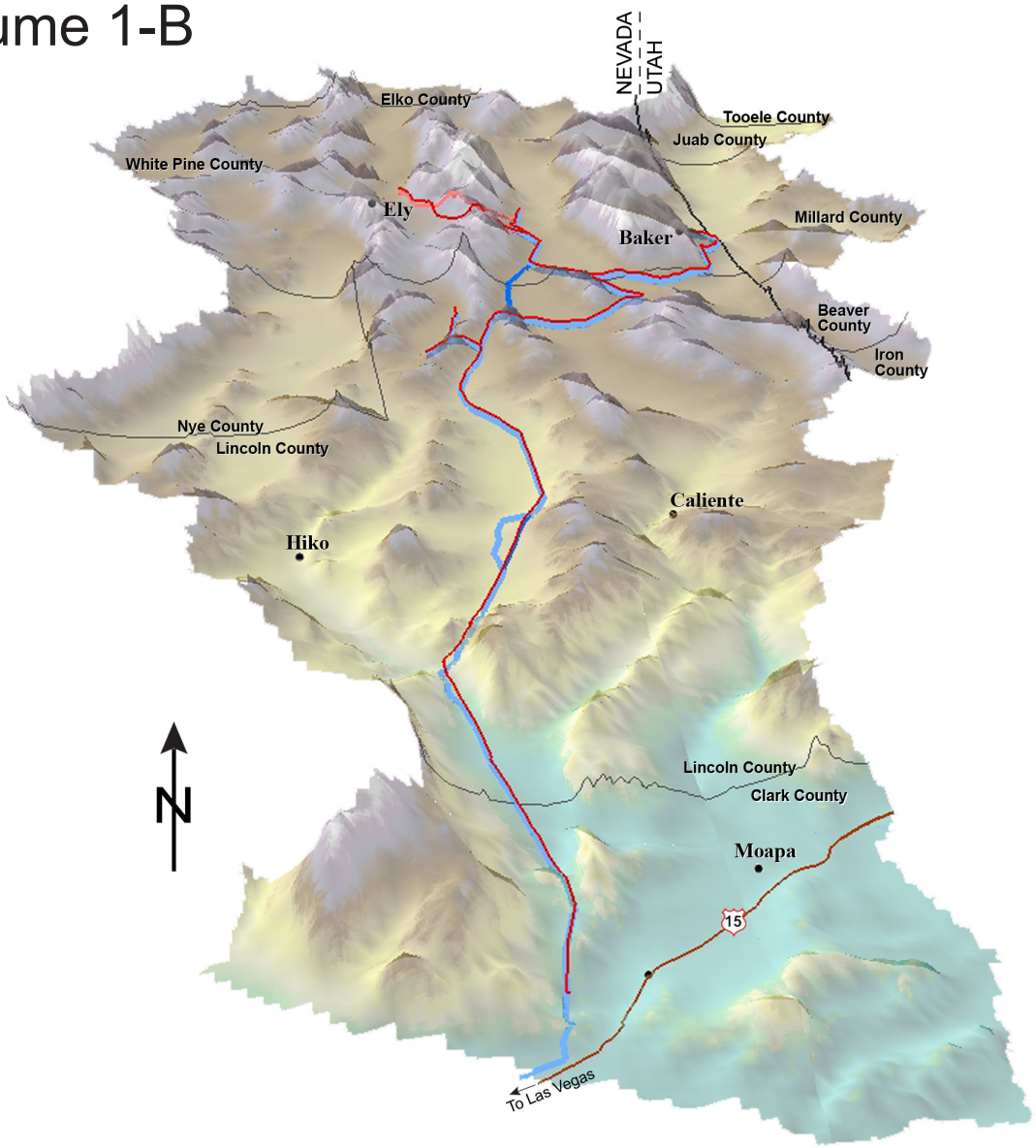
Clark, Lincoln, and White Pine Counties Groundwater Development Project Draft Environmental Impact Statement

Volume 1-B



Bureau of Land Management

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DES 11-18

Cooperating Agencies:

Army Corps of Engineers
Bureau of Indian Affairs
Bureau of Reclamation
Central Nevada Regional Water Authority
Clark County, NV
Juab County, UT
Lincoln County, NV
Millard County, UT
National Park Service
Nellis Air Force Base
Nevada Department of Wildlife
State of Utah
Tooele County, UT
U.S. Fish and Wildlife Service
U.S. Forest Service
White Pine County

BLM

Nevada Groundwater Projects Office

Mission Statement

The BLM's multiple-use mission is to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/NV/NV/ES/11-17+1793

3.6 Terrestrial Wildlife

3.6.1 Affected Environment

3.6.1.1 Overview

This section covers general wildlife, species of management concern, and special status terrestrial wildlife species. General wildlife habitats within the study area are described and quantified in Section 3.5, Vegetation Resources, while general wildlife species are discussed briefly in this overview section.

The region of study for terrestrial wildlife includes 33 hydrologic basins that encompass portions of Nevada and Utah. The natural resources region of study differs slightly from the water resources model area. This is explained in more detail in Section 3.5, Vegetation Resources.

Detailed discussion of management concern and special status species is included for specific portions of the study area, in relation to the ROW and groundwater development areas. The discussion of management concern species focuses on big game, small mammals, game birds, waterfowl, shorebirds, raptors, and migratory birds. These species include wildlife species that occur in the general habitat types that are found in the project area.

The special status species discussion includes mammals, birds, reptiles, and terrestrial invertebrates that are listed or proposed for listing under the ESA, and considered sensitive by the BLM or the USFS (for that portion of USFS land crossed by an alternative ROW). The BLM special status species are: 1) species listed or proposed for listing under the ESA, and 2) species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA, which are designated as BLM sensitive by the State Director(s).

All federal candidate species, proposed species and delisted species in the 5 years following delisting will be conserved as BLM-sensitive species (per the BLM Manual 6840 [BLM 2008b]). It should be noted that the BLM sensitive species list is under review and updates are not yet available. If available, updates to the list will be reflected in the Final EIS.

USFS examines the following sources as possible candidates for listing as sensitive species: 1) USFWS candidates for federal listing under the ESA (categories 1 and 2); 2) state lists of endangered, threatened, rare, endemic, unique, or vanishing species, especially those listed as threatened under State law; and 3) other sources as appropriate in order to focus conservation management strategies and to avert the need for Federal or State listing as a result of National Forest management activities (Forest Service 1991).

QUICK REFERENCE

ACEC – Area of Critical Environmental Concern

ACM – Applicant Committed Protection Measure

APLIC – Avian Power Line Interaction Committee

DDC – Dry Lake, Delamar and Cave Valleys

DOI – U.S. Department of Interior

ESA – Endangered Species Act

ET – Evapotranspiration

IBA – Important Bird Areas

GBBO – Great Basin Bird Observatory

LCRMSCP – Lower Colorado River Multiple Species Conservation Program

MBTA – Migratory Bird Treaty Act

NDOW – Nevada Department of Wildlife

NEPA – National Environmental Policy Act

NNHP – Nevada Natural Heritage Program

NPS – National Park Service

NWR – National Wildlife Refuge

RMP – Resource Management Plan

UDWR – Utah Division of Wildlife Resources

USFS – United States Forest Service

USFWS – U.S. Fish and Wildlife Service

Species habitats are managed by the agency who owns the land (i.e., BLM, NPS, USFS, and USFWS refuges). The species are managed by the state agencies (NDOW and the UDWR) with coordination and cooperation with the federal agencies. One exception to species management is the NPS authority in park such as Great Basin National Park (GBNP). NPS direction is to protect and manage resources in the park including terrestrial wildlife resources.

On lands with federally listed species, their management is under the jurisdiction of the USFWS. The USFWS coordinates with the state agencies to develop and implement recovery and other plans for threatened and endangered species.

Collectively, the state and federal agencies develop and implement management plans and strategies for both game and nongame terrestrial wildlife species. Management direction and guidance are provided through the implementation of management plans, agreements, and their wildlife plans (e.g., Wildlife Action Plan [2006] and the Utah Comprehensive Wildlife Conservation Strategy [Sutter et al. 2005].

As previously mentioned in Section 3.5, Vegetation Resources, the Natural Resources Group provided input and evaluation on species occurrences in a baseline summary report (ENSR/AECOM 2008). The Natural Resources Group included representatives from the BLM in Nevada and Utah, USFWS in Nevada and Utah, NDOW, UDWR, SNWA, AECOM (formerly ENSR) (BLM's EIS Contractor), and ENTRIX (subcontractor to AECOM). Tables from that baseline report are the source of **Table F3.6-1** in **Appendix F3.6**. Other data sources used by the Natural Resources Group and for this section include Natural Heritage data, primary research, conservation reports, and input from agency staff. The Natural Heritage dataset was acquired from Nevada and Utah, and occurrence data were used to identify rare and sensitive species presence. Many studies on various animal groups, including mammals (SNWA 2007a, SNWA 2008), birds (Great Basin Bird Observatory [GBBO] 2007a,b), herpetofauna (SNWA 2008), and terrestrial invertebrates (Ecological Sciences, Inc. 2007) have been conducted in the region. Amphibians are addressed in Section 3.7, Aquatic Biology Resources. Wildlife Action Plans for Utah (Sutter et al. 2005) and Nevada (Wildlife Action Plan Team 2006) provided additional information on species. Please note that at the time of this document drafting, the Nevada Wildlife Action Plan was under revision and updates are not yet available. If available, updates to the Plan will be reflected in the Final EIS. The USFWS lists of threatened, endangered, proposed and candidate species, USFS Sensitive Species list, GBNP Listing of Sensitive and Extirpated Species, and BLM's Sensitive Species list were referenced to identify protected and management species.

Wildlife species that are culturally significant to Confederated Tribes of the Goshute Reservation people include elk, bighorn sheep, antelope, deer, rabbits, bears, mountain lions, sage-grouse, rock chuck, and various species of raptors. They have cultural significance in many forms, including food resources, spiritual resources, and resources as traditional values (Steele 2010). These animals have the potential to occur throughout historical aboriginal territories and throughout the proposed project area.

General wildlife communities in the natural resources region of study occur in two main ecological regions: the Great Basin Desert and Mojave Desert. These communities include mammals, birds, herpetofauna, and terrestrial invertebrates. Large mammals occurring in these areas include Rocky Mountain elk, mule deer, pronghorn antelope, desert and Rocky Mountain bighorn sheep, and mountain lions. Medium-sized mammals include coyote, kit fox, and American badger. Small mammals are abundant and include a variety of bat species and rodents. General terrestrial habitat types in these two ecological regions include: shrubland, desert scrub, pinyon-juniper woodland, grassland, playa, and riparian.

Based on surveys conducted by the SNWA (2007a, 2008), 20 small mammal species were collected in seven of the basins that the ROWs and groundwater development areas would cross (Cave, Delamar, Dry Lake, Hamlin, Lake, Snake, and Spring). Fourteen species were associated with riparian and phreatophytic plant communities (i.e., greasewood flats). Species that dominated the collections in one or more valleys included the following: Least chipmunk, Great Basin pocket mouse, Ord's kangaroo rat, Chisel-toothed kangaroo rat, Merriam's kangaroo rat, and Deer mouse.

Some other small mammal species that occur in the study area include: northern grasshopper mouse, pinyon mouse, dark kangaroo mouse (NDOW 2010a), western harvest mouse, montane vole, desert woodrat, and white tailed antelope squirrel.

From April 2005 through June 2006, acoustic surveys were conducted at 32 sites to identify bat species presence within 12 valleys crossed by the Project. Surveys identified a total of 16 special status species (O'Farrell Biological Consulting 2006). From July 9, 2008 through October 9, 2008, mist net surveys were conducted at 11 select spring sites, 7 of which were generally associated with locations sampled in the previous acoustic surveys. Nine bat special status species were captured (SNWA 2009). Special status bat species are listed in **Appendix F**, **Table F3.6-1**. Of the 17 species listed in the table, all except Allen's big-eared bat and spotted bat were detected during acoustic or mist net surveys. One additional special status species, long-legged myotis, was identified.

Many bird species can be found within the study area throughout the year; some are year-round residents, whereas others are present only during the breeding season or in winter (GBBO 2007a,b). These bird species include neotropical migrants, upland game birds, raptors, waterfowl, and shore birds. Common species include the following: horned lark, house finch, black-throated sparrow, rock wren, northern mockingbird, gambel's quail, greater sage-grouse, red-tailed hawk, northern harrier, american kestrel, and common aquatic bird species, including: Canada goose, cinnamon teal, gadwall, redhead, American coot, pied-billed grebe, double crested cormorant, great blue heron, and killdeer.

There are also a number of important bird areas that have been identified by the Audubon Society in both Nevada and Utah. Important bird areas are sites that provide essential habitat for one or more species of bird. They can include public or private lands, or both, and they may or may not be legally protected. Important bird areas are discussed in more detail later in this section as the locations of individual important bird areas relate to ROWs, groundwater development areas and the region of study.

From July through October 2007, reptile and amphibian surveys were conducted by thee SNWA within six valleys crossed by the Project (Cave, Dry Lake, Hamlin, Lake, Snake, and Spring valleys). Fourteen herptile species, out of 26 potentially present species, were identified during these surveys. An additional two species were observed during a 2005 survey, for a total of 16 species. The number of species reported per basin ranged from 7 in Hamlin Valley to 12 in Spring Valley. Side-blotched lizard, long-nosed leopard lizard, sagebrush lizard, striped whipsnake, Great Basin gopher snake, and Great Basin spadefoot toad were detected in five or six of the surveyed basins. Other reptiles that occur in the natural resources region of study include species such as the Sonoran Mountain kingsnake, short-horned lizard, desert horned lizard, Great Basin collared lizard (ENSR/AECOM 2008), glossy snake, western red-tailed skink, western blind snake, terrestrial garter snake, coachwhip snake, long-nosed snake, racer snake, and western whiptail lizard (SNWA 2008). Herptile species identified by the Natural Resources Group are listed in **Appendix F**, **Table F3.6-1**.

A terrestrial invertebrate species desktop review and field survey was completed in 2006 by Ecological Sciences, Inc. (Ecological Sciences, Inc. 2007). Ecological Sciences, Inc. collected invertebrates from 76 sites in the Great Basin and Mojave Desert regions and identified a total of 681 terrestrial invertebrate species, after completing taxonomic analysis of one-third of the specimens. The identified species represented 149 families from 21 invertebrate orders, many of which have aquatic larval stages and terrestrial adults. The orders with the greatest number of species were wasps, beetles, moths, and flies.

The following plans identify wildlife species that the BLM or the states of Nevada or Utah consider a focus of management:

- Ely District Record of Decision and Approved Resource Management Plan (BLM 2008a);
- Record of Decision for the Approved Las Vegas Resource Management Plan and Final Environmental Impact Statement (BLM 1998);
- Nevada Wildlife Action Plan (Wildlife Action Plan Team 2006); and
- Utah Comprehensive Wildlife Conservation Strategy (Sutter et al. 2005).

3.6.1.2 Right-of-way Areas

Species of Management Concern

The BLM and other land-management agencies manage wildlife habitat on public lands; the NDOW and the UDWR manage wildlife populations on the public lands. The NPS manages both wildlife and habitat within units it

administers. For the purposes of this document, terrestrial wildlife species of management concern are defined as species considered to be a focus of management by the BLM or the states of Nevada and/or Utah and include big game mammals, small mammals, upland game birds, aquatic birds, raptors, passerines, other migratory birds (e.g., hummingbirds, sparrows, and corvids), and reptiles. They are identified in one or a combination of the plans listed above. Non-game species that are included in these plans are a focus of management concern because populations are declining, threats to the species need to be monitored, or the species are protected under regulations such as the MBTA.

Working under direction from the BLM, the Natural Resources Group developed the list of species presented in **Appendix F**, **Table F3.6-1.** This table provides the representative list of wildlife species of management concern that occur within the natural resources region of study and identifies the hydrologic basins in which the species can be found in ROW areas, according to the Nevada and Utah Natural Heritage datasets, data from the state agencies, and project-specific survey data. The list of bird species in the table and addressed in more detail in this document follows the BLM Washington Office Instruction Memorandum No. 2008-050 MBTA - Interim Management guidance. The BLM and USFWS continue to work together to promote the conservation of migratory birds through their MOU signed in April 2010.

Habitat requirements and life-history information for species of management concern are provided in **Appendix F**, **Table F3.6-2**. The following information summarizes the occurrence of representative wildlife species of management concern within the ROW areas. There are no ROW areas in the State of Utah.

Five big-game mammals of management concern are known to occur within the ROW areas (**Appendix F**, **Table F3.6-1**). The occurrence and habitat of these big game species are as follows:

- **Pronghorn antelope (Figure 3.6-1) –** The overall range for this species overlaps with the central and northern portions of the ROWs. No crucial winter range is present in the ROWs. Pronghorn prefer gently rolling or flat topography that provides good visibility. Primary habitat for this species consists of mixed shrubs, grasses and forbs with modest height and low density of pinyon and juniper trees. Sagebrush is used as cover and food sources.
- **Rocky Mountain elk** (**Figure 3.6-2**) **–** The overall range for elk overlaps with the ROWs in Dry Lake, Cave, Lake, Steptoe, and Spring valleys. The ROWs do not overlap crucial summer habitat. This species occurs in a wide variety of habitats, ranging from low to upper elevations. Summer habitat includes mixed conifer and aspen forests and higher-elevation, pinyon-juniper woodlands and meadows as well as mountain brush and grass communities. Winter use mainly occurs in pinyon-juniper woodlands and sagebrush grasslands between approximately 5,000 and 9,500 feet elevation.
- **Mule deer (Figure 3.6-3) –** Mule deer range occurs along the central and northern portions of the ROWs. Crucial summer and winter ranges overlap the ROWs in Cave, Dry Lake, Hamlin, Lake, Spring, Steptoe and Snake valleys. This species is widespread, with distribution primarily associated with middle and upper elevations in sagebrush and grassland habitats that occur throughout much of the ROWs as well as all forest types. Forbs and grasses comprise most of the diet in the spring and summer; shrubs are used in the winter and dry summer periods. During the summer, mule deer tend to rely on riparian, mixed mountain brush and forest communities. Movement corridors between Dry Lake Valley up into Lake and Cave valleys are crossed by the ROW.
- **Desert bighorn sheep (Figure 3.6-4) –** Occupied habitat for desert bighorn sheep overlaps with the ROWs in Pahranagat and Delamar valleys and is adjacent to the ROWs in Cave, Dry Lake, Coyote Spring, Garnet, Hidden Valley, and Las Vegas valleys. Potential desert bighorn habitat overlaps with the ROW in Spring and Steptoe valleys and is adjacent to the ROWs in Cave and Dry Lake valleys. All occupied desert bighorn sheep habitat is managed as priority habitat by the BLM on BLM managed lands (BLM 2008a). Migration corridors for desert bighorn sheep cross the ROWs in Las Vegas, Garnet, Hidden, and Coyote Spring valleys. Desert bighorn sheep movements and migration corridors are dynamic and occur in the ROW areas in Delamar and Coyote Spring valleys. Movement between Las Vegas Range and Arrow Canyon Range and Delmar Mountains and Sheep Range (NDOW 1978) are crossed by the ROW. More recent data indicate that the desert bighorn sheep distribution includes the Hiko and South and North Pahroc Ranges to the west of Dry Lake Valley, and Egan Range and Schell Creek Range. Potential habitat is currently being targeted by the NDOW for reintroduction of desert bighorn sheep to expand the occupied areas throughout the state. Desert bighorn sheep habitat typically consists of rough, rocky, and steep terrain, broken by canyons and washes. Bighorn sheep require access to water during the summer and

throughout the year during drought conditions. Their diet mainly consists of grasses, shrubs, and forbs. This species also is a BLM sensitive species, but for the purposes of this document it is addressed with the species of management concern in order to address all big game species together.

- **Rocky Mountain bighorn sheep (Figure 3.6-5) –** The ROWs are located adjacent to occupied habitat in Snake and Hamlin Valleys and adjacent to potential habitat in Spring Valley; however, the ROWs do not cross occupied or potential habitat. Rocky Mountain bighorn sheep prefer high, steep, rocky slopes that are close to suitable feeding sites. However, during the winter months, they will seek open areas in lower elevations where snow depth is lighter and food sources are more plentiful (UDWR 2008). Primary forage consists of grasses, forbs, and shrubs.

As reference for big game including antelope, elk and mule deer, crucial winter range is used between November 1 through March 31, and crucial summer range is used between April 15 and late September (BLM 2008a). Within occupied desert bighorn habitat, the rut occurs from approximately August – September (NDOW 1978). Lambing can occur at any time of the year and is associated with favorable environmental conditions. However, lambs are normally dropped during late February or early March in Southern Nevada and during April or early May in Central Nevada (NDOW 1978). The BLM recommends a restriction on activity within bighorn sheep occupied habitat between March 1 to May 31 and July 1 through August 31 (BLM 2008b). Range information shown on **Figures 3.6-1** through **3.6-5** display NDOW (2004) data for antelope, elk and deer and NDOW (2010b) data for bighorn sheep.

Of the representative species listed in **Appendix F**, **Table F3.6-1**, 31 small mammal species are known to occur or suspected to occur within basins crossed by the ROWs; 10 are species of management concern (dark kangaroo mouse, Merriam's shrew, desert kangaroo rat, vagrant shrew, Inyo shrew, desert pocket mouse, brush mouse, water shrew, kit fox, and ringtail) and the remaining species are BLM sensitive. The BLM sensitive species are addressed in the Special Status Species section. When considering species range or habitat use, water shrew and Inyo shrew are unlikely to occur in the ROWs. Dark kangaroo mouse has been recorded in the ROWs, based on project-specific surveys in Cave, Dry Lake, Hamlin, and Spring valleys. Kit fox habitat occurs in all basins crossed by the ROWs (USGS 2007).

Of the two representative species, one diurnal raptor species of management concern (northern harrier) was observed during winter raptor surveys (SNWA 2005-2008) in the ROW in Cave and Delamar valleys and within 0.5 mile of the ROW in two additional valleys (Dry Lake and Spring). Klinger and Williams (2005) also reported an incidental siting of northern harrier within the project area. Flammulated owl is also suspected to occur in a number of the basins that would be crossed by the ROWs. Many other raptor species are likely to occur in habitats crossed by the ROWs; specific information on special status raptor species is addressed in the next section.

Upland game-bird species (including migratory species) within the ROWs include: greater sage-grouse, mourning dove, chukar, quail, and band-tailed pigeon. Greater sage-grouse, which is considered a BLM sensitive species, was petitioned for listing under the ESA. The species listing was found to be warranted but precluded, and the species has been designated a federal Candidate (Priority 8) species (Federal Register, March 5, 2010).This species is discussed in the Special Status Species section. Mourning dove has been documented in four of the valleys that would be crossed by the ROWs (Coyote Spring, Cave, Snake, and Spring valleys) and is likely to occur in all the valleys crossed by the ROWs. Band-tailed pigeon was recorded in Las Vegas Valley (GBBO 2007a) and could occur within the ROW in this area.

No waterfowl species of management concern have been documented along the ROWs, although the majority of these species have been documented or are suspected of occurring in at least one of the ROW basins. Marshlands comprise less than 1 percent of the land cover types crossed by the ROW. See Section 3.5, Vegetation Resources, for cover types in the ROW (**Table 3.5-1**).

Figure 3.6-1 Pronghorn Habitat

Figure 3.6-2 Rocky Mountain Elk Habitat

Figure 3.6-3 Mule Deer Habitat

Figure 3.6-4 Desert Bighorn Sheep Habitat

Figure 3.6-5 Rocky Mountain Bighorn Sheep Habitat

Some of the more common migratory bird species that occur within the ROW include the neotropical migrants and raptors that are listed in **Appendix F**, **Table F3.6-1**. Additional migratory birds are included in the discussion of special status wildlife species. Based on **Table 3.5-1** in Vegetation Resources, the following list includes cover types and some management concern migratory bird species that are associated with these habitats. The first four cover types comprise 24, 25, 2, and 48 percent of the ROW, respectively. The last four are habitats of interest that make up less than 1 percent of the ROW collectively.

- **Greasewood/Salt Desert Shrubland** – sage sparrow, Brewer's sparrow;
- **Mojave mixed desert scrub** – cactus wren, crissal thrasher, and Le Conte's thrasher;
- **Pinyon-juniper woodland** – black-throated gray warbler;
- **Sagebrush shrubland** – sage sparrow, vesper sparrow, and Brewer's sparrow;
- **Marshland** – American avocet, mallard, Canada goose, Wilson's phalarope, willet, northern pintail;
- **Perennial grassland** – grasshopper sparrow, vesper sparrow, horned lark;
- **Playa** – American avocet; and
- **Riparian** – Canada goose, Costa's hummingbird, red-naped sapsucker, Williamson's sapsucker, bell's vireo, and yellow warbler.

There is one important bird area, Lower Meadow Valley Wash, which overlaps with the construction support site near Caliente (Lower Meadow Valley Wash Valley). The Pahranagat Valley Complex important bird area is approximately 0.2 mile to the west of the ROW in Pahranagat Valley, but it is not crossed by the ROW.

Special Status Wildlife Species

Special status wildlife species' occurrence data were reviewed for the ROWs and are identified in **Appendix F**, **Table F3.6-1**. The terrestrial wildlife species that are identified as special status in this section are federally threatened, endangered, or proposed, under the ESA, or considered sensitive by the BLM or USFS (note that only Alternative F crosses USFS lands). Habitat and life-history information for these species is provided in **Appendix F**, **Table F3.6-3**. Special status wildlife species or groups that are known to occur along the ROWs include desert tortoise, pygmy rabbit, greater sage-grouse, western burrowing owl, other special status raptors (golden eagle, bald eagle, ferruginous hawk, prairie falcon), other special status birds, nine bat species, desert valley kangaroo mouse, reptiles, and Mojave poppy bee. The following information summarizes the occurrence of these species within the ROWs. (The desert bighorn sheep is discussed under the species of management concern.) See **Appendix F**, **Table F3.6-1** for species status.

Desert Tortoise (Federally Threatened) – The proposed ROWs cross habitat for one federally listed species, desert tortoise, in five basins (Las Vegas, Garnett, Hidden Valley, Coyote Spring, and Pahranagat valleys). A portion of the tortoise habitat in this area has been designated as critical habitat for the desert tortoise and occurs in the Mormon Mesa Critical Habitat Unit of the Northeastern Mojave Recovery Unit (USFWS 1994a). Approximately 1,760 acres of critical habitat and 591 acres of non-critical habitat occur within project ROWs. According to the USFWS, tortoise densities are least abundant in the Northeast Mojave Recovery Unit (0.84–3.01 tortoises/2 square kilometers) compared to the other five recovery units, meaning low tortoise densities (USFWS 2006). Of the seven ACECs created by the Ely and Las Vegas BLM RMPs for the protection of desert tortoise, two (Coyote Spring and Kane Spring ACECs) overlap the proposed ROWs. **Figure 3.6-6** displays USFWS critical habitat as well as USGS modeled potential habitat (Nussear et al 2009) for this species.

Many project-specific surveys have been conducted in the ROWs for ESA Section 7 compliance with the USFWS. In general, the highest densities of tortoise sign were observed from Hidden Valley south to Las Vegas Valley. Densities of desert tortoise along the ROWs ranged from 0 to 45 along most of the ROWs, with one site recording 46 to 90 tortoises per square mile (Wildland International 2009).

Figure 3.6-6 Desert Tortoise Habitat and Critical Habitat

Since the 1994 Desert Tortoise Recovery Plan was approved by the USFWS, much new information has become available and will likely result in changes to the recovery strategy for the desert tortoise. In 2003, the Desert Tortoise Recovery Plan Assessment Committee was appointed by the USFWS to conduct a comprehensive assessment of the Recovery Plan. The Committee consists of a team of scientists with diverse expertise in fields relative to the desert tortoise and its recovery. In 2004, the Committee completed its assessment and prepared a report of its findings and recommendations. The USFWS considers the information in this report to be relevant to desert tortoise conservation planning.

Currently, efforts are underway to complete the final revised Desert Tortoise Recovery Plan for the Mojave population. A draft of the final revised plan was completed and published for the comment period that started in August 2008 and ended in November 2008. Comments were reviewed and edits made to the final revised plan, which is currently undergoing final review. The document is anticipated for release in mid-2011.

Greater Sage-grouse (Federal Candidate) – Aerial and ground surveys that were conducted along the ROWs by SNWA (2007c) documented active greater sage-grouse leks in two valleys (Cave and Spring valleys). Additional active greater sage-grouse leks in Spring Valley were documented by the SNWA during a greater sage-grouse telemetry study (SNWA 2009). The 2008 greater sage-grouse NDOW database identified active leks in Cave, Lake, Snake, Spring, Hamlin, and Steptoe valleys. **Figure 3.6-7** displays active, inactive, unknown, and historic leks, **Figure 3.6-8** displays sage-grouse nesting and brooding and summer habitat and **Figure 3.6-9** displays winter habitat. Fifteen leks were identified within 2 miles of the proposed ROW. Of the 15 leks identified, nine are considered active. Three of the nine active lek sites were found within the Spring/Snake Valley population management unit and within Spring Valley in White Pine County. These leks contained male counts ranging from 3 to 5 males in attendance. One active lek was found within the Spring/Snake Valley population management unit within Snake Valley with 5 males in attendance. Two active leks were found within the Cave population management unit within Cave Valley with male counts ranging from 2 to 24 males in attendance. Two active leks were found within the Lincoln population management unit within Spring Valley with male counts ranging from 2 to 5 males in attendance and one active lek was found with the Steptoe/Cave population management unit within Steptoe Valley with 2 males in attendance.

Greater sage-grouse typically occupy sagebrush communities, breeding in relatively open lek sites (or strutting grounds). Leks are established in open areas, 0.2 to 12 acres in size. Nesting habitat is characterized primarily by Wyoming big sagebrush communities with a 15- to 38-percent canopy cover and a grass-forb understory (NDOW and California Department of Fish and Game 2004). On average, most nests occur within 4 miles of a lek site; however, nesting habitat may occur at greater distances from a lek site for migratory populations (Connelly et al. 2000). Early brood rearing generally occurs close to nest sites. Optimum brood-rearing habitat consists of sagebrush stands that are 16 to 32 inches tall, with a canopy cover of 10 to 25 percent and an herbaceous understory consisting of grass and forb species (BLM 2000). Sage-grouse breeding/nesting season occurs from March to May (BLM 2000) and brood rearing season falls between April and August.

- Summer habitat consists of sagebrush mixed with areas of wet meadows, riparian habitat, or irrigated agriculture fields. As habitat begins to dry up, greater sage-grouse broods move to more mesic habitat, such as wet meadows, where succulent grasses and insects are still available. In Nevada, greater sage-grouse rely on wet areas for their survival, because Nevada typically receives less precipitation than other states (Conservation Planning Team 2001). Fall habitat in northeastern Nevada consists of a mosaic of low-growing sagebrush and Wyoming big sagebrush. In both Nevada and Utah, it is crucial that sagebrush be exposed at least 10 to 12 inches above snow level for wintering greater sage-grouse (Conservation Planning Team 2001). Sagebrush is the primary food source of adult greater sage-grouse; however, forb species are an important food source in spring and early summer and improve successful reproduction in females. Numerous forb species also enhance nest concealment and relative nest success (Wambolt et al. 2002). See **Table F3.6-3** in **Appendix F3.6** for additional life history and habitat requirement information.

Figure 3.6-7 Two Mile Buffers of Sage-grouse Leks

Figure 3.6-8 Greater Sage-grouse Summer, Nesting and Brooding Habitat

Figure 3.6-9 Greater Sage-grouse Winter Habitat

Raptors – Additional special status raptor species (golden eagle, ferruginous hawk, and prairie falcon) have been observed within or near the ROWs. Bald eagle is also addressed here in the raptors discussion.

- Golden eagle has been recorded in the ROWs during winter surveys in Delamar, Dry Lake, Hamlin, and Spring valleys and also within the 0.5 mile buffer of the ROW in Steptoe Valley (GBBO 2007b; SNWA 2005-2008). NDOW's raptor nest database (2011) was searched for nest sites within the ROWs, as well as a 0.5 mile and 10 mile buffer of the ROWs. There is one golden eagle nest site recorded in 1978 that occurs within the 0.5 mile buffer in Pahranagat Valley. There are 13 nest sites recorded in the 10 mile buffer. Three of the 13 nests are located in Dry Lake Valley and were recorded in 2007; the remaining 10 nests were recorded in Hamlin, Pahranagat, Spring and Steptoe valleys prior to 1981. NDOW surveys specific to the proposed project ROW found no golden eagle nests in the ROWs or with a 0.5 mile buffer (Klinger and Williams 2005). This species is protected under the Bald and Golden Eagle Protection Act (BGEPA). Habitat and life-history information for this species and subsequent species mentioned in this section is provided in **Appendix F**, **Table F3.6-3**. At this time, USFWS has not requested an Avian Protection Plan.
- Ferruginous hawk has been recorded during winter surveys within 0.5 mile of the ROWs in Delamar, Dry Lake and Spring valleys (GBBO 2007b, SNWA 2005-2008). The NDOW raptor nest database has records of 6 nests in the ROWs in Hamlin and Spring valleys, all recorded before 1984. Within the 0.5-mile buffer, there are 40 nests recorded between 1977 and 1992 in Hamlin, Snake, Spring, and Steptoe valleys. There are 161 nests recorded within the 10-mile buffer recorded between 1976 and 1992. Project-specific nest surveys conducted by the NDOW in 2005 found no active ferruginous hawk nests within the ROWs and 2 active nests within the 0.5-mile buffer, one each in Hamlin and Spring valleys (Klinger and Williams 2005).
- Prairie falcon has been recorded during winter surveys in the ROW in Delamar Valley and also within Dry Lake and Spring valleys within the 0.5 mile buffer (GBBO 2007b, SNWA 2005-2008). The NDOW raptor nest database has no nest records for prairie falcon within the ROW or the 0.5 mile buffer. Within the 10 mile buffer there are 14 nests in five valleys crossed by the ROW (Garnet, Las Vegas, Snake, Spring, and Steptoe); all but two were recorded between 1973 and 1981, with two were nests in Las Vegas Valley recorded in 1997 and 2001.
- Bald eagle is not known to nest in eastern Nevada (Floyd et al. 2007), but it does winter in basins crossed by the ROW. It has been recorded during winter surveys in Hamlin, Spring, and Snake valleys, but more than 0.5 mile outside the ROWs. This species is protected under the BGEPA.
- Other special status raptor species that may be in the ROW include Swainson's hawk, short and long-eared owls, peregrine falcon, and northern goshawk. See **Table F3.6-3** in **Appendix F** for life history and habitat requirement information on special status raptors.

