 years followed by recovery for 100 years

without the projected pumping. The simulations indicate that groundwater pumping under the Proposed Action from wells in the carbonate rock system beneath the Tule Desert would result in a negligible impact to carbonate system springs, nearby existing and proposed wells and the Virgin River. The extent of the model included the entire portion of the following hydrographic basins (Virgin River Valley, Lower Moapa Valley, Lower Meadow Valley Wash, Clover Valley, California Wash, Kane Springs Wash, and Muddy River Springs Area), and portions of the following hydrographic basins (Black Mountain Area and Panaca Valley). The additional basins allowed projections of impacts out to springs on the Overton Arm of Lake Mead and along the Muddy River. **Table 3-7** presents details of drawdowns simulated at the different pumping scenarios at various locations.

Table 3-7 Simulated Drawdowns in Selected Location in Response to 100 Years of Proposed Pumping and 100 Years of Recovery

Total Pumping in Tule Desert	**6,000 AFY**	**7,000 AFY**	**8,000 AFY**	**9,340 AFY**	**Time to Maximum Drawdown (years)**
Location	**Maximum Simulated Drawdown (feet)**				
Production Well No. 3	27.8	32.4	37.0	43.2	100
Tule Desert Well near center of 6 pumping wells	24.2	28.2	32.3	37.7	100
Monitoring Well FF-2B	16.4	19.2	21.9	25.6	100
Location close to Tule Desert in Virgin River Basin	13.2	15.4	17.6	20.6	100
Location close to Tule Desert in Meadow Valley Wash Basin	3.1	3.6	4.1	4.8	110
Proposed Well Virgin Valley Water District #39	1.9	2.2	2.5	3.0	160
Existing Well Virgin Valley Water District #32	1.2	1.4	1.6	1.9	160
Muddy River/Warm Springs	0.07	0.08	0.09	0.11	140
Blue Point / Rogers Springs	0.02	0.03	0.04	0.04	140
Near Mesquite adjacent to Virgin River	0.17	0.2	0.23	0.26	140

Source: Mock 2008

Based on the results of the hydrologic studies conducted to date and ongoing coordination between the Applicant and the various resource agencies (BLM, USFWS, NSE, NPS), the BLM does not expect groundwater pumping associated with the Proposed Action to affect surface flows in the Virgin River; springs that contribute to the Virgin River; or riparian areas that support listed species along the Virgin River. However, due to uncertainties related to natural systems, there are differences of opinion regarding regional groundwater flow and groundwater availability in the Tule Desert. Due to the inherent hydrogeologic complexity of the Tule Desert and Virgin River basins, there is still insufficient information for complete agreement among investigators on the details of the regional flow systems.

3.4 SPECIES ADDRESSED IN THIS BIOLOGICAL ASSESSMENT

On May 16, 2006, the USFWS provided the BLM with a list of threatened and endangered species that may occur in the area affected by the Proposed Action. Seven federally listed species and one candidate species were identified; the endangered southwestern willow flycatcher (*Empidonax traillii extimus*), Virgin River chub (*Gila seminuda)*, woundfin (*Plagopterus argentissimus*), and Yuma clapper rail (*Rallus longirostris yumanensis*); the threatened desert tortoise (*Gopherus agassizii*), Big Spring spinedace (*Lepidomeda mollispinis pratensis*), and Ute ladies'-tresses (*Spiranthes diluvialis)*; and the candidate yellow-billed cuckoo (*Coccyzus americanus*). This list was reviewed to identify species that would not be affected by implementation of the Proposed Action and those that may be affected. The potential for occurrence was evaluated based on the following criteria:

- Pertinent scientific literature;
- Qualitative comparisons between the known habitat requirements of each species and biotic and abiotic conditions found in the project area;
- Field surveys conducted by ARCADIS biologists; and
- Consultation among the BLM, USFWS, and Proponents biologists, hydrologists, and other resource specialists.

Based upon these criteria, the BLM has concluded that of the seven federally listed and one candidate species that may occur in or near the project area. The desert tortoise (Mojave population) is the only species that occurs within the project area. Due to the uncertainties associated with groundwater pumping in the Tule Desert and Clover Valley Hydrographic Areas, the BLM has determined the Proposed Project *may affect, but is unlikely to adversely affect* the southwestern willow flycatcher, Virgin River chub, woundfin, Yuma clapper rail, and the yellow-billed cuckoo. These species are dependent on streamflows in the Virgin River or Meadow Valley Wash, or riparian habitat along these riverine systems. **Table 3-8** lists federally listed species excluded from further consideration in this biological assessment and their reasons for their exclusion.

Table 3-8 Federally Listed Species Excluded from Further Consideration and Reasons for Their Exclusion

Common Name (Scientific name)	Status	Habitat	Exclusion Justification
Big Spring spinedace (*Lepidomeda mollispinis pratensis*)	T	Habitat is restricted to clean, perennial, spring-fed streams with deep pools and marshy areas along the shores free of non-native fish species.	Presently only known to occur in Meadow Valley Wash in Condor Canyon, northeast of Panaca, Nevada. This location is approximately 24 miles north of the Clover Valley well field. Groundwater pumping associated with the Proposed Action would not impact streamflows in Rainbow Canyon.
Ute ladies'-tresses (*Spiranthes diluvialis*)	T	Endemic to areas with moist soils in mesic or wet meadows near springs, lakes, or perennial streams from 4,300 to 7,000 feet.	Preferred habitat is absent in the project area. The only known extant population within Nevada is near Panaca Springs in northern Lincoln County. Groundwater pumping associated with the Proposed Action would not impact Panaca Springs.