Western Burrowing Owl – This species has been recorded in or near the ROWs in seven valleys: Las Vegas, Coyote Spring, Delamar, Dry Lake, Hamlin, Snake, and Spring valleys (Wildland International 2007, 2009; NNHP 2011). There were 8 burrowing owl burrows recorded in 2003 (NNHP 2011) within 0.5 mile of the ROW; all in Las Vegas Valley. NDOW's raptor nest database has four burrows recorded within the 10 mile buffer; two each in Dry Lake and Spring valleys recorded between 1977 and 2000. Burrowing owls have been sighted throughout the state of Nevada, primarily breeding in salt desert scrub, Mojave shrub, and in some sagebrush habitat. They also are known to breed around the fringes of agricultural lands, using croplands and pasture lands for foraging during the breeding season. Burrowing owls winter most frequently in the southern half of Nevada but have been recorded throughout the state during all months (Klute et al. 2003). Population status and trends are not well understood for this species (GBBO 2010). See **Table F3.6 3** in **Appendix F** for additional life history and habitat requirement information.

Additional Special Status Bird Species – Similar to the species addressed in the management concern section, a list of special status species associated with the various cover types from **Table 3.5-1** is provided below. See the management concern species section for information on important bird areas crossed and near the ROWs and **Table F3.6-3** in **Appendix F** for life history and habitat requirement information on other special status birds.

- Greasewood/Salt Desert Shrubland – loggerhead shrike;
- Mojave mixed desert scrub – loggerhead shrike;

- Pinyon-juniper woodland – pinyon jay and gray vireo;
- Sagebrush shrubland – loggerhead shrike;
- Marshland – western snowy plover and common yellowthroat;
- Perennial grassland – long-billed curlew;
- Playa – western snowy plover; and
- Riparian – common yellowthroat.

Pygmy Rabbit – This species was observed in the ROWs within five basins (Dry Lake, Cave, Lake, Steptoe, and Spring valleys) (SNWA 2009, 2007b). Pygmy rabbit also has been recorded in Dry Lake and Lake valleys during previous surveys (NNHP 2006). The species also has a reasonable expectation of occurrence in Hamlin Valley based on best available knowledge by wildlife management agencies; however, it has not been recorded in the ROWs. The majority of overlap of this species within the ROWs is in Spring Valley, although signs of pygmy rabbit have been observed throughout the northern portion of the ROWs. Generally, pygmy rabbits burrow in dense sagebrush areas with loamy soils that are deeper than 20 inches (Roberts 2001). Pygmy rabbits typically inhabit dense stands of big sagebrush growing in deep, loose soils. Habitat includes broad valley floors, drainage bottoms, alluvial fans, and other areas with friable soils that are usually associated with rabbitbrush or sagebrush vegetation (SNWA 2007b). The understory of grasses and forbs in the habitat varies from sparse to dense. This species digs its own burrow, 4 to 10 inches in diameter (Ulmschneider et al. 2004) and deeper than 20 inches, primarily in loamy soils among taller and denser big sagebrush. However, other subspecies of sagebrush may be used as well (SNWA 2007b). Big sagebrush is the primary food source, but grasses and forbs are also consumed in mid- to late summer. The species can be active during the entire year throughout the day and night, but generally tend to be active during twilight. The breeding period extends from spring to early summer.

Bats – Eight bat species have been recorded in or near the ROWs (big brown, Brazilian free-tailed, California myotis, fringed myotis, hoary bat, pallid bat, western pipistrelle, and western small-footed myotis). An additional special status species, the long-legged myotis, was identified during surveys (SNWA 2009). An additional eight special status bat species have been identified as having reasonable expectation of occurrence based on best available knowledge by wildlife management agencies within basins crossed by the ROWs (ENSR/AECOM 2008) (**Appendix F**, **Table F3.6-1**). See **Table F3.6-3** in **Appendix F** for more information on life history and habitat requirements of these bat species.

Desert Valley Kangaroo Mouse – The SNWA (2007a) small mammal survey identified the subspecies as occurring in Dry Lake Valley in areas with sandy soils. The NDOW has records of the species dark kangaroo mouse in ROWs in Cave, Dry Lake, Hamlin and Spring valleys. The NDOW considers records of dark kangaroo mouse found in Dry Lake or Delamar valleys to likely be the subspecies *M.m. albiventer* (Tomlinson 2011). Generally, the Desert Valley kangaroo mouse inhabits areas with loose sands and gravel, and may occur in sand dunes near the margins of its range. It is found in shadscale scrub, sagebrush scrub, and alkali sink plant communities in the Upper Sonoran life zone (Wildlife Action Plan Team 2006). This species primarily feeds on seeds, but it may also consume insects. It does not appear to utilize surface water. Food is likely stored in seed caches within burrow systems. The species is active from March through October. Peak nocturnal activity occurs during the first 2 hours after sunset. Activity level is influenced by ambient temperature and moonlight. Individuals remain underground in burrows when inactive and are believed to hibernate. The majority of young are born in May and June, with litter size ranging from two to seven (O'Farrell 1974). The range of the pale kangaroo mouse, another special status species, falls outside of ROW areas (USGS 2007).

Reptiles – The banded Gila monster has been observed in a number of the basins crossed by the ROWs (Coyote Spring, Garnet, Hidden Valley, Las Vegas, and Pahranagat valleys). Common chuckwalla also is found in these same valleys and was recorded along a power line ROW in Coyote Spring Valley. Both species are suspected within or near ROWs. The types of vegetation communities that these species inhabit include desert grassland, Mojave and Sonoran desert scrub, and thorn scrub (NatureServe 2010). See **Table F3.6-3** in **Appendix F** for more information on life history and habitat requirements of these two special status reptile species.

Terrestrial Invertebrates – Based on January 2010 Nevada Natural Heritage data and the Ecological Sciences, Inc. (2007) study, there are five BLM sensitive terrestrial invertebrate species that occur in valleys crossed by the ROWs.

These species are the White River wood nymph (Lake Valley), Baking Powder Flat blue butterfly (Spring Valley), Mojave poppy bee (Coyote Spring Valley), Steptoe Valley crescentspot (Steptoe Valley), and Koret's checkerspot (Snake, Spring, and Steptoe valleys). Of these invertebrate species, only the Mojave poppy bee (Coyote Spring Valley) has been recorded within the ROWs. The Mojave poppy bee only utilizes plants in the poppy family for pollen (Tepedino 2000). See **Table F3.6-3** in **Appendix F** for more information on life history and habitat requirements of these special status species.

Alignment Options 1 through 4

Wildlife resources within the four alignment alternatives (Alignment Option 1 through 4) are summarized in the following sections. The dominant types of wildlife habitat are noted, as well as any differences in wildlife use for the alignment alternatives, compared to the Proposed Action segment. Additionally, based on surveys that were conducted by Wildland International (2009, 2007), special status wildlife species that could occur within or near the alignment alternatives (F through I) include the following:

- **Alignment Option 1 (Humboldt-Toiyabe Power Line) –** This alternative would align a segment of the proposed power line adjacent to other existing power lines across the Humboldt-Toiyabe National Forest rather than create a new corridor for the power line to the south. Habitat consists of higher-elevation montane shrubland, compared to Great Basin pinyon-juniper woodland and xeric sagebrush shrubland along the Proposed Action segment. This alternative contains potential Rocky Mountain bighorn sheep and elk crucial summer range, which are not present along the Proposed Action segment. This alignment would pass within the 2 mile buffer of one active lek, but further away than the Proposed Action alignment. Special status species include pinyon jay and Brewer's sparrow.
- **Alignment Option 2 (North Lake Valley Pipeline and Power Line) –** Habitat mainly consists of big sagebrush shrubland and grassland (the same as the Proposed Action). Big-game ranges are the same as those that would be crossed by the Proposed Action. This alternative passes within 2 miles of 10 active greater sage-grouse lek sites as compared to 9 active lek sites in the Proposed Action. Special status species include long-billed curlew, pygmy rabbit, and White River wood nymph (Lake Valley). Little information on habitat is known about the White River wood nymph subspecies (see **Table F3.6-1** in **Appendix F** for additional information on the White River wood nymph).
- **Alignment Option 3 (Muleshoe Substation and Power Line) –** The predominant habitat is mixed desert shrubland (the same as the Proposed Action). This alternative would avoid passing within 2 miles of an active greater sage-grouse lek site in Steptoe Valley, as compared to the Proposed Action. Special status species include pygmy rabbit, western burrowing owl, pinyon jay, and Brewer's sparrow.
- **Alignment Option 4 (North Delamar Valley Pipeline and Power Line) –** Habitat is dominated by big sagebrush shrubland and desert shrub steppe (the same as the Proposed Action). Special status species include the western burrowing owl.

3.6.1.3 Groundwater Development Areas

Groundwater development areas are proposed in five basins: Snake, Spring, Cave, Dry Lake, and Delamar valleys. There are no groundwater development areas in Utah.

Species of Management Concern

Five big game mammals of management concern are known to occur within the groundwater development areas. Range information shown on **Figures 3.6-1** through **3.6-5** is based on the NDOW (2004, 2010b). Overlap between bighorn sheep habitat and groundwater development areas are shown, but given that habitat for bighorn sheep is generally at higher elevations and groundwater development facilities will most likely be placed in valleys, overlap when actual future groundwater facilities are proposed is not anticipated. The following big game species are found in the groundwater development project areas:

- **Pronghorn Antelope (Figure 3.6-1) –** Year-round range for antelope overlaps all of the groundwater development areas. Crucial winter range is crossed by the groundwater development areas in Spring Valley.
- **Rocky Mountain Elk (Figure 3.6-2) –** Year-round elk range overlaps with the groundwater development areas in Dry Lake, Cave, Snake, and Spring valleys.

- **Mule Deer (Figure 3.6-3) –** Year-round mule deer range overlaps with all five of the groundwater development areas. Crucial summer range occurs in Cave, Dry Lake, Spring, and Snake valleys; crucial winter range overlaps the groundwater development areas in Dry Lake and Spring valleys.
- **Desert Bighorn Sheep (Figure 3.6-4) –** Occupied habitat occurs within the groundwater development areas in Dry Lake, Delamar and Cave valleys. Potential habitat overlaps the groundwater development areas in Cave, Delamar and Spring valleys.
- **Rocky Mountain Bighorn Sheep (Figure 3.6-5) –** Occupied and potential habitat for Rocky Mountain bighorn sheep overlaps the groundwater development areas in Spring and Snake valleys.

Of the ten management concern small mammal species, six may occur in groundwater development areas (dark kangaroo mouse, Merriam's shrew, vagrant shrew, brush mouse, kit fox, and ringtail). Given species range or habitat use, water shrew, Inyo shrew, desert kangaroo rat, and desert pocket mouse are unlikely to occur in groundwater development areas. Project-specific surveys have recorded dark kangaroo mouse in groundwater development areas in Dry Lake, Cave and Spring valleys. Kit fox habitat occurs in groundwater development areas in all five basins (USGS 2007).

One of the two representative raptor species of management concern, the northern harrier, was recorded within groundwater development areas in all five basins (GBBO 2009) and an active nest site (NDOW 2011) was recorded within a groundwater development area in Spring Valley. Flammulated owl has been recorded in groundwater development areas in Spring and Snake valleys.

Mourning dove has been documented in groundwater development areas in three basins (Cave, Snake, and Spring valleys) and is suspected to occur in the other two basins. Band-tailed pigeon has not been recorded in the groundwater development areas, although it could occur there.

Other management concern migratory bird species are found in groundwater development areas. Cover types in the groundwater development areas are similar to those in the ROWs (**Table 3.5-3**, Vegetation). See the ROW management concern species earlier in this section for examples of birds that could occur in these habitats in groundwater development areas as well as **Table F3.6-1** in **Appendix F** for information on basins of suspected occurrence.

No important bird areas are crossed by groundwater development areas, although GBNP and D.E. Moore Bird and Wildlife Sanctuary important bird areas share a boundary with a groundwater development area in Snake Valley. The Northern Snake Range important bird area is located within 2 miles of groundwater development areas in Snake and Spring valleys.

Special Status Wildlife Species

Based on a review of occurrence data for special status wildlife, species occurrences were identified for the groundwater development areas (**Appendix F**, **Table F3.6-1**). The terrestrial wildlife species that are identified as special status in this section are federally threatened, endangered, or proposed under the ESA or are considered sensitive by the BLM or the USFS. There are 34 special status species that have been recorded within groundwater development areas (**Appendix F**, **Table F3.6-1**). Habitat and life history information for these species is provided in **Appendix F**, **Table F3.6-3**.

Special status wildlife species or groups that have habitat in the groundwater development areas include greater sage-grouse, pygmy rabbit, bats, desert valley kangaroo mouse, golden eagle, bald eagle, western burrowing owl, ferruginous hawk, other special status migratory birds and Baking Powder Flat blue butterfly. There is no desert tortoise habitat in the groundwater development areas. Based on surveys that were conducted by Wildland International (2007), the banded Gila monster has not been observed in any of the groundwater development areas. Based on the Southwest ReGap animal models, neither Gila monster or common chuckwalla have habitat in these areas. The following information summarizes the occurrence of pygmy rabbit, greater sage-grouse, raptors, additional special status birds, and terrestrial invertebrates within the groundwater development areas. (The desert bighorn sheep is discussed under the species of management concern.)

- **Greater Sage-grouse** – Habitat for this species is located in three of the groundwater development areas (Cave, Snake, and Spring valleys). Active, inactive, and historic breeding areas within 2 miles of groundwater development areas are shown in **Figure 3.6-7**. Twenty-seven leks were identified within the boundaries of the proposed groundwater development areas. Of the 27 leks identified, 13 are considered active. Nine of the 13 active lek sites are found within the Spring/Snake Valley population management unit and within Spring Valley in White Pine and Lincoln counties. Male counts in these leks ranged from 3 to 30. There is one active lek within the Spring/Snake Valley population management unit within Snake Valley with 5 males in attendance. There are two active leks within the Lincoln population management unit within Spring Valley. Male counts ranged from two to five males in attendance. One active lek is found within the Cave population management unit within Cave Valley. This lek had a count of 10 males in attendance. An additional 5 leks are found within 2 miles of groundwater development areas. All five are found within the Cave population management unit within Cave Valley with male attendance numbers ranging from 0 to 24. The winter, summer and nesting and early brood ranges that have been mapped by the NDOW overlap the groundwater development basins (see **Figures 3.6-8** and **3.6-9**).

- **Raptors** – Additional special status raptor species (golden eagle, bald eagle, ferruginous hawk, peregrine falcon, prairie falcon, and northern goshawk) have been observed within the groundwater development areas.

  Golden eagle has been recorded in groundwater development areas in Dry Lake, Delamar, Spring and Snake valleys during winter surveys (GBBO 2007b; SNWA 2005-2008). The NDOW raptor nest database has a 1980 record for a nest in a groundwater development area in Snake Valley. No additional nest sites are recorded in the 0.5 mile groundwater development area buffer. There are 15 nests in the NDOW raptor database within the 10 mile groundwater development area buffer; 3 nests were recorded in 2007 in Dry Lake, Pahranagat, and Pahroc valleys and the other 12 nests were recorded prior to 1981 in Dry Lake, Hamlin, Pahranagat, Snake, Spring, and Steptoe valleys. Habitat and life-history information for this species and subsequent species mentioned in this section is provided in **Appendix F**, **Table F3.6-3**.

  Bald eagle has been recorded during winter surveys in groundwater development areas in Snake and Spring valleys (GBBO 2007b; SNWA 2005-2008) and in Spring valley in the 0.5 mile groundwater development area buffer. This species is not known to nest in eastern Nevada.

  Ferruginous hawk has been recorded in Dry Lake, Hamlin, Snake, and Spring valleys (NNHP 2006; Klinger and Williams 2005; GBBO 2007b; SNWA 2005-2008). The NDOW raptor nest database has 70 nests within the groundwater development areas all recorded prior to 1993. There is one nest in Snake Valley recorded in 1977 and 69 nests in Spring Valley dating from 1976 to 1992. In the 0.5 mile buffer an additional 6 nests are recorded; 3 in Spring Valley, 2 in Hamlin Valley, and 1 in Dry Lake Valley, all recorded prior to 1993. More recent surveys by NDOW (Klinger and Williams 2005) recorded five active ferruginous hawk nests in groundwater development areas in Snake and Spring valleys and three additional ferruginous hawk nests within a 0.5 mile buffer of groundwater development areas in Hamlin and Spring valleys. The 10 mile buffer of groundwater development areas has records for 162 nests recorded between 1972 and 2001 in Dry Lake, Hamlin, Lake, Snake, Spring and Steptoe valleys.

  Peregrine falcon has been recorded in Spring Valley during winter surveys. The NDOW raptor nest database does not contain records for this species in groundwater development areas or in the 0.5 mile or 10 mile buffers.

  Prairie falcon has been recorded during winter surveys in groundwater development areas in Delamar, Dry Lake and Spring valleys (GBBO 2007b; SNWA 2005-2008); and also in Snake Valley in the 0.5 mile groundwater development area buffer. The NDOW raptor nest database has 3 prairie falcon nest records from Snake and Spring valleys all recorded prior to 1980 within the groundwater development areas. There are an additional 4 nests in the 0.5 mile buffer; all four recorded before 1982 within the same two valleys. The 10 mile groundwater development area buffer has records for 18 nests in five basins (Pahroc, Snake, Spring, Steptoe, and White River valleys) all recorded before 1982.

  Northern goshawk has been recorded in a groundwater development area in Spring Valley (GBBO 2007a). The NDOW raptor nest database does not contain records for this species in groundwater development areas, the 0.5-mile or 10-mile buffers.

NDOW's raptor nest site database also contains a short-eared owl nest record from 1978 that falls within a groundwater development area in Spring Valley. Habitat and life-history information for special status raptors is provided in **Appendix F**, **Table F3.6-3**.

- **Western Burrowing Owl** – This species has been recorded during surveys in groundwater development basins in three valleys: Dry Lake, Snake, and Spring (Wildland International 2009, 2007). The NDOW's raptor nest site database has records of four burrows recorded between 1982 and 2000 within groundwater development areas in Dry Lake, Snake, and Spring valleys. See **Table F3.6-3** in **Appendix F** for additional species habitat and life-history information.
- **Additional Special Status Bird Species** – Other special status bird species (e.g. pinyon jay, loggerhead shrike, long-billed curlew, and gray vireo) are found in groundwater development areas. Cover types in the groundwater development areas are similar to those in the ROWs; however, there are no marshland cover types (see **Table 3.5-3**, Vegetation). See the ROW special status species earlier in this section for examples of birds that could occur in these habitats in groundwater development areas as well as **Table F3.6-1** in **Appendix F** for information on basins of occurrence.
- **Pygmy Rabbit** – This species was observed in four valleys within the groundwater development areas: Dry Lake, Cave, Spring, and Snake valleys (Wildland International 2007; SNWA 2009, 2007b). Pygmy rabbit also has been recorded in Dry Lake Valley in previous surveys (NNHP 2006) and by the NDOW in Cave, Spring and Snake valleys.
- **Bats** – Of the 17 species of bats that occur in the area, 15 have been recorded within groundwater development areas and all 17 have been recorded in at least one of the valleys where groundwater development areas are located. See **Tables F3.6-1** and **F3.6-3** in **Appendix F** for basins of occurrence and habitat information.
- **Desert Valley Kangaroo Mouse** – This subspecies is recorded in a groundwater development area in Dry Lake Valley (NNHP 2010). NDOW has records of the species (dark kangaroo mouse) in groundwater development areas in Cave, Dry Lake, and Spring valleys; records in Dry Lake valley would be considered to be the subspecies *M.m. albiventer*.
- **Terrestrial Invertebrates** – There is one BLM sensitive terrestrial invertebrate species, the Baking Powder Flat blue butterfly, recorded in Spring Valley within a groundwater development area (NNHP 2010). The other five BLM sensitive terrestrial invertebrate species have not been recorded, nor are they suspected to occur in groundwater development areas. This butterfly species is only known from Baking Powder Flat in Spring Valley and its host plant is Shockley's buckwheat (Austin 1998). See **Table F3.6-3** in **Appendix F** for additional species information.

3.6.1.4 Region of Study

The overall natural resources region of study is a large geographical area, within which the focus for terrestrial wildlife is on habitats that are water dependent (i.e., wetland, riparian, and phreatophytic communities). Spring systems and associated species are discussed in Section 3.7, Aquatic Biological Resources. The same habitat types that are discussed for the ROWs and groundwater development areas occur in the natural resources region of study. Therefore, the focus of this section is on Great Basin and Mojave Desert riparian and playa communities and habitats associated with surface water. Cave habitats also are discussed, because of their unique biological characteristics and public interest. Please note the natural resources region of study differs slightly from the water resources region of study discussed in Section 3.3, Water Resources. This is explained in more detail in Section 3.5., Vegetation Resources Overview. These regions of study boundaries are depicted on **Figures 3.5-3** and **3.5-4**.

Wildlife Species of Management Concern

Management guidance for species of management concern is described in state management plans (**Table 3.6-1**). In addition to the species-specific management guidance documents that are listed in **Table 3.6-1**, the Clark County Multiple Species Habitat Conservation Plan (RECON 2000) and the Lower Colorado River Multiple Species Conservation Program (LCRMSCP) (2004) cover some of these species. Many of these species also are covered in the Nevada Wildlife Action Plan (Wildlife Action Team 2006) and the Utah Comprehensive Wildlife Conservation Strategy (Sutter et al. 2005). Multiple bird species are covered in Landbirds of Nevada and the Habitats They Need (GBBO 2005), Atlas of the Breeding Birds of Nevada (Floyd et al. 2007), Nevada Partners in Flight Bird Conservation

Plan (Nevada Partners in Flight 1999), Utah Partners in Flight Avian Conservation Srategy Version 2.0 (Parrish et al. 2002) and the Partners in Flight North American Landbird Conservation Plan (Rich et al. 2004). In addition, the American avocet is discussed in the U.S. Shorebird Conservation Plan (Brown et al. 2001) and the Intermountain West Regional Shorebird Plan (Oring et al. 2000). Most of the mammal, bird, and reptile species have been mapped as part of the Provisional Digital Animal-Habitat Models for the Southwestern U.S. (USGS 2007).

Table 3.6-1 Management Guidance for Species of Management Concern

Species	Plan/Citation
Pronghorn	Policy for the Management of Pronghorn Antelope (Nevada Board of Wildlife Commissioners 2003); Nevada's Pronghorn Antelope – Ecology, Management and Conservation (Tsukamoto 1983); Utah Pronghorn Statewide Management Plan (UDWR 2009b)
Elk	Nevada Elk Species Management Plan (NDOW 1997); Lincoln County Elk Management Plan (NDOW 2006a); White Pine County Elk Management Plan - Revision (NDOW 2007a); Utah Division of Wildlife Resources Statewide Management Plan for Elk (UDWR 2005)
Mule deer	Management Plan for Mule Deer (NDOW 2006b); Utah Division of Wildlife Resources Statewide Management Plan for Mule Deer (UDWR 2003)
Desert and Rocky Mountain bighorn sheep	Bighorn Sheep Management Plan (NDOW 2001); Utah Division of Wildlife Resources Bighorn Sheep Statewide Management Plan (UDWR 2008)

Five big-game mammals of management concern occur within the natural resources region of study in the following areas. Pronghorn antelope and elk occur in approximately half of the hydrologic basins in the study region (18 basins); mule deer are present in 26 of the 33 hydrologic basins in the study region. Desert bighorn sheep occur in all but six of the hydrologic basins, but Rocky Mountain bighorn sheep occur in only five of the basins within the study region. Species distribution for the species of management concern is identified, by hydrologic basin, in **Appendix F**, **Table F3.6-1**. Habitat requirements and life-history information for these species is provided earlier in this section and in **Appendix F**, **Table F3.6-2**.

Small mammals of management concern occur throughout the natural resources region of study. Those species that are dependent on wetland or phreatophytic vegetation are of particular interest (e.g. vagrant shrew and water shrew). The 10 representative management concern species are discussed earlier in this section in the ROW and groundwater development sections and basins of occurrence and habitat and life history information can be found in **Appendix F**, **Tables F3.6-1** and **F3.6-2**. Similarly, representative upland game birds, waterfowl, and other migratory birds of management concern are addressed earlier in the section and in appendix tables.

There are a number of important bird areas within the natural resources region of study. In Nevada, Lake Mead National Recreation Area, Virgin River, Moapa Valley, Meadow Valley Wash, Sheep Range, Pahranagat Valley complex, GBNP, D.E. Moore Bird and Wildlife Sanctuary, and Northern Snake Range important bird areas are within the region of study (Audubon 2010a). In Utah, the Fish Spring NWR important bird area is within the region of study (Audubon 2010b).

Special Status Wildlife Species

The occurrence of special status wildlife species within the natural resources region of study is listed by basin in **Appendix F**, **Table F3.6-1**. Federally listed species are shown in **Appendix F**, **Figure F3.6-1**. The region of study contains habitat for three federally listed terrestrial wildlife species (e.g., southwestern willow flycatcher, Yuma clapper rail, and desert tortoise).

Management guidance for special status terrestrial species is described in recovery plans, habitat management plans, and conservation agreements (**Table 3.6-2**). In addition, the western snowy plover and long-billed curlew are discussed in the U.S. Shorebird Conservation Plan (Brown et al. 2001) and the Intermountain West Regional Shorebird Plan (Oring et al. 2000), and bats are discussed in NDOW's Bat Conservation Plan (Bradley et al. 2006).

Table 3.6-2 Management Guidance for Special Status Terrestrial Wildlife Species

Species	Plan/Citation
Southwestern willow flycatcher	Southwestern Willow Flycatcher Recovery Plan (USFWS 2002); Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*) (USFWS 2005)
Yuma clapper rail	Yuma Clapper Rail Recovery Plan (USFWS 1983)
Greater sage-grouse	Greater Sage-grouse Conservation Plan for Nevada and Eastern California (NDOW and California Department of Fish and Game 2004); Utah Greater Sage-grouse Statewide Management Plan (UDWR 2009a); Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats (Connelly et al. 2004); Lincoln County Sage-grouse Conservation Plan (Lincoln County Technical Review Team 2004); White Pine County Portion (Lincoln/White Pine Planning Area) Sage-grouse Conservation Plan (Sage-grouse Technical Review Team 2004)
Bald eagle	Pacific States Bald Eagle Recovery Plan (USFWS 1986)
Desert tortoise	Draft Revised Recovery Plan for the Mojave Population of the Desert Tortoise (USFWS 2008); Endangered and Threatened Wildlife and Plants: Determination of Critical Habitat for the Mojave Population of the Desert Tortoise (USFWS 1994b)

A summary of the occurrence and habitat information for the federally listed species is provided here. This section is followed by a summary of the BLM sensitive species or groups, with more detailed discussions for those species that have conservation agreements or public scoping interest. Many BLM sensitive species occur in the overall region of study; 54 species are addressed in **Appendix F**, **Table F3.6-1** and have potential to be impacted by construction or operation of the proposed project. Detailed occurrence information is provided for the greater sage-grouse and yellow-billed cuckoo, as they are federal candidate species. Raptors, bats, pygmy rabbit, and terrestrial invertebrates also are discussed. Habitat and life history information for the other special status species is provided in **Appendix F**, **Table F3.6-3**.

Southwestern Willow Flycatcher (Federally Endangered) – The range of this subspecies in Nevada is confined to the southern portion of the state (Las Vegas, Pahranagat, Lower Meadow Valley Wash, Muddy River Springs Area, Lower Moapa valleys, and Black Mountains area). Designated critical habitat for this subspecies occurs near the natural resources region of study, approximately 6.5 miles northeast of Lower Moapa Basin along the Virgin River (USFWS 1997). The final recovery plan for the southwestern willow flycatcher was published in 2002 (USFWS 2002).

The southwestern willow flycatcher breeds in dense patches of riparian habitat along streams or other wetland areas, near or adjacent to surface water or saturated soils. Nesting habitat includes willows, cottonwoods, tamarisk, seep willow (*Baccharis salicifolia*), and arrow weed (*Pluchea sericea*). Relative to the overall region of study, reported suitable breeding habitat for the southwestern willow flycatcher is limited to riparian shrub and wetland habitat within the Pahranagat Valley and Lower Moapa Valley hydrologic basins, as well as along the Lower Meadow Valley Wash. In the study area, southwestern willow flycatchers have been detected in numerous locations in Lincoln County in the Pahranagat Valley on Pahranagat NWR (Koronkiewicz et al. 2006), from 1999–2007 on Key Pittman WMA (NDOW 2007b), and on private land in the valley (NDOW 2007b).

The population of southwestern willow flycatchers in the Pahranagat Valley is important to the Lower Colorado Recovery Unit. In 2005, more than 25 percent of breeding territories in this Recovery Unit occurred in the Pahranagat Valley (Durst et al. 2006; Koronkiewicz et al. 2006; NDOW 2007b). In 2005, 19 nests were detected in Pahranagat NWR (Koronkiewicz et al. 2006) and 11 nests at Key Pittman WMA (NDOW 2006c); in 2008, 10 nests were detected in Pahranagat NWR (McLeod and Koronkiewicz 2009). Sporadic breeding occurs along Meadow Valley Wash in Clark and Lincoln counties; breeding was last detected in 1998 (BIO-WEST 2005). In total, approximately 714 acres of woody vegetation types were delineated as potential habitat for this species in Meadow Valley Wash (BIO-WEST 2005). Subsequent flooding of the habitat in 2005 and 2011 has removed the majority of this habitat and southwestern willow flycatchers have not been sighted there since (Daniels 2011). Consistent surveys have not been conducted in this drainage. Other breeding locations within the study area in Clark County are along the upper and lower Muddy River, particularly in Overton WMA (Koronkiewicz et al. 2006; NDOW 2007b). Willow flycatcher

migrants have been detected along Las Vegas Wash (McLeod et al. 2007), although it is unclear if these birds are southwestern willow flycatchers or a different subspecies.

Yuma Clapper Rail (Federally Endangered) – Yuma clapper rails are primarily known from Arizona and California. Observation records from Braden et al. (2008) report sightings at three sites within Nevada, one of which was along the Virgin River north of Mesquite. No new clapper rail sitings were reported in 2008 within Nevada (Braden et al. 2009). No critical habitat has been designated for this subspecies.

Habitat for this species includes freshwater marshes with dense stands of cattails and bulrushes, dominated by stands of emergent vegetation interspersed with areas of open water and drier, upland benches. Mature stands of emergent vegetation along the margins of shallow ponds with stable water levels are preferred. Nests are built on dry hummocks or in small shrubs among dense vegetation on the edge of shallow ponds in marshy areas. Relative to the region of study, the species has been reported only from the Las Vegas, Lower Moapa, and Black Mountains hydrologic basins. Along the Muddy River, Yuma clapper rail habitat is starting to recover from the impacts of the 2005 floods and attempts to control them, which removed much of the rail habitat (Braden et al. 2008). Numbers along the Muddy and Virgin rivers have fluctuated from a high of 26 in 2000 to a low of zero in 2005, after the floods (Braden et al. 2008). In 2006, one pair was detected at Overton WMA in the lower Muddy River floodplain (Braden et al. 2007).

Desert Tortoise (Federally Threatened) – One designated critical habitat unit (Mormon Mesa) occurs within the natural resources region of study in eight hydrologic basins (Las Vegas, Garnet, Hidden, Coyote Spring, Kane Springs, Muddy River Springs, Lower Meadow Valley Wash, and Lower Moapa valleys). Within the region of study, approximately 366,676 acres have been designated as critical habitat for the desert tortoise. In 1998, the Las Vegas Field Office BLM RMP established four ACECs for the protection of critical desert tortoise habitat (BLM 1998). Three additional ACECs were established by the Caliente Amendment for the protection of critical desert tortoise habitat (BLM 2000).

The desert tortoise inhabits upland plateaus and mountain slopes in the Mojave Desert, from 1,000 to 4,200 feet in elevation. The species requires firm ground with adequate ground moisture for constructing burrows in banks of washes or compacted sand and for digging holes for nests. The active period for desert tortoise is from April to October (USFWS 2009). Tortoise activity decreases in summer (June, July, and August), but they emerge after summer rain storms (USFWS 2008). The NDOW, NNHP, BLM, and USFWS have documented numerous desert tortoise sightings within the region of study. There have been several reports of desert tortoise burrows in the lowlands near the mountains from Ash Springs, southward along Pahranagat Wash to the Lincoln County line. Sites that are occupied by desert tortoise are scattered throughout southeastern Lincoln County, with areas of concentration along Kane Springs Wash, Meadow Valley Wash, and the region just south of the Tule Springs Hills. In addition, desert tortoise habitat in Clark County is widespread at elevations below 4,500 feet. The majority of the known occurrences of desert tortoise are found within the southern portion of the county between the Las Vegas Valley and Laughlin, Nevada (RECON 2000). Additional occurrence records are found near Red Rock Canyon and the Moapa Indian Reservation (RECON 2000). See additional discussion under Section 3.6.1.2, ROW Areas, Species of Management Concern.

Yellow-billed Cuckoo (Federal Candidate) – The yellow-billed cuckoo formerly ranged throughout much of North America, from southern Canada to northern Mexico (USFWS 2001). However, the bird has suffered population decline (primarily because of the loss of streamside habitat) and is declining west of the Continental Divide (Biota Information System of New Mexico 2002).

The yellow-billed cuckoo inhabits dense riparian woodlands with tall cottonwood and willow trees. It can also occur in deciduous woodlands, moist thickets, orchards, or overgrown pastures. The yellow-billed cuckoo has been reported in six locations in the Lincoln County portions of the study area. Observations of yellow-billed cuckoo were reported at two sites along Meadow Valley Wash: a breeding pair was identified at one site in 2001 and a single bird was identified at another site in 2002. In total, approximately 253 acres of riparian vegetation were delineated as marginal habitat for this species in Meadow Valley Wash (BIO-WEST 2005). At Crystal Springs, two breeding pairs were reported in 2001. South of Crystal Springs, individual birds were observed at a fourth site in 2000 and 2002. At another site at Ash Springs, four breeding pairs and additional single birds were reported in both 2000 and 2001. In 1979, the NDOW reported a single cuckoo, just south of Beaver Dam State Park in extreme eastern Lincoln County. In Clark County, the yellow-billed cuckoo has been detected at one location in Lower Moapa Valley and two sites in the Muddy River Springs Area hydrologic basins. In addition, this species was detected in Utah in the Fish Springs Flat hydrologic basin.