T = Threatened

3.4.1 Desert Tortoise

3.4.1.1 Description

The desert tortoise is one of four species of the genus *Gopherus*, which are known collectively as gopher tortoises. The desert tortoise adult averages 9 to 15 inches in upper shell (carapace) length, with males growing larger than females. The young tortoises emerging from the nest (hatchlings) are approximately 1.5 inches long, and their shells remain soft for the first 5 to 6 years. The desert tortoise is a high-domed turtle, with elephant-like or "columnar" hind limbs. Whereas the hind limbs are elephantine, the forelimbs are more flattened with well-developed muscle used for digging burrows. Both males and females have a gular horn, an extension of the plastron (lower shell) just below the head. The gular horn is longer and often upturned in males, which they use when fighting with other males.

The range of the desert tortoise roughly approximates the distribution of the creosote bush scrub community and includes the Mojave and Sonoran deserts in southern California, southern Nevada, northwestern Arizona, the southwestern corner of Utah; and Sonora and northern Sinaloa, Mexico. There are significant morphological, genetic, ecological, and behavioral differences between desert tortoise populations in different geographical areas within its range.

The species is divided into two distinct populations: the Sonoran and Mojave. The Sonoran population occurs south and east of the Colorado River in Arizona and Mexico, and the Mojave population occupies those portions of the Mojave and Colorado Deserts north and west of the Colorado River in southwestern Utah, northwestern Arizona, southern Nevada, and southern California. The latter is the population federally listed as threatened, and will be addressed in the remainder of this BA.

The desert tortoise is considered to be a "K-selected" species, meaning that it has a low birth rate, low recruitment of juveniles into the breeding population, low mortality in older age categories, and a low population turnover rate (Hohman et al. 1980). Eggs and hatchlings are quite vulnerable, and pre-reproductive adult mortality averages 98 percent (Wilbur and Morin 1988; Turner et al. 1987). As a result, the number of adults may remain constant for relatively long periods, during which the ratio of adults to other age groups may vary widely. Ultimately, desert tortoise longevity helps compensate for their variable reproductive success.

3.4.1.2 Species Status – Past and Present

In response to the dramatic decrease in numbers of the Mojave population of the desert tortoise throughout its entire range, the USFWS emergency-listed the species as endangered on August 4, 1989 (54 FR 32326). The Mojave population was then proposed under normal listing procedures on October 13, 1989 (54 FR 42270) and was subsequently listed as threatened on April 2, 1990 (55 FR 12178).

On March 30, 1993, the USFWS released the *Draft Recovery Plan for the Desert Tortoise (Mojave Population)* (58 FR 16691). This plan divides the range of the desert tortoise into six recovery units and recommends the establishment of 14 reserves, or Desert Wildlife

Management Areas (DWMAs), ranging in size from 160 to 1,300 square miles. Using the DWMAs as the basis for areas recommended for recovery, the USFWS proposed a rule to list critical habitat for the desert tortoise on August 30, 1993 (58 FR 45748), under provisions of the Federal ESA of 1973, as amended (16 U.S.C. 1531 *et. seq*.).

Following an extensive review of information and public comments, the USFWS formally designated 12 areas, encompassing a total of 6.4 million acres of critical habitat for the species in a final rule, published February 8, 1994 (59 FR 5820). In determining areas that were appropriate to define as critical habitat for the desert tortoise, the USFWS used the following primary constituent elements:

- Sufficient space to support viable populations within each of the six recovery units (Western Mojave, Eastern Mojave, Northern Colorado and Eastern Colorado [California]; Northeastern Mojave [Nevada]; and Upper Virgin River [Utah]) and provide for movements, dispersal, and gene flow;

- Sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species;

- Suitable substrates for burrowing, nesting, and overwintering;

- Burrows, caliche caves, and other shelter sites;

- Sufficient vegetation for shelter from temperature extremes and predators; and

- Habitat protected from disturbance and human-caused mortality (USFWS 1994a).

In Lincoln County, there are 244,900 acres of designated critical habitat for the desert tortoise. The Beaver Dam Slope Critical Habitat Unit covers approximately 87,400 acres in Nevada (USFWS 1994a). Desert tortoise critical habitat in or near the project area is shown on **Figure 3**.

3.4.1.3 Threats to Species Survival

According to the Desert Tortoise Recovery Plan (USFWS 1994b), the most serious problem facing the remaining desert tortoise populations in the Mojave region is the cumulative load of disease-related mortality accompanied by habitat destruction, degradation, and fragmentation as a result of urbanization, development, and increased access of humans into desert tortoise habitat.

The loss of habitat, mortality from increased traffic, reduced quality and effectiveness of habitat in proximity to human presence and activity, and the additive effects from other aspects of human activity (e.g., dogs, recreation) pose a significant and increasing threat to tortoise populations within the Mojave Desert.

The emergency listing of the desert tortoise in 1989 was prompted, in part, by dramatic declines in some populations where Upper Respiratory Tract Disease was prevalent in desert tortoise

(Berry 1997). The causative agent of Upper Respiratory Tract Disease is the bacterium *Mycoplasma agassizii*, which causes lesions in the respiratory tract (Jacobson 1994). During the last decade, this disease has continued to spread across the western Mojave Desert and elsewhere within the range of the species. Additionally, shell disease—*cutaneous dyskeratosis*—has also been identified in some populations (Homer et al. 1998; Homer and Berry 2001; Jacobson et al. 1994). Although little is known about the cause, epidemiology, or treatment of this shell disease, its incidence is reported to be low in the Mojave Desert.

One of the most significant threats to the desert tortoise relates to the level of access by humans to tortoise habitat. Repeated or frequent off-road vehicle use compacts soil and damages vegetation, and individual tortoises may be run over or their burrows may be crushed. Other potentially harmful human-induced activities that exert unnatural pressure on desert tortoise populations include mineral exploration; illegal dumping of garbage; human-caused fire; handling, collecting, and harassing of tortoises; spread of invasive weeds; and trailing of livestock (Berry and Nicholson 1984).

Predation is another factor implicated in population declines of the desert tortoise. Predation by common ravens has become a major threat to desert tortoise populations in some areas. Ravens are known to prey on juvenile tortoise from 1.3 to 4.9 inches in length (Berry 1985). Between 1968 and 1992, raven populations in the Mojave Desert have increased by more than 1,000 percent due to the increase in resource subsidies (e.g., food, water, nesting substrate) that are provided by increasing human populations (Boarman and Berry 1995).

3.4.1.4 Habitat and Behavior

Adult desert tortoises in the Mojave Desert are typically active between March and October, or 5 to 7 months per year. Desert tortoises generally emerge from their burrows in mid-March to feed on annual plants. During a roughly 6-week period, these annual plants are their primary nutritional source.

Habitat requirements for the desert tortoise are somewhat variable with regard to the different regions in which it occurs. These regional differences also seem to be somewhat reflected by genetic and morphologic differences exhibited by localized tortoise populations. Desert tortoises in the Mojave Desert occupy a wide variety of habitats below 3,530 feet, from sandy flats, bajadas, washes, and canyons in lower elevations, to rocky foothills and caliche outcrops. Winter dormancy typically takes place in southern Nevada in earthen burrows dug in moderately deep to deep, well-drained soils or extensive fissures of at least 30 feet. Earthen burrows often extend from 1 to 8 feet in length and have a single, crescent-shaped opening. In the Mojave Desert, burrows are most often found under a creosote bush (*Larrea tridentata*) (59 to 77 percent of the time) or white bursage shrub (21 percent of the time). Both of these plant species are common throughout the project area.

The tortoise mating system is probably polygynous, and may be polyandrous, meaning more than one mate for each individual. Mate choice is mediated by aggressive male-male interactions and possibly by female choice (Niblick et al. 1994). Females are capable of storing sperm at least 3 to 5 years after mating. Tortoises in the Mojave Desert exhibit pre-breeding dispersal movements ranging from 1 to 10 miles away in a single season (Sazaki et al. 1995).

Desert tortoises begin reproducing at 15 to 20 years of age (Turner and Berry 1984). Clutch sizes are variable and depend on a number of factors such as the size of the female, precipitation, annual productivity of forage plants in the current and previous year, and whether it is a first clutch or not (Henen 1997; Turner et al. 1984, 1986). Average clutch size is 4.5 eggs (range 1 to 8), with up to three clutches deposited per year. Eggs are typically laid during the months of April through June in shallow depressions, usually in sandy or friable soil near the mouths of burrows.

Hatching occurs 90 to 120 days later during mid-August through October. Parental care ends with egg laying and subsequent mortality of the eggs is high; only 2 percent of a cohort may reach sexual maturity. Sex determination in tortoises is environmentally controlled during incubation. Hatchlings develop into females when the soil temperature around the eggs is higher than 89.3°F and into males when the temperature is below that required to produce females (Spotila et al. 1994).

Tortoise activities are primarily concentrated in core areas or home ranges. Home ranges among individuals overlap without defense of specific or exclusive areas indicating territoriality. Home range size can vary from 10 to 450 acres and are influenced by an individual's sex and age, the density of the population, the season, and the availability of resources (USFWS 1994b).

In the Mojave Desert, the desert tortoise occupies various types of plant communities from sparse creosote bush desert-scrub to semi-arid grasslands. In general, desert tortoises will forage on any edible plants including spring and summer annuals, native and exotic perennial grasses, cacti flowers and fruit, and perennial shrubs. The native grasses, big galleta and Indian rice grass are often present where the desert tortoise is most abundant. Indian rice grass and big galleta are common within the project area. Insects, caterpillars, and other insect larvae also may be eaten, and desert tortoises have been observed biting road-killed anurans and lizards (Brown 1968; Okamoto 1995). Introduced plant species have greatly encroached upon native plant species in the desert tortoise's natural range, degrading the existing natural ecosystem. Desert tortoises have, however, modified their behavior to include many non- native species if present.

3.4.1.5 Distribution and Current Use in the Project Area

The Desert Tortoise Recovery Plan (USFWS 1994b) divides the range of the tortoise into six distinct population segments or recovery units. The Northeastern Mojave Recovery Unit, which covers most of southern Nevada and includes the project area, contains three critical habitat units: Coyote Spring, Mormon Mesa, and Beaver Dam Slope. The ROW crosses the Beaver Dam Slope Critical Habitat Unit. In 1994, desert tortoise populations in the Beaver Dam Slope Critical Habitat Unit were estimated to be between 5 and 60 adults per square mile (USFWS 1994b).