The yellow-billed cuckoo has been detected several times in the Pahranagat Valley, and most recently on the NWR on July 7, 2006, in riparian woodland habitat (Johnson et al. 2007) and at the Pahranagat north survey site in 2008 (Braden et al. 2009). The Warm Spring Ranch in Moapa Valley (north of the town of Glendale) is the most consistent location for yellow-billed cuckoo in southern Nevada (Braden et al. 2007). At one time, 7 to 14 breeding pairs occurred there per season, but numbers since 2002 have been lower (Braden et al. 2007; NDOW 2007b). Potentially suitable habitat for the yellow-billed cuckoo in the region of study is limited to riparian and wetland areas (Las Vegas, Pahranagat, Muddy River Springs Area, Lower Moapa, Lower Meadow Valley Wash, and Fish Springs Flat valleys).

Greater Sage-Grouse (Federal Candidate) – There are more than 300 known greater sage-grouse active, inactive, historic and unknown lek sites within the natural resources region of study (see **Figure 3.6-7** and the Glossary for an explanation of these four lek classifications). **Figure 3.6-8** shows summer and nesting/brooding habitat and **Figure 3.6-9** displays winter habitat. All of these habitat types are in the northern portion of the natural resources region of study, beginning in the northern halves of Lincoln County, Nevada and Iron County, Utah. See the habitat discussion under Section 3.6.1.2, ROW Areas, Special Status Species and in **Appendix F**, **Table F3.6-3**.

Raptors – The GBBO has published data from spring-breeding bird surveys that were conducted from 2004-2006 and winter raptor surveys from 2005-2008. Additional data from GBBO and the state Natural Heritage programs were also reviewed. Of the nine representative special status species (golden and bald eagle, ferruginous hawk, long-eared owl, northern goshawk, peregrine falcon, prairie falcon, short-eared owl and western burrowing owl), all but the northern goshawk have been recorded in more than half the basins in the natural resources region of study (Floyd et al. 2007; GBBO 2007a,b; NNHP 2006, 2010, 2011; UNHP 2007; Wildland International 2009, 2007). See **Appendix F**, **Table F3.6-1**.

The study area provides an abundance of habitat for species that depend on sagebrush, salt desert scrub, or pinyon juniper habitats. The highest densities of ferruginous hawks in Nevada occur within the study area. Ferruginous hawks are both a Utah and Nevada Partners in Flight priority species. The NDOW has been monitoring ferruginous hawk nests since the 1970s and has documented a decline in the number of active nesting territories over this period (Klinger and Williams 2005). In Utah, ferruginous hawk is considered rare and productivity may not be sufficient to sustain the state's population (Sutter et al. 2005). Nevada and western Utah represent a large portion of the basin and range province, which support 28 percent of the world population of prairie falcons (Nevada Partners in Flight 1999). Prairie falcons nest in cliffs and rock outcrops; other raptors within the study area may use rock outcrops, trees, or burrows as nesting sites. Habitat and life-history information for special status raptors is provided in **Appendix F**, **Table F3.6-3**.

Additional Special Status Birds – The natural resources region of study includes habitat for a wide variety of bird species. Representative species that occur in habitats potentially impacted by the proposed project construction or operation are included in **Appendix F**, **Table F3.6-1** (e.g. common yellowthroat, long-billed curlew, and western snowy plover). This list follows the BLM Washington Office Instruction Memorandum No. 2008-050 MBTA - Interim Management guidance. Section 3.5.1.4, Region of Study, explains the key groundwater dependent resources potentially impacted by groundwater pumping, namely phreatophytic vegetation and wetland/wet meadow types. See the bulleted lists earlier in this section on cover types and associated special status species.

Pygmy Rabbit– Pygmy rabbits are found in the Great Basin desert ecological region of the study area. While habitat exists further south, records of the species are found in the northern half of Lincoln County, Nevada, in Beaver County, Utah and areas further north. See habitat discussion under Section 3.6.1.2, ROW Areas, and in **Appendix F**, **Table F3.6-3**.

Bats – The majority of the 23 bat species in Nevada and Utah could occur throughout the natural resources region of study (Bradley et al. 2006). Based on records from NNHP (2006) and O'Farrell Biological Consulting (2006), bat occurrences are listed for the region of study in **Appendix F**, **Tables F3.6-1** and **F3.6-3** which also include life history and habitat information.

Acoustic sampling for bats was conducted at 32 locations in 12 valleys (O'Farrell Biological Consulting 2006). Nine of these basins (Cave, Delamar, Dry Lake, Lake, Pahranagat, Pahroc, Spring, Snake, and White River) are within the region of study. A total of 16 bat species was recorded in the study, with multiple species occurring in 10 valleys within the study area. Mist nest surveys were conducted in 2008 (SNWA 2009) at 11 sites in four valleys within the region of study. These included two additional sites in Spring Valley and one additional site in Steptoe Valley that had not

previously been surveyed in the acoustic sampling study. Special status bat species are listed in **Table F3.6-1**. Of the 17 species listed in the table, all except Allen's big-eared bat and spotted bat were detected during acoustic or mist net surveys. One additional special status species, long-legged myotis, was identified.

Most of the species have a broad distribution in Nevada. However, six species (big free-tailed, fringed myotis, Yuma myotis, silver-haired, hoary, and western red bat) have a limited distribution in Nevada. The big free-tailed and western red bats have limited distribution in Utah, yet the fringed and Yuma myotis are found in much of the state. Most bat species are insectivores; foraging habitat includes areas with supporting insect populations, usually with some association to surface water (e.g., streams, springs, or ponds). Roost sites vary by season and gender, and commonly are close to foraging habitat. Summer roosts are primarily inhabited by females and their young until the young are independent, approximately 1.5 months after birth. Most bats return to their maternal roost each year. During the period of maternal care, males are thought to have widely-spaced, individual roost sites. After the young are independent, both sexes generally disperse across the habitat, using individual roost sites in tree crevices, cavities and cracks in rocks, and crevices in cliffs. In the fall, both males and females begin to congregate at winter roost sites, which allow more protection during the cold periods. Mating occurs during the fall, just before hibernation, and fertilization occurs in the spring when the female ovulates. One, and occasionally more, young are born per female, 2 to 3 months later in the maternal roost (Bogan 2000).

Desert Valley Kangaroo Mouse –Within the natural resources region of study, NDOW has records of the species (dark kangaroo mouse) in Cave, Dry Lake, Hamlin, Lake, Spring, Steptoe, and White River valleys. Records within Dry Lake and Delamar valleys would be considered the subspecies, *M.m. albiventer*. See **Appendix F**, **Table F3.6-3** for additional information on habitat and life history.

Terrestrial Invertebrates – Species surveys were conducted by Ecological Sciences, Inc. (2007) at 76 locations within or close to the boundary of the study region in Nevada and Utah. The BLM lists a number of terrestrial invertebrates as sensitive species, which are known to occur in the region of study. Nine of these species occur in habitats or at elevations that may be impacted by construction or operation of the proposed project. These species are the Aegilian scarab beetle, White River Valley skipper, White River wood nymph, Baking Powder Flat blue butterfly, MacNeill sooty wing skipper, Mojave poppy and Gypsum bees, and Steptoe Valley crescentspot. Most species are not well known and potential association with wetland or phreatophytic vegetation also is not well understood. However, given their apparent host plants, the White River Valley and McNeil's sootywing skippers may be tied to surface water dependent resources. See **Appendix F**, **Table F3.6-1** for basins of occurrence and **Table F3.6-3** for information on habitat and life history if information was available.

Other Wildlife Species or Habitats of Interest

Cave habitats are in karst formations at scattered locations throughout the natural resources region of study (**Figure 3.2-5**) in both Nevada and Utah. In general, cave ecology is unique because nutrients enter the system via water or organisms that in turn deposit debris, guano, or decomposing carcasses. These materials represent the only source of nutrients for organisms that are restricted to life in the cave environment (Baker 2007). Biological surveys that have been conducted in caves within the Baker, Lehman, and Snake creek watersheds in GBNP have shown diverse and unique biological communities (Krejca and Taylor 2003). Model Cave, part of the Baker Creek watershed, has the highest known species diversities of cave invertebrates in Nevada caves (NPS 2005). Based on surveys in eight caves, eight animal phyla were observed, with the most diverse classes being insects, mites, spiders, and scorpions. Some species, such as the Lehman Cave millipede, are restricted to one cave. Caves also contain primitive insect species such as the campodeid dipluran. New or potentially new millipede species also have been described in two of the Baker Creek watershed caves (Shear and Shelley 2007; Shear 2007). Further bioinventory work conducted by Taylor et al. (2008) in 22 caves both in and outside GBNP greatly increased the information available about species using caves. Two new millipede species have been described and identified, *Idagona lehmanensis* and *Nevadesmus ophimontis* (Shear 2007, Shear et al. 2009), and a new springsnail, *Pygmarrhopalites shoshoneiensis*, has also been found and identified (Zeppelini et al. 2009). Based on work by Taylor et al. (2008), the potentially new millipede species described by Shear (2007) has been recorded in more caves, expanding the range of elevations in which the species has been found. A variety of mammals, such as cliff chipmunk, deer mouse, and bats, also inhabit caves (Baker 2007; NPS 2005; Krejca and Taylor 2003). Both the Ely and Las Vegas RMPs as well as the GBNP General Management Plan recognize the importance of caves and have management objectives to protect and manage caves.

Assessment of four watersheds in GBNP (NPS 2007) included surveys for birds, small mammals, and cave resources. Three NPS sensitive bird species were detected during surveys and habitat for 12 additional NPS sensitive bird species was documented. Small mammal surveys detected 11 species, one of which is NPS sensitive. The assessment also described 20 caves. These caves serve as habitat for nine different species of bats (NPS 2007), six of which are NPS sensitive (NPS 2006) and macroinvertebrates (see above). For information on other representative species selected by the Natural Resources Group that are NPS sensitive, see **Appendix F**, **Table F3.6-1**.

Culturally Significant Wildlife Species

Wildlife species that are culturally significant to the Confederated Tribes of the Goshute reservation people include elk, bighorn sheep, antelope, deer, rabbits, bears, mountain lions, sage-grouse, rock chuck, and various species of raptors. They have cultural significance in many forms, including food resources, spiritual resources, and resources as traditional values (Steele 2010). These animals have the potential to occur throughout historical aboriginal territories and throughout the proposed project area.

3.6.2 Environmental Consequences

3.6.2.1 Rights-of-way

Issues

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

Construction

- Habitat loss and fragmentation from construction clearing of ROWs, transmission lines, and new and improved access roads;
- Direct disturbance and loss of individuals from construction activities along ROWs (including trenching), transmission lines, and access roads;
- Disturbance and loss of individuals from accidental wildfires and loss of habitat;
- Indirect effects, consisting of displacement of individuals and loss of breeding success, from exposure to construction movements, noise and higher levels of human activity (including traffic);
- Compliance with recovery plans, conservation agreements, and state wildlife action plans for special status species;
- Potential disruption of migration patterns because of temporary fencing and potential entanglement and loss of individuals; and
- Potential effects on terrestrial wildlife species that are culturally significant and traditionally used as food by regional Tribes.

Facility Maintenance

- Indirect effects, consisting of displacement of individuals and loss of breeding success because of operational noise and higher levels of human activity (including traffic);
- Direct disturbance and loss of individuals from loss of habitat and traffic mortality;
- Potential effects from collisions and electrocutions to raptors and other wildlife from power lines;
- Potential effects of additional infrastructure resulting in increased perches for raptors and corvids that may increase predation on other animals; and
- Compliance with recovery plans, conservation agreements, and state wildlife action plans for special status species.

Assumptions

The following assumptions were used in the ROW impact analysis for terrestrial wildlife:

- Identification of terrestrial wildlife that could be affected by project actions focused categorically on species of management concern and special status wildlife species in the ROWs.
- Construction disturbances, while temporary in nature, have been defined as long-term for all habitat types due to existing vegetation structure and composition, recovery time frames, and limiting revegetation factors (e.g., low precipitation rates, soil chemistry constraints, and soil moisture).
- The mainline pipeline ROW would not be realigned or curved to avoid sensitive wildlife species habitat because of the large diameter of the pipeline. Temporary work space along the construction ROW may be narrowed to avoid sensitive habitats. Access roads and power line pole locations can be adjusted to avoid discrete sensitive species habitat features.

Methodology for Analysis

Construction and surface disturbance impacts by alternative were evaluated using the following steps:

- Calculated the area of habitats in general and the extent of special status species habitats where available, that would be removed temporarily or permanently during project construction or facility maintenance based on various habitat layers including NDOW big game layers, sage-grouse habitat, USGS digital animal-habitat models, and vegetation communities based on SWReGAP cover types (as described in **Appendix F**, **Table F3.6-4**).
- Provided additional detail on specific impacts (e.g. greater sage-grouse leks), where more specific data were available for some special status species.
- Evaluated the BLM RMP management actions, BMPs and ACMs available to limit the extent and duration of predicted impacts. Recommended additional mitigation measures to reduce or offset impacts. Described mitigation effectiveness.
- Estimated residual impacts after ACM and RMP management actions and BMPs were applied to each alternative.

3.6.2.2 Proposed Action, Alternatives A through C

Right-of-way Areas

Construction and Facility Maintenance

Habitat Loss, Fragmentation, Accidental Wildfires, and Power Line Effects

Impacts to terrestrial wildlife resources under the Proposed Action and Alternatives A through C would include surface disturbance or alteration of native habitats, increased habitat fragmentation, animal displacement, changes in species composition, and direct loss of wildlife. The severity of both short- and long-term impacts would depend on factors such as the sensitivity of the affected species, seasonal use patterns, the type and timing of project activities, and physical parameters (e.g., topography, cover, forage, and climate).

Habitat impacts would include both short-term and long-term impacts and permanent reduction or loss of habitat as a result of construction and operation of the proposed project. The Proposed Action would result in the (long-term) loss of 12,303 acres of wildlife habitat, primarily consisting of shrub-scrub types including sagebrush shrubland (48 percent), Mojave mixed desert shrubland (25 percent), and greasewood/saltbush shrubland (24 percent), with lesser amounts of woodland, grasslands, and other types comprising the remaining 3 percent. Approximately 1,000 acres would be permanently converted to industrial uses (**Table 3.5-9** in Section 3.5, Vegetation). Habitat loss or alteration would result in direct loss of smaller, less mobile species of wildlife, such as small mammals and reptiles, and the displacement of more mobile species into adjacent habitats. Displacement also could result in some local reductions in wildlife populations, if adjacent habitats are at carrying capacity. The most common wildlife responses to habitat fragmentation are avoidance or accommodation. Avoidance would result in displacement of wildlife from an area that is larger than the actual disturbance area. Although the habitats that are adjacent to the proposed disturbance area could support some displaced animals, species that are at or near carrying capacity could experience a reduction in breeding success and some level of unquantifiable wildlife mortalities. Potential indirect impacts also would include an incremental increase in the potential for wildlife/vehicle collisions (short- and long-term), resulting in an unquantifiable reduction in wildlife populations.

Habitat fragmentation would result from the various project facilities including the development of access roads, pipelines, electrical power lines, and various above-ground facilities including pumping stations and electrical substations. Other fragmentation effects such as increased noise, elevated human presence, dispersal of noxious and invasive weed species, and dust deposition from unpaved road traffic would extend beyond the boundaries of the project ROWs. These effects would result in overall changes in habitat quality, habitat loss, increased animal displacement, reductions in local wildlife populations, and changes in species composition. The severity of these effects on terrestrial wildlife species depends on factors as listed above.

Habitat fragmentation caused by the construction of access roads can impact habitat in a variety of ways. Roads alter the temperature, humidity, sunlight intensity, moisture content of surrounding soils, and vegetation composition (Vaillancourt 1995). As a result, vegetation adjacent to the roads is dissimilar to surrounding vegetation, as measured by species composition, abundance, dust, and amount of bare soil and litter. Baker and Dillon (2000) summarized the

effects on vegetation at a variety of sites and concluded the average depth-of-edge for vegetation effects was 200 feet. Gelbard and Belnap (2003) showed that desert shrub communities located near maintained gravel and paved roads contained a large amount of exotic species, while plant communities near primitive, two-track roads were less disrupted compared to surrounding native vegetation. Based on the literature (Gelbard and Belnap 2003; Baker and Dillon 2000), vegetation community composition would be expected to be altered for approximately 165 to 200 feet away from the roadsides, despite reclamation with native seed mixtures. Additional fragmentation effects are addressed below within the specific species or species group discussions relative to available literature.

Accidental wildfires could be initiated during construction and facility maintenance activities and could cause minor to major impacts on forage and cover availability to all wildlife, depending on the acreage burned and whether any areas of particular species-specific value were disturbed. Impacts from wildfire would result in mortalities of less mobile species (e.g., small mammals, bird eggs and nestlings, reptiles, amphibians, and invertebrates) and short-term or long-term displacement of wildlife from the impacted area. Although the habitats adjacent to the impacted area may support some displaced animals, species that are at or near carrying capacity could result in some unquantifiable mortalities. It is anticipated that wildlife would slowly return to the impacted areas upon revegetation of herbaceous and woody vegetation. ACMs that would reduce potential impacts to wildlife from wildfire during construction would include a fire prevention plan (ACM A.1.1), the presence of a water truck and other fire suppression equipment, the presence of a designated individual at each construction site responsible for fire watch and suppression, an additional fire watch individual during welding activities, and the placement of all flammable materials within a 15-foot brush/litter-cleared area (ACM A.1.47). Proposed mitigation discussed in Section 3.5, Vegetation (ROW-VEG-1 and ROW-VEG-2) also would help to minimize the potential for accidental wildfire. Impacts related to vegetation composition changes as a result of accidental wildfires are discussed in Vegetation, Section 3.5.2.2, Accidental Wildfires.

The operation of proposed electrical power lines would increase the potential for electrocution impacts to some bird species (e.g., raptors and eagles), incrementally increase the collision potential for migrating and foraging bird species (e.g., raptors and migratory birds [APLIC 1994]) and bats, and could serve as predator perches and nest sites, increasing predation potential on a number of species. Potential electrocution impacts would be minimized through the implementation of ACM A.5.66 (see list below). Collision potential typically depends on variables such as the line location in relation to high-use habitat areas (e.g., nesting, foraging, and roosting), line orientation to flight patterns and movement corridors, species composition, visibility, and line design. Potential impacts to birds and bats from an incremental increase in collision and electrocution may be minimized through implementation of the Ely RMP BMP related to new power lines. To reduce the potential impacts of power lines, the applicant has committed to the following environmental-protection measures (for more detail see **Appendix E**):

- Power poles and lines will be designed and constructed in accordance with recommendations of APLIC to reduce the potential to electrocute or otherwise harm raptors (ACM A.5.66);
- Perch discouraging devices will be installed on power lines in sensitive species habitats (ACM A.5.8); and
- Solar panels will be used on monitoring wells to reduce need for additional power lines (ACM B.1.2).

Construction Water Use

SNWA is proposing to use groundwater or temporary construction wells for hydrostatic testing, dust control, and fire suppression (if needed). Groundwater withdrawal could result in localized drawdown effects. There could be potential short-term effects on surface water depending on the hydraulic connection to groundwater and the surface water location. No diversion or modification of surface water flows would occur for temporary construction water use. Any change in water use involving surface water sources would need to meet Nevada permit requirements, as well as a review by the BLM. If surface water use was approved, Ely BMP requirements would apply.

The discharge of hydrostatic test water would follow NPDES requirements, which would eliminate potential effects on water quality. Erosion effects would be minimized by implementing ACMs to reduce discharge velocities (ACM A.1.64 and A.1.65, as described in **Appendix E**). Additional details on hydrostatic test water discharge are provided in Section 3.4.2.5, Alternative D.

Conclusion. Construction water use could adversely affect water sources for wildlife, if surface water is located within the drawdown area and connected to groundwater sources.

Proposed mitigation measures:

As discussed in water resources, mitigation measure ROW-WR-3 (Construction Water Supply Plan) would be required to determine the effects of construction water use on groundwater and surface water. Additional mitigation may be required, if surface water and wildlife habitats are affected.

Residual impacts include:

- Residual effects from construction water use could occur if groundwater withdrawal reduces surface water quantity and water sources for wildlife. Residual effects will be quantified during subsequent BLM review of the Construction Water Supply Plan.

Species of Management Concern

Big Game: Direct impacts to big game species (i.e., pronghorn antelope, Rocky Mountain elk, mule deer, desert bighorn sheep) would include the loss of potential forage within the proposed surface-disturbance areas. Herbaceous forage species might become established within the short-term (see Vegetation **Table 3.5-9**), depending on reclamation success, future weather conditions, and grazing-management practices in the project region. In most instances, suitable habitat adjacent to the disturbed areas would be available for these species until grasses and woody vegetation were reestablished within the disturbance areas. No impacts to Rocky Mountain bighorn sheep are anticipated from ROW construction or facility maintenance, as this species inhabits higher elevation habitats that would not be impacted by these project activities. Antelope, elk, deer, and bighorn sheep are all considered culturally significant to regional Tribes.

Table 3.6-3 summarizes acreages of pronghorn antelope, Rocky Mountain elk, and mule deer ranges that would be affected by ROW construction (temporary) and facility maintenance (permanent). Impacts include incremental, long-term surface disturbance of approximately 7,952 acres of pronghorn antelope range; 4,019 acres of Rocky Mountain elk range; and 3,917 acres of mule deer range, including 169 acres of mule deer crucial summer range and 133 acres of mule deer crucial winter range. Although surface disturbance activities would represent a long-term habitat loss for big game and the location of the ROW may impact local herds, these disturbance acres would represent a small percentage (less than 1 percent) of the overall available habitat within the basins impacted. Facility maintenance would result in the permanent conversion of mule deer, antelope, and Rocky Mountain elk habitat at the acreages listed in **Table 3.6-3**. During construction, big game species would likely move away from areas being disturbed and may abandon areas of low quality habitat (e.g. areas with low quality forage, invasive weeds, limited water sources, and high human activity). In addition to the habitat impacts, facility maintenance activities could also include long-term, elevated, traffic-caused mortality from the increased vehicle use that would be needed to support maintenance.

Direct impacts to desert bighorn sheep would include the incremental, long-term reduction of approximately 259 acres of occupied habitat and 25 acres of potential habitat (**Table 3.6-4**), consisting primarily of grassland and desert shrubland habitats. Although surface-disturbance activities would represent an incremental, long-term habitat loss for desert bighorn sheep, these acreages of disturbance would represent less than 1 percent of the overall available habitat for this species on a regional basis. Facility maintenance activities would permanently convert 14 acres of occupied and potential desert bighorn sheep habitat (**Table 3.6-4**). The ROW areas between one of the pressure reducing stations and 2.5 miles north of the regulating tank site cross habitat for desert bighorn sheep. Given the number of facilities in this area, (regulating tank, pressure reducing station, secondary electrical substation, pipeline, and access road) movement between the Delamar Mountains and South Pahroc and Hiko ranges may be reduced. Additionally, proposed ROW locations within movement routes between the Las Vegas Range and Arrow Canyon Range, Delmar Mountains and Sheep Range, and Egan Range and Schell Creek Range may be reduced. Locating ROWs and associated facilities within movement corridors would cause habitat fragmentation and displacement of desert bighorn sheep due to increased noise and human presence. Displacement from current migratory routes would be short term in areas where the ROWs would be reclaimed and long term where permanent facilities and roads are located. The increase in habitat fragmentation and displacement of desert bighorn sheep from current migratory routes could cause stress and increased mortality rates to current populations.

Table 3.6-3 Big Game Range Acreage Potentially Impacted by the Proposed Action and Alternatives A through C, Right-of-way Construction (Temporary) and Facility Maintenance (Permanent)

Range	County	Basin	Pronghorn Antelope (Temp.)	Pronghorn Antelope (Perm.)	Rocky Mountain Elk (Temp.)	Rocky Mountain Elk (Perm.)	Mule Deer (Temp.)	Mule Deer (Perm.)
Crucial Summer	Lincoln	Cave	NI	NI	0	0	41	0
		Dry Lake	NI	NI	0	0	4	0
		Lake	NI	NI	0	0	45	5
		LMVW	NI	NI	0	0	11	11
	Lincoln Total		NI	NI	0	0	101	16
	White Pine	Snake	NI	NI	0	0	8	1
		Spring	NI	NI	0	0	42	5
		Steptoe	NI	NI	0	0	18	2
	White Pine Total		NI	NI	0	0	68	8
Crucial Summer Total			**NI**	**NI**	**0**	**0**	**169**	**24**
Crucial Winter	Lincoln	Dry Lake	0	0	NI	NI	3	0
		Hamlin	0	0	NI	NI	130	0
	Lincoln Total		0	0	NI	NI	133	0
Crucial Winter Total			**0**	**0**	**NI**	**NI**	**133**	**0**
Year Round	Lincoln	Cave	668	21	712	21	660	21
		Delamar	757	62	0	0	0	0
		Dry Lake	1,995	184	703	24	1,091	59
		Hamlin	351	2	0	0	0	0
		Lake	566	44	804	57	759	53
		LMVW	0	0	0	0	110	110
		Pahranagat	0	0	0	0	0	0
		Spring	716	80	485	77	328	59
	Lincoln Total		5,053	393	2,704	179	2,948	302
	White Pine	Hamlin	33		0		0	
		Snake	879	52	0	0	370	38
		Spring	1,687	113	1,010	83	477	20
		Steptoe	300	16	305	20	122	3
	White Pine Total		2,899	181	1,315	103	969	61
Year Round Total			**7,952**	**574**	**4,019**	**282**	**3,917**	**363**

NI = None Identified. LMVW = Lower Meadow Valley Wash

Table 3.6-4 Bighorn Sheep Range Acreage Potentially Impacted by the Proposed Action and Alternatives A through C, Right-of-way Construction (Temporary) and Facility Maintenance (Permanent)

County	Basin	Occupied (Temp.)	Occupied (Perm.)	Potential (Temp.)	Potential (Perm.)
Clark	Coyote Spring	11	1	0	0
	Garnet	14	0	0	0
	Hidden	14	1	0	0
	Las Vegas	14	0	0	0
Clark Total		**53**	**2**	**0**	**0**
Lincoln	Cave	0	0	1	0
	Coyote Spring	1	0	0	0
	Delamar	53	5	0	0
	Dry Lake	0	0		0
	LMVW	0	0	0	0
	Pahranagat	152	4	0	0
Lincoln Total		**206**	**9**	**1**	**0**
White Pine	Spring	0	0	11	1
	Steptoe	0	0	13	2
White Pine Total		**0**	**0**	**24**	**3**
Grand Total		**259**	**11**	**25**	**3**

LMVW = Lower Meadow Valley Wash.

Indirect impacts to all big game species would result from increased noise levels and human presence, dispersal of noxious and invasive weed species, and dust effects from vehicle traffic on unpaved roads during surface-disturbance activities. Given the conservative estimate that adjacent habitats are at or near carrying capacity and due to human development activities in the project region, displacement of big game species would create some unquantifiable reduction in wildlife populations. Displacement of big game, as a result of direct habitat loss and indirect reduction in habitat quality, has been widely documented (Irwin and Peek 1983; Lyon 1983, 1979; Rost and Bailey 1979; Ward 1976). Big game species tend to move away from areas of human activity and roads, reducing habitat utilization near the disturbance areas (Cole et al. 1997; Sawyer et al. 2006). Displacement distances are strongly influenced by the level and timing of human activity, topography, and the presence of vegetation (Cole et al. 1997; Lyon 1979), presumably due to noise attenuation and visual cover. Displacement of big game is greatest for heavily traveled secondary and dirt roads. Most research has focused on displacement distances for elk and deer. Displacement distances indicate the distance from the road's centerline where animal densities are less than in surrounding areas (i.e., under-utilized habitat). In most circumstances, elk were not observed to habituate due to human activities. Deer and pronghorn appear to be more tolerant of human activities than elk. For deer, displacement distances ranged from 330 to 3,168 feet (0.6 mile) depending on the presence of vegetative cover (Ward 1976). Deer and pronghorn have been observed to habituate to vehicles and displacement distances decreased when traffic was predictable, moving at constant speeds, and was not associated with out-of-vehicle activities (Ward 1976). However, traffic within the project area during construction would be characterized by slow-moving traffic, vehicles that stop, and out-of-vehicle activity; thus, acclimation by big game is not anticipated. This displacement would be short term and animals would return to the disturbance area following construction activities (Krausman and Etchberger 1995). In addition, big game may experience increased mortality rates due to increased public access (Cole et al. 1997). Vehicular traffic may injure or kill individuals and local populations may experience higher levels of hunting and poaching pressure due to improved public access (Cole et al. 1997).

The Las Vegas and Ely RMPs include management actions that mitigate loss of priority wildlife habitat, (E:WL-4), seasonally restrict permitted activities (E:WL-6 to 8), protect waters that provide benefit to wildlife (LV:FW-3-e), and ensure authorized activities are consistent with goals and objectives of bighorn sheep management (LV:FW-1-b).

Impacts, as a result of ROW construction and facility maintenance, would be reduced given the protections provided by the RMPs and the ACMs.

In addition to construction monitoring (ACM A.1.2), the applicant has committed to the following environmental-protection measures to reduce potential impacts to wildlife (for more detail, see **Appendix E**):

- Design to allow seasonal movements across ROWs and access to surface water sources (ACMs A.5.70 and 71);
- Speed-limit restrictions to reduce vehicle/wildlife impacts (ACM A.1.29);
- Escape ramps to be installed at excavation areas, left open overnight and checked periodically by a biological monitor (ACM A.1.42);
- Assurances that wildlife would not be harassed or intentionally harmed (ACM A.5.5); and
- Continued consultation and coordination with the BLM and the NDOW to identify and mitigate potential impacts to big game species (ACM A.5.71).

Conclusion: Habitat for big game species would be temporarily disturbed by construction and a portion would be permanently converted to industrial uses as identified in **Tables 3.6-3** and **3.6-4**. There would be a loss of 24 acres of mule deer crucial summer habitat and 11 acres of desert bighorn sheep occupied habitat. Construction and facility maintenance impacts would include displacement of individuals and potential loss of breeding success from habitat alteration, exposure to construction/maintenance movements and noise, and higher levels of human activity (including traffic). The area of habitat affected by construction surface disturbance would represent less than 1 percent of the surface area of these habitat ranges within the hydrologic basins occupied by the GWD Project; however, the location of ROW construction or maintenance activities could impact local herds and migration corridors. Impacts as a result of ROW construction and facility maintenance would be reduced given the protections provided by the RMPs and the ACMs.

Proposed mitigation measures:

In order to address the permanent conversion of 24 acres of mule deer crucial summer habitat and 11 acres of desert bighorn sheep occupied habitat, as well as the long-term surface disturbance to mule deer crucial summer habitat (169 acres), mule deer crucial winter habitat (134 acres), and desert bighorn sheep occupied habitat (260 acres), mitigation measure ROW-WL-1 is proposed.

ROW-WL-1: Big game key habitat priority restoration and habitat improvement. If surface disturbing activities impact key big game habitats (crucial summer and winter ranges for antelope, Rocky Mountain elk, or mule deer, or occupied desert bighorn sheep habitat), the SNWA shall improve 2 acres of comparable habitat for every 1 acre of disturbed habitat. The SNWA shall coordinate with the BLM and NDOW to determine the specific areas for big game key habitat improvements. Effectiveness: This measure would be moderately to highly effective in mitigating for impacts to big game key habitats. Effects on other resources: Conducting habitat improvement work for big game may contribute to noise and human presence disturbance to wildlife, as well as the potential for vehicle collisions to wildlife.

Residual impacts include:

- The long-term (20 to 200 years) restoration periods for shrublands and woodlands in big game ranges disturbed by ROW construction make these habitats less suitable for forage and cover and contribute to habitat fragmentation;
- An unknown portion of habitats may be degraded because recovery may not fully occur or proximity to permanent facilities makes the habitat less suitable; and
- Potential big game mortalities may result from vehicle collisions.

Other Terrestrial Wildlife Species of Management Concern

Direct impacts to small mammals, reptiles, game and other bird species of management concern (including raptors) from surface-disturbance activities include the incremental, long-term surface disturbance of 12,208 acres of native

shrubland and woodland habitat and would require 20 to more than 200 years for recovery to similar species composition and vertical structure as adjacent undisturbed areas. Sixty-four acres of annual and perennial grassland and marshland habitats would require from 2 to 20 years for recovery. See **Table 3.5-9** in Vegetation for estimated vegetation community recovery times. Natural land habitat types that would be permanently converted to industrial uses would be 1,004 acres. Culturally significant species to regional Tribes in this group of wildlife include rabbits and various species of raptors. Potential impacts also would likely include mortalities of less mobile or burrowing species as a result of crushing from increased vehicle traffic and construction equipment and abandonment or loss of eggs or young. The project will not have any open water storage devices; water troughs proposed in ACM A.5.72 for wild horses and big game (see **Appendix E**) will include escape ramps approved by the BLM so potential for small wildlife species entrapment and drowning would be minimized.

Indirect impacts include increased habitat fragmentation effects as a result of increased noise levels and human presence, dispersal of noxious and invasive weed species, and dust effects from increased traffic on unpaved roads during surface-disturbance activities. Fragmentation effects would be incremental, but species that require large tracts of unbroken habitat such as sagebrush obligate species may not be able to complete their life functions and this project may contribute to general population declines. General habitat fragmentation, accidental wildfire, and power line impacts are described at the beginning of the ROW areas section; other species-group fragmentation effects are described below.

If construction or facility maintenance were to occur during the breeding season for migratory bird species (approximately March to August, depending on the species, elevation, and location), then direct impacts to MBTA breeding birds could include abandonment of a new site or territory or the loss of eggs or young, resulting in a loss of productivity for the breeding season. Loss of an active nest site, incubating adults, eggs or young would violate the MBTA and potentially could affect populations of migratory bird species that occur within the project area. Management concern raptor species have also been documented in the basins crossed by the ROW (**Appendix F**, **Table F3.6-1**).

Fragmentation effects on upland game birds have been shown to impact populations adversely. Vehicular traffic may injure or kill individuals and local populations may experience higher levels of hunting and poaching pressure due to improved public access (Holbrook and Vaughan 1985).