A desert tortoise survey within the project area was conducted by ARCADIS biologists between October 19 and 23, 2006. The strip-transect method was used to sample distribution and relative abundance of tortoise sign throughout the project area. Transects were 1.5 miles long by 10 meters wide and were walked in an equilateral triangle with 0.5 mile to a side. Transects were spaced at 1-mile intervals throughout the project area and were selected to represent the various vegetation associations, topographic features, and habitat conditions (grazed, burned, etc.).

Results of the surveys show that desert tortoises are distributed relatively evenly along the proposed ROW with slightly higher densities occurring in the southern survey areas. However, nearly all sign were inferred (burrows and water scrapes). One live tortoise was found within an alternative ROW approximately 8.6 miles north/northwest of the southern extent of the project area. Tortoise densities ranged from 0 per square mile to 10 per square mile and are distributed relatively evenly across the project ROW. The highest densities in the LCLA Project area occurred within one transect (10 per square mile). This transect was located in a green field along the preferred right-of-way approximately 2 miles north of the southern extent of the project area. The topography consisted of rolling hills, and the vegetation was dominated by creosote (*Larrea tridentata*) and bursage. Joshua trees were the co-dominant species. Most of the sign was found in sandy washes within this transect. Two tortoise sign were identified in the burned areas within the ROW (ARCADIS 2007b). The survey report is included in **Appendix E**.

3.4.2 Southwestern Willow Flycatcher

The southwestern willow flycatcher (*Empidonax traillii extimus*) is a federally listed endangered bird species that is a neotropical migrant. It winters in Mexico, Central America, and possibly northern South America (Sogge et al. 1997). Arizona, southern California, New Mexico, extreme southern portions of Utah and Nevada, and southwestern Texas comprise the majority of the historic and current breeding range of this subspecies. Southwestern willow flycatchers breed between early May and late August. The southwestern willow flycatcher breeds only in dense riparian vegetation near surface water or saturated soil. Nests are generally located in thickets of shrubs or trees that are approximately 6 to 98 feet tall with dense foliage from ground level up to approximately 13 feet (USFWS 2002).

Habitat for the southwestern willow flycatcher includes riparian areas along rivers, streams, or other wetlands with dense growth of willows (*Salix* spp.), arrowweed (*Pluchea sericea*), and tamarisk (*Tamarix* spp.). Other common plant species associated with nesting habitat include cottonwood (*Populus* spp.), seep willow (*Baccharis* spp.), boxelder (*Acer negundo*), stinging nettle (*Urtica* spp.), blackberry (*Rubus* spp.), and Russian olive (*Elaeagnus angustifolia*) (USFWS 2002). During migration, this species may be encountered in all but the sparsest of desert habitats.

The southwestern willow flycatcher was listed as endangered by the USFWS on March 29, 1995. On July 22, 1997 the USFWS designated critical habitat for this species, which was subsequently rescinded by court order. On October 19, 2005, the USFWS designated 74 miles of the Virgin River as critical habitat for the species (70 Federal Register 60886). The critical habitat unit along the Virgin River is the closest southwestern willow flycatcher critical habitat to the project area.

Suitable and potential habitat for the southwestern willow flycatcher also occurs within the Meadow Valley Wash approximately 12 miles west of the project area. A southwestern willow flycatcher habitat assessment conducted in Meadow Valley Wash identified approximately 557 acres of suitable habitat for this species scattered throughout the wash, with the best habitat to support nesting populations of southwestern willow flycatchers in Rainbow Canyon, approximately 3 miles south of Caliente, Nevada. Two breeding observations and two non-

breeding observations were made in Rainbow Canyon in 2004 during this habitat evaluation. An additional five historic records of southwestern willow flycatchers have been identified within Rainbow Canyon in the Meadow Valley Wash (Bio-West, Inc. 2005). The Clover Creek drainage also supports a small amount of habitat for the southwestern willow flycatcher (approximately 10 miles northwest of the project area), but none have been observed in this area (Meadow Valley/Clover Creek Technical Review Team 2000).

3.4.3 Virgin River Chub

The Virgin River chub is a federally listed endangered species that historically occurred in the Virgin River from La Verken Springs, Utah, downstream to the confluence of the Virgin River with the Colorado River in Nevada (USFWS 1989). Presently, this species is known to occur in the Virgin River from La Verken Springs, Utah, downstream to the Mesquite Diversion in Nevada. The middle and the upper portions of the Muddy River in Nevada contain another distinct population of this species, which is isolated by Lake Mead. Riverine habitat for the Virgin River chub typically includes areas of slow to moderate flow with deep runs or pools where large boulders or root snags provide instream cover. Designated critical habitat for this species exists in the Virgin River and its 100-year floodplain from the confluence with La Verkin Creek in Utah downstream to Halfway Wash in Nevada (USFWS 2000). There is no potential habitat for the Virgin River chub within the project area. The Virgin River near Mesquite, Nevada is the closest potential habitat for the species.

3.4.4 Woundfin

The woundfin (*Plagopterus argentissimus*) is a federally listed endangered fish species that historically occurred in the Salt, Verde, and Gila Rivers in Arizona; the lower Colorado River; and the Virgin River in Nevada and Utah (USFWS 1995). Woundfin typically occupy runs and quiet waters adjacent to riffles. Currently, this species is only known to occur in the main stem of the Virgin River from La Verkin Springs in Utah downstream to Lake Mead and in the lower portions of La Verkin Creek in Utah.

The woundfin was listed as endangered by the USFWS on October 12, 1970. On February 25, 2000, the USFWS designated critical habitat for this species. Designated critical habitat for this species was designated along the Virgin River and its 100-year floodplain from the confluence with La Verkin Creek in Utah downstream to Halfway Wash in Nevada (USFWS 2000). There is no potential habitat for the woundfin within the project area. The Virgin River near Mesquite, Nevada is the closest potential habitat for the woundfin.

3.4.5 Yuma Clapper Rail

The Yuma clapper rail is a federally listed endangered species that typically occurs in sedimented, shallow water cattail (*Typha latifolia*) and bulrush (*Scirpus acutus*) marshes. Nests are constructed primarily in mature cattail-bulrush habitat along margins of freshwater marshes near the water's edge. Areas where cattail and bulrush are dissected by narrow stream channels seem to support the densest populations of Yuma clapper rails. The closest potential habitat for the Yuma clapper rail is along the Virgin River, approximately 3 miles south of the southern end of the project area.

3.4.6 Yellow-billed Cuckoo

The yellow-billed cuckoo is a federal candidate for listing as threatened or endangered west of the Rocky Mountains. On July 18, 2001, the USFWS issued a 12-month finding on the petition to list the western yellow-billed cuckoo in the western continental United States. The western yellow-billed cuckoo was placed on the list of candidate species as a result of higher priorities taking precedence. Western populations of this species have declined due to loss or degradation of up to 90 percent of its riparian habitat throughout its historic range.

The historic breeding range of the yellow-billed cuckoo included most of North America from southern Canada to Mexico, but presently is restricted to scattered areas where suitable habitat exists. This species breeds in large blocks of riparian habitats, particularly woodlands with cottonwoods, willows, and dense understory foliage (USFWS 2001). A habitat assessment conducted in 2004 in Meadow Valley Wash identified approximately 253 acres of potentially suitable yellow-billed cuckoo habitat. There have been two recent yellow-billed cuckoo sightings within Meadow Valley Wash. In 2001, a yellow-billed cuckoo was observed approximately 0.5 mile north of Elgin (approximately 12 miles southwest of the Clover Valley well field area and approximately 20 miles downstream of Caliente), and in 2002, a possible nesting pair was observed near Rox (approximately 30 miles west of the LCLA development area and approximately 60 miles downstream of Caliente; Bio-West, Inc. 2005). Suitable habitat for this species may also occur along the Virgin River approximately 3 miles south of the southern end of the project area.

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4.0 EFFECTS OF THE PROPOSED ACTION

4.1 DIRECT AND INDIRECT EFFECTS

Direct impacts to the surrounding environment would be primarily associated with surface disturbing activities during construction. These effects may include increased dust, noise, and odor from construction equipment and vehicles. Construction of the Proposed Action would require vegetation clearing and other ground disturbance that would result in both temporary disturbance and permanent conversion of existing vegetation and habitat within the ROW. Construction, operation and maintenance (O&M) activities that could result in the temporary or permanent loss or degradation of vegetation communities include:

- Blading/grading of pipeline, water storage tank, access road, and well ROWs and material staging areas;
- Improvements to some portions of the existing access roads as well as construction of new access roads;
- Vegetation removal where needed for construction vehicle access, pipeline installation, and installation of other project features;
- Excavations resulting from buried pipeline construction;
- Utilization of temporary material construction staging areas;
- Soil compaction;
- Vehicle access for as-needed maintenance and emergency repairs.

Project construction is estimated to take between 18 to 24 months. During construction, the Applicant would implement site-specific Best Management Practices (BMPs), and mitigation measures to minimize impacts on the environment from construction activities. Applicant proposed environmental protection measures are described in **Appendix F**.

Indirect effects of groundwater pumping from the Proposed Action would not occur as long as the Applicant adheres to the Clover Valley and Tule Desert Monitoring and Mitigation Plans. In Clover Valley, groundwater levels and well water quality, as well as flow and quality of local springs will be monitored as outlined in the Monitoring and Management Plan for Future Pumping in Clover Valley (**Appendix D**). This information will alleviate uncertainties that currently exist regarding future impacts from groundwater pumping on sensitive resources in the Clover Valley drainage area, including Meadow Valley Wash.

Similarly, groundwater levels, springflow, streamflow, and water quality will be monitored as part of the Monitoring Plan for Groundwater Development in Tule Desert and the Stipulation Agreement between the NPS and the LCWD (**Appendix B).** Simultaneous with delivery to the NSE and the NPS, the LCWD will provide to BLM results of groundwater level, pumping, and spring flow monitoring data. The BLM will use these data to effectively coordinate with the LCWD, the NSE, and the NPS to ensure that groundwater pumping in the Tule Desert from the Proposed Action would not result in adverse impacts to the water rights and resources of the

National Park Service, including any measureable reduction in flow rates in the Virgin River and changes to riparian habitat supported by the Virgin River

4.2 DESERT TORTOISE

The project is anticipated to have a direct effect upon desert tortoise habitat within the Beaver Dam Slope Critical Habitat Unit. Direct disturbance will occur within this critical habitat unit, but it is not anticipated that any of the primary constituent elements used to determine critical habitat will be impacted in a way that would affect long-term viability of the desert tortoise population in the region. Because linear features will not be fenced, the pipeline will be buried, and all areas not needed for O&M activities will be revegetated, it is expected that habitat conditions and movement corridors will only be affected during the temporary construction phase of the project. Based on the project features of the Proposed Action, temporary and permanent disturbance acreage has been calculated to estimate cumulative acreage impacts within desert tortoise habitat (**Table 4-1**).