For raptor species, fragmentation effects can result in the loss or alteration of habitat, reduction in prey base, and increased human disturbance. The loss of native habitat to human development has resulted in declines of hawks and eagles throughout the West (Boeker and Ray 1971; Schmutz 1984). In some cases, habitat changes have not reduced numbers of raptors but have resulted in shifts in species composition (Harlow and Bloom 1987). Impacts to small mammal populations due to habitat loss and fragmentation can result in a reduced prey base for raptors and lower raptor densities. Furthermore, the increased number of access roads associated with the GWD Project would lead to greater public access. As a result, raptors may be disturbed from nests and roosts, thereby leading to displacement and reduced nesting success (Holmes et al. 1993; Postovit and Postovit 1987; Stalmaster and Newman 1978). Noise levels and human activity also can preclude otherwise acceptable raptor habitat from use (Romin and Muck 2002). As with big game, vehicles that stop cause greater levels of disturbance to raptors than continuously moving vehicles (Holmes et al. 1993; White and Thurow 1985).

Elevated noise levels also contribute to fragmentation effects. In studies that examined the effects of high levels of daily traffic on bird densities located near paved roads, reductions in bird population densities from roads in both open grasslands and woodlands were attributed to a reduction in habitat quality produced by elevated noise levels (Reijnen et al. 1997, 1995). Although visual stimuli in open landscapes may add to density effects at relatively short distances, the effects of noise appear to be the most critical factor, since breeding birds of open grasslands (threshold noise range of 43 to 60 decibels on the A-weighted scale) and woodlands (threshold noise range of 36 to 58 decibels on the A-weighted scale) respond very similarly to disturbance by traffic volume (Reijnen et al. 1997). Reijnen et al. (1996) determined a threshold effect for bird species to be 47 decibels on the A-weighted scale, while a New Mexico study in a pinyon-juniper community found that effects of gas well compressor noise on bird populations were strongest in areas where noise levels were greater than 50 decibels on the A-weighted scale. However, moderate noise levels (40 to 50 decibels on the A-weighted scale) also showed some effect on bird densities in this study (LaGory et al. 2001). The applicant has provided information to the BLM that noise levels from stationary sources (pumping stations and pressure reducing stations), would not exceed 52 decibels on the A-weighted scale at 500 feet from these facilities.

The Ely RMP includes a BMP to install wildlife escape ramps in all watering troughs including temporary water haul facilities and open storage tanks. In addition, a BMP would use current science, guidelines, and methodologies for all new power lines for the purpose of minimizing raptor and other bird electrocution and collision effects. The procedure for MBTA bird species consultation mentioned in ACM A.5.65 should include consultation with USFWS. Further, the Ely RMP management action (SS-4) and ACMs A.5.62 through A.5.69 provide protections for raptors.

In addition to construction monitoring (ACM A.1.2), the use of predictive models to identify critical nesting locations (ACM A.5.62), pre-construction and other surveys (ACMs A.5.64, 67, 68), compliance reporting (ACMs A.5.4, A.5.7), and raptor nest monitoring by qualified biologists (ACMs A.5.64 and 68), the applicant has committed to the following ACMs to reduce potential impacts to small mammal, game and MBTA and other birds species of management concern (for more detail, see **Appendix E**):

- Develop a Construction Traffic Management plan, including measures to reduce the number of trips (ACM A.1.28);
- Impose speed-limit restrictions to reduce vehicle/wildlife impacts (ACM A.1.29);
- Install escape ramps in excavation areas, where these areas will be left open overnight; biological monitors will also check these areas periodically (ACM A.1.42);
- Provide assurances that wildlife would not be harassed or intentionally harmed (ACM A.5.5);
- Conduct initial ground clearing outside the critical nesting period for migratory birds as feasible (ACM A.5.63);
- Identify and use exclusion areas as feasible until birds have fledged or consultation with the BLM (ACM A.5.65);
- Conduct pre-construction tree removal (if during breeding season, pre-removal surveys will be conducted; if occupied, tree removal will wait until fledging and any necessary permits are obtained) (ACM A.5.68); and
- Include escape ramps for small wildlife in temporary water haul designs (ACM A.5.72).

Conclusion: 12,208 acres of native shrubland and woodland habitat would be removed or disturbed by construction and would require 20 to more than 200 years for recovery to similar species composition and vertical structure as adjacent undisturbed areas. Sixty-four acres of annual and perennial grassland and marshland habitats would require from 2 to 20 years for recovery. See **Table 3.5-9** in Vegetation for estimated vegetation community recovery times. Natural land habitat types would have 1,006 acres permanently converted to industrial uses. Increased mortalities could occur given construction and facility maintenance activities and timing of activities could impact migratory bird and other species breeding. Fragmentation effects would incrementally contribute to species impacts. Impacts as a result of ROW construction and facility maintenance would be reduced given the protections provided in the RMPs land the ACMs.

Proposed mitigation measures:

ROW-WL-2: USFWS Concurrence on Plans. The SNWA shall obtain concurrence from USFWS on any plans developed as part of the POD (ACM A.1.1) that address species protected under the MBTA or the Bald and Golden Eagle Protection Act. Effectiveness: This measure would be moderately to highly effective in reducing impacts to nesting and breeding MBTA birds and eagles. Effects on other resources: Implementation of this measure would not adversely affect other environmental resources.

ROW-WL-3: Raptor nest survey and avoidance. If surface disturbance activities may be initiated during raptor breeding and nesting seasons (as determined by the NDOW and the BLM), surveys for active raptor nests would be conducted by SNWA within suitable habitat, within 2 weeks prior to the anticipated start of surface disturbing construction activities. Raptor nests found during surveys would be addressed under the Ely RMP SS-4 management action as well as protected under provisions of the MBTA and BGEPA as relevant. (SS-4: Where appropriate, restrict permitted activities from May 1 through July 15 within 0.5 mile of raptor nest sites unless the nest site has been determined to be inactive for at least the previous 5 years.) Effectiveness: This measure would be highly effective in avoiding impacts to nesting raptors. Effects on other resources: Conducting surveys would contribute to noise and human presence disturbance to wildlife, as well as the potential for vehicle collisions to wildlife. This measure also could provide a record of other breeding bird species that could be potentially affected by the project.

Residual impacts include:

- The long-term (20 to 200 years) restoration periods for 12,208 acres of shrubland and woodland habitats disturbed by ROW construction would make these habitats unavailable for nesting, forage, and cover for other management concern species and contribute to habitat fragmentation; and
- An unknown portion of habitats may be degraded because recovery may not fully occur or proximity to permanent facilities makes the habitat less suitable.

Special Status Species

The impact analysis for special status terrestrial wildlife species focuses on those species that were identified as occurring or potentially occurring within the ROWs and project facility areas (**Appendix F**, **Table F3.6-1**). Species for which there is a record of occurrence in the proposed project ROWs and that could be affected by the Proposed Action and Alternative A through C are presented in **Table 3.6-5**. Alternatives D and E are a subset of these alignments and species with these ROWs would be the same or fewer. As a result, one federally listed species and 17 BLM Sensitive Species are analyzed in detail for construction and facility maintenance. Direct habitat impacts during construction (temporary) are presented in the first column, while facility maintenance (permanent) is presented in the second column. Impacts to special status species as a result of fragmentation, accidental wildfires and power lines are the same as generally described in the Habitat Loss, Fragmentation, Accidental Wildfires and Power Line and Direct Disturbance Effects section. Species or groups of species are addressed in more detail below.

Table 3.6-5 Special Status Species Habitat Acreage Potentially Impacted by the Proposed Action and Alternatives A through C, Right-of-way Construction (Temporary) and Facility Maintenance (Permanent)

Common Name	Habitat (acres) (Temporary)	Habitat (acres) (Permanent)	Habitats
Federally listed species			
Desert tortoise	2,350 (1,759 critical/ 591 non-critical)	331 (245 critical/ 86 non-critical)	Barren, shrubland
BLM Sensitive Species			
Mammals			
Pygmy rabbit[1]	3,634	235	Sagebrush shrubland
Bat species [2]	1,166 to 12,030	104 to 1,009	Various habitats potential foraging areas depending on species
Desert valley kangaroo mouse[1,3]	3,129	245	Shrubland
Birds			
Greater sage-grouse[4]	3,813/4,703/3,864	269/360/233	Nesting, early brood/late summer/winter range foraging habitat
Golden eagles[1]	12,061	888	Most habitats, potential foraging areas
Bald eagle[1]	5,571	442	Most habitats, potential foraging areas
Ferruginous hawk[1]	5,173	331	Grassland, shrubland, woodland
Western burrowing owl[1]	11,621	858	Grassland, shrubland, marshland
Reptiles			
Gila Monster[1]	2,627	248	Mojave scrub, woodland
Invertebrates			
Mojave poppy bee	1,718	120	Mojave scrub in Coyote Spring Valley

[1] Acreages for these species are based on SWReGAP animal habitat models (USGS 2007).

[2] Bat species recorded in the ROW are listed in **Appendix F**, **Table F3.6-1** and include Big brown bat, Brazilian free-tailed bat, California myotis, fringed myotis, hoary bat, Pallid bat, western pipistrelle, and western small-footed myotis. Acreage range in the table is given for the species with the least and most habitat potentially impacted by construction and facility maintenance (based on SWReGAP animal habitat model data), which are the long-eared myotis and western pipistrelle.

[3] This acreage is for dark kangaroo mouse (the species) in Dry Lake and Delamar valleys as SWReGAP habitat model data are not available for the subspecies. Dark kangaroo mouse habitat within the ROW in all valleys is 7,732 acres of temporary disturbance and 557 acres of permanent conversion.

[4] Sage-grouse habitat data are from NDOW (2008).

Desert Tortoise (Federally Threatened). Direct impacts to the desert tortoise would include the incremental, long-term reduction of approximately 2,350 acres of desert tortoise habitat from construction of ROWs and project facilities (approximately 1,759 acres of designated critical habitat and approximately 591 acres of non-critical habitat) and increased habitat fragmentation, until reclamation activities are completed and native vegetation is reestablished. This temporary habitat loss would occur over an area in five hydrologic basins (Las Vegas, Garnett, Hidden, Coyote Spring, and Pahranagat valleys). Facility maintenance would include permanent conversion of approximately 245 acres of critical habitat and 86 acres of non-critical habitat. Potential impacts also could result in the direct mortalities of individual tortoises, loss of burrows, and loss of eggs, as a result of crushing from increased vehicle traffic and construction equipment. Construction and facility maintenance activities could result in an increased risk of accidental wildfire. If fire occurred within tortoise habitat, it could alter habitat structure and vegetation available as food plants and individual tortoises could be lost. Also see the general discussion of accidental wildfire at the beginning of the ROW construction section.

Indirect impacts include increased habitat fragmentation effects as a result of increased noise levels and human presence, dispersal of noxious and invasive weed species, and dust effects from unpaved road traffic during surface-disturbance activities. This habitat fragmentation could cause a variety of impacts involving: barriers to movement, degradation of habitat, increased potential for mortality (e.g., stress-related mortalities may result due to disturbance), or illegal collection. Impacts from the operation of new power lines would include increased predation given the creation of additional perching sites for predators within tortoise habitat. Corvids (e.g., ravens and crows) also use power line structures for nest building, thereby increasing the population of these species (BLM 2001) and the potential for increased predation pressure on tortoises.

The Las Vegas and Ely RMPs include a requirement to manage desert tortoise habitat to achieve recovery criteria and ultimately to achieve delisting of the species. Desert tortoise management actions are included in **Appendix D**.

In addition to construction monitoring (ACM A.5.30), adherence to USFWS-approved desert tortoise survey protocols (ACMs A.5.17-20, 30), and acquisition of appropriate state and federal permits or letters of authorization prior to handling desert tortoises and their parts (ACM A.5.16), the applicant has committed to the following ACMs to reduce potential impacts to desert tortoise (for more detail, see **Appendix E**):

- Excavation, handling and relocating procedures (ACMs A.5.16-17, 21-27, A.5.33);
- Placement of exclusion fencing (ACM A.5.18);
- Speed-limit restrictions to reduce vehicle/wildlife impacts (ACM A.1.29);
- Escape ramps to be installed at excavation areas, left open overnight and checked periodically by a biological monitor (ACM A.1.42);
- Assurances that wildlife would not be harassed or intentionally harmed (ACM A.5.5);
- Hydrostatic water discharge plans (ACM A.1.64);
- Installation of perch discouraging devices (ACM A.5.8); and
- Reporting of acres disturbed, remuneration fees paid, and number of tortoises taken during the project activities (ACM A.5.36).

Conclusion: Compliance with the ESA would require implementation of measures to reduce the effects of anticipated take of desert tortoise, including through habitat loss or degradation. Potential impacts would be reduced based on compliance with recovery plans and RMPs and adherence to ACMs.

Proposed mitigation measures:

The applicant would consult with the USFWS on this species. No additional mitigation beyond what would be determined by USFWS would be proposed.

Residual impacts include:

- The long-term (100 to 200 years) restoration period for Mojave mixed desert scrub in areas disturbed by ROW construction makes this habitat unavailable for nesting, forage, and cover for tortoise and contributes to habitat fragmentation;
- An unknown portion of habitats may be degraded because recovery may not fully occur or proximity to permanent facilities makes the habitat less suitable; and
- Potential mortalities to tortoises may occur due to construction activities.

Greater Sage-grouse (Federal Candidate). Direct impacts of construction to this species would include the incremental long-term loss of approximately 3,813 acres of nesting and early brood habitat; 4,703 acres of late-summer range, and 3,864 acres of winter range in Cave, Dry Lake, Hamlin, Lake, Snake, Spring, and Steptoe valleys (**Table 3.6-6**). Note that these seasonal habitats overlap with one another in many areas. Facility maintenance would result in the permanent conversion of 269 acres of nesting and brood range, 360 acres of late summer range, and 233 acres of winter range. As explained in the Affected Environment section, 15 leks were identified within 2 miles of the proposed ROWs (**Table 3.6-7**). Of the 15 leks identified, nine are considered active; however, no known active lek sites occur within 0.25 mile of the proposed disturbance areas for the project. Other direct impacts could include the loss of nests, eggs, or young. Eight out of nine active leks are within 2 miles of proposed overhead power line ROWs.

Table 3.6-6 Summary of Greater Sage-grouse Early Brood, Late Summer, and Winter Range Acreages Potentially Impacted by Proposed Action and Alternatives A through C, Construction (Temporary) and Facility Maintenance (Permanent)

Basin	Nesting and Early Brood Range (Temp.)	Nesting and Early Brood Range (Perm.)	Late Summer Range (Temp.)	Late Summer Range (Perm.)	Winter Range (Temp.)	Winter Range (Perm.)
Cave	569	13	66	0	108	3
Dry Lake	0	0	268	81	0	0
Hamlin	80	0	384	2	384	2
Lake	496	40	720	49	0	0
Snake	448	24	774	37	757	36
Spring	2,004	177	2,253	171	2,320	176
Steptoe	216	15	238	20	295	16
Total	**3,813**	**269**	**4,703**	**360**	**3,864**	**233**

Table 3.6-7 Summary of Greater Sage-grouse Active, Inactive, and Historic Lek Locations with 2 Miles of the Proposed Action and Alternatives A through C, Right-of-way (Temporary)

Valley	Population Management Unit	Active	Inactive	Historic	Unknown	Total # of Leks
Cave Valley	Cave	2	0	0	0	2
Lake Valley North	Lincoln	0	1	0	0	1
Snake Valley	Spring/Snake Valley	1	0	2	0	3
Spring Valley - White Pine, Lincoln	Spring/Snake Valley	3	0	0	1	4
Spring Valley - White Pine, Lincoln	Lincoln	2	2	0	0	4
Steptoe Valley	Steptoe/Cave	1	0	0	0	1
Total		**9**	**3**	**2**	**1**	**15**

Indirect impacts include increased habitat fragmentation effects as a result of increased noise levels and human presence, dispersal of noxious and invasive weed species, and dust effects from unpaved road traffic during surface-disturbance activities. Nest or lek abandonment could result from increased human noise and presence close to an active nest or lek site. Additional potential impacts from power lines and roads include disruption of seasonal movements, increased collision potential as well as increased predation or harassment by raptors, corvids, and coyotes. Sage-grouse may also avoid habitat near utility lines as a result of the perceived threat of predation (Atamian et al. 2007).

There are eight active leks (2 in Cave Valley, 1 in Snake Valley, 1 in Steptoe Valley, and 4 in Spring Valley) located within 2 miles of proposed overhead power lines. Of these active leks, two (1 in Cave Valley and 1 in Spring Valley) are within 1 kilometer (0.62 mile) of the ROW. Both of the leks had 2 males in attendance. The alignment of the proposed power line ROW falls within the designated LCCRDA corridor as it passes near the majority of these leks. Three of the eight leks are impacted by power line alignments that fall outside designated corridors: one in Spring Valley in line-of-sight of the 25 kV power line, one in Snake Valley outside of line-of-sight of the 25 kV power line, and one in Steptoe Valley in line-of-sight of the 230 kV power line. Impacts to leks near power lines vary given a number of factors related to line-of-sight including: distance between the power line and the lek; cardinal direction (east/west) of the power line from the lek; background of the view; and topography (BLM 2001). Leks most at risk for increased avian predation would be a short distance west of a power line that is on flat ground or on ground with a slope that faces toward the power line, and a mountain range or some other backdrop to obscure the outline of a perched predator (BLM 2001). Other leks near power lines also may experience impacts from predators depending on the combination of these orientation factors.

Additionally, **Table 3.6-8** lists the acreages of seasonal habitat types within 0.25 mile of proposed power line ROWs. While Dry Lake Valley does not have lek sites, approximately 15 percent of the combined seasonal ranges in the valley are within 0.25 mile of power line ROW. Other valleys, including Cave, Lake, Snake, and Spring, have 3 percent or more of the habitat in the valley within 0.25 mile of proposed power line ROWs. Sage-grouse may abandon certain areas within and near the proposed project due to loss or alteration of habitat as a result of construction or facility maintenance activities. Sage-grouse are considered culturally significant to regional Tribes.

Table 3.6-8 Summary of Combined Greater Sage-grouse Seasonal Range Acreages Potentially Indirectly Impacted by Proposed Action and Alternatives A through C, Power Lines (Permanent) within Valleys

Basin	Total Combined Greater Sage-grouse Seasonal Ranges within the Valley	Combined Greater Sage-grouse Seasonal Ranges within 0.25 Mile of Power Line ROW	Percent of Greater Sage-grouse Seasonal Ranges within 0.25 Mile of Power Line ROW (%)
Cave	110,074	4,612	4
Dry Lake	64,907	9,854	15
Hamlin	146,171	3,209	2
Lake	206,305	5,909	3
Snake	217,711	7,552	3
Spring (SLD)	652,818	19,664	3
Steptoe	833,235	8,656	1
Grand Total	**2,231,221**	**59,456**	**3**

In addition to construction monitoring (ACM A.1.2), the applicant has committed to the following ACMs to reduce potential impacts to greater sage-grouse (for more detail, see **Appendix E**):

- Specific facility-siting criteria, including no above-ground facilities sited within 2 miles of active greater sage-grouse leks, for the proposed action (ACM A.5.49);
- Design and operation of lighting to reduce visual impacts (ACMs A.11.2 and A.11.3), which also would benefit greater sage-grouse;
- No spraying of herbicides within exclusion areas containing sensitive resources (ACM A.1.89);
- Construction scheduling restrictions (ACMs A.5.50 and A.5.51);
- Avoidance of line-of-sight views between power poles or along power lines and leks where feasible (ACM A.5.52);
- Enhanced restoration measures (ACM A.5.53);
- Installation of perch discouraging devices (ACM A.5.8); and
- Habitat enhancement (ACMs A.5.54, A.5.55, A.5.56).

The applicant also is working on development of a Candidate Conservation Agreement with assurances to provide benefit to specific species (including greater sage-grouse and pygmy rabbit) that occur on SNWA private properties in Spring Valley and associated grazing allotments. ACMs would reduce impacts to sage-grouse from the construction and maintenance of project facilities. Similarly, ACM A.5.8 will reduce potential impacts from predators, but perch deterrents are not completely effective, nor do they address the potential issue of habitat abandonment.

Conclusion: Habitat for greater sage-grouse would be temporarily disturbed by construction and a portion would be permanently converted to industrial uses as identified in **Tables 3.6-6** through **3.6-8**. Nine active leks fall within 2 miles of project ROWs. Eight of the nine active leks are within 2 miles of power line ROWs. Construction and facility maintenance impacts could include loss of nests, eggs, or young, nest or lek abandonment, and increased potential for disruption of seasonal movements, collisions with power lines and vehicles, and predation or harassment. ACMs would reduce potential impacts to greater sage-grouse.

Proposed mitigation measures:

While ACM A.5.8 would reduce potential impacts from predators, perch deterrents are not completely effective, nor would they address the potential issue of habitat abandonment. Given the importance of avoiding impacts to leks where practicable, mitigation measure ROW-WL-4 is proposed. Other ACMs, as listed above, would potentially reduce impacts to greater sage-grouse from the construction and maintenance of project facilities. In addition, mitigation measures ROW-WL-5 and ROW-WL-6 are proposed.

ROW-WL-4: **Specific lek avoidance – Burying power lines**. For the power line in Cave Valley, SNWA shall bury the portion of the 25 kV line within the 2 mile buffer of the active leks in Cave Valley. For the power line in Snake Valley, the portion of the 25 kV line within the 2 mile buffer of the active lek shall be buried. Effectiveness: This measure would be highly to moderately effective in avoiding power line associated impacts to these specific leks. Effects on other resources: Burying these power line segments would result in additional surface disturbance and could affect various other resources. These proposed segments are adjacent to the proposed pipeline ROW, so impacts are likely to be similar to those along the pipeline. This measure would potentially reduce impacts to visual resources in these portions of Cave and Snake valleys.

ROW-WL-5: **Specific lek avoidance –Siting of power lines**. SNWA shall site 230kV power lines west of three active leks in southern Spring Valley at sufficient distances to avoid line-of-sight with leks. Effectiveness: This measure would be highly effective in avoiding increased predation of leks due to additional perching sites for raptors and corvids as well as minimizing potential lek abandonment. Effects on other resources: Locations selected to avoid active sage-grouse leks will also be evaluated by the BLM for management consistency with other resource values.

ROW-WL-6: **Habitat restoration to benefit greater sage-grouse**. Restore greater sage-grouse habitat on public lands where habitat is disturbed. The SNWA shall coordinate with the BLM and the NDOW to determine the specific areas and timing for restoration activities. Effectiveness: This measure would be highly effective in mitigating impact to sagebrush habitat to benefit greater sage-grouse depending on the type, timing and location of restoration activities. Effects on other resources: Conducting restoration activities would contribute to noise and human presence disturbance to wildlife as well as the potential for vehicle collisions to wildlife. This measure also would provide benefits to other sagebrush obligate species like the pygmy rabbit.

Residual impacts include:

- The long-term (20 to 50 years) restoration periods for sagebrush shrubland habitats disturbed by ROW construction make these habitats less suitable for forage and cover for greater sage-grouse;
- An unknown portion of habitats may be degraded because recovery did not fully occur or proximity to permanent facilities makes the habitat less suitable; and
- Five leks within 2 miles of the ROW sited within the LCCRDA corridor may be attended by fewer males or abandoned given the proximity of the overhead power lines.

Raptors: Direct impacts to these species would include the long-term reduction of approximately 12,061 acres of golden eagle habitat in 13 valleys (Cave, Coyote Spring, Delamar, Dry Lake, Garnet, Hamlin, Hidden, Lake, Las Vegas, Pahranagat, Snake, Spring, and Steptoe valleys), and 5,173 acres of ferruginous hawk nesting or foraging habitat in 10 valleys (Cave, Coyote Spring, Delamar, Dry Lake, Hamlin, Lake, Pahranagat, Snake, Spring, and Steptoe valleys). Since bald eagles do not nest in the project area, direct impacts would include the long-term reduction of approximately 5,571 acres of foraging habitat in the same 13 valleys as listed for golden eagles. This would result in a reduction in the amount of available habitat for this species until reclamation activities are completed and native vegetation is reestablished. Note that SWReGAP data may overestimate the amount of habitat used by bald eagles which have only been recorded in the valleys listed in the affected environment ROW section. Habitat loss is expected to have little effect on these raptor populations, based on the amount of suitable breeding and foraging habitat in the surrounding area. Facility maintenance would result in the permanent conversion of 888 acres of golden eagle nesting and foraging habitat in 11 valleys (those listed above, except Hamlin and Pahranagat); 331 acres of ferruginous hawk nesting and foraging habitat in 6 valleys (Cave, Dry Lake, Lake, Snake, Spring and Steptoe); and 442 acres of bald eagle foraging habitat. If construction or facility maintenance activities were to occur during the breeding season (March through August), then direct impacts to breeding raptors could include the possible direct loss of nests, eggs, or young.

As discussed in the affected environment section, a total of 2 active ferruginous hawk nests were recorded within a 0.5 mile buffer of the ROWs in Snake and Spring valleys (Klinger and Williams 2005). NDOW's raptor database recorded numerous historic ferruginous hawk nests and one historic golden eagle nest within the ROW or a 0.5 mile buffer of the ROW. If construction or facility maintenance activities were to occur within 0.5 mile of an active raptor nest during breeding season, direct impacts could include abandonment of a new site or territory or the loss of eggs or in young, resulting loss of productivity for the breeding season. Loss of an active nest site, incubating adults, eggs or young would violate the MBTA and potentially could affect populations of raptor species that occur within the Project area. In order to avoid impacts to active golden eagle and ferruginous hawk nests as well as nests of other raptor species, mitigation measure ROW-WL-3 is proposed.

Indirect impacts include increased habitat fragmentation effects as a result of increased noise levels and human presence, dispersal of noxious and invasive weed species, and dust effects from unpaved road traffic during surface disturbance activities. However, the degree of these potential impacts would depend on a number of variables including the location of the nest site, the species' relative sensitivity, breeding phenology, and possible topographic shielding. Nest abandonment could result from increased human noise and presence close to an active nest site.

Fragmentation effects for raptor species can result in the loss or alteration of habitat, reduction in prey base, and increased human disturbance. The loss of native habitat to human development has resulted in declines of hawks and eagles throughout the West (Boeker and Ray 1971; Schmutz 1984). In some cases, habitat changes have not reduced numbers of raptors, but they have resulted in shifts in species composition (Harlow and Bloom 1987). Impacts to small

mammal populations due to habitat loss and fragmentation can result in a reduced prey base for raptors, resulting in lower raptor densities. Thompson et al. (1982) and Woffinden and Murphy (1989) found that golden eagles and ferruginous hawks had lowered nesting success where native vegetation had been lost and was unable to support jackrabbit (prey) populations. Furthermore, the increased number of access roads with the project would lead to greater public access. As a result, raptors may be disturbed from nests and roosts, thereby leading to displacement and reduced nesting success (Holmes et al. 1993; Postovit and Postovit 1987; Stalmaster and Newman 1978). Noise levels and human activity also can preclude otherwise acceptable raptor habitat from use (USFWS 2002). As with big game, vehicles that stop cause greater levels of disturbance to raptors than continuously moving vehicles (Holmes et al. 1993; White and Thurow 1985). Certain species of raptors are considered culturally significant to regional Tribes.

In addition to conducting occurrence surveys (ACM A.5.64), monitoring of construction (ACM A.1.2) and of known nests by qualified biologists (ACM A.5.68), use of predictive models to identify critical nesting locations (ACM A.5.62), and compliance reporting (ACM A.5.4 and A.5.7), the applicant has committed to the following ACMs to reduce potential impacts to these species (for more detail, see **Appendix E**):

- Pre-construction tree removal outside of nesting season as feasible and identification of exclusion areas (ACM A.5.68);
- Where appropriate, restriction of permitted activities from May 1 through July 15 within 0.5 mile of raptor nest sites unless the nest site has been determined to be inactive for at least the previous 5 years, (ACM A.5.69); and
- Design and construction of power poles and lines in accordance with APLIC recommendations (ACM A.5.66).

Conclusion: Habitat for raptors would be temporarily disturbed by construction and a portion would be permanently converted to industrial uses as identified above. ACMs and protections afforded in the RMPs would reduce potential impacts to raptors; however, impacts could result if construction or facility maintenance activities were to occur within 0.5 mile of an active raptor nest.

Proposed mitigation measures:

ROW-WL-3: Raptor survey and avoidance. ROW-WL-3 would be applied to address the potential for impacts from construction or facility maintenance activities within 0.5 mile of an active raptor nest.

Residual impacts include:

- The long-term (20 to 200 years) restoration periods for shrubland and woodland habitats disturbed by ROW construction make these habitats less suitable for forage and potential nesting sites for golden eagles or ferruginous hawks as well as less suitable for forage for bald eagles; and
- An unknown portion of habitats may be degraded because recovery did not fully occur or proximity to permanent facilities makes the habitat less suitable.

Western Burrowing Owl: Direct impacts to these species would include the incremental, long-term reduction of habitat quality in approximately 11,621 acres of nesting and foraging habitat in 13 valleys (Cave, Coyote Spring, Delamar, Dry Lake, Garnet, Hamlin, Hidden, Lake, Las Vegas, Pahranagat, Snake, Spring, and Steptoe valleys). Facility maintenance would result in the permanent conversion of 858 acres of nesting and foraging habitat in 13 valleys, with habitat in Hamlin and Pahranagat valleys being marginally impacted. Other direct and indirect impacts would be the same as those discussed for golden eagle and ferruginous hawk.

In addition to pre-construction surveys in suitable habitat during nesting season (ACM A.5.41), avoiding active nesting burrows when feasible and identifying these avoidance areas using construction fencing (ACM A.5.42), the applicant has committed to the following ACMs to reduce potential impacts to this species (for more detail, see **Appendix E**):

- Seasonal restrictions during the active nesting season unless a qualified biologist verifies through non-invasive means that either: 1) the birds have not begun egg laying and incubation, or 2) juveniles from the occupied burrows are foraging independently and are capable of independent survival (ACM A.5.47);

- Mitigation for destruction of any active burrows within the ROW with enhanced or new burrows on adjacent BLM lands at a ratio of 2:1, with two enhanced or new burrows to each one active burrow that will be destroyed (ACM A.5.43); and
- Relocation of individuals during the fall to winter season prior to the start of construction, in coordination with the BLM and the NDOW (ACM A.5.44).

Conclusion: Habitat for burrowing owl would be temporarily disturbed by construction and a portion would be permanently converted to industrial uses as identified above. ACMs and RMP guidance would reduce potential ROW construction and facility maintenance impacts to the western burrowing owl.

Proposed mitigation measures:

None.

Residual impacts include:

- An unknown portion of habitats may be degraded because recovery may not fully occur or proximity to permanent facilities makes the habitat less suitable.

Additional Special Status Birds: Direct and indirect impacts to additional special status birds would be the same as described for management concern birds earlier in the section. Mitigation measure ROW-WL-2 (USFWS Concurrence on Plans) and ROW-WL-3 (raptor nest survey and avoidance) would also apply to special status MBTA birds and raptor species. ACMs also would be the same.

Pygmy Rabbit: Direct impacts would result in the long-term reduction of approximately 3,634 acres of sagebrush habitat within the ROW and ancillary facility areas in nine basins (Cave, Delamar, Dry Lake, Hamlin, Lake, Pahranagat, Snake, Spring, and Steptoe). This would result in an incremental reduction in the amount of available habitat for this species until reclamation activities are completed and native vegetation is reestablished. Facility maintenance activities would result in the permanent conversion of 235 acres of habitat in four basins (Cave, Dry Lake, Lake, and Spring). Potential impacts also include the direct mortality of individual rabbits and loss of burrows (as a result of crushing from increased vehicle traffic and construction equipment, if present).

Indirect impacts include increased habitat fragmentation effects as a result of increased noise levels and human presence, dispersal of noxious and invasive weed species, and dust effects from unpaved road traffic during surface-disturbance activities. General habitat fragmentation, accidental wildfire, and power line impacts are described at the beginning of the ROW areas section, although it is important to note fragmentation of sagebrush habitat is of particular concern for pygmy rabbits because of their limited dispersal potential (Weiss and Verts 1984). Impacts from the operation of new power lines would include increased predation given the creation of additional nesting and perching sites for predators within pygmy rabbit habitat. Rabbits are considered culturally significant to regional Tribes.

The Ely RMP management action (E:SS-10) requires mitigation for the loss of special status species habitat as a result of discretionary permitted activities. Mitigation ratios are 2 acres of comparable habitat for every 1 acre of lost habitat as determined on a project-by-project basis. ACM A.5.58 will address the loss of occupied pygmy rabbit habitat. ACM A.5.56 would conduct habitat treatments to benefit greater sage-grouse on federal lands outside the ROWs, equal to the acreage of sagebrush habitat disturbed by construction. These may also benefit pygmy rabbit. Acreage of sagebrush disturbed is presented in **Table 3.5-9** in Section 3.5, Vegetation Resources. As mentioned under the greater sage-grouse discussion, the applicant also is working on development of a Candidate Conservation Agreement with assurances for SNWA private properties in Spring Valley which could also benefit this species.

In addition to construction monitoring (ACM A.1.2) and surveys (ACM A.5.57), the applicant has committed to the following ACMs to reduce potential impacts to pygmy rabbit (for more detail, see **Appendix E**):

- Habitat improvement, habitat mitigation, livestock management, and enhanced restoration measures (ACMs A.5.58, A.5.59, A.5.60);
- Speed-limit restrictions that would reduce vehicle/wildlife impacts (ACM A.1.29);
- Escape ramps to be installed at excavation areas, left open overnight and checked periodically by a biological monitor (ACM A.1.42);
- Assurances that wildlife would not be harassed or intentionally harmed (ACM A.5.5); and
- Installation of perch discouraging devices (ACM A.5.8).

Conclusion: Habitat for pygmy rabbits would be temporarily disturbed by construction and a portion would be permanently converted to industrial uses as identified above. Protections defined in the RMPs and the ACMs would reduce potential ROW construction and facility maintenance impacts to pygmy rabbit.

Proposed mitigation measures:

None.

Residual impacts include:

- The long-term (20 to 50 years) restoration period for sagebrush shrubland habitat disturbed by ROW construction makes this habitat unavailable for forage and cover for pygmy rabbit and contributes to habitat fragmentation; and
- An unknown portion of habitat may be degraded because recovery may not fully occur or proximity to permanent facilities makes the habitat less suitable.