Table 4-1 Desert Tortoise Habitat Disturbed by the Proposed Action

	Permanent Impacts (acres)	Temporary Impacts (acres)
Public Land		
Desert Tortoise Critical Habitat	32.3	253.7
Desert Tortoise Habitat (non-critical)	75.7	594.8
Project Total Disturbance	108	848.5

As shown in **Table 4-1**, approximately 108 acres of desert tortoise habitat would be permanently disturbed by construction of the Proposed Action. Approximately 848.5 acres would be temporarily disturbed. Of these totals, 32.3 acres (federal lands) of permanent disturbance would occur in the Beaver Dam Slope Critical Habitat Unit. Approximately 253.7 acres of temporary disturbance would occur in the Beaver Dam Slope Critical Habitat Unit. Permanent and temporary disturbance acreage would affect approximately 0.04 and 0.3 percent, respectively, of the Beaver Dam Slope Critical Habitat Unit acreage within Nevada (87,400 acres). All critical habitat that would be disturbed is located on federal land.

Indirect habitat effects associated with the Proposed Action include negative impacts resulting from the increased potential for invasion of noxious and non-native weeds.

4.2.1 Construction Vehicle Traffic

Traffic during the construction phase, as well as long-term O&M phase of the pipeline facilities and transmission line will increase the potential for collisions with desert tortoise.

The influx of construction personnel and transportation of material and equipment to the project area would likely increase traffic on U.S. Highway 93, Interstate 15 and existing BLM-maintained dirt roads.

Given the location of the project construction ROW corridor and the proximity to areas ranging from very low to moderate densities of desert tortoise, the potential exists for collisions between

vehicles and migrating or active tortoise. This concern arises during both the construction and O&M phases of the project. The period of highest risk for potential vehicle collisions with the desert tortoise is between March 15 to May 31, when the tortoises are most active and, to a lesser degree, throughout the summer months (e.g., end of October).

Indirect effects associated with vehicle traffic include the increased access for recreational users within the area. However, all new access roads that are not required for O&M will be closed and revegetated, limiting the amount of new access roads in the area. Additionally, access roads will be very short spur roads off of existing dirt roads.

4.2.2 Raptor Predation

The project transmission line towers could provide artificial perches and nest sites for raptors and ravens in areas of open habitat. Habitats previously used only to hunt occasionally could become routine hunting areas because of the increased number of available perches (Ryser 1985). The Applicant will work with the USFWS to incorporate the most current anti-perching measures in the project design and construction practices. Such design characteristics could include perch guards or other technology to minimize available perching and nesting sites for raptors and ravens.

4.2.3 Fragmentation

In some sensitive habitat areas, disturbance could result in fragmentation of existing vegetation communities/habitats. Fragmentation occurs whenever a large continuous habitat is transformed into smaller patches that are isolated from each other by both natural and human-induced mechanisms. The changed landscape functions as a barrier to dispersal for species associated with the original vegetation community/habitat. These smaller and more isolated habitats also support smaller populations, which are more vulnerable to local, stochastic extinction events, thereby causing smaller, more isolated habitats that ultimately contain fewer species and lower biodiversity. As more edge habitat becomes available due to fragmentation, the species that utilize the edge have the opportunity to invade the interior vegetation community/habitat and become a major threat to the survival of those species. Permanent fencing will only be left in place around well pads and water storage tanks. The BLM does not anticipate that the Proposed Action will increase fragmentation of the habitat beyond what is currently found throughout the proposed ROW.

4.3 SOUTHWESTERN WILLOW FLYCATCHER

There is no suitable habitat for the southwestern willow flycatcher in the project area; however, the southwestern willow flycatcher and its riparian habitat have been documented within the Meadow Valley Wash (including Clover Creek drainage).

Construction of the Proposed Action will not directly impact the southwestern willow flycatcher or its habitat. Implementation of the Clover Valley Monitoring and Mitigation Plan will reduce uncertainties from groundwater pumping associated with the Proposed Action. However, due to the minimal amount of hydrological information available for the Clover Valley Hydrographic

Area at this time, the BLM expects that the Proposed Action, "may affect, but is unlikely to adversely affect' the southwest willow flycatcher or its habitat.

4.4 VIRGIN RIVER CHUB

There is no suitable habitat for the Virgin River chub within the project area. The closest waterway that may be occupied by the Virgin River chub is the Virgin River near Mesquite, Nevada, approximately 3 miles south of the southern reach of the project area. As described in **Section 3.3.2**, the Nevada State Engineer required LCWD to prepare and adhere to the Tule Desert Monitoring and Management Plan. As such, potential impacts to Virgin River are not expected. However, due to uncertainties related to natural systems, there are differences of opinion regarding regional groundwater flow and groundwater availability in the Tule Desert. Due to the inherent hydrogeologic complexity of the Tule Desert and Virgin River basins, there is still insufficient information for complete agreement among investigators on the details of the regional flow systems. Therefore, the BLM expects that the Proposed Action, "may affect, but is unlikely to adversely affect' the Virgin River chub.