Bats: Direct impacts to special status bat species (i.e., pallid bat, big brown bat, hoary bat, California myotis, western small-footed myotis, fringed myotis, western pipistrelle, and Brazilian free-tailed bat; **Appendix F**, **Table F3.6-1**) would include the long-term reduction of foraging habitat within all the basins crossed by the ROW and ancillary facilities. This would result in an incremental reduction in the amount of available habitat for these species until reclamation activities are completed and native vegetation is reestablished. To demonstrate impacts to bats, two species, the western pipistrelle and the long-eared myotis, were selected to provide the range of potential habitat impacts based on the difference in their SWReGAP modeled habitats. Approximately 12,030 acres of foraging habitat for western pipistrelle would be impacted during construction and 1,009 acres would be permanently converted. Long-eared myotis, one of the species not recorded in the ROW but that has been identified as having reasonable expectation of occurrence based on best available knowledge by wildlife management agencies, would have approximately 1,166 acres of foraging habitat impacted due to construction activities. Facility maintenance would convert 104 acres of foraging habitat for this species. No winter hibernacula, nursery colonies, or maternity roosts have been identified at proposed project facilities; however, tree-clearing for ROW construction could result in loss of roosting sites for tree-roosting species. There may also be increased potential for mortality to bats from power line collisions.

Indirect impacts include increased habitat fragmentation effects as a result of increased noise levels and human presence, dispersal of noxious and invasive weed species, and dust effects from unpaved road traffic during surface-disturbance activities. Many bat species are easily disturbed by noise and human presence (Oliver 2000). These species are especially sensitive to disturbance during roosting, maternity, and parturition. Abandonment of roost sites may occur due to increased human presence and noise disturbance (Oliver 2000).

In addition to construction monitoring (ACM A.1.2), the applicant has committed to the following ACM to reduce potential impacts to bats (for more detail, see **Appendix E**):

- Improve habitat conditions for bats by reducing or changing grazing in wet meadows on SNWA allotments (ACM C.2.18);
- Design water hauls with escape ramps(ACM A.5.72); and
- Design and operate lighting to reduce visual impacts (ACMs A.11.2 and A.11.3) which would also benefit bat species.

Conclusion: Habitat for bats would be temporarily disturbed by construction and a portion would be permanently converted to industrial uses as identified above. ACMs and the protections afforded in the RMPs would reduce potential ROW construction and facility maintenance impacts to bats.

Proposed mitigation measures:

None.

Residual impacts include:

- The long-term (20 to 200 years) restoration periods for woodland habitats disturbed by ROW construction make this habitat unavailable for forage and roosting for bats; and
- An unknown portion of habitats may be degraded because recovery may not fully occur or proximity to permanent facilities makes the habitat less suitable.

Desert Valley Kangaroo Mouse: Direct impacts would result in the long-term reduction of approximately 3,129 acres (see **Table 3.6-5,** footnote 3) of desert valley kangaroo mouse habitat. This would result in an incremental reduction in the amount of available habitat for this species until reclamation activities are completed and native vegetation is reestablished. Facility maintenance would result in the permanent conversion of 245 acres of habitat. Note habitat specific to the subspecies, desert valley kangaroo mouse, is not available, so species (dark kangaroo mouse) habitat information within Dry Lake and Delamar valleys was used. Potential impacts also could result in the direct mortalities of individual mice (as a result of crushing from increased vehicle traffic and construction equipment, if present).

Indirect impacts include increased habitat fragmentation effects as a result of increased noise levels and human presence, dispersal of noxious and invasive weed species, and dust effects from unpaved road traffic during surface-disturbance activities. Impacts from the operation of new power lines would include increased predation due to the creation of additional nesting and perching sites for predators within mouse habitat.

In addition to construction monitoring (ACM A.1.2), the applicant has committed to reducing potential impacts to this species by trapping and relocating individual mice within known habitat in Dry Lake Valley (ACM A.5.61).

Conclusion: Habitat for desert valley kangaroo mouse would be temporarily disturbed by construction and a portion would be permanently converted to industrial uses as identified above. The ACMs and protections afforded in the RMPs would reduce potential ROW construction and facility maintenance impacts to the desert valley kangaroo mouse.

Proposed mitigation measures:

None.

Residual impacts include:

- The long-term (20 to 200 years) restoration periods for shrublands and woodlands in habitats disturbed by ROW construction make these habitats unavailable for forage and cover for desert valley kangaroo mouse;
- An unknown portion of habitats may be degraded because recovery may not fully occur or proximity to permanent facilities makes the habitat less suitable; and
- Potential mortalities may occur to desert valley kangaroo mouse from construction equipment and soil movement.

Banded Gila Monster: Direct impacts to this species would include the long-term reduction of habitat quality in approximately 2,627 acres of suitable habitat (in Coyote Spring, Garnet, Hidden Valley, and Las Vegas valleys) and would result in an incremental reduction in the amount of available habitat until reclamation activities are completed and native vegetation is reestablished. Facility maintenance would result in the permanent conversion of 248 acres of habitat in the same valleys listed above. Potential impacts also could result in the direct mortalities of individuals (as a result of crushing from increased vehicle traffic and construction equipment, if present) as well as increased potential for illegal collection.

Indirect impacts include increased habitat fragmentation effects as a result of increased noise levels and human presence, dispersal of noxious and invasive weed species, and dust effects from unpaved road traffic during surface-disturbance activities as well as potential for increased illegal collection.

In addition to pre-construction surveys by qualified biologists, in accordance with the NDOW protocol (ACM A.5.37), the applicant has committed to the following ACMs to reduce potential impacts to this species (for more detail, see **Appendix E**):

- Speed-limit restrictions to reduce vehicle/wildlife impacts (ACM A.1.29);
- Relocation of individuals that are found during pre-construction surveys (ACM A.5.38);
- Assurances that wildlife would not be harassed or intentionally harmed (ACM A.5.5); and
- Immediate contact to the NDOW if a gila monster is found, and reporting of all gila monster observations by project workers (ACM A.5.39).

Conclusion: Habitat for gila monster would be temporarily disturbed by construction and a portion would be permanently converted to industrial uses as identified above. ACMs would reduce potential ROW construction and facility maintenance impacts to gila monster.

Proposed mitigation measures:

None.

Residual impacts include:

- An unknown portion of habitats may be degraded because recovery may not fully occur or proximity to permanent facilities makes the habitat less suitable; and
- Potential mortalities to gila monster from construction equipment and soil movement.

Mojave Poppy Bee: Direct impacts would result in the long-term reduction of approximately 1,718 acres of potentially suitable habitat for this bee species in Coyote Spring Valley and in an incremental reduction in the amount of available habitat for this species, until reclamation activities are completed and native vegetation is reestablished. Facility maintenance would result in the permanent conversion of 120 acres of habitat in Coyote Spring Valley. Other impacts could include the direct mortality of individuals (as a result of crushing from increased vehicle traffic and construction equipment, if present). Given the lack of information on this species (e.g. range, distribution, reasons for rarity, degree of threat), the level of impact as a result of this project is not known. There are no proposed species-specific ACMs. It

is assumed that potential impacts to this species would be minimized through implementation of mitigation measures in vegetation ROW-VEG-1 (reducing spread of invasive weeds) and ROW-VEG-2 (reducing risk of accidental wildfire).

Conclusion: Habitat for Mojave poppy bee would be temporarily disturbed by construction and a portion would be permanently converted to industrial uses as identified above. There are no proposed species-specific ACMs.

Proposed mitigation measures:

ROW-VEG-1: Reducing Spread of Noxious Weeds and **ROW-VEG-2: Reducing Risk of Accidental Wildfire**. These measures would assist in reducing impacts to Mojave poppy bee.

Residual impacts include:

- An unknown portion of habitats that may be degraded because recovery did not fully occur.

3.6.2.3 Alternative D

The same ROW construction and facility maintenance issues discussed for the Proposed Action and Alternatives A through C would apply to Alternative D. The following discussion describes acreage and species location-specific differences for this alternative.

The Alternative D ROW stops at the White Pine County line. Impacts in White Pine County are removed or reduced as a result.

Summary

General Habitat Loss and Alteration

Construction would disturb approximately 8,843 acres of wildlife habitat, primarily consisting of shrub-scrub types including sagebrush shrubland (44 percent), Mojave mixed desert shrubland (35 percent) and greasewood/saltbush shrubland (19 percent), with lesser amounts of woodland, grasslands and other types comprising the remaining 2 percent. Shrub/scrub and woody vegetations would be impacted long term, while grass and forb vegetation would be impacted over the short term when considering reclamation time frame. Facility maintenance would result in the permanent conversion of approximately 822 acres of terrestrial wildlife habitat in similar proportions to construction (within 4 percent).

Habitat fragmentation would result from the construction of the various project facilities including the development of access roads, pipelines, electrical power lines, and various above-ground facilities including pumping stations and electrical substations. Other fragmentation effects such as increased noise, elevated human presence, dispersal of noxious and invasive weeds species and dust deposition from unpaved road traffic would extend beyond the boundaries of the project ROWs.

Accidental wildfires could be initiated during construction and facility maintenance activities and could cause minor to major impacts on forage and cover availability to all wildlife, depending on the acreage burned and whether any areas of particular species-specific value were disturbed. Impacts from wildfire would result in mortalities of less mobile species (e.g., small mammals, birds, reptiles, amphibians, invertebrates) and short-term displacement of wildlife from the impacted area.

The operation of proposed electrical power lines would incrementally increase the potential for electrocution for birds and collision potential for birds and bats, and could serve as predator perches and nest sites, increasing predation potential on a number of species.

Species of Management Concern

Big Game: Construction disturbance would result in reduction of forage areas and habitat fragmentation on a long-term basis for big game species, including antelope (4,571 acres), elk (2,704 acres), mule deer range (2,949 acres), mule deer crucial summer range (101 acres), mule deer crucial winter range (3 acres), and desert bighorn sheep occupied habitat (260 acres). Disturbance acres represent less than 1 percent of the available species habitat within the basin impacted. Facility maintenance would result in the permanent conversion of habitat to industrial uses including antelope

(391 acres), elk (180 acres), mule deer range (302 acres), mule deer crucial summer range (16 acres), and desert bighorn sheep occupied habitat (11 acres). Impacts also would include displacement of individuals and potential loss of breeding success given habitat alteration, exposure to construction/maintenance movements and noise and higher levels of human activity. The proposed Project also would have potential to cause long-term, elevated, traffic-caused mortality. While the area of habitat affected by construction surface disturbance would represent less than 1 percent of the surface area of these habitat ranges within the hydrologic basins occupied by Alternative D, the location of ROW construction could impact local herds and migration corridors. Protections provided in the RMPs and the ACMs would reduce potential impacts to big game species. However, in order to address the permanent conversion of 16 acres of mule deer crucial summer habitat and 11 acres of desert bighorn sheep occupied habitat, as well as the long-term surface disturbance of mule deer crucial summer range (101 acres) and mule deer crucial winter range (3 acres), mitigation measure ROW-WL-1 is proposed.

Mitigation measure ROW-WL-1 specifies that SNWA will improve 2 acres of comparable big game key habitat for each 1 acre disturbed.

Other Terrestrial Species of Management Concern: Direct impacts to small mammals, reptiles, game and other bird species of management concern (including raptors) would include the incremental, long-term surface disturbance of approximately 8,840 acres of habitat and increased fragmentation, until vegetation became reestablished and construction noises ceased. Facility maintenance would result in the permanent conversion of approximately 820 acres of habitat to industrial uses. Fragmentation effects would be incremental, but species that require large tracts of unbroken habitat such as sagebrush obligate species may not be able to complete their life functions and this project may contribute to general population declines. Potential impacts also likely would include:

- Displacement of mobile wildlife species on a short-term basis from noise and human activity from construction and on a long-term basis for facility maintenance;
- Mortalities of less-mobile or burrowing species as a result of crushing from increased vehicle traffic and construction equipment and abandonment or loss of eggs or young;
- Disruption of breeding success (displacement or nest abandonment) of migratory birds from noise or human activity if construction occurred during breeding season; and
- Potential for small wildlife to be trapped in water troughs and be drowned.

ACMs that would reduce potential impacts to wildlife include: speed limit restrictions (ACM A.1.29), traffic management to reduce vehicle trips (ACM A.1.28), escape ramps in water troughs (ACM A.5.72), timing of ground clearing to avoid critical nesting periods for migratory birds as feasible (ACM A.5.63), and pre-construction bird surveys and avoidance until birds have fledged, or consultation with the BLM (ACM A.5.65). Protections provided in the RMPs and the ACMs would reduce potential impacts to other terrestrial wildlife species of management concern. However, mitigation measure ROW-WL-2 (USFWS concurrence on plans) is added to obtain concurrence from USFWS on plans that address species protected under MBTA or BGEPA and ROW-WL-3 (Raptor nest survey and avoidance) addresses pre-construction surveys and nest avoidance for raptors.

Special Status Species

Desert Tortoise: Direct impacts to the desert tortoise would include the incremental, long-term reduction of approximately 2,350 acres of desert tortoise habitat (1,759 acres of which is designated critical habitat) within five basins (Las Vegas, Garnett, Hidden, Coyote Spring and Pahranagat valleys) from ROW construction until reclamation activities have been completed and native vegetation is reestablished. Facility maintenance would result in the permanent conversion of habitat to industrial uses including approximately 245 acres of critical habitat and 86 acres of non-critical habitat. Potential impacts also could include direct mortality of individual tortoises as a result of crushing from increased vehicle traffic and construction equipment, if present. Indirect impacts would result from increased noise and human presence and increased habitat fragmentation. ACMs that would reduce potential impacts to desert tortoise include adherence to USFWS-approved desert tortoise survey protocols (ACMs A.5.17-20, 30), handling and relocating procedures (ACM A.5.16), placement of exclusion fencing (ACM A.5.18), construction monitoring by the USFWS-approved qualified biologists (ACM A.5.30), speed limit restrictions that would reduce vehicle/wildlife impacts (ACM A. 1.29), and removal of entrapped animals from trenches (ACM A.1.42). Compliance with the ESA

would require implementation of measures to reduce the effects of anticipated take of desert tortoise, including through habitat loss or degradation. Potential impacts would be reduced based on compliance with recovery plans and RMPs and adherence to ACMs. The applicant would consult with USFWS on this species.

Greater Sage-grouse: Incremental, long-term reduction of 1,562 acres of nesting and early brood range, 2,496 acres of late summer range habitat, 621 acres of winter range habitat, animal displacement (short and long term), and habitat fragmentation (long term) would result from this alternative. Facility maintenance would result in the permanent conversion of approximately 130 acres of nesting and early brood range, 190 acres of late summer range, and 69 acres of winter range habitats to industrial uses. Other impacts include potential mortalities from vehicle traffic (short and long-term), potential loss of nests, eggs or young, and potential for increased predation given additional perching sites on power lines. There are four active leks within 2 miles of proposed ROWs, three of them within 2 miles of proposed overhead power lines. ACMs that would reduce potential impacts to greater sage-grouse include specific facility siting criteria (ACM A.5.49), design and operation of lighting (ACMs A.11.2 and 3), seasonal timing restrictions (ACMs A. 5.50 and 51), enhanced restoration measures (ACM A.5.53), perch discouraging devices (ACM A.5.8) and habitat enhancement (ACMs A.5.54, 55 and 56). In addition, mitigation measures ROW WL-4 (Relevant alignment in Cave Valley), ROW WL-5 (Specific lek avoidance) and ROW-WL-6 (Sage-grouse habitat restoration) have been added.

Raptors: Incremental, long-term reduction of approximately 8,615 acres of golden eagle foraging habitat and 3,170 acres of ferruginous hawk nesting and foraging habitat and 4,165 acres of bald eagle foraging habitat would result from this alternative. Facility maintenance would result in the permanent conversion of 700 acres of golden eagle foraging habitat, and 220 acres of ferruginous hawk nesting and foraging habitat and 360 acres of bald eagle foraging habitat to industrial uses. There are no ferruginous hawks or golden eagle nests recorded within 0.5 mile of the ROW. ACMs that would reduce potential impacts to these species include design of power lines following APLIC recommendations to avoid electrocution potential (ACM A.5.66), construction timing restrictions where appropriate (ACM A.5.69), pre-construction surveys and nest avoidance where feasible (ACM A.5.65), and pre-construction tree removal as feasible (ACM A.5.68). ACMs and the protections afforded in the RMPs would reduce potential ROW construction and facility maintenance impacts to raptors; however, raptors would not be not fully protected. As such, mitigation measure ROW-WL-3 for preconstruction surveys and nest avoidance is proposed.

Western Burrowing Owl: Direct impacts would include the incremental, long-term reduction of approximately 8,320 acres of suitable foraging habitat (shrub-scrub) and facility maintenance would result in the permanent conversion of 680 acres of nesting and foraging habitat to industrial uses. Impacts include potential mortalities from vehicle traffic (short term and long term). ACMs that would reduce potential impacts to burrowing owl include mitigation for destruction of any active burrows within the ROW with 2 enhanced or new burrows to each 1 active burrow that will be destroyed (ACM A.5.43), relocation of individuals (ACM A.5.44), and seasonal restrictions around occupied burrows (ACM A.5.47). No additional species-specific mitigation is proposed.

Pygmy Rabbit: Direct impacts would include the incremental, long-term reduction of approximately 2,810 acres of suitable habitat (shrub-scrub) would result from this alternative and facility maintenance would result in the permanent conversion of 200 acres of habitat to industrial uses. Impacts would include displacement of animals due to noise and human activity (short and long term), habitat fragmentation (long term), direct mortality that could occur during construction from crushing by vehicles or equipment as well as potential for increased predation given additional perching sites on power lines. ACMs that would reduce potential impacts to pygmy rabbits include, speed limit restrictions (ACM A.1.29), installation of perch discouraging devices (ACM A.5.8), and habitat improvement, mitigation, livestock management, and enhanced restoration measures (ACMs A.5.58, 59, 60). These ACMs and the protections afforded in the RMPs would reduce ROW construction and facility maintenance impacts to pygmy rabbit. No additional species-specific mitigation is proposed.

Bat Species: Direct impacts would include the incremental, long-term reduction of approximately 690 to 8,610 acres of foraging habitat and facility maintenance would result in the permanent conversion of 93 to 820 acres of habitat to industrial uses (based on Western pipistrelle and long-eared myotis models, see **Table 3.6-5** footnote 2). No winter hibernacula, nursery colonies, or maternity roosts have been identified at proposed project facilities; however, tree-clearing for ROW construction could result in loss of roosting sites for tree-roosting species. Impacts also would include displacement of animals due to noise and human activity (short and long term), and habitat fragmentation (long term). There also may be increased mortality to bats from potential power line collisions. ACMs that would reduce potential impacts to bats include improving habitat conditions on SNWA grazing allotments (ACM C.2.18), lighting

design (ACM A.11.2 and 3), and escape ramps in water troughs (ACM A.5.72). No additional species-specific mitigation is proposed.

Desert Valley Kangaroo Mouse: Direct impacts would include the incremental, long-term reduction of approximately 3,129 acres of dark kangaroo mouse habitat would result from this alternative and facility maintenance would result in the permanent conversion of 245 acres of habitat to industrial uses. Other impacts include potential mortalities from vehicle traffic (short and long-term) and habitat fragmentation (long term). Note that habitat information specific to the subspecies desert valley kangaroo mouse is not available, so species habitat information within Dry Lake and Delamar valleys is used as an estimate of the number of acres likely to be occupied by the subspecies. ACMs that would reduce potential impacts to desert valley kangaroo mouse include speed limit restrictions (ACM A.1.29), installation of perch discouraging devices (ACM A.5.58), and trapping and relocating individual mice within known habitat in Dry Lake Valley (ACM A.5.61). No additional species-specific mitigation is proposed.

Gila Monster: Direct impacts would include the incremental long-term reduction of approximately 2,627 acres of potential habitat and facility maintenance would result in the permanent conversion of 248 acres of habitat to industrial uses. Impacts include potential mortalities from vehicle traffic (short and long term), habitat fragmentation (long term), and increased potential for illegal collection. ACMs that would reduce potential impacts to gila monster include speed limit restrictions (ACM A.1.29), installation of perch discouraging devices (ACM A.5.58), and preconstruction surveys and relocations and notifications (ACM A.5.38 and 39). No additional species-specific mitigation measures are proposed.

Mojave Poppy Bee: Direct impacts would include the incremental long-term reduction of approximately 1,718 acres of potential habitat would result from this alternative and facility maintenance would result in the permanent conversion of 120 acres of habitat to industrial uses. Impacts include potential mortalities from vehicle traffic (short and long term) and habitat fragmentation (long term). Potential impacts to this species would be minimized through implementation of mitigation measures in vegetation ROW VEG-1 and ROW-VEG-2. No additional species-specific mitigation is proposed.

Residual impacts include:

- The same types of residual impacts would occur except that habitat effects would be less than the Proposed Action.

3.6.2.4 Alternative E

The same ROW construction and facility maintenance issues discussed for the Proposed Action and Alternatives A through C would apply to Alternative E. The following discussion describes acreage and species location-specific differences for this alternative.

Summary:

General Habitat Loss and Alteration

Construction would disturb approximately 10,697 acres of wildlife habitat, primarily consisting of shrub-scrub types including sagebrush shrubland (47 percent), Mojave mixed desert shrubland (29 percent) and greasewood/saltbush shrubland (21 percent), with lesser amounts of woodland, grasslands and other types comprising the remaining 3 percent. Shrub/scrub and woody vegetations would be impacted long term, while grass and forb vegetation would be impacted over the short term when considering the reclamation time frames. Facility maintenance would result in the permanent conversion of approximately 960 acres of terrestrial wildlife habitat in similar proportions to construction (within 4 percent).

Habitat fragmentation would result from the construction of the various project facilities including the development of access roads, pipelines, electrical power lines, and various above-ground facilities including pumping stations and electrical substations. Other fragmentation effects such as increased noise, elevated human presence, dispersal of noxious and invasive weeds species and dust deposition from unpaved road traffic would extend beyond the boundaries of the project ROWs.

Accidental wildfires could be initiated during construction and facility maintenance activities and could cause minor to major impacts on forage and cover availability to all wildlife, depending on the acreage burned and whether any areas

of particular species-specific value were disturbed. Impacts from wildfire would result in mortalities of less mobile species (e.g., small mammals, birds, reptiles, amphibians, invertebrates) and short-term displacement of wildlife from the impacted area.

The operation of proposed electrical power lines would incrementally increase the potential for electrocution for birds and collision potential for birds and bats, and could serve as predator perches and nest sites, increasing predation potential on a number of species.

Species of Management Concern

Big Game: Construction disturbance would result in reduction of forage areas and habitat fragmentation on a long-term basis for big game species, including antelope (6,345 acres), elk (4,019 acres), mule deer range (3,547 acres), mule deer crucial summer range (161 acres), mule deer crucial winter range (3 acres), and desert bighorn sheep occupied habitat (260 acres) and potential habitat (25 acres). Disturbance acres represent less than 1 percent of the available species habitat within the basins impacted. Facility maintenance would result in the permanent conversion of habitat to industrial uses including antelope (520 acres), elk (283 acres), mule deer range (326 acres), mule deer crucial summer range (23 acres), and desert bighorn sheep occupied habitat (11 acres). Impacts would also include displacement of individuals and potential loss of breeding success given habitat alteration, exposure to construction/maintenance movements and noise and higher levels of human activity. The proposed project also would have potential to cause long-term, elevated, traffic-caused mortalities. While the area of habitat affected by construction surface disturbance would represent less than 1 percent of the surface area of these habitat ranges within the hydrologic basins occupied by the Alternative E, the location of ROW construction could impact local herds and migration corridors. Protections provided in the RMPs and the ACMs would reduce potential impacts to big game species. However, in order to address the permanent conversion of 23 acres of mule deer crucial summer habitat and 11 acres of desert bighorn sheep occupied habitat, as well as the long-term surface disturbance of mule deer crucial summer range (161 acres), mule deer crucial winter range (3 acres), and desert bighorn sheep occupied habitat (260 acres), mitigation measure ROW-WL-1 (Big game habitat restoration and improvement) is proposed.

Other Terrestrial Species of Management Concern: Direct impacts to small mammals, reptiles, game and other bird species of management concern (including raptors) would include the incremental, long-term surface disturbance of approximately 10,700 acres of habitat and increased fragmentation until vegetation became reestablished and construction noises ceased. Facility maintenance would result in the permanent conversion of approximately 960 acres of habitat to industrial uses. Fragmentation effects would be incremental, but species that require large tracts of unbroken habitat such as sagebrush obligate species may not be able to complete their life functions and this project may contribute to general population declines. Potential impacts also likely would include:

- Displacement of mobile wildlife species on a short-term basis from noise and human activity from construction, and on a long-term basis for facility maintenance;
- Mortalities of less-mobile or burrowing species as a result of crushing from increased vehicle traffic and construction equipment, and abandonment or loss of eggs or young;
- Disruption of breeding success (displacement or nest abandonment) of migratory birds from noise or human activity if construction occurred during breeding season; and
- Potential for small wildlife to be trapped in water storage devices and be drowned.

ACMs that would reduce potential impacts to wildlife include: speed limit restrictions (ACM A.1.29), traffic management to reduce vehicle trips (ACM A.1.28), escape ramps in trenches and water storage devices (ACM A.5.72), timing of ground clearing to avoid critical nesting periods for migratory birds as feasible (ACM A.5.63), and pre-construction bird surveys and avoidance until birds have fledged, or consultation with the BLM (ACM A.5.65). Protections provided in the RMPs and the ACMs would reduce potential impacts to other terrestrial wildlife species of management concern. No additional mitigation is proposed. However, mitigation measure ROW-WL-2 is added to obtain concurrence from USFWS on plans that address species protected under MBTA or BGEPA, and ROW-WL-3 addresses pre-construction surveys and nest avoidance for raptors.

Special Status Species

Desert Tortoise: Direct impacts to the desert tortoise would include the incremental, long-term reduction of approximately 2,350 acres of desert tortoise habitat (1,759 acres of which is designated critical habitat) within five basins (Las Vegas, Garnett, Hidden, Coyote Spring and Pahranagat valleys) from ROW construction until reclamation activities have been completed and native vegetation is reestablished. Facility maintenance would result in the permanent conversion of habitat to industrial uses including approximately 245 acres of critical habitat and 86 acres of non-critical habitat. Potential impacts also could include direct mortality of individual tortoises as a result of crushing from increased vehicle traffic and construction equipment, if present. Indirect impacts would result from increased noise and human presence and increased habitat fragmentation. ACMs that would reduce potential impacts to desert tortoise include adherence to USFWS-approved desert tortoise survey protocols (ACM A.5.17-20, 30), handling and relocating procedures (ACM A.5.16), placement of exclusion fencing (ACM A.5.18), construction monitoring by the USFWS-approved qualified biologists (ACM A.5.30), speed limit restrictions that would reduce vehicle/wildlife impacts (ACM A.1.29), and removal of entrapped animals from trenches (ACM A.1.42). Compliance with the ESA would require implementation of measures to reduce the effects of anticipated take of desert tortoise, including through habitat loss or degradation. Potential impacts would be reduced based on compliance with recovery plans and RMPs and adherence to ACMs. The applicant would consult with USFWS on this species.

Greater Sage-grouse: Incremental, long-term reduction of 3,208 acres of nesting and early brood range, 4,202 acres of late summer range habitat, 2,379 acres of winter range habitat, animal displacement (short and long term), and habitat fragmentation (long term) would result from this alternative. Facility maintenance would result in the permanent conversion of approximately 245 acres of nesting and early brood range and 320 acres of late summer range and 195 acres of winter range habitats to industrial uses. Other impacts include potential mortalities from vehicle traffic (short and long-term), potential loss of nests, eggs or young, and potential for increased predation given additional perching sites on power lines. There are eight active leks within 2 miles of proposed ROWs, seven of them within 2 miles of proposed overhead power lines. ACMs that would reduce potential impacts to greater sage-grouse include specific facility siting criteria (ACM A.5.49), design and operation of lighting (ACM A.11.2 and 3), seasonal timing restrictions (ACMs A.5.50 and 51), enhanced restoration measures (ACM A.5.53), perch discouraging devices (ACM A.5.8) and habitat enhancement (ACM A.5.54, 55, and 56). In addition, mitigation measures ROW WL-4, ROW WL-5, and ROW-WL-6 have been added.

Raptors: Direct impacts would include the incremental, long-term reduction of approximately 10,460 acres of golden eagle foraging habitat, 4,340 acres of ferruginous hawk nesting and foraging habitat, and 4,900 acres of bald eagle foraging habitat would result from this alternative. Facility maintenance would result in the permanent conversion of 835 acres of golden eagle foraging habitat, 306 acres of ferruginous hawk nesting and foraging habitat, and 410 acres of bald eagle foraging habitat to industrial uses. Two ferruginous hawks nests are recorded within 0.5 mile of the ROW (Spring and Snake valleys). ACMs that would reduce potential impacts to these species include design of power lines following APLIC recommendations to avoid electrocution potential (ACM A.5.66), construction timing restrictions where appropriate (ACM A.5.69), pre-construction surveys and nest avoidance where feasible (ACM A.5.65), and pre-construction tree removal as feasible (ACM A.5.68). ACMs and the protections afforded in the RMPs would reduce potential impacts to raptors; however, raptors would not be fully protected. As such, mitigation measure ROW-WL-2 (Raptor survey and avoidance) for preconstruction surveys and nest avoidance is proposed.

Western Burrowing Owl: Direct impacts would include the incremental, long-term reduction of approximately 10,070 acres of suitable foraging habitat (shrub-scrub) and facility maintenance would result in the permanent conversion of 808 acres of nesting and foraging habitat to industrial uses. Impacts include potential mortalities from vehicle traffic (short term and long term). ACMs that would reduce potential impacts to burrowing owl include mitigation for destruction of any active burrows within the ROW; 2 enhanced or new burrows to each 1 active burrow that will be destroyed (ACM A.5.43), relocation of individuals (ACM A.5.44), and seasonal restrictions around occupied burrows (ACM A.5.47). No additional species-specific mitigation is proposed.

Pygmy Rabbit: Direct impacts would reduce the incremental, long-term reduction of approximately 3,320 acres of suitable habitat (shrub-scrub) would result from this alternative and facility maintenance would result in the permanent conversion of 235 acres of habitat to industrial uses. Impacts would include displacement of animals due to noise and human activity (short and long term), habitat fragmentation (long term), direct mortality that could occur during construction from crushing by vehicles or equipment as well as potential for increased predation given additional perching sites on power lines. ACMs that would reduce potential impacts to pygmy rabbits include, speed limit

restrictions (ACM A.1.29), installation of perch discouraging devices (ACM A.5.8), and habitat improvement, mitigation, livestock management, and enhanced restoration measures (ACMs A.5.58, 59, 60). ACMs and the protections afforded in the RMPs would reduce potential impacts to pygmy rabbit. No additional species-specific mitigation is proposed.

Bat Species: Direct impacts would include the incremental, long-term reduction of approximately 1,033 to 10,420 acres of foraging habitat and facility maintenance would result in the permanent conversion of 101 to 955 acres of habitat to industrial uses (based on Western pipistrelle and long-eared myotis models, see **Table 3.6-5** footnote 2). No winter hibernacula, nursery colonies, or maternity roosts have been identified at proposed project facilities; however, tree-clearing for ROW construction could result in loss of roosting sites for tree-roosting species. Impacts also would include displacement of animals due to noise and human activity (short and long term) and habitat fragmentation (long term). There also may be increased mortality to bats from potential power line collisions. ACMs that would reduce potential impacts to bats include improving habitat conditions on SNWA grazing allotments (ACM C.2.18), lighting design (ACM A.11.2 and 3), and escape ramps in water troughs (ACM A.5.72). No additional species-specific mitigation is proposed.

Desert Valley Kangaroo Mouse: Direct impacts would include the incremental, long-term reduction of approximately 3,129 acres of dark kangaroo mouse habitat would result from this alternative and facility maintenance would result in the permanent conversion of 245 acres of habitat to industrial uses in Dry Lake and Delamar valleys. Other impacts include potential mortalities from vehicle traffic (short and long-term) and habitat fragmentation (long term). Note that habitat information specific to the subspecies, desert valley kangaroo mouse, is not available, so species habitat information within Dry Lake and Delamar valleys is used as an estimate of the number of acres likely to be occupied by the subspecies. ACMs that would reduce potential impacts to desert valley kangaroo mouse include speed limit restrictions (ACM A.1.29), installation of perch discouraging devices (ACM A.5.58), and trapping and relocating individual mice within known habitat in Dry Lake Valley (ACM A.5.61). No additional species-specific mitigation is proposed.

Gila Monster: Direct impacts would include the incremental long-term reduction of approximately 2,627 acres of potential habitat and facility maintenance would result in the permanent conversion of 248 acres of habitat to industrial uses. Impacts include potential mortalities from vehicle traffic (short and long term), habitat fragmentation (long term), and increased potential for illegal collection. ACMs that would reduce potential impacts to gila monster include speed limit restrictions (ACM A.1.29), installation of perch discouraging devices (ACM A.5.58), and preconstruction surveys and relocations and notifications (ACM A.5.38 and 39). No additional species-specific mitigation measures are proposed.

Mojave Poppy Bee*:* Incremental long-term reduction of approximately 1,718 acres of potential habitat would result from this alternative and facility maintenance would result in the permanent conversion of 120 acres of habitat to industrial uses. Impacts include potential mortalities from vehicle traffic (short and long term) and habitat fragmentation (long term). Potential impacts to this species would be minimized through implementation of mitigation measures in vegetation ROW-VEG-1 and ROW-VEG-2. No additional species-specific mitigation is proposed.

Residual impacts include:

- The same type of residual effects would occur except that habitat effects would be less than the Proposed Action.

3.6.2.5 Alignment Options 1 through 4

Table 3.6-9 compares the impacts associated with the alignment in the Proposed Action to the impacts associated with the alignments options 1 through 4. Mitigation measures and ACMs would apply to these alignment options.

Table 3.6-9 Potential Effects on Terrestrial Wildlife Resources from Implementation of Alignment Options 1 through 4

Alignment Option	Analysis
Alignment Option 1 (Humboldt-Toiybe Power Line Alignment). **Option Description**: Change the locations of a portion of the 230-kV power line from Gonder Substation near Ely to Spring Valley. **Applicable To**: Proposed Action and Alternatives A through C and E.	• Big game species ranges with reduced acreage impacts: mule deer crucial summer (-60 acres), antelope year round (-120 acres), elk year round (-96 acres), desert bighorn potential (-23 acres). Facility maintenance conversions reduced: mule deer crucial summer (-8 acres), antelope year round (-14 acres), elk year round (-2 acres), and desert bighorn potential (-3 acres). • Big game species ranges with increased acreage impacts: mule deer year round (75 acres), elk crucial summer (29 acres), rocky mountain bighorn sheep potential (38 acres). Facility maintenance conversions increased: mule deer year round (9 acres), elk crucial summer (4 acres), and rocky mountain bighorn sheep potential (58 acres). • Special status species for which there is no change: desert tortoise, gila monster, Mojave poppy bee, no change in the number of active greater sage-grouse leks within 2 miles. • Special status species with reduced construction/facility maintenance acreage impacts: pygmy rabbit (-16 acres /-1 acre), bats[1] (-2 acres /-105 acres / 0 to -13 acres), desert valley kangaroo mouse (-121 acres /-14 acres), greater sage-grouse [nesting early brood (-155 acres /-14 acres), summer (-98 acres /-11 acres) winter (-106 acres /-13 acres) ranges], golden eagle (-94 acres / -1 acres), ferruginous hawk (-77 acres /-9 acres), bald eagle (-55 acres /-6 acres), and western burrowing owl (-997 acres /-11 acres).
Alignment Option 2 (North Lake Valley Pipeline Alignment). **Option Description**: Change the locations of portions of the mainline pipeline and electrical transmission line in North Lake Valley. **Applicable To**: Proposed Action and Alternatives A through C and E.	• Big game species ranges with increased acreage impacts: mule deer year round (233 acres), antelope year round (294 acres), and elk year round (165 acres). Facility maintenance conversions increased: mule deer year round (42 acres), antelope year round (38 acres), and elk year round (24 acres). • Special status species for which there is no change: desert tortoise, gila monster, and Mojave poppy bee. • Special status species with reduced construction acreage impacts: pygmy rabbit (-189 acres), bats (-57 to -221 acres), desert valley kangaroo mouse (-168 acres), greater sage-grouse (winter range, -129 acres), golden eagle (-69 acres), and western burrowing owl (-81 acres). Facility maintenance conversions reduced: pygmy rabbit (-6 acres), bats[1] (+52 to -57 acres), desert valley kangaroo mouse (-5 acres), greater sage-grouse (winter range, -56 acres), and golden eagle (-4 acres). • Special status species with increased construction acreage impacts: greater sage-grouse (nesting and early brood [14 acres] and late summer [200 acres]); one additional active lek within 2 miles (Spring/Lake Valley), ferruginous hawk (32 acres), bald eagle (61 acres), bats (+52 to -57 acres). Facility maintenance conversions increased: bats[1] (-4 to +15 acres), greater sage-grouse [nesting and early brood (12 acres) and late summer (45 acres)], ferruginous hawk (13 acres), bald eagle (6 acres), and western burrowing owl (3 acres).
Alignment Option 3 (Muleshoe Substation and Power Line Alignment). **Option Description**: Eliminate the Gonder to Spring Valley transmission line, and construct a substation with an interconnection with an interstate, high voltage power line in Muleshole Valley. **Applicable To**: Proposed Action and Alternatives A through C and E.	• Big game species ranges with reduced acreage impacts: mule deer crucial summer (-60 acres), mule deer year round (-111 acres), antelope year round (-294 acres), elk year round (-387 acres), and desert bighorn potential (-3 acres). Facility maintenance conversions reduced: mule deer crucial summer (-8 acres), elk year round (-30 acres), and desert bighorn potential (-3 acres). • Big game species ranges with facility maintenance conversions increased: antelope year round (22 acres) and mule deer year round (35 acres). No construction acreage impact increased for any big game range. • Special status species for which there is no change: desert tortoise, gila monster, and Mojave poppy bee. • Special status species with reduced construction acreage impacts: pygmy rabbit (-15 acres), bats (-73 to -325 acres), greater sage-grouse (nesting and early brood [-239 acres], summer range [-217 acres], winter range [-314 acres]; one less active lek within 2 miles [Steptoe]), golden eagle (-362 acres), ferruginous hawk (-290 acres), bald eagle (-332 acres) and western burrowing owl (-272 acres). Facility maintenance conversions reduced: greater sage-grouse [nesting and early brood range (-18 acres), winter range (-18 acres)], and bald eagle (-22 acres). • Special status species with increased construction acreage impacts: desert valley kangaroo mouse (39 acres). Facility maintenance conversions increased: pygmy rabbit (25 acres), bats[1] (+18 to -8 acres), desert valley kangaroo mouse (37 acres), greater sage-grouse (late summer range [20 acres]), golden eagle (13 acres), ferruginous hawk (9 acres), and western burrowing owl (24 acres).

Table 3.6-9 Potential Effects on Terrestrial Wildlife Resources from Implementation of Alignment Options 1 through 4 (Continued)

Alignment Option	Analysis
Alignment Option 4 (North Delamar Valley Pipeline and Power Line Alignment). **Option Description**: Change the location of a short section of mainline pipeline in Delamar Valley to follow an existing transmission line. **Applicable To**: All alternatives.	• Big game species range with reduced acreage impacts: antelope year round (-53 acres). Facility maintenance conversion reduced: antelope year round (-45 acres). • Special status species for which there is no change: desert tortoise, greater sage-grouse (no change in ranges or number of active leks within 2 miles), gila monster, and Mojave poppy bee. • Special status species with reduced construction acreage impacts: bats (-53 to -176 acres), desert valley kangaroo mouse (-89 acres), golden eagle (-47 acres), bald eagle (-142 acres), and western burrowing owl (-45 acres). Facility maintenance conversions reduced: pygmy rabbit (-2 acres), bats[1] (-46 acres), desert valley kangaroo mouse (-42 acres), golden eagle (-45 acres), ferruginous hawk (-2 acres), bald eagle (-34 acres) and western burrowing owl (-45 acres). • Special status species with increased construction acreage impacts: pygmy rabbit (130 acres), ferruginous hawk (134 acres). Facility maintenance conversions increased: none.

[1] Two species, the long-eared myotis (with less habitat within the region of study) and the western pipistrelle (with more habitat within the region of study) were selected to provide a range of potential habitat impacts based on the difference in their SWReGAP modeled habitat.

3.6.2.6 No Action

Under the No Action Alternative, the proposed project would not be constructed or maintained. No project-related surface disturbance would occur. Impacts to terrestrial wildlife species and their habitat would continue at present levels as a result of natural conditions and existing and other proposed development within the project area. Habitat for terrestrial wildlife species would continue to be influenced by natural events such as drought and fire, land use activities such as grazing, recreational uses such as hunting, as well as reasonably foreseeable development actions. Wildlife species of management concern and special status wildlife species, depending on their status, would continue to be managed by the BLM, USFS, GBNP, or the states of Nevada or Utah, under the relevant plans (e.g., RMPs, recovery plans, and forest, park or state management plans) that have been developed for their management as described earlier in this section.

3.6.2.7 Comparison of Alternatives

Table 3.6-10 compares Alternatives D and E relative to the Proposed Action and Alternatives A through C.

Table 3.6-10 Comparison of Alternatives

Parameter	Proposed Action and Alternatives A through C (Acres Construction/ Acres Permanent)	Alternative D (Acres Construction/Acres Permanent) Described or provided as a percent decrease from the Proposed Action	Alternative E (Acres Construction/Acres Permanent) Described or provided as a percent decrease from the Proposed Action
Qualitative Description	Proposed Action footprint	Reduced from the Proposed Action footprint and does not include any ROWs or ancillary facilities north of the White Pine county line, reducing surface impacts to wildlife in Spring Valley and removing surface impacts to wildlife in Snake valley.	Reduced from the Proposed Action footprint and does not include any ROWs or ancillary facilities in Snake Valley, avoiding surface impacts to wildlife from Snake Valley.
Total habitat disturbance (acres)	12,303/1,014 acres	8,843/822 acres	10,697/960 acres
Big Game Ranges (habitat):			
Mule Deer crucial summer	169/24 acres	Decrease 40%/33%	Decrease 5%/4%
Mule Deer crucial winter	133/0 acres	Decrease nearly 100% /NA	Decrease nearly 100% /NA
Mule Deer year round	3,917/363 acres	Decrease 25% /17%	Decrease 9% /10%
Antelope year round	7,952/574 acres	Decrease 43%/32%	Decrease 20%/9%
Rocky Mtn elk year round	4,019/282 acres	Decrease 33%/36%	Same as Proposed Action
Desert Bighorn (occupied)	259/11 acres	Same as Proposed Action	Same as Proposed Action
Desert Bighorn (potential)	25/3 acres	No habitat impacts	Same as Proposed Action
Special Status Spp. (habitat)			
Desert tortoise	2,350/331 acres	Same as Proposed Action for all three species.	Same as Proposed Action for all three species.
Gila monster	2,627/248 acres		
Mojave poppy bee	1,718/120 acres		
Special Status Spp. (habitat)			
Pygmy rabbit	3,634/235 acres	Decrease 23%/15%	Decrease 9%/no change
Bat species[1]	1,166 to 12,030/104 to 1,009 acres	Decrease 18-28%/11-18%	Decrease 11-13%/1-3%
DVK mouse[2]	3,129/245acres	Same as Proposed Action	Same as Proposed Action
Golden eagle	12,061/888 acres	Decrease 29%/21%	Decrease 13%/6%
Ferruginous hawk	5,173/331 acres	Decrease 39%/33%	Decrease 16%/8%
	Two known nests within 0.5 mile of ROW	No known nests within 0.5 mile of ROW	Two known nests within 0.5 mile of ROW
Bald Eagle	5,571/442 acres	Decrease 25%/19%	Decrease 12%/7%
Western burrowing owl	11,621/858 acres	Decrease 28%/21%	Decrease 13%/6%
Greater sage-grouse	Active leks within 2 miles of ROW and ancillary facilities = 9.	Active leks within 2 miles of ROW and ancillary facilities = 4.	Active leks within 2 miles of ROW and ancillary facilities = 8.
	Active leks within 2 miles of overhead power lines = 8.	Active leks within 2 miles of overhead power lines = 3.	Active leks within 2 miles of overhead power lines = 7.
Seasonal ranges:			
Nesting and early brood	3,813/269 acres	Decrease 59%/52%	Decrease 16%/9%
Late summer	4,703/360 acres	Decrease 56% /47%	Decrease 26% /11%
Winter	3,864/233 acres	Decrease 84% /70%	Decrease 38% /16%

[1] Two species, the long-eared myotis (less habitat within the region of study) and the western pipistrelle (more habitat within the region of study) were selected to provide a range of potential habitat impacts based on the difference in their SWReGAP modeled habitat.

[2] DVK = desert valley kangaroo mouse. This acreage is for dark kangaroo mouse in Dry Lake and Delamar valleys. Desert valley kangaroo mouse is the subspecies considered special status for this EIS.

3.6.2.8 Groundwater Development and Groundwater Pumping

Issues

Groundwater Field Development Construction and Facility Maintenance

- Habitat loss and fragmentation from construction clearing of ROWs, transmission lines, and new and improved access roads;
- Direct disturbance and loss of individuals from construction activities along ROWs (including trenching), transmission lines, and access roads;
- Disturbance and loss of individuals from accidental wildfires and loss of habitat;
- Indirect effects, consisting of displacement of individuals and loss of breeding success, from exposure to construction or operational movements and noise and higher levels of human activity (including traffic);
- Potential disruption of migration patterns because of temporary fencing and potential entanglement and loss of individuals;
- Direct disturbance and loss of individuals from loss of habitat, and traffic mortality;
- Potential effects from collisions and electrocutions to raptors and other wildlife from power lines and power stations;
- Potential effects of additional infrastructure resulting in increased perches for raptors and corvids that may increase predation on other animals;
- Potential effects on terrestrial wildlife species culturally significant and traditionally used as food by regional Tribes;
- Compliance with recovery plans, conservation agreements, and state wildlife action plans for special status species; and
- Potential effects of climate change on terrestrial wildlife resources. Refer to Air Resources, Section 3.1.3.2 for a discussion of how climate change could contribute to GWD pumping effects on environmental resources.

Groundwater Pumping

- Short-term, long-term, and permanent loss of wildlife habitats used by wildlife from reductions in phreatophytic, wetland, riparian habitat, and surface water availability;
- Loss of individuals and displacement of wildlife species;
- Potential effects of groundwater drawdown on water resources and habitat that support migratory waterfowl, bats, and important bird areas;
- Potential effects of groundwater drawdown on wildlife that is associated with cave habitats;
- Compliance with recovery plans, conservation agreements, and state wildlife action plans for special status terrestrial wildlife species; and
- Potential effects of climate change on terrestrial wildlife resources. Refer to Air Resources, Section 3.1.3.2 for a discussion of how climate change could contribute to GWD pumping effects on environmental resources.

Assumptions

Groundwater Field Development Construction and Facility Maintenance

- Identification of terrestrial wildlife that could be affected by project actions focused on species of management concern and special status wildlife species in groundwater development areas and drawdown areas;
- Construction disturbances, while temporary in nature, have been defined as long-term for all vegetation cover types due to existing vegetation structure and composition, recovery time frames, and limiting revegetation factors (e.g. low precipitation rates, soil chemistry constraints, and soil moisture);

- Identification of terrestrial wildlife habitat that could be affected by construction activities for groundwater development associated with the Proposed Action, Alternatives A, C, D, and E, included all habitat within the exploration boundaries (groundwater development areas);
- Identification of terrestrial wildlife habitat that could be affected by construction activities for groundwater development associated with Alternative B included areas within 1 mile of the proposed Points of Diversion within the five groundwater development valleys;
- Application of the Ely and Las Vegas RMP management actions and best management practices to all proposed construction activities, based on the most current RMPs – Ely 2008 and Las Vegas 1998; and
- Inclusion of the ACMs included in the SNWA POD to manage surface disturbance effects as a basis for appropriate measures that may be submitted in future SNWA ROW applications.

Groundwater Pumping

- The extent of groundwater drawdown effects on the terrestrial wildlife species is tied directly to drawdown impacts on springs, perennial streams, and vegetation plant communities as outlined in Section 3.3, Water Resources, and Section 3.5, Vegetation Resources.
- Assumptions made in the vegetation section also apply to wildlife with regard to vegetation communities, see Section 3.5.2.8, Vegetation.
- Assumptions made in the water section also apply to wildlife with regard to spring and perennial stream habitats, see Section 3.3.2.8, Water.

Methodology

Groundwater Field Development Construction and Facility Maintenance

- The methods outlined under ROWs were applied to project surface development activities.
- Location of future facilities is unknown. For general discussions of terrestrial wildlife impacts it is assumed that the total estimated acreage for both construction and permanent facilities would impact wildlife habitat. A summary of these general project disturbance numbers is in Chapter 2, **Table 2.10-2**.
- Acreages of overlap between species habitat and groundwater development areas are provided for some species. However, the direct disturbance that is anticipated for construction of future facilities is limited to only a small portion of these acres. Impacts would occur where surface-disturbance activities occur, not within the entire groundwater development areas. Acres of habitat within groundwater development areas are provided in context of the percent of groundwater development area that is a particular type of habitat. It is calculated by using the acres of species habitat within the groundwater development areas divided by the total acreage of the groundwater development areas in each valley or summarized for all valleys. The intent is to provide the reader with a general sense of how feasible it will be to site future facilities outside of a particular species' habitat.
- If the acreage of proposed future facilities is less than the total amount of available habitat within the groundwater development areas, then impacts are conservatively estimated (more impacts to species habitat) to all be sited within that particular habitat and the full acreage of proposed future facilities is listed. If the acreage of proposed future facilities is more than the total amount of available habitat within the groundwater development areas, then impacts are conservatively estimated to be up to the total amount of available habitat.
- Indirect impacts, including construction noise, lighting, spread of noxious weeds, potential for wildfire, could also affect adjacent wildlife habitat. Impact discussions are considered general in terms of applicability to wildlife resources within the five basins and within these groundwater development areas.
- Climate Change – Section 3.1.3.2 in Air Resources discusses the potential effects of climate change on terrestrial wildlife resources. These effects could be in combination with the GWD pumping. As a result of the current knowledge of climate change, it is not possible to relate potential effects with specific pumping alternatives that are analyzed in this EIS.

Groundwater Pumping

- To understand how the wildlife habitat impacts related to drawdown are described, the reader should review: 1) the Methodology, Assumptions, and Limitations discussion in the Water Resources section (3.3.2.8); particularly the discussion under the unnumbered heading "Identification of Spring and Streams Susceptible to Drawdown Impacts", and 2) the Assumptions and Methods sections in 3.5.2.8, Vegetation.
- The key habitat features (e.g. springs, perennial streams, phreatophytic vegetation communities) within species habitats were calculated (count, miles) and provided in percentage of the total of each features within the species habitat or within the basin to determine relative change in potential availability of those features to wildlife.

3.6.2.9 Proposed Action

Groundwater Development Areas

Construction and Facility Maintenance

Habitat Loss, Fragmentation, Accidental Wildfires, and Power Line Effects

The following information summarizes general habitat impacts to terrestrial wildlife resources in groundwater development areas, within the five groundwater development basins (DDC, Snake and Spring valleys; there are no groundwater development areas in Utah). Construction of well pads, access roads, gathering pipelines, and electrical service lines would result in a total surface disturbance of approximately 3,530 to 8,265 acres. A portion of this construction disturbance – approximately 67 percent (or 2,365 to 5,538 acres) – would be permanently converted to industrial uses for the operational life of the project. No specific development plans are available, so it is assumed that the habitat cover types would be affected in proportion to their relative surface area within the groundwater development areas. Consequently, it is expected that sagebrush shrubland, greasewood/saltbush shrubland, and Mojave mixed desert shrubland habitat types would be most extensively disturbed (see **Table 3.5-9**, Vegetation). The impacts of construction and facility maintenance on terrestrial wildlife in groundwater development areas would be similar to the impacts described in the ROW areas (Section 3.6.2.4.1) including impacts related to habitat fragmentation and potential impacts from accidental wildfires and power lines.

In its Programmatic Measures, SNWA stated it will implement ACMs that may reduce potential impacts to terrestrial wildlife species. These may include, but are not limited to:

- Groundwater production well siting and design to reduce impacts (ACM B.1.1, B.1.4);
- Collector pipeline, distribution power line, and secondary substation siting (ACM B.1.3);
- Monitoring well design to use solar panels, to reduce need for additional power lines (ACM B.1.2); and
- Lighting limited and designed to reduce impacts (ACM B.2.4).

Surface restoration, restoration monitoring measures, and ACMs would be those identified in **Appendix E**.

Species of Management Concern

Big Game: Five big game species ranges (pronghorn antelope, Rocky Mountain elk, mule deer, Rocky Mountain bighorn sheep, and desert bighorn sheep) occur in at least one of the groundwater development basins. Species with the most widespread distribution are pronghorn antelope and mule deer. Crucial summer range is present for mule deer in four of the basins; crucial winter range is in Spring Valley for antelope and in Spring and Dry Lake valleys for mule deer (**Figures 3.6-1** to **3.6-5**). Antelope, elk, deer and bighorn sheep are all considered culturally significant to regional Tribes.

Table 3.6-11 summarizes acreage of big game ranges that fall within groundwater development areas for the Proposed Action. Refer to **Table 3.5-3** in the vegetation section for the acreages of the groundwater development areas in the five valleys.

Table 3.6-11 Big Game Range Acreage Overlap with Proposed Action Groundwater Development Areas

Habitat	County	Basin	Pronghorn	Rocky Mountain Elk	Mule Deer
Crucial Summer	Lincoln	Cave Valley	NI	0	2,884
		Dry Lake Valley	NI	0	800
		Spring Valley	NI	0	1,461
	Lincoln Total		NI	0	5,145
	White Pine	Snake Valley	NI	0	11,282
		Spring Valley	NI	0	366
	White Pine Total		NI	0	11,648
Crucial Summer Total			**NI**	**0**	**16,793**
Crucial Winter	Lincoln	Dry Lake Valley	0	NI	27,533
		Spring Valley	0	NI	4,672
	Lincoln Total		0	NI	32,205
	White Pine	Spring Valley	24,813	NI	26,154
	White Pine Total		24,813	NI	26,154
Crucial Winter Total			**24,813**	**NI**	**58,359**
Year Round	Lincoln	Cave Valley	32,319	34,787	31,887
		Delamar Valley	61,896	0	3,196
		Dry Lake Valley	121,659	41,346	50,465
		Spring Valley	54,645	12,843	8,738
	Lincoln Total		270,519	88,976	94,286
	White Pine	Snake Valley	90,163	3,121	22,237
		Spring Valley	288,604	103,030	86,156
	White Pine Total		378,767	106,151	108,393
Year Round Total			**649,286**	**195,127**	**202,679**

NI: None Identified.

Direct impacts to big game would include the incremental, long-term surface disturbance of approximately 3,530 to 8,265 acres of primarily shrubland wildlife habitat in groundwater development areas in the five basins. Of this, approximately 67 percent, or 2,365 to 5,538 acres of habitat would be permanently converted to industrial uses. This disturbance would cause the loss of potential forage. Herbaceous forage species might become established within 1 or 2 years, depending on reclamation success; other habitat types including shrubs and woodlands would take much longer (see Vegetation **Table 3.5-1**). Although surface-disturbance activities would represent a long-term habitat loss for big game and the location of facilities within the groundwater development areas may impact local herds, these disturbance acres would represent a small percentage (less than 1 percent) of the overall available habitat within these areas. Other impacts to big game species would be the same as described in ROW impact discussion (Section 3.6.2.2).

The groundwater development areas overlap with approximately 9,269 acres of occupied desert bighorn sheep habitat in Cave, Delamar, and Dry Lake valleys and 7,801 acres of potential habitat in Cave, Dry Lake, and Spring valleys. Rocky Mountain bighorn sheep occupied and potential habitat overlaps groundwater development areas in Snake and Spring valleys including approximately 6,664 acres of occupied habitat and 5,061 acres of potential habitat (**Table 3.6-12**). Potential impacts to desert bighorn and Rocky Mountain bighorn sheep as a result of construction and maintenance of groundwater development facilities would be the same as those described in the ROW impact discussion for desert bighorn sheep (Section 3.6.2.2).

Table 3.6-12 Bighorn Sheep Range Acreage Overlap with Proposed Action and Alternatives A and C Groundwater Development Areas

Basin	Desert Bighorn Sheep		Rocky Mountain Bighorn Sheep	
	Occupied	Potential	Occupied	Potential
Cave	3,680	500	0	0
Delamar	703	0	0	0
Dry Lake	4,886	2,879	0	0
Snake	0	0	3,079	229
Spring	0	4,422	3,585	4,840
Total	**9,269**	**7,801**	**6,664**	**5,069**

Protections provided by the RMPs and ACMs would reduce impacts to big game.

Habitat Impact by Basin:

Cave Valley: More than 90 percent of the groundwater development area in Cave Valley is antelope, elk, and mule deer year-round habitat ranges. (See **Figure 1.1-1** for groundwater development areas and valleys, **Figures 3.6-1** through **3.6-5** for big game habitats, and **Appendix F**, **Table F3.6-4**). Future facilities built in groundwater development exploratory areas would impact these big game habitats because these habitats could not be completely avoided through siting decisions. Eight percent of the groundwater development area is mule deer crucial summer range and 11 percent is desert bighorn sheep occupied habitat. Given the more limited extent of these big game ranges within the exploratory area in Cave Valley, facility siting decisions could avoid these habitats.

Delamar Valley: Eighty-six percent of the groundwater development area in Delamar Valley is antelope year-round habitat. Four percent is mule deer year round habitat and 1 percent is occupied desert bighorn sheep occupied habitat. In this valley it would be difficult to site future facilities without impacting antelope year round habitat, but other big game ranges could be avoided. There is no crucial seasonal range for mule deer in this valley, no crucial winter for antelope, and no crucial summer for elk.

Dry Lake Valley: Seventy-two percent of the groundwater development area in Dry Lake Valley is antelope year-round range. Thirty percent is mule deer year round range and 24 percent is elk year round. These ranges would likely be impacted by future project facilities. As only 16 percent of the groundwater development area is mule deer crucial winter range and 3 and 2 percent are occupied and potential desert bighorn sheep range, respectively, facility siting decisions could avoid bighorn sheep habitat entirely and should make every effort to avoid mule deer crucial winter range.

Spring Valley: Ninety-five percent of the groundwater development areas in Spring Valley are antelope year-round range. Thirty-two percent is elk year round and 26 percent is mule deer year round range. Nine percent is mule deer crucial winter range and 7 percent is antelope crucial winter range. Since only 1 percent of the development areas in Spring Valley are mule deer crucial summer range, potential desert bighorn sheep, and occupied and potential rocky mountain bighorn sheep ranges, these could likely be avoided through facility siting decisions.

Snake Valley: Ninety-seven percent of the groundwater development areas in Snake Valley is antelope year-round range. Facilities would impact this range type because it would be difficult to site facilities to avoid this range type. Twenty-four percent is mule deer year round habitat and 12 percent is mule deer crucial summer range. Three percent of the areas are elk year-round and Rocky Mountain bighorn sheep occupied habitats, which could be avoided through facility siting decisions.

Big Game Conclusion: Habitat for big game would temporarily be disturbed by construction (approximately 3,530 to 8,265 acres) and a portion would be permanently converted to industrial uses (approximately 2,365 to 5,538 acres) with potential for impact described above by basin. Construction and facility maintenance impacts would also include

displacement of individuals, potential loss of breeding success, exposure to construction/maintenance movements and noise, and higher levels of human activities (including potential increased mortality from traffic and illegal poaching). The area of habitat affected by construction surface disturbance would represent less than 1 percent of the surface area of these habitat ranges within these basins; however, the location of facility construction or maintenance could impact local herds and migration corridors. Protections provided by the RMPs and ACMs would reduce impacts to big game.

Mitigation Recommendations:

GW-WL-1: Avoid siting facilities in key big game habitats. Avoid locating wells, new roads, or other linear facilities within key big game habitats including crucial summer and winter ranges, and occupied bighorn sheep habitats. Where avoidance is not practicable, the SNWA shall improve 2 acres of comparable habitat for every 1 acre disturbed. Effectiveness: This measure would be highly effective in avoiding impacts to key big game habitat.

Other Terrestrial Wildlife Species of Management Concern

Direct disturbance to small mammals, reptiles, game and other bird species of management concern (including raptors) from surface-disturbing activities include the incremental, long-term surface disturbance of approximately 3,530 to 8,265 acres of habitat in Delamar, Dry Lake, Cave, Snake and Spring valleys (see **Table 3.5-9**, Vegetation, for land cover types within the groundwater development areas). Terrestrial wildlife species of management concern habitat requirements are described in **Appendix F**, **Table F3.6-2**. Approximately 67 percent of the construction surface disturbance, or 2,365 to 5,538 acres would be permanently converted to industrial uses, and would not be reclaimed during the project life. Direct and indirect impacts to small mammal, reptiles, game and other bird species of management concern (including raptors) as a result of construction and facility maintenance in groundwater development areas are anticipated to be similar to those described in ROWs, including general habitat fragmentation and potential for accidental wildfires and power line impacts. Culturally significant species in this group of wildlife include rabbits and various species of raptors.

While no important bird areas overlap with groundwater development areas, GBNP and D.E. Moore Bird and Wildlife Sanctuary important bird areas share a boundary with a groundwater development area in Snake Valley and the Northern Snake Range important bird area is within 2 miles of groundwater development areas in Snake and Spring valleys. Construction of facilities in the groundwater development areas, if near the boundary of the area, could have impacts to wildlife in these important bird areas, from indirect effects of noise and dust.

In its Programmatic Measures, the SNWA has stated it will implement ACMs that may reduce potential impacts to wildlife species. These are mentioned at the beginning of the groundwater development section and available in **Appendix E**.

Conclusion: Construction of well pads, gathering pipelines, and electrical service lines would disturb approximately 3,530 to 8,265 acres of primarily shrubland wildlife habitat in the five groundwater basins. Of this disturbance, approximately 67 percent (2,365 to 5,538 acres) would be permanently converted to industrial uses. Increased mortalities could occur given construction and facilities maintenance activities and timing of activities could impact migratory bird species and other species breeding. Habitat fragmentation effects would incrementally contribute to impacts to species, but for species requiring large tracts of unbroken habitat such as sagebrush obligates, species may not be able to complete their life functions and this project may contribute to general population declines. Protections provided by the RMPs and the ACMs would reduce impacts. See the corresponding section under ROW areas for relevant RMP protections and ACM numbers.

Mitigation Recommendations:

ROW-WL-2: USFWS concurrence on Plans. The SNWA shall obtain concurrence from USFWS on any plans developed as part of the POD (A.1.1) that address species protected under MBTA or Bald and Golden Eagle Protection Act. Effectiveness: This measure would be highly to moderately effective in reducing impacts to nesting and breeding MBTA birds and eagles. Effects on other resources: None.

ROW-WL-3: Raptor nest survey and avoidance. If surface disturbance activities may be initiated during raptor breeding and nesting seasons (as determined by the NDOW and the BLM), surveys for active raptor nests shall be

conducted by the SNWA within suitable habitat, within 2 weeks prior to the anticipated start of surface disturbing construction activities. Raptor nests found during surveys would be addressed under Ely RMP SS-4 management action. (SS-4: Where appropriate, restrict permitted activities from May 1 through July 15 within 0.5 mile of raptor nest sites unless the nest site has been determined to be inactive for at least the previous 5 years.) Effectiveness: This measure would be highly effective in avoiding impacts to nesting raptors. Effects on other resources: Conducting surveys would contribute to noise and human presence disturbance to wildlife as well as the potential for vehicle collisions to wildlife. This measure also could provide a record of other breeding bird species that could be potentially affected by the project.

Measures proposed in the Aquatic Biology section would also benefit other species of management concern. GW-AB-1 and GW-AB-2 would also reduce impacts to terrestrial wildlife species by avoiding or minimizing impacts to aquatic habitat and adjacent wetland and riparian habitats used by many terrestrial wildlife species.

Special Status Species

The focus of the impact analysis was on the following BLM Sensitive Species: pygmy rabbit, bats, desert valley kangaroo mouse, greater sage-grouse, special status raptors, western burrowing owl, additional special status birds, and Baking Powder Flat blue butterfly. Other special status birds are addressed as a group. Impacts for each species or species group would be qualitatively the same as described for the ROW impacts on special status species (Section 3.6.2.4). Although acreages of overlap between species habitat and groundwater development areas are provided for some species, the direct disturbance that is anticipated for future facilities is limited to approximately 3,530 to 8,265 acres from construction, of which, approximately 67 percent (2,365 to 5,538 acres) would be permanently converted to industrial uses.

Desert Bighorn Sheep: Habitat is discussed under the species of management concern.

Greater Sage-grouse: Construction of facilities in the groundwater development areas could affect greater sage-grouse leks as well as late-summer, winter, and nesting and early brood ranges. The number of leks inside groundwater development areas is listed in **Table 3.6-13**, the number of leks within 2 miles of groundwater development areas are shown in **Table 3.6-14** and the estimated number of acres of greater sage-grouse habitat that overlap the groundwater development areas is provided in **Table 3.6-15**. Sage-grouse is considered culturally significant to regional Tribes.

Table 3.6-13 Summary of Greater Sage-grouse Active, Inactive, and Historic Lek Locations within Proposed Groundwater Development Areas

Valley	Population Management Unit	Active	Inactive	Historic	Unknown	Total # of Leks
Cave Valley	Cave	1	0	0	0	1
Snake Valley	Spring/Snake Valley	1	0	2	0	3
Spring Valley - White Pine, Lincoln	Lincoln	2	2	0	0	4
Spring Valley - White Pine, Lincoln	Schell/Antelope	0	1	0	1	2
Spring Valley - White Pine, Lincoln	Spring/Snake Valley	9	1	1	6	17
Total		**13**	**4**	**3**	**7**	**27**

Table 3.6-14 Summary of Greater Sage-grouse Active, Inactive, and Historic Lek Locations within 2 Miles of Proposed Groundwater Development Areas

Valley	Population Management Unit	Active	Inactive	Historic	Unknown	Total # of Leks
Cave Valley	Cave	6	0	0	0	6
Snake Valley	Spring/Snake Valley	1	1	3	0	5
Spring Valley - White Pine, Lincoln	Lincoln	2	2	0	0	4
Spring Valley - White Pine, Lincoln	Schell/Antelope	0	1	0	1	2
Spring Valley - White Pine, Lincoln	Spring/Snake Valley	9	1	1	6	17
Total		**18**	**5**	**4**	**7**	**34**

Table 3.6-15 Acres within and Percent of Groundwater Development Areas for Greater Sage-grouse Habitat by Valley

Basin	Acres of Nesting and Early Brood Range within Groundwater Development Areas	Percent of Groundwater Development Areas that is Nesting and Early Brood Range (%)	Acres of Summer Range within Groundwater Development Areas	Percent of Groundwater Development areas that is Summer Range (%)	Acres of Winter Range within Groundwater Development Areas	Percent of Groundwater Development areas that is Winter Range (%)
Cave	23,688	68	20,797	60	21,906	63
Dry Lake	0	0	21,708	13	0	0
Snake	35,314	38	66,845	72	40,794	44
Spring	221,004	61	257,840	71	289,139	80
Total	**280,006**	**38**	**367,190**	**50**	**351,839**	**48**

Direct impacts would include the long-term reduction of up to approximately 2,590 to 6,231 acres of habitat within four of the groundwater development basins (Cave, Dry Lake, Snake, and Spring valleys). This would result in the incremental reduction in the amount of available habitat for this species until reclamation activities are completed and native vegetation is reestablished. Sixty-seven percent of the construction surface disturbance or 1,747 to 4,180 acres of habitat would be permanently converted to industrial uses for the life of the proposed project. **Table 3.6-15** shows the percent of groundwater development areas that is seasonal sage-grouse habitat. Given the amount of the various seasonal habitats within Cave, Snake, and Spring valleys, it would be difficult to site facilities without impacting these habitats (also see **Appendix F**, **Table F3.6-4**). Further, given the number of leks that fall within groundwater development areas as well as within 2 miles of groundwater development areas, facility siting with regard to active sage-grouse leks would be of particular importance. While ACMs may reduce the potential for impacts to sage-grouse leks by avoiding areas within 0.25 mile of an active lek, impacts including potential increased collision and predation (particularly when power lines are located east of leks within line-of-sight) as well as habitat avoidance could occur as a result of overhead power lines. Other impacts to greater sage-grouse would be the same as described in the ROW section.