4.5 WOUNDFIN

There is no suitable habitat for the woundfin within the project area. The closest waterway that may be occupied by the species is the Virgin River near Mesquite, Nevada, approximately 3 miles south of the southern reach of the project area. As described in Section 4.4.2, the BLM does not expect the Proposed Action to impact flows in the Virgin River. However, due to uncertainties related to groundwater pumping in the Tule Desert, the BLM has determined that the Proposed Action, "may affect, but is unlikely to adversely affect" the woundfin.

4.6 YUMA CLAPPER RAIL

There is no suitable habitat for the Yuma Clapper rail within the project area. The closest habitat that may be occupied by the species are riparian areas along the Virgin River near Mesquite, Nevada, approximately 3 miles south of the southern reach of the project area. As described in Section 3.3.2, the BLM does not expect the Proposed Action to reduce surface water flows or impact riparian habitat associated with the Virgin River. However, due to uncertainties related to groundwater pumping in the Tule Desert, the BLM has determined that the Proposed Action, "may affect, but is unlikely to adversely affect" the Yuma Clapper rail.

4.7 YELLOW BILLED CUCKOO

There is no suitable habitat for the Yellow billed cuckoo within the project area. The closest habitats that may be occupied by the species are riparian areas along the Meadow Valley Wash, west of the project area, and the Virgin River near Mesquite, Nevada. As described in **Sections 3.3.1 and 3.3.2**, it is not anticipated that groundwater pumping associated with the Proposed Action will reduce surface water flows within the Meadow Valley Wash, Virgin River, or Beaver Dam Wash. Therefore, a finding of "would not contribute to the need to list" was found for the western yellow-billed cuckoo.

4.8 CUMULATIVE EFFECTS

Cumulative effects include the effects of future federal, state, tribal, local, or private actions that are reasonably certain to occur in the action area. Future federal actions that are unrelated to the Proposed Action are not considered in this section because they require separate consultation pursuant to Section 7 of the Endangered Species Act.

Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time. Cumulative effects can also result from spatial (geographic) and/or temporal (time) crowding of environmental impacts.

Cumulative impacts on biological resources are generally additive and proportional to the amount of ground disturbance within specific habitat areas. Lincoln County is preparing a Multi-Species Habitat Conservation Plans (MSHCP) that would address cumulative effects on biological resources for development and construction activities within Lincoln County. All other known actions in the area will occur on federal lands and will thus be subject to Section 7 consultation and are not included in this document. The Southeastern Lincoln County MSHCP and a separate MSHCP being prepared to address the nearby Coyote Springs Investment area 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 affect the biological viability of the region.

Ongoing and future utility infrastructure projects (e.g. Toquop Energy Project, Holly Energy Gas Pipeline, other groundwater development projects), and residential development projects (e.g. build-out of the LCLA development area, Coyote Springs Investment, and Mesquite Land Act Area) will have a cumulative effect on desert tortoise critical habitat. These development activities in southern Lincoln County would be subject to the applicable MSHCP, and would require consultation with the appropriate resource management agency (e.g., BLM, USFWS, Nevada Department of Wildlife [NDOW]) to implement site-specific desert tortoise protection measures.

Potential cumulative impacts to desert tortoise associated with projects occurring within critical habitat include habitat fragmentation and degradation, increased predation from common ravens, increased threats of disturbance and mortality from increased human presence in the area, and an increase in fire risk in the area associated with increased human presence.

An ongoing potential exists for added incremental impacts from all projects that could have long-term effects. Increased public access potentially increases tortoise mortality resulting from shooting, collecting tortoises for pets, and running over tortoises with vehicles. Also, increased access elevates the potential for the public to release diseased tortoises into the wild.

Cumulative indirect effects from groundwater pumping in the regional flow system may result in a decline in local and regional groundwater levels and flows at downgradient locations. The interrelated projects and activities with potential effects on groundwater resources include

existing and future groundwater pumping rights in Clover Valley, Tule Desert, Lower Meadow Valley Wash, and Virgin River Valley Hydrographic Areas.

A summary of existing water rights and applications within the cumulative impacts study area is provided in **Table 4-2**.

Table 4-2 Perennial Yield And Water Rights In The Cumulative Impacts Area

Hydrographic Area	Perennial Yield[1] (AFY)	NDWR Permitted Annual Duty[2] (AFY)	Water Rights Pending[3] (cfs)
Clover Valley	1,000	3,787	20
Tule Desert	1,000	2,104	58
Virgin River Valley	3,600*	12,343	325
Lower Meadow Valley Wash	5,000	23,480	29

*Based on Recharge
[1]NDWR 1992
[2] Permitted Water Rights Reported as Annual Duty in AFY
[3] Pending Water Rights Reported as Diversion Rates in cfs
Source: NDWR 2007 unless otherwise noted.

The NSE has granted a total of 41,714 AFY of annual duty within the cumulative analysis study area. If all the pending water rights are permitted, up to an additional 403 cfs could be withdrawn from the cumulative analysis area. Most of these requested water rights are associated primarily with increased municipal water use requirements.

To date, no detailed cumulative analysis involving a modeling effort has been completed for the Proposed Action or other groundwater development projects in the ROI. However, groundwater modeling is currently being performed by the NPS to evaluate the regional flow systems and to determine if groundwater pumping in the regional area would influence spring flows in the Virgin River Hydrographic Area.