In its Programmatic Measures, SNWA has stated it will implement ACMs that may reduce potential impacts to wildlife species (for more detail see **Appendix E**). These may include, but are not limited to:

- Groundwater production well siting and design to reduce impacts (ACM B.1.1, B.1.4);
- Collector pipeline, distribution power line, and secondary substation siting (ACM B.1.3);
- Monitoring well design to use solar panels, to reduce need for additional power lines (ACM B.1.2);
- Lighting limited and designed to reduce impacts (ACM B.2.4); and
- Siting groundwater production wells and overhead power lines at least 0.25 mile away from of an active greater sage-grouse lek and routing underground pipelines to be at least 0.25 mile away from active leks, unless placed within an existing road and not constructed during the breeding season (ACM B.5.1).

Conclusion: Construction would result in the incremental, long-term reduction of up to approximately 2,590 to 6,231 acres of habitat within four of the groundwater development basins (Cave, Dry Lake, Snake, and Spring valleys). Of this disturbance, approximately 1,747 to 4,180 acres of habitat would be permanently converted to industrial uses. Other impacts would include animal displacement (short and long term), habitat fragmentation (long term), increased potential mortalities from vehicle traffic (short and long-term), potential loss of nests, eggs or young, and potential for increased collisions and predation given additional perching sites on power lines. There are 13 active leks within proposed groundwater development areas and 18 active leks within 2 miles. Six of the seven active leks in southern Cave Valley are within 2 miles of groundwater development areas. All 10 of the active leks in Spring/Snake population management unit fall within groundwater development areas in Spring and Snake valleys and an additional two active leks in southern Spring Valley are also within proposed Spring Valley groundwater development areas. Protections provided by the RMP and the ACMs would reduce impacts, but potential for long term impacts to local greater sage-grouse populations exists. See ACMs listed above and the corresponding section under ROW areas for relevant RMP protections and ACM numbers.

Mitigation Recommendations:

Given the importance of avoiding line-of-sight views within 2 miles of active leks, additional mitigation recommendations for construction of groundwater development facilities include GW-WL-2.

GW-WL-2: Avoid Siting Facilities Within 2 Miles of Active Sage-grouse Leks. Where possible, the SNWA shall avoid siting wells and power lines within 2 miles of active sage-grouse leks. Where not possible, all power lines 33-kV or smaller within 2 miles of active greater sage-grouse leks must be buried. Effectiveness: This measure would be highly to moderately effective in avoiding power line associated impacts to active sage-grouse leks.

Raptor Species: Direct impacts to raptor species would include the long-term reduction of an estimated 3,530 to 8,265 acres of foraging and nesting habitat in the five basins. This would result in a reduction in the amount of available foraging and nesting habitat for golden eagles, ferruginous hawks, northern goshawks, peregrine falcons, and prairie falcons and foraging habitat for bald eagles within the five groundwater development basins until reclamation activities are completed and native vegetation is reestablished. Sixty-seven percent of the construction surface disturbance, or 2,365 to 5,538 acres would be permanently converted to industrial uses for the life of the proposed project. Other impacts to raptors would be the same as described in the ROW section.

Conclusion: Construction would result in the incremental, long-term reduction of up to an estimated 3,530 to 8,265 acres of raptor foraging and nesting habitat. Of this, approximately 67 percent (2,365 to 5,538 acres) would be permanently converted to industrial uses. Other impacts would include animal displacement (short and long term), habitat fragmentation (long term), increased potential nesting and roosting disruption from vehicle traffic (short and long-term), and potential loss of nests, eggs, or young. Protections provided by the RMP and ACMs would reduce impacts. See the corresponding section under ROW Areas for relevant RMP protections and ACM numbers.

Mitigation Recommendations:

Given the importance of raptor nest avoidance, additional mitigation recommendations for construction of groundwater development facilities include ROW-WL-3.

Mitigation measure GW-WL-1 protects burrowing owls by requiring pre-construction surveys.

ROW-WL-3: Raptor Nest Survey and Avoidance.

Western Burrowing Owl: Direct impacts to western burrowing owl would include the long-term reduction of up to approximately 3,530 to 8,265 acres of owl habitat in the five groundwater development basins until reclamation activities are completed and native vegetation is reestablished. Approximately 67 percent of the construction surface disturbance, or 2,365 to 5,538 acres, would be permanently converted to industrial uses for the life of the proposed project. Other impacts to western burrowing owl would be the same as described in the ROW section. Based on the SWreGap habitat model for burrowing owl, 99 percent of the groundwater development area in Delamar Valley is burrowing owl habitat. The groundwater development areas in Cave, Dry Lake, Snake, and Spring valleys are 68, 88, 86, and 88 percent burrowing owl habitat, respectively (**Appendix F**, **Table F3.6-4**). As such, siting facilities to avoid burrowing owl habitat may be difficult.

Conclusion: Construction would result in the incremental, long-term reduction of up to approximately 3,530 to 8,136 acres of nesting and foraging habitat for burrowing owl. Of this, approximately 67 percent (2,365 to 5,538 acres) would be permanently converted to industrial uses. Other impacts to burrowing owls would include potential mortalities from vehicle traffic (short term and long term), as well as impacts similar to other raptor species listed above. Protections provided by the RMP and the ACMs would reduce impacts. See the corresponding section under ROW areas for relevant RMP protections and ACM numbers. Additional recommended mitigation measures would include pre-construction surveys, well siting avoidance of western burrowing owl burrows, and other facility siting avoidance of burrows to the extent practicable with applicant-proposed mitigation for burrows that were not avoided.

Mitigation Recommendations:

Given the importance of burrows for western burrowing owl, additional mitigation recommendations for construction of groundwater development facilities include GW-WL-3.

GW-WL-3: Pre-construction Surveys and Avoidance of Active Burrowing Owl Burrows. Prior to siting future facilities, SNWA shall conduct pre-construction surveys for burrowing owl based on habitat, known range, and previous occurrences within areas being considered for facilities. Well and other facility siting shall avoid active burrows during breeding and nesting season to the extent practicable. Effectiveness: This measure would be highly to moderately effective in avoiding impacts to active burrowing owl burrows.

Additional Special Status Bird Species: Direct impacts to other special status bird species would include the long-term reduction of up to approximately 3,530 to 8,265 acres of nesting and foraging habitat in the five groundwater development basins until reclamation activities are completed and native vegetation is reestablished. Approximately 67 percent of the construction surface disturbance (2,365 to 5,538 acres) would be permanently converted to industrial uses for the life of the proposed project. Potential impacts from future groundwater development could impact foraging, courtship, breeding, or nesting success of these species that occur within groundwater development areas. A list of species is provided in **Appendix F**, **Table F3.6-1**. Other impacts to special status birds would be the same as described in the ROW section.

Conclusion: Construction would result in the incremental long-term reduction of up to approximately 3,530 to 8,265 acres of nesting and foraging habitat for additional special status birds. Of this, approximately 2,365 to 5,538 acres would be permanently converted to industrial uses for the life of the proposed project. Native shrubland and woodland habitat would likely be removed or disturbed by construction and would require 20 to more than 200 years for recovery to similar species composition and vertical structure as adjacent undisturbed areas. Annual and perennial grassland, and marshland habitats would require from 2 to 20 years for recovery. Increased mortalities could occur given construction and facilities maintenance activities and timing of activities could impact breeding of migratory bird species. Fragmentation effects would incrementally contribute to impacts to species. Protections provided by the RMP

and the ACMs would reduce impacts. See the corresponding section under ROW areas for relevant RMP protections and ACM numbers.

Mitigation Recommendations:

Given the importance of protecting active MBTA bird nests, additional mitigation recommendations for construction of groundwater development facilities include ROW-WL-2 and ROW-WL-3.

ROW-WL-2: USFWS Concurrence on Plans and **ROW-WL-3: Raptor Nest Survey and Avoidance**.

Pygmy Rabbit: Based on the SWReGap habitat model for pygmy rabbits, 52 percent of the groundwater development area in Cave Valley is modeled pygmy rabbit habitat; 35 percent of the groundwater development areas in Dry Lake Valley; 39 percent of the groundwater development areas in Spring Valley and 7 percent of the groundwater development areas in Snake Valley are modeled pygmy rabbit habitat (**Appendix F**, **Table F3.6-4**). Particularly in Dry Lake and Spring valleys it could be difficult to avoid impacting pygmy rabbit habitat. Direct impacts would include the long-term reduction of up to approximately 2,590 to 6,231 acres of habitat within the four groundwater development valleys (there is SWReGAP modeled habitat in Delamar Valley; however, there are no records of the species there). Approximately 67 percent of the construction surface disturbance or 1,747 to 4,180 acres of habitat would be permanently converted to industrial uses. This would result in the incremental reduction in the amount of available habitat for this species until reclamation activities are completed and native vegetation is reestablished. Other impacts to pygmy rabbit would be the same as described in the ROW section.

Conclusion: Construction would result in the incremental, long-term reduction of up to approximately 2,590 to 6,231 acres of habitat. Of this, approximately 67 percent (1,747 to 4,180 acres) of habitat (shrub-scrub) would be permanently converted to industrial uses. Impacts would include displacement of animals due to noise and human activity (short and long term), habitat fragmentation (long term), potential for direct mortality from crushing of individuals or burrows by vehicles or equipment (long term), as well as potential for increased predation given additional perching sites on power lines (long term). Protections provided by the RMP and the ACMs would reduce impacts. See the corresponding section under ROW areas for relevant RMP protections and ACM numbers.

Mitigation Recommendations:

Given the importance of active burrows, additional mitigation recommendations for construction of groundwater development facilities include GW-WL-4.

GW-WL-4: Pre-construction Survey and Avoidance of Pygmy Rabbit Occupied Habitat. Prior to siting future facilities, the SNWA shall conduct pre-construction surveys for pygmy rabbits based on habitat, known range, and previous occurrences within areas being considered for facilities. Well and other facility siting shall avoid occupied habitat to the extent practicable. Effectiveness: This measure would be highly to moderately effective in avoiding impacts to pygmy rabbits.

Bats: Direct impacts to special status bat species would include the long-term reduction of up to approximately 3,530 to 8,265 acres of foraging habitat. For species that use more specialized habitat these acres would likely be lower. This would result in an incremental reduction in the amount of available habitat for these species until reclamation activities are completed and native vegetation is reestablished. Approximately 67 percent of the construction surface disturbance or up to approximately 2,365 to 5,538 acres would be permanently converted to industrial uses within the five groundwater development basins. Based on the SWReGap model for western pipistrelle, 100 percent of the groundwater development areas in all five basins is potential foraging habitat. For long-eared myotis the percent of the groundwater development areas that is habitat for the species ranges from 7 percent in Spring Valley to 33 percent in Delamar Valley (**Appendix F**, **Table F3.6-4**); thus facility siting will impact habitat for more generalist bat species, but it may be possible to avoid habitat for habitat specialists. Other impacts to bat species would be the same as described in the ROW section.

Conclusion: Construction would result in the incremental, long-term reduction of up to approximately 3,530 to 8,265 acres of bat foraging habitat. Of this, approximately 67 percent (up to 2,365 to 5,538 acres) would be

permanently converted to industrial uses. Other impacts could include: loss of roosting sites for tree-roosting species; displacement of animals due to noise and human activity (short and long term); and habitat fragmentation (long term). There also may be increased mortality to bats from potential power line collisions (long term). Protections provided by the RMP and the ACMs would reduce impacts. See the corresponding section under ROW Areas for relevant RMP protections and ACM numbers.

Mitigation Recommendations:

GW-WR-5: Spring Avoidance, **GW-WR-6: Avoid Perennial Streams**, **GW-AB-4: Avoid Direct Impacts to Springs**, and **GW-AB-5: Avoid Locating Facilities Within 0.5 Mile of or Parallel to Perennial Streams and Riparian Areas**. These mitigations would also reduce impacts to bat species by avoiding or minimizing impacts to these important foraging habitats.

Desert Valley Kangaroo Mouse: Direct impacts to desert valley kangaroo mouse would include the long-term reduction of habitat due to construction and potential for permanent conversion of habitat, most likely within Dry Lake Valley and perhaps in Delamar Valley, although there are currently no known records in that valley (NDOW 2010a). Using SWReGAP dark kangaroo mouse modeled habitat, up to 395 to 834 acres of habitat in Dry Lake Valley and up to 940 to 2,034 acres in Delamar Valley could be disturbed during construction. Of this, approximately 67 percent of the construction surface disturbance would be permanently converted to industrial uses within these two basins. Based on the SWreGap model for the species (dark kangaroo mouse) 76 percent of the groundwater development area in Dry Lake Valley is dark kangaroo mouse habitat (**Appendix F**, **Table F3.6-4**); thus facility siting may impact habitat for this subspecies. Other impacts to desert valley kangaroo mouse would be the same as described in the ROW section.

Conclusion: Construction would result in the incremental, long-term reduction of habitat. A portion of this surface disturbance acreage (67 percent) would be permanently converted to industrial uses. Other impacts would include potential mortalities from vehicle traffic (short and long-term), and habitat fragmentation (long term). ACMs would reduce impacts to this subspecies. See the corresponding section under ROW Areas for relevant ACM numbers.

Mitigation Recommendations:

Additional mitigation recommendations for construction of groundwater development facilities include GW-WL-5 (pre-construction survey and avoidance of desert valley kangaroo mouse occurrences).

GW-WL-5: Pre-construction Survey and Avoidance of Desert Valley Kangaroo Mouse Occurrences. Prior to siting future facilities, the SNWA shall conduct pre-construction surveys for desert valley kangaroo mouse based on habitat, known range, and previous occurrences within areas being considered for facilities. Well and other facility siting shall avoid occurrences to the extent practicable. Where impacts cannot be avoided, measures similar to those proposed by the applicant for ROW construction would be followed. Effectiveness**:** This measure would be highly to moderately effective in avoiding impacts to desert valley kangaroo mouse.

Baking Powder Flat Blue Butterfly: Given the presence of Baking Powder Flat Blue Butterfly within a groundwater development area (Spring Valley), potential impact could include the direct mortality to the species (adult) from construction or vehicle traffic, disruption of breeding success (displacement) or direct mortality of adults, larvae, or eggs if host plants are impacted, and temporary or permanent loss of habitat if facilities are sited within occupied habitat.

Conclusion: Construction could result in the incremental long-term reduction of habitat and facility maintenance could result in the permanent conversion of habitat to industrial uses. Impacts include potential mortalities from vehicle traffic (short and long term), habitat fragmentation (long term), or direct mortality of adults, larvae, or eggs if host plants are impacted. Requirements for reclamation, as provided for in the RMP, would reduce impacts.

Mitigation Recommendations:

Given the importance of the currently known location of the butterfly and the host plant in the known occurrence area, additional mitigation recommendations for construction of groundwater development facilities include GW-WL-6.

GW-WL-6: Pre-construction Surveys and Avoidance of Baking Powder Flat Blue Butterfly Occurrences and Habitat. Prior to siting future facilities, SNWA shall conduct pre-construction surveys for Baking Powder Flat Blue Butterfly based on habitat, known range, and previous occurrences within areas being considered for facilities. Well and other facility siting shall avoid occurrences and habitat to the extent practicable. Effectiveness: This measure would be highly to moderately effective in avoiding impacts to occurrences of this species of butterfly.

Groundwater Pumping

Pumping Effects General Terrestrial Wildlife Discussion

This section focuses on the potentially long-term, indirect impacts to wildlife species due to a potential reduction in groundwater dependent habitats (i.e. spring, perennial streams, riparian areas below springs and along stream channels with perennial flows, and phreatophytic wetland/meadow and basin shrubland vegetation types).

A change in groundwater level would potentially reduce the water availability in perennial streams and springs as well as to associated vegetation communities (e.g. wetlands, riparian areas, wet meadows) and groundwater dependent phreatophytes vegetation communities. The potential loss or reduction in available water as a result of water level change could result in long-term changes in these wildlife habitats where the water sources are hydraulically connected to pumped areas.

The habitat associated with naturally occurring springs, seeps, and perennial stream reaches and associated perennial pools encompass riparian vegetation (both woody and herbaceous plant species), wetland areas, mesic habitats (wet meadows), and groundwater dependent vegetation communities (phreatophytic vegetation). Reduction or loss of habitats associated with water sources would impact terrestrial wildlife dependent on these sources, resulting in a possible reduction or loss of cover, breeding sites, foraging areas, and changes in both plant and animal community structure. Naturally occurring seeps, springs, and perennial stream reaches provide important wildlife habitat in the region of study. These habitats and their associated plant communities contribute to greater wildlife species diversity, as compared to the adjacent upland areas. Since surface water and associated habitats are limiting factors for wildlife in the study area, loss of these habitat features would alter the available habitat for species that depend on these areas, resulting in: 1) a reduction of available water for consumption; 2) a reduction in amount or quality of groundwater dependent vegetation types for breeding, foraging, and cover; 3) a reduction in the regional carrying capacity; 4) displacement and loss of animals; 5) a reduction in the overall biological diversity; 6) a potential long-term impact to the population numbers of some species; and 7) reduction in prey availability.

The degree of impacts to wildlife resources would depend on a number of variables, such as the existing habitat values and level of use, species' sensitivity (i.e. level of dependency on groundwater dependent habitats), the extent of the anticipated water and habitat reductions/shifts, and capacity for wildlife to accommodate additional effects, such as climate change.

Due to the limited amount of perennial streams and springs and associated wetlands, wet meadow and riparian habitats within the study area, it is assumed that terrestrial species dependent on these areas are currently at carrying capacity. Consequently, while some species that are displaced due to the reduction in these habitats may be able to move into adjacent areas, it is assumed that these adjacent habitats are already at their full carrying capacity and would not support additional animals. Therefore, some individuals would be lost from the population, concentrating the remaining animals within smaller habitat areas. Species groups likely affected by reduction in groundwater dependent habitats would include: big game, small mammals, carnivores, upland game birds, waterfowl, nongame birds (e.g. raptors and passerines), bats, reptiles, and invertebrates.

Pumping Effects Analysis

Based on evaluations of the model-predicted 10-foot groundwater drawdown contour for the Proposed Action pumping and geology and groundwater characteristics, there is potential risk to terrestrial wildlife species (perennial streams, springs, ET wetland/meadow and basin shrubland) in habitat portions of 8 basins (Spring, Snake, Cave, Pahranagat, Steptoe, Hamlin, Lake, and Lower Meadow Valley Wash) during the three model time frames (full build out, full build out plus 75 years, and after full build out plus 200 years). **Figure 3.5-6**, Vegetation, illustrates the expansion of the 10-foot drawdown contour in relation to the wetland and phreatophytic cover types. **Figures F3.3.8A-1** through **F3.3.8A-3** in **Appendix F3.3** show the potentially impacted perennial waters at the three model time frames for the full water resources region of study. It should be clarified that there are uncertainties associated with the model analysis as

described in Water Resources, Section 3.3, Methodology, Assumptions, and Limitations. This would apply to all impact discussions for individual alternatives, as well as cumulative impacts associated with each alternative.

Pine Valley, Wah Wah Valley, Tule Valley, and Fish Springs Flat basins (see **Figure 3.0-2**) are located to the east of the northeast boundary of the water resources region of study, but are part of the natural resources region of study. While the groundwater flow model results suggest that drawdown attributable to the Proposed Action pumping scenario could eventually extend into Pine Valley, depth to the regional groundwater flow system in this valley is so deep that risk to groundwater dependent habitats in this valley are unlikely (see discussion in Section 3.3.29, Water Resources). There is some predicted reduction in flow from Snake Valley to Pine, Wah Wah, and Tule valleys that could eventually result in a reduction of discharge as Fish Springs, if the groundwater flow system is interconnected and regional flow from Snake Valley contributes to flow Fish Springs. However, as explained in Section 3.3, Water Resources, flow reductions of this magnitude would likely be difficult to measure and distinguish from natural flow variations. See **Appendix F**, **Table F3.6-1** for species that occur in these valleys.

Full Build Out. Valleys and miles of perennial streams where surface waters could be impacted include approximately 6 miles (3 percent of the perennial stream miles in the valley) in Spring Valley. Eight springs are located in high and moderate risk areas in one valley (Spring). This represents 1 percent of springs in Spring Valley. Small percentages of ET wetland meadow (1 percent) and basin shrubland (12 percent) in Spring Valley may be potentially affected (**Appendix F**, **Table F3.6-9**).

Full Build Out Plus 75 Years. Valleys and miles of perennial streams where surface waters could be impacted include 26 miles (13 percent of the stream miles in the valley) in Spring Valley and 54 miles (25 percent) in Snake Valley (of which 11 miles falls within Utah). The 212 springs are located in high and moderate risk areas in Spring, Snake, and Hamlin valleys, including nine springs in Utah. This represents 20 percent of springs in Spring Valley, 8 percent in Snake Valley, and 1 percent in Hamlin Valley. ET vegetation types are potentially impacted in two additional valleys (Snake and Hamlin) as compared to the full build out time frame; in the case of Hamlin Valley where there is limited ET vegetation, 100 percent of wetland meadow and 94 percent of basin shrubland ET types are in areas that may be potentially impacted. In Spring Valley the percent of ET wetland meadow and basin shrubland increases to 27 and 66 percent, respectively (**Appendix F**, **Table F3.6-9**).

Full Build Out Plus 200 Years. Valleys and miles of perennial streams where surface waters could be impacted include 38 miles (19 percent of the stream miles in the valley) in Spring Valley, 63 miles (29 percent) in Snake Valley (of which 13 miles falls within Utah), less than 1 mile (2 percent) in Pahranagat, 4 miles (3 percent) in Steptoe, 3 miles (35 percent) in Lake, and 3 miles (5 percent) in Lower Meadow Valley Wash. The 305 springs located in high to moderate risk areas in Spring, Snake, Hamlin, Cave, and Lake valleys. The number also includes 10 springs in Utah and 3 springs within the boundary of the GBNP (an important bird area). See **Appendix F**, **Table F3.6-9** for percentage of springs within each valley. ET vegetation types are potentially impacted in three additional valleys (Lake, Lower Meadow Valley Wash, and Pahranagat). The percent of ET wetland meadow and basin shrubland potentially impacted in Spring Valley increases to 34 and 71 percent, respectively (**Appendix F**, **Table F3.6-9**).

The following terrestrial wildlife impacts could occur in response to groundwater pumping as outlined in the general discussion.

Species of Management Concern

Big Game: Big game species require water, as needed, to satisfy physiological requirements. The reduction or loss of existing water sources could impact big game species use and movements. Due to reduced habitat availability resulting from earlier habitat alteration in the area as discussed under surface impacts (ROW and groundwater development areas), populations of big game that currently utilize these disturbed areas may already be under some stress. It is assumed that some individuals could be displaced due to the potential reduction in water availability and associated habitats and may move into adjacent areas that are already at their carrying capacity. These displaced individuals could be lost from the population; however, this loss cannot be quantified.

Other Terrestrial Species of Management Concern: A reduction in groundwater dependent vegetation communities would affect the amount of nesting, brooding, and foraging habitat for upland game birds, and denning and foraging habitat for small mammals. A decline in available surface water would impact the extent of open water and these

habitats along portions of perennial streams, springs, and seeps. Since these communities are limited within the study areas, it cannot be assumed that displaced individuals would successfully relocate into adequate breeding or foraging habitat in adjacent areas, as it is assumed that these habitats already would be at carrying capacity. As a result, some animals could be lost from the population.

A variety of bird species may breed, forage, or roost in or near the region of study as described earlier in the section. Potential long-term impacts to bird species could include loss of nesting, roosting, and foraging habitat along perennial stream reaches and at seeps and springs and associated habitats that occur within the drawdown area. These losses would result from an incremental reduction in available habitat for both resident and migratory bird species. In addition, the regional carrying capacity would be reduced by the incremental loss of available nest and roost sites. Some bird species are closely associated with groundwater dependent habitats that support trees and increased shrub density while other species may use these trees for roosting only. Impacts may also include reductions in prey populations.

Potential impacts to reptile species that are associated with groundwater dependent habitats that may be affected by pumping-related drawdown would parallel those discussed for other terrestrial wildlife species. The loss or reduction in water availability and associated vegetation communities could result in an incremental loss of suitable breeding, foraging, cover habitat, and potential reductions in prey base for these species. Impacts on species would depend on the species' ability to move to adjacent habitats, especially smaller less mobile species.

Special Status Species

General impacts to special status species would be the same as described above for management concern species and in the general wildlife discussion above. Extent of potential impacts for various special status species or species groups is described below.

- **Desert Tortoise (Federally Threatened)**: Impacts to desert tortoise or desert tortoise-critical habitat would not be anticipated from Proposed Action pumping as the tortoise is not dependent on habitats that may be affected by drawdown.
- **Southwestern Willow Flycatcher, Yellow-billed Cuckoo, and Yuma Clapper Rail (Federally Endangered, Federal Candidate, Federally Endangered)**: These three species use riparian habitats, a habitat type that would potentially be at risk from drawdown. A reduction in groundwater dependent vegetation communities would affect the amount of nesting, brooding, and foraging habitat available for these species. There are two basins (Lower Meadow Valley Wash and Pahranagat) where model-predicted drawdown effects to water resources overlap with southwestern willow flycatcher habitat and where potential effects to water resources overlap with yellow-billed cuckoo migratory range. However, Yuma clapper rail is not currently known to occur in these basins.

  Lower Meadow Valley Wash contains a perennial stream segment that could be impacted at the full build out plus 200 years time frame. Of the approximately 42 miles of Lower Meadow Valley Wash (stream) in Lower Meadow Valley Wash Valley, model results suggest that 8 percent of the stream could be impacted by drawdown. Impacts in flow would depend on the actual drawdown that occurs in these areas and the site-specific hydraulic connection between the groundwater system impacted by pumping and Lower Meadow Valley Wash stream. If this stream is hydraulically connected to the groundwater system impacted by pumping and within the drawdown area, it would likely experience a reduction in baseflow that could result in changes to available riparian habitat for yellow-billed cuckoo and to historic southwestern willow flycatcher habitat. Model results suggest that in the full build out plus 200 years time frame, a small percent 2 percent of perennial streams in Pahranagat Valley (0.5 mile) could be impacted by project-related pumping. This valley is important to these two bird species.

- **Greater Sage-grouse (Federal Candidate):** In summer, greater sage-grouse hens with broods move to more mesic habitats with higher food availability in the form of insects and forbs. While this species uses sagebrush for much of the year, these mesic habitats, including habitats around springs, perennial streams, and ET wetland/meadow are the focus of this discussion as they would potentially be impacted by drawdown and are a key seasonal habitat for sage-grouse. At the full build out time frame and within nesting brooding or summer range for greater sage-grouse, ET wetland/meadow and basin shrubland as well as springs may be impacted by drawdown. Perennial stream segments in Spring Valley could also be impacted during this time frame as suggested by model

results. In the full build out plus 75 years time frame, three basins have ET vegetation types, springs or perennial stream segments at potential risk within these two habitat ranges (Spring, Snake, and Hamlin). By full build out plus 200 years, 6 basins contain these potential affected habitats based on groundwater model predictions, the three mentioned previously as well as Cave, Steptoe, and Lake valleys. Potential pumping impacts, when combined with potential groundwater development surface impacts, could result in the reduction or even loss of some local sage-grouse populations in Cave, Snake, and Spring valleys. While there is greater sage-grouse brooding habitat in Pine Valley, groundwater in this valley is so deep that risk to groundwater dependent habitats from drawdown are unlikely (Section 3.3, Water).

- **Additional Special Status Bird Species including Raptors and Important Bird Areas**: In the eight valleys with springs, perennial streams, or ET wetland/meadow or basin shrubland that could potentially be impacted by drawdown, there are many special status bird species that use these habitats for nesting, roosting, or foraging. See **Appendix F**, **Table F3.6-1** for special status bird species that occur or are suspected to occur in the various basins. Important bird areas that have springs or perennial streams that could potentially be impacted by drawdown include: GBNP (6 miles perennial stream in the full build out plus 75 years time frame, and 2 springs and 10 miles of perennial stream and 4 springs in the full build out plus 200 years time frame), D.E. Moore Bird and Wildlife Sanctuary (approximately 2 miles of perennial stream) in the full build out plus 75 and plus 200 years time frames; Lower Meadow Valley Wash important bird area (3 miles of perennial stream) at the full build out plus 200 years time frame; and Pahranagat Valley Complex (less than 1 mile of perennial stream) at the full build out plus 200 years time frame. The model suggests that impacts in flow are anticipated to Big Springs and approximately 10 miles of Lake Creek and 9 miles of Big Springs Creek are in areas that could be impacted in the full build out plus 75 years time frame. Therefore, it is anticipated that the bird habitat conservation area associated with Lake Creek/Big Springs Creek and Pruess Lake could be impacted. Groundwater pumping could result in reductions in flow as well as in vegetation composition and structure changes as described in Vegetation, Section 3.4, Groundwater Pumping. These potential habitat changes could result in reductions in local populations of other special status birds or changes in species composition as well as potential changes in prey base.

- **Pygmy Rabbit**: While this species primarily uses sagebrush as forage, in the summer, forbs and grasses also can become part of its diet. Mesic foraging habitat that would potentially be at risk from drawdown includes habitats near springs, perennial streams, and ET wetland/meadow and basin shrubland. Pygmy rabbit mesic foraging habitat could be potentially impacted by drawdown in seven valleys including: Spring, Snake, Lake, Hamlin, Cave, Pahranagat, and Steptoe during the time frames explained above in the general pumping effects analysis.

- **Bats:** The 17 special status bats are insectivores and their most productive foraging habitats often include areas near water that support higher insect populations. These habitats, including springs, perennials streams, and ET wetland/meadows and the associated prey base could be at risk from drawdown. Eight valleys have habitats important to bat foraging that would potentially be impacted by drawdown including: Spring, Snake, Lake, Hamlin, Cave, Pahranagat, Steptoe, and Lower Meadow Valley Wash. See **Appendix F**, **Table F3.6-1** for special status bat species that occur or are suspected to occur in the various basins.

- **Gila Monster**: This species is found in canyon bottoms or arroyos with permanent or intermittent streams (Wildlife Action Plan Team 2006). Habitats this species uses with potential for impact from drawdown include springs and perennial streams. In Pahranagat Valley during the full build out plus 200 years time frame, model results indicate that less than 1 mile of perennial stream in the valley may be at risk from project-related pumping. In the same time frame in Lower Meadow Valley Wash Valley, approximately 3 miles are potentially at risk. In these two valleys, habitat used by the gila monster may be impacted by groundwater drawdown.

- **Baking Powder Flat Blue Butterfly and Other Terrestrial Invertebrates**: Blind Spring within the Baking Powder Flat ACEC (Spring Valley) could potentially be impacted by drawdown based on the model-predicted 10-foot drawdown in the full build out plus 75 years time frame. While the Baking Powder Flat blue butterfly has habitat in this area, it is not anticipated that the butterfly's host plant, Shockley's buckwheat, would be impacted by drawdown as it is an upland plant. White River valley skipper may be impacted in two valleys (Lake and Spring) as its apparent host plant is Mexican rush, a wetland species. McNeil's sooty wing skipper is not suspected to occur in a valley where potential drawdown impacts to springs, perennials streams or ET vegetation types are predicted.

Other Wildlife Species of Interest

Cave Species: As explained in Section 3.3, Water Resources, Baker (2009) has identified 6 caves in direct contact with the water table or surface water and within susceptibility areas (Elliott et al 2006). These are Model Cave, Ice Cave, Wheeler's Deep Cave and Systems Key Cave in the Baker Creek watershed; Squirrel Springs Cave in the Snake Creek watershed; and Water Trough Cave in the Can Young watershed. While available information suggests that stream flow within Ice Cave, Systems Key Cave, and Squirrel Springs Cave are likely not tied to regional groundwater, information is not available to determine the likely source of water in the other caves. **Table 3.6-16** lists water-associated cave biota found within all six caves.

Table 3.6-16 Cave Biota Associated with Water Found in Selected Great Basin National Park Caves

	Ice Cave	Model Cave	Squirrel Springs Cave	Systems Key Cave	Water Trough Cave	Wheeler's Deep Cave
Mollusca:Gastropoda:*Gyraulus parvus*	X	X	X	X		X
Nematoda		X				
Oligochaeta: *Haplotaxis* cf. *gordioides* (aquatic earthworm)		X		?	?	
Crustacea:Copepoda		X		X		
Crustacea:Ostracoda		X		X		
Arachnida:Acari:Rhagidiidae (Rhagidiid mite)	X	X	X	X	X	
Arachnida:Opiliones: *Cyptobunus ungulatus ungulatus*		X		X		X
Arachnida:Pseudoscorpiones: Neobisiidae: *Microcreagris grandis*		X	X		X	
Diplopoda: *Idagona lehmansis* (millipede)		X	X	?	X	X
Diplopoda:*Nevadesmus ophimontis*	X	X				X
Hexapoda:Collembola: Arrhopalitidae: *Pygmarrhopalites shoshoneiensis* (springtail)		X				
Diplura		X				
Ephemeroptera (Mayflies)	X				X	
Plecoptera (Stoneflies)					X	
Trichoptera (Caddisflies)	X		X		X	
Amphipod		X				

Source: Baker (2009)

If these caves have waters associated with them that are dependent on discharge from the regional groundwater flow system, habitat for cave obligate species, like those listed in the table, may be impacted as a result of Proposed Action pumping. Loss or reduction in water flow could result in reduced habitat for these species and may result in the loss of individuals. As explained in Water, Section 3.3, the upland setting of most of these caves may indicate that these cave waters are tied to locally derived precipitation. However, given the uncertainty regarding the source of water in these caves, potential for impacts to these cave obligate species is unclear. Ongoing work by the NPS on the water sources in caves will provide additional information in the future.

ACMs and Monitoring and Mitigation Measures: ACMs would be implemented to reduce groundwater pumping effects on environmental resources. The measures would involve monitoring, management, and mitigation measures

required by existing agreements and adaptive management measures. The following items highlight those measures relative to habitats important to terrestrial wildlife. The ACM number from **Appendix E** is noted in parentheses.