Groundwater withdrawals in the Tule Desert under the Proposed Action are subject to the Stipulation Agreement between the NPS and the LCWD (**Appendix C**). Under this agreement, the LCWD agrees to monitor, manage, and mitigate unanticipated impacts due to development of groundwater resources in the Tule Desert Hydrographic Area. The BLM proposes to continue to coordinate with the LCWD and NPS to ensure that the Proposed Action would not adversely impact the regional springs and the Virgin River flows.

5.0 CONSERVATION MEASURES

As shown in **Table 4-1**, approximately 108 acres of desert tortoise habitat would be permanently disturbed by construction of the Proposed Action. Approximately 848.5 acres would be temporarily disturbed. Of these totals, 32.3 acres (BLM lands) of permanent disturbance and approximately 253.7 acres of temporary disturbance would occur in the Beaver Dam Slope Critical Habitat Unit. Permanent and temporary disturbance make up 0.04 and 0.3 percent of the Beaver Dam Slope Critical Habitat Unit in Nevada (87,400 acres), respectively. All critical habitat disturbed during construction is located on federal land. Habitat restoration would be conducted for all federal lands disturbed by construction of the Proposed Action with the exception of those lands permanently impacted by the project footprint.

Prior to issuance of any federal permit, lease, or authorization for any surface disturbing activity on public lands, the LCWD and/or the other utility agencies would be required to pay a remuneration fee for each acre of surface disturbance to desert tortoise habitat. The BLM would ensure payment of remuneration fees by the project proponents or the designated utilities for compensation of the loss of desert tortoise habitat as a result of the proposed Project. The BLM and the USFWS would require a receipt of payment from each designated utility prior to issuing the Notice to Proceed.

Compensation fees are calculated according to *Compensation for the Desert Tortoise; A Report Prepared for the Desert Tortoise Management Oversight Group* (Desert Tortoise Compensation Team, 1991). The fee for disturbance within designated critical habitat is based on assignment of ratings to the following five factors:

- Category of Habitat (value of the land to tortoise populations)
- Term of Effect (short term vs. long term)
- Existing Disturbance on Site
- Growth Inducement (growth inducing effects of the proposed action)
- Effect of Adjacent Lands (whether adjacent lands will be affected)

The total rating of the five factors is then multiplied by the current compensation rate and the total acres of disturbance within the designated critical habitat. Compensation for disturbance on lands not within designated critical habitat is calculated by multiplying the acres of disturbance by the current compensation rate. The section 7 payments would be accompanied by a Section 7 Fee Payment Form and completed by the payee.

The LCWD is required to submit a Final POD to the BLM, which must be approved by BLM prior to issuance of the Notice to Proceed. It is likely that the amount of disturbance will change with the final engineering design; therefore, BLM will reevaluate the project disturbance and adjust the total compensation fee accordingly. The final compensation fee will be provided to USFWS with a copy of the Final POD and a breakdown of how the final compensation fee was calculated. Payment shall be made in accordance with the BLM Ely District Office Resource Management Plan Biological Opinion (July 2008) prior to issuance of the Notice to Proceed.

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6.0 DETERMINATION

Implementation of the Proposed Action "may affect, is likely to adversely affect" the desert tortoise in the project area. This determination is based on the following considerations:

- Construction-related impacts on the desert tortoise could include direct mortality or injury as a result of being crushed by vehicles and disturbance of soil. During pedestrian surveys of the proposed corridor route, desert tortoise sign (e.g., scat, tracks, burrows, shell fragments) as well as one live tortoise were observed at locations along the ROW. In addition to the direct and indirect effects of construction on the tortoise, potential temporary and permanent acreages have been estimated for the project. An estimated 848.5 acres of temporary disturbance, of which 253.7 acres are within critical habitat, and 108 acres of permanent disturbance, of which 32.3 acres are within critical habitat, would be attributed to the project. Upon completion of the project, all temporary and permanent disturbance areas would be professionally surveyed (e.g., via Global Positioning System), and a final acreage report would be submitted to the USFWS and BLM to be incorporated into the agency-administered cumulative 1 percent total disturbance acreage database.

The project is anticipated to directly affect habitats within the Beaver Dam Slope Critical Habitat Unit; however, the project would not jeopardize the continued survival or future recovery of the desert tortoise. It is not anticipated that any of the primary constituent elements used to determine critical habitat will be impacted in a way that would affect long-term viability of the desert tortoise population in the region. 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 only be affected during the construction phase of the project.

Implementation of the Proposed Action will not directly impact the southwestern willow flycatcher, Virgin River chub, (*Gila seminuda),* woundfin (*Plagopterus argentissimus*), yellow-billed cuckoo (*Coccyzus americanus*), or Yuma clapper rail (*Rallus longirostris yumanensis*or their habitat. However, due to uncertainties associated with groundwater pumping in the Clover Valley and Tule Desert Hydrographic Areas the BLM finds that the Proposed Action, "may affect, but is unlikely to adversely affect' these species or habitat in the Virgin River, Meadow Valley Wash, and Clover Valley drainages. Implementation of the Tule Desert and Clover Valley Monitoring and Mitigation Plans will reduce uncertainties related to the effects on sensitive resources within or near the project area due to groundwater pumping associated with the Proposed Action.

With regards to the Big Spring spinedace (*Lepidomeda mollispinis pratensis*), or the Ute ladies'-tresses (*Spiranthes diluvialis),* these species are not present in or near the project area. Therefore, construction, operation, and maintenance activities associated with the Proposed Action would not affect these species.

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7.0 REFERENCES

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