Existing Agreements

- Implement monitoring, management, and mitigation, as required by the Spring Valley Stipulation (C.1.1).
- Consider alternative withdrawal points from Shoshone Ponds, as part of the Spring Valley Stipulated Agreement (ACM C.1.3).
- Monitor groundwater levels at agreed-upon monitoring wells in the Spring Valley and Hamlin Valley basins, as required by the Spring Valley Stipulation (ACM C.1.8).
- Maintain a discharge monitoring site at Big Springs and Cleve Creeks, with regular public reporting (ACM C.1.16).
- Ensure continued groundwater monitoring at agreed-upon monitoring wells, to characterize the movement of groundwater from the DDC basins to adjacent basins (White River, Pahroc, and Pahranagat valleys), as part of the DDC Stipulation (C.1.31).
- Monitor spring discharge of valley floor and range-front springs at agreed-upon sites where special status species occur (with approved access), as part of the DDC Stipulation (ACM C.1.42).
- Monitor sage-grouse breeding and late brood-rearing habitat that is groundwater dependent, as well as water-dependent ecosystems on the valley floors, as part of the DDC Stipulation (ACM C.1.42).
- Monitor selected sites for special status species and their habitat in Pahranagat Valley (Pahranagat NWR, Key Pittman WMA, and Ash, Crystal, and Hiko springs) and White River Valley (Hot Creek, Flag, Moorman, and Hardy springs and phreatophytic habitats that support special status species in the Middle and Lower White River Valley, including Kirch WMA), per the DDC Stipulation (ACM C.1.42).
- Follow Candidate Conservation Agreements for the greater sage-grouse and pygmy rabbit on SNWA private properties (to be provided upon completion).
- Monitor and mitigate as defined in the DDC Valley Hydrologic Monitoring and Mitigation Plan (in preparation).

Adaptive Management Measures

- Reduce or cease groundwater withdrawals.
- Acquire real property or water rights that are dedicated to the recovery of special status species within their current and historic habitat range (ACM C.2.1).
- Improve late brood-rearing habitat for sage-grouse at the Stonehouse and Larson parcels on the SNWA Robison Ranch property in north Spring Valley, by use of gabion structures to expand and enhance riparian meadow habitat (ACM C.2.2).
- Assist the BLM with pinyon-juniper control and sagebrush habitat improvement projects in suitable areas in the project-development basins (including Spring, Snake and Cave valleys) and with secondary opportunities in non-project development basins (including Lake and White River valleys) (ACM C.2.3).
- Conduct large-scale seeding to assist with vegetation transitions from phreatophytic communities in Spring and Snake valleys, to benefit wildlife (ACM C.2.5).
- Conduct wetlands-area restoration at Big Springs and Pruess lakes in Snake Valley, to enhance habitat for bald eagle, migratory birds, greater sandhill crane, and long billed curlew (ACM C.2.7).
- Work with USFWS and NDOW to improve and/or expand southwestern willow flycatcher habitat on Pahranagat NWR and Key Pittman WMA, respectively (ACM C.2.11 and ACM C.2.12).
- Assist the BLM with habitat-enhancement projects in Rainbow Canyon of Lower Meadow Valley Wash, to improve conditions for southwestern willow flycatchers and yellow-billed cuckoo (ACM C.2.14).

- Reduce or change grazing in wet meadows, to improve habitat for migratory birds, waterfowl, shore bird, sage-grouse, raptors, and bats in the BLM grazing allotments on which SNWA holds grazing permits (ACM C.2.18).
- Conduct facilitated recharge projects to offset local groundwater drawdown, to benefit sensitive biological areas (ACM C.2.21).

Summary

Groundwater pumping under the Proposed Action would affect terrestrial wildlife resources in 8 hydrologic basins (Spring, Snake, Cave, Pahranagat, Steptoe, Hamlin, Lake, and Lower Meadow Valley Wash) during the three model time frames (full build out, full build out plus 75 years, and full build out plus 200 years). There are some reductions to total predicted flow from Snake Valley to Pine, Wah Wah, and Tule valleys that could eventually result in a reduction in discharge to Fish Springs if groundwater flow system is interconnected. For all species dependant on groundwater dependent habitats (i.e., springs, perennial streams and ET wetland/meadow and basin shrubland habitats), due to the limited amount of these habitats within the study area, it is assumed that species' habitats are currently at carrying capacity. As a result, while individuals displaced due to the reduction in these habitats may be able to move, it is assumed that adjacent habitats are already at their full carrying capacity and would not support additional animals. Therefore, some individuals would be lost from the population concentrating the remaining animals within smaller habitat areas.

Applicant-committed monitoring, as agreed to in the Spring Valley and DDC Stipulated Agreements and Biological Monitoring Plans would be used to detect project effects and to develop mitigation to reduce impacts based on an adaptive management strategy.

Monitoring and Mitigation Recommendations

The following proposed monitoring and mitigation measures are intended to supplement the existing monitoring and mitigation commitments included in the stipulation agreements and the ACMs described in **Appendix E**.

GW-WL-7: Artificial Water Sources for Big Game. If groundwater pumping by the SNWA results in the loss of existing water sources used by big game, the SNWA, in coordination with the BLM or NPS and NDOW, will develop artificial water sources to maintain current distribution of big game. Effectiveness: This measure would be highly effective in mitigating for loss of a big game water source. Effects on other resources: Creation of artificial water sources may benefit some species and negatively impacts others (e.g. kit fox can have difficulty competing with coyotes in habitat with artificial water sources) (Arjo et al. 2007).

GW-WL-8: Monitoring, Mitigation and Management Plan for Snake Valley. (related to GW-WR-3 and others). In addition to the monitoring and mitigation described in Section 3.3, Water Resources and Section 3.4, Vegetation Resources, the Snake Valley 3M Plan will include management and mitigation measures that could be used to address impacts identified during monitoring relevant to terrestrial wildlife species including: 1) geographic redistribution of groundwater withdrawals, 2) reduction or cessation of groundwater withdrawals, 3) if water supplies used for consumptive purposes, such as irrigation, domestic, and livestock watering use were limited by the project, then SNWA will provide alternate supplies of water, 4) acquisition of real property and/or water rights dedicated to management of special status species, and 4) augmentation of water supply and/or acquisition of existing water rights. The Draft Plan and accompanying guidance is provided in **Appendix B**.

Potential Residual Impacts

As described in Section 3.3, Water Resources, Potential Residual Impacts, there is a potential reduction in the surface discharge at perennial surface water areas that cannot be avoided as well as an unavoidable long-term reduction in groundwater discharge to ET areas. While the SNWA could mitigate the resulting impacts to terrestrial wildlife species in discrete areas, the regional scale of pumping impacts would not allow for all impacts to be mitigated. Some groundwater dependent habitat types would decline in extent and/or productivity and the species that use these habitats would likely decline as well.

3.6.2.10 Alternative A

Groundwater Development Area

As compared to the Proposed Action, Alternative A considers the same groundwater development areas in the five groundwater development basins (DDC, Snake and Spring valleys), but would require fewer future facilities within those areas given the reduced volume of water proposed. Construction of well pads, access roads, gathering pipelines, and electrical service lines would result in a total surface disturbance of approximately 2,035 to 4,732 acres. A portion of this construction disturbance – approximately 67 percent, or 1,363 to 3,170 acres – would be permanently converted to industrial uses for the operational life of the project. No specific development plans are available, so it is assumed that the habitat cover types would be affected in proportion to their relative surface area within the groundwater development areas (see **Table 3.5-9**, Vegetation). Consequently, it is expected that sagebrush shrubland, greasewood/saltbush shrubland, and Mojave mixed desert shrubland habitat types would be most extensively disturbed.

The species within the various groundwater development areas are the same as described for the Proposed Action (e.g. percent of groundwater development areas that are various species' habitat). The types of impacts to terrestrial wildlife that would result from construction and facility maintenance in groundwater development areas would be similar to the impacts described in the ROW areas (Section 3.6.2.4.1) including impacts related to habitat fragmentation and potential impacts from accidental wildfires and power lines. Given that Alternative A could disturb approximately 43 percent fewer acres during construction and convert approximately 43 percent fewer acres to permanent facilities, while the same terrestrial wildlife species could be impacted, the extent of potential impacts would be less.

Groundwater Pumping

Alternative A would consist of reduced quantity pumping (114,755 afy) at distributed locations in Snake, Spring, and DDC valleys. Alternative A pumping could result in reductions in groundwater dependent terrestrial wildlife habitat and affect terrestrial wildlife species.

Full Build Out. Spring Valley has small amounts of all three groundwater dependent habitat types (i.e. perennial streams, springs, or ET vegetation types) in areas that may be potentially impacted. Less than 1 percent of perennial stream miles, less than 1 percent of springs, and small percentages of ET wetland meadow (1 percent) and basin shrubland (8 percent) in the valley are in areas that may be potentially affected (**Appendix F**, **Table F3.6-10**; **Figure F3.3.8A-4**, and **Figure 3.5-7**, Section 3.5, Vegetation Resources).

Full Build Out Plus 75 Years. Three valleys have one or more of the three groundwater dependent habitats in areas that may be potentially impacted at the full build out plus 75 years time frame. Thirteen percent of perennial stream miles in Spring Valley and 25 percent in Snake Valley are in areas that may be potentially affected. Springs in three valleys are in areas that could be impacted during this time frame including Spring, Snake, and Hamlin. These potentially impacted springs make up 1 percent of springs in Hamlin Valley and up to 8 percent of the springs in Spring Valley. ET vegetation types are potentially impacted in two additional valleys (Snake and Hamlin) as compared to the full build out time frame and the percent of ET wetland meadow and basin shrubland in areas that may be potentially impacted in Spring Valley increases to 20 percent and 49 percent, respectively (**Appendix F**, **Table F3.6-10**; **Figure F3.3.8A-5**, and **Figure 3.5-7** , Vegetation).

Full Build Out Plus 200 Years. Six valleys have one or more of the three groundwater dependent habitat types in areas that may be potentially impacted at the full build out plus 200 years time frame. Four valleys have streams in areas where flows could be potentially affected including Spring, Snake, Steptoe, and Lake valleys. These potentially impacted stream miles make up 3 percent of stream miles in Steptoe Valley to up to 28 percent of stream miles in Snake Valley. The potentially impacted springs are found in 6 valleys, adding Cave, Lake, and Steptoe Valley to those named for the previous time frames above. Percent of potentially impacted springs range from less than 1 percent in Steptoe Valley to 13 percent in Spring Valley. ET vegetation types are potentially impacted in one additional valley (Lake). The percent of ET wetland meadow and basin shrubland potentially impacted in Spring Valley increases to 23 percent and 53 percent, respectively, over the previous time frame. Snake and Hamlin valleys also show increases in the amount of ET vegetation types that may be impacted (**Appendix F**, **Table F3.6-10**; **Figure F3.3.8A-6**, and **Figure 3.5-7**, Vegetation).

Groundwater pumping would have the potential to impact important habitats for wildlife including perennial springs and streams and their associated vegetation communities (e.g. wetlands, riparian areas, wet meadows) and

phreatophytic wetland/meadow and basin shrubland vegetation types in ET areas. The degree of impacts to wildlife resources would depend on a number of variables, such as the existing habitat values and level of use, species' sensitivity (i.e. level of dependency on groundwater dependent habitats), and the extent of the anticipated water and habitat reductions/shifts. Given the limited amount of these habitat types within the study area, it is assumed that species dependent on these areas are currently at carrying capacity. As a result, any individuals displaced as a result of reduction in amount or quality of these habitats could be lost, concentrating the remaining animals within smaller habitat areas. Species groups likely affected by reduction in groundwater dependent habitats would include: big game, small mammals, upland game birds, waterfowl, nongame birds (e.g. raptors and passerines), bats, reptiles, and invertebrates.

Conclusion

- Alternative A pumping impacts to big game and other management concern species as well as special status species would be similar to those described in the Proposed Action, but the extent of impacts may be reduced given the reduced pumping volumes (**Appendix F**, **Figures F3.3.8A-4** through **F3.3.8A-6**). There are two important bird areas with springs or streams where impacts to flow could occur (D.E. Moore and GBNP) at the full build out plus 75 years and plus 200 years time frames.
- Based on model results, Alternative A pumping is not anticipated to impact Lower Meadow Valley Wash basin or perennial stream, which are important to yellow-billed cuckoo and has historical southwestern willow flycatcher habitat, nor is it anticipated to impact Pahranagat Valley perennial streams or springs used by these two species.
- At the full build out time frame and within nesting brooding or summer range for greater sage-grouse, ET wetland/meadow and basin shrubland as well as springs and perennial streams are in areas that may be impacted by drawdown in Spring Valley. In the full build out plus 75 years time frame, three basins have ET vegetation types, springs or perennial stream segments in areas at potential risk within these two habitat ranges. By full build out plus 200 years, six basins contain these potentially affected habitats based on groundwater model results. Potential pumping impacts, when combined with potential groundwater development surface impacts, could result in the reduction or even loss of some local sage-grouse populations in Cave, Snake and Spring valleys.

ACMs, recommended mitigation measures and residual impacts would be the same as for the Proposed Action.

3.6.2.11 Alternative B

Groundwater Development Area

As compared to the Proposed Action, this alternative considers points of diversion rather than groundwater development areas in the five groundwater development basins (DDC, Snake, and Spring valleys). Construction of well pads, access roads, gathering pipelines, and electrical service lines would result in a total surface disturbance of approximately 4,585 acres. A portion of this construction disturbance – approximately 67 percent, or 3,077 acres – would be permanently converted to industrial uses for the operational life of the project. No specific development plans are available, so it is assumed that the habitat cover types would be affected in proportion to their relative surface area within 1 mile of the points of diversion within the five groundwater development basins. Consequently, it is expected that sagebrush shrubland, greasewood/saltbush shrubland, and pinyon juniper woodland habitat types would be most extensively disturbed.

Alternative B would disturb approximately 45 percent fewer acres during construction and convert approximately 45 percent fewer acres to permanent facilities than the Proposed Action when the estimated maximum potential acreage for the two alternatives is compared. The percent of groundwater development areas that are various species' habitat is presented in **Appendix F**, **Table F3.6-6**. The types of impacts from construction and facility maintenance on terrestrial wildlife in groundwater development areas would be similar to the impacts described in the ROW areas (Section 3.6.2.4.1) including impacts related to habitat fragmentation and potential impacts from accidental wildfires and power lines.

Species impacts are similar to those discussed for the Proposed Action; however, because Alternative B concentrates facility construction to the points of diversion, the acreage impact is less and therefore, species impacts could be less overall (**Appendix F**, **Table F3.6-6**). Given the smaller size of the points of diversion as compared to the groundwater development areas, avoiding important species habitats within the points of diversion through facility siting decisions

may be more difficult. Some key differences in potential wildlife impacts between Alternative B and the Proposed Action are:

- Mule deer crucial summer and winter ranges are not found within proposed points of diversion in Dry Lake Valley in this alternative; crucial summer range is not found within the points of diversion in Cave Valley. Desert bighorn sheep occupied habitat is not found within proposed P points of diversion ODs in Delamar or Dry Lake valleys; and
- There are 2 active greater sage-grouse leks within proposed points of diversion and 8 active leks within 2 miles. No greater sage-grouse habitat is found within points of diversion in Dry Lake Valley in this alternative.

Groundwater Pumping

Alternative B would consist of full quantity pumping (176,655 afy) at or near points of diversion in Snake, Spring, and DDC valleys. Alternative B pumping could result in reductions in groundwater dependent terrestrial wildlife habitat and affect terrestrial species.

Full Build Out. Spring Valley has all three groundwater dependent habitat types (i.e. perennial streams, springs, and ET vegetation types) in areas that may be potentially impacted. Two percent of perennial stream miles in Spring Valley are in areas that may be potentially impacted. Springs in one valley (Spring) could be impacted during this time frame. These potentially impacted springs make up 6 percent of springs in Spring Valley. A small percentage of ET wetland meadow (4 percent) and basin shrubland (13 percent) are in areas potentially affected in Spring Valley (**Appendix F**, **Table F3.6-11**; **Figure F3.3.8A-7**, and **Figure 3.5-8**, Vegetation).

Full Build Out Plus 75 Years. Five valleys have one or more of the three groundwater dependent habitats in areas that may be potentially impacted at the full build out plus 75 years time frame. Nine percent of perennial stream miles in Spring, 31 percent in Snake, 3 percent in Steptoe, and 12 percent in Lake valleys are in areas that may be potentially impacted. Springs in four valleys are in areas that could be impacted during this time frame. These potentially impacted springs are less than 1 percent of the springs in Steptoe Valley and approximately 12 percent of the springs in Spring Valley. ET vegetation types are potentially impacted in three additional valleys (Snake, Hamlin and Lake) as compared to the full build out time frame and percent of ET wetland meadow (29 percent) and basin shrubland (47 percent) potentially impacted in Spring Valley increase (**Appendix F**, **Table F3.6-11**; **Figure F3.3.8A-8**, and **Figure 3.5-8**, Vegetation).

Full Build Out Plus 200 Years. Eight valleys have one or more of the three groundwater dependent habitat types in areas that may be potentially impacted at the full build out plus 200 years time frame. Six valleys have streams in areas where flows may be potentially affected. Two additional valleys with potentially impacted springs are added at this time frame (Lake and Cave). ET vegetation types are potentially impacted in two additional valleys; Lower Meadow Valley Wash and Pahranagat. The percent of ET wetland meadow and basin shrubland potentially impacted in Spring Valley increases to 43 percent and 52 percent respectively over the previous time frame. Lake Valley also shows an increase in the amount of ET vegetation types that may be impacted, up to 91 percent of wetland meadow and 78 percent of basin shrubland (**Appendix F**, **Table F3.6-11**; **Figure F3.3.8A-9**, and **Figure 3.5-8**, Vegetation).

Conclusion

- Pumping impacts to big game and other management concern species as well as special status species would be similar to those described in the Proposed Action, but the distribution of impacts on the landscape would vary (**Appendix F**, **Figures F3.3.8A-7** through **F3.3.8-9**). There are two important bird areas with springs or streams where impacts to flow could occur (D.E. Moore and GBNP) at the full build out plus 75 years time frame, and an additional two IBAs (Lower Meadow Valley Wash and Pahranagat Valley Complex) would be impacted at the plus 200 years time frame.
- Based on model results, Alternative B pumping may potentially impact perennial streams in Lower Meadow Valley Wash as well as in Pahranagat Valley in the full build out plus 200 years time frame. Impacts in Pahranagat Valley could reduce available breeding habitat for the southwestern willow flycatcher and in Lower Meadow Valley Wash could reduce historically used habitat. Potential impact in these two valleys could reduce foraging habitat for yellow-billed cuckoo.

- At the full build out time frame and within nesting brooding or summer range for greater sage-grouse, ET wetland/meadow and basin shrubland as well as springs and perennial streams are in areas may be impacted by drawdown in Spring Valley. In the full build out plus 75 years time frame, five basins have ET vegetation types, springs or perennial stream segments in areas at potential risk within these two habitat ranges. By full build out plus 200 years, six basins contain these potentially affected habitats based on groundwater model results. Potential pumping impacts, when combined with potential groundwater development surface impacts, could result in the reduction or even loss of some local sage-grouse populations in Cave, Snake, and Spring valleys.

ACMs, recommended mitigation measures, and residual impacts would be the same as for the Proposed Action.

3.6.2.12 Alternative C

Groundwater Development Area

As compared to the Proposed Action, Alternative C considers the same groundwater development areas in the five groundwater development basins (DDC, Snake, and Spring valleys), but would require fewer future facilities within those areas given the reduced volume of water pumped (intermittent pumping up to same amount as Alternative A). Construction of well pads, access roads, gathering pipelines, and electrical service lines would result in a total surface disturbance of approximately 2,035to 4,732 acres. A portion of this construction disturbance – approximately 67 percent, or 1,370 to 3,171 acres – would be permanently converted to industrial uses for the operational life of the project. No specific development plans are available, so it is assumed that the habitat cover types would be affected in proportion to their relative surface area within the groundwater development areas (see **Table 3.5-3**, Vegetation). Consequently, it is expected that sagebrush shrubland, greasewood/saltbush shrubland, and Mojave mixed desert shrubland habitat types would be most extensively disturbed.

The species and species habitat within the various groundwater development areas are the same as described for the Proposed Action. The percent of groundwater development areas that are various species' habitat is presented in **Appendix F**, **Table F3.6-5**. The types of impacts to terrestrial wildlife that would result from construction and facility maintenance in groundwater development areas would be similar to the impacts described in the ROW areas (Section 3.6.2.4.1) including impacts related to habitat fragmentation and potential impacts from accidental wildfires and power lines. Given that Alternative C (like A) could disturb approximately 43 percent fewer acres during construction and convert approximately 43 percent fewer acres to permanent facilities, while the same terrestrial wildlife species could be impacted, the extent of potential impacts would be less.

Groundwater Pumping

Alternative C would consist of intermittent pumping (between 12,000 to 114,755 afy) at distributed locations in Snake, Spring, and DDC valleys based on a conceptual drought scenario. Alternative C pumping could result in reductions in groundwater dependent terrestrial wildlife habitat and affect terrestrial species.

Full Build Out. Spring Valley has all three groundwater dependent habitat types (i.e. perennial streams, springs, and ET vegetation types) in areas that may be potentially impacted. Less than one percent of perennial stream miles in Spring Valley [184] are in areas that may be potentially impacted. Three springs in Spring Valley occur in areas that could be impacted during this time frame. A small percentage of ET wetland meadow (1 percent) and basin shrubland (8 percent) are in areas that may be potentially affected in Spring Valley (**Appendix F**, **Table F3.6-12**; **Figure F3.3.8A-10**, and **Figure 3.5-9**, Vegetation).

Full Build Out Plus 75 Years. Three valleys have one or more of the three groundwater dependent habitats in areas that may be potentially impacted at the full build out plus 75 years time frame. Two percent of perennial stream miles in Spring and 15 percent in Snake valleys are in areas that may be potentially impacted. Springs in three valleys occur in areas that could be impacted during this time frame including Spring, Hamlin, and Snake. These potentially impacted springs make up less than 1 percent of springs in Hamlin Valley and up to 5 percent of the springs in Spring Valley. ET vegetation types are potentially impacted in Spring and Snake valleys. Six percent of ET wetland meadow and 16 percent of basin shrubland in Spring could be potentially impacted. In Snake Valley, 22 percent of wetland meadow and 8 percent of basin shrubland could be potentially impacted (**Appendix F**, **Table F3.6-12**; **Figure F3.3.8A-11**, and **Figure 3.5-9**, Vegetation).

Full Build Out Plus 200 Years. Three valleys have one or more of the three groundwater dependent habitat types in areas that may be potentially impacted at the full build out plus 200 years time frame. No additional valleys have streams in areas that may be potentially affected, though 25 percent of stream miles in Snake Valley are now in areas where impacts to flow could occur. The potentially impacted springs are found in the same 3 valleys mentioned in the previous time frame. ET vegetation types are potentially impacted in Spring, Snake, and Hamlin valleys. The percent of ET wetland meadow and basin shrubland potentially impacted in Spring Valley increases to 13 percent and 18 percent, respectively, over the previous time frame. Snake Valley also shows increases in the amount of ET vegetation types that may be impacted (**Appendix F**, **Table F3.6-12**; **Figure F3.3.8A-12**, and **Figure 3.5-9**, Vegetation).

Conclusion

- Alternative C pumping impacts to big game and other management concern species as well as special status species would be similar to those described in the Proposed Action, but the extent of impacts may be reduced given the reduced pumping volumes and intermittent pumping regime (**Appendix F**, **Figures F3.3.8A-10** through **F3.3.8A-12**). There are two important bird areas with springs or streams where impacts to flow could occur (D.E. Moore and GBNP) at the full build out plus 200 years time frame.
- Based on model results, Alternative C is not anticipated to impact Lower Meadow Valley Wash basin or perennial stream which are important to southwestern willow flycatcher and yellow-billed cuckoo nor is it anticipated to impact Pahranagat Valley perennial streams or springs used by these two species.
- At the full build out time frame and within nesting brooding or summer range for greater sage-grouse, ET wetland/meadow and basin shrubland as well as springs and perennial streams are in areas that may be impacted by drawdown in Spring Valley. In the full build out plus 75 years time frame, three basins have ET vegetation types, springs or perennial stream segments at potential risk within these two habitat ranges. By full build out plus 200 years, greater impacts to habitats in these three basins would be anticipated based on groundwater model results. Potential pumping impacts, when combined with potential groundwater development surface impacts, could result in the reduction or even loss of some local sage-grouse populations in Snake and Spring valleys.

ACMs, recommended mitigation measures, and residual impacts would be the same as for the Proposed Action.

3.6.2.13 Alternative D

Groundwater Development Area

As compared to the Proposed Action and Alternative D considers the same groundwater development areas in Cave, Delamar, and Dry Lake valleys and only the southern portion of groundwater development areas in Spring Valley (within Lincoln County). Construction of well pads, access roads, gathering pipelines, and electrical service lines would result in a total surface disturbance of approximately 2,470 to 3,936 acres. A portion of this construction disturbance – approximately 67 percent, or 1,655 to 2,635 acres – would be permanently converted to industrial uses for the operational life of the project. No specific development plans are available, so it is assumed that the habitat cover types would be affected in proportion to their relative surface area within the groundwater development areas (see **Table 3.5-10**, Section 3.5, Vegetation Resources). Consequently, it is expected that sagebrush shrubland and greasewood/saltbush shrubland habitat types would be most extensively disturbed.

The species and species habitat within the various groundwater development areas are the same as described for the Proposed Action except there would not be impacts from construction and maintenance of future facilities in Snake Valley and northern Spring Valley (north of Lincoln County). The percent of groundwater development areas that are various species' habitat is presented in **Appendix F**, **Table F3.6-7**. The types of impacts to terrestrial wildlife that would result from construction and facility maintenance in groundwater development areas would be similar to the impacts described in the ROW areas (Section 3.6.2.4.1) including impacts related to habitat fragmentation and potential impacts from accidental wildfires and power lines. Given that Alternative D could disturb between 30 and 52 percent fewer acres overall during construction and convert between 30 and 52 percent fewer acres to permanent facilities, while the same terrestrial wildlife species could be impacted in DDC and Spring (south of White Pine County line) valleys, the extent of potential impacts would be less than the Proposed Action in those valleys.

Some key differences in potential wildlife impacts between Alternative D and the Proposed Action are listed below:

- Pronghorn crucial winter range is not found within groundwater development areas in southern Spring Valley;
- There are 3 active greater sage-grouse leks within proposed groundwater development areas and 8 active leks within 2 miles; and
- The known occurrence of baking powder flat blue butterfly in the Baking Powder Flat ACEC is no longer within proposed groundwater development areas as it is north of the Lincoln County line.

Groundwater Pumping

Alternative D would consist of reduced pumping (78,755 afy) at distributed locations in southern Spring, Cave, Dry Lake, and Delamar valleys. No pumping would occur in Snake Valley. Alternative D pumping could result in reductions in groundwater dependent terrestrial wildlife habitat and affect terrestrial wildlife species.

Full Build Out. Only Hamlin Valley has one of the three groundwater dependent habitat types (i.e. one spring) in areas that may be potentially impacted. This potentially impacted spring represents less than 1 percent of the springs in Hamlin Valley (**Appendix F**, **Table F3.6-13**; **Figure F3.3.8A-13**, and **Figure 3.5-10**, Vegetation).

Full Build Out Plus 75 Years. Five valleys have one or more of the three groundwater dependent habitats in areas that may be potentially impacted at the full build out plus 75 years time frame. There are three valleys with perennial streams where impacts to flow could occur. Five percent of perennial stream miles in Spring, 22 percent in Lake, and less than 1 percent in Snake valleys are in areas that could be potentially impacted. Springs in five valleys could be impacted during this time frame including Spring [valleys 201 and 184], Hamlin, Lake, and Snake valleys. These potentially impacted springs make up less than 1 percent of springs in Snake Valley and up to 11 percent of the springs in Lake Valley. ET vegetation types are in areas that may be potentially impacted in three valleys (Spring, Snake, and Hamlin). Eleven percent of wetland meadow and 10 percent of basin shrubland are in areas that could be potentially impacted in Spring Valley. Sixty-eight percent of wetland meadow and 73 percent of basin shrubland are in areas that could be potentially impacted in Hamlin Valley (**Appendix F**, **Table F3.6-13**; **Figure F3.3.8A-14**, and **Figure 3.5-10**, Vegetation).

Full Build Out Plus 200 Years. Eight valleys have one or more of the three groundwater dependent habitat types in areas that may be potentially impacted at the full build out plus 200 years time frame. Five valleys have streams in areas where flows may be potentially affected including the three named above as well as Spring [184] and Hamlin valleys. The potentially impacted springs are found in 8 valleys, adding Cave, Steptoe, and Patterson valleys to those named above. One additional valley (Lake) has ET vegetation types in areas that may be potentially impacted in this time frame. The percent of ET wetland meadow and basin shrubland in areas that may be potentially impacted in Spring Valley is 18 percent and 23 percent, respectively, in this time frame. Snake and Hamlin valleys also show increases in the amount of ET vegetation types that may be impacted. Ninety-one percent of wetland meadow and 78 percent of basin shrubland are in areas that could be potentially impacted in Lake Valley in this time frame. (**Appendix F**, **Table F3.6-13**; **Figure F3.3.8A-15**, and **Figure 3.5-10**, Vegetation).

Conclusion

- Alternative D pumping impacts to big game and other management concern species as well as special status species would be similar to those described in the Proposed Action, but the distribution of impacts on the landscape would vary given that pumping facilities would be located south of the White Pine County line (**Appendix F**, **Figures F3.3.8A-13** through **F3.3.8-15**). There is one important bird area with springs or streams where impacts to flow could occur (GBNP) at the full build out plus 200 years time frame.
- Based on model results, Alternative D is not anticipated to impact Lower Meadow Valley Wash basin or perennial stream, which are important to southwestern willow flycatcher and yellow-billed cuckoo nor is it anticipated to impact Pahranagat Valley perennial streams or springs used by these two species.
- At the full build out time frame and within nesting brooding or summer range for greater sage-grouse, one spring is in an area that may be impacted by drawdown in Hamlin Valley. In the full build out plus 75 years time frame, four basins have ET vegetation types, springs or perennial stream segments in areas at potential risk within these two habitat ranges. By full build out plus 200 years, seven basins contain these potentially affected habitats based

on groundwater model results. Potential pumping impacts, when combined with potential groundwater development surface impacts, could result in the reduction or even loss of some local sage-grouse populations in Cave, Snake, and Spring valleys.

ACMs, recommended mitigation measures, and residual impacts would be the same as for the Proposed Action.

3.6.2.14 Alternative E

Groundwater Development Area

As compared to the Proposed Action, this alternative considers the same groundwater development areas in only four groundwater development basins (DDC and Spring valleys). Construction of well pads, access roads, gathering pipelines, and electrical service lines would result in a total surface disturbance of approximately 1,725 to 3,987 acres. A portion of this construction disturbance – approximately 67 percent, or 1,158 to 2,661 acres – would be permanently converted to industrial uses for the operational life of the project. No specific development plans are available, so it is assumed that the habitat cover types would be affected in proportion to their relative surface area within the groundwater development areas (see **Table 3.5-11**, Vegetation). Consequently, it is expected that sagebrush shrubland and greasewood/saltbush shrubland habitat types would be most extensively disturbed.

The species and species habitat within the various groundwater development areas are the same as described for the Proposed Action except that Snake Valley would not be impacted by construction and maintenance of future facilities. The percent of groundwater development areas that are various species' habitat is presented in **Appendix F**, **Table F3.6-8**. The types of impacts to terrestrial wildlife that would result from construction and facility maintenance in groundwater development areas would be similar to the impacts described in the ROW areas (Section 3.6.2.4.1) including impacts related to habitat fragmentation and potential impacts from accidental wildfires and power lines. Given that Alternative E could disturb approximately 52 percent fewer acres overall during construction and convert approximately 52 percent fewer acres to permanent facilities, while the same terrestrial wildlife species could be impacted DDC and Spring valleys, the extent of potential impacts would be less than the Proposed Action in those valleys.

The species and species habitat within the various groundwater development areas are the same as described for the Proposed Action except that Snake Valley would not be impacted by construction and maintenance of future facilities. The types of impacts to terrestrial wildlife that would result from construction and facility maintenance in groundwater development areas would be similar to the impacts described in the ROW areas (Section 3.6.2.4.1) including impacts related to habitat fragmentation and potential impacts from accidental wildfires and power lines. Given that Alternative E could disturb approximately 52 percent fewer acres overall during construction and convert approximately 52 percent fewer acres to permanent facilities, while the same terrestrial wildlife species could be impacted DDC and Spring valleys, the extent of potential impacts would be less than the Proposed Action in those valleys (**Appendix F**, **Table F3.6-9**).

Some key differences in potential wildlife impacts between this alternative and the Proposed Action are listed below:

- Because Snake Valley is not included in the alternative, all big game ranges in this valley discussed in the Proposed Action groundwater development section would not be impacted (e.g. mule deer crucial summer range and rocky mountain bighorn sheep occupied habitat); and
- There are 12 active greater sage-grouse leks within proposed groundwater development areas and 17 active leks within 2 miles; no sage-grouse habitats would be impacted in Snake Valley.

Groundwater Pumping

Alternative E would consist of reduced pumping (78,755 afy) at distributed locations in Spring, Cave, Dry Lake, and Delamar valleys. No pumping would occur in Snake Valley. Alternative E pumping could result in reductions in groundwater dependent terrestrial wildlife habitat and affect terrestrial wildlife species.

Full Build Out. Spring Valley has all three groundwater dependent habitat types (i.e. perennial streams, springs, and ET vegetation types) in areas that may be potentially impacted. Less than one percent of perennial stream miles in Spring Valley may potentially be impacted. Less than one percent of the springs in Spring Valley could be impacted

during this time frame. A small percentage of ET wetland meadow (1 percent) and basin shrubland (8 percent) are potentially affected in Spring Valley (**Appendix F**, **Table F3.6-14**; **Figure F3.3.8A-16**, and **Figure 3.5-11**, Vegetation).

Full Build Out Plus 75 Years. Two valleys have one or more of the three groundwater dependent habitats in areas that may be potentially impacted at the full build out plus 75 years time frame. There is one valley with perennial streams where impacts to flow could occur. Three percent of perennial stream miles in Spring Valley could potentially be impacted. Springs in two valleys are in areas that could be impacted during this time frame. These potentially impacted springs make up less than 1 percent of springs in Hamlin Valley and up to 8 percent of the springs in Spring Valley. ET vegetation types are potentially impacted in two valleys (Spring and Hamlin). Twenty percent of ET wetland meadow and 49 percent of basin shrubland could potentially be impacted in Spring Valley. In Hamlin Valley, 2 percent of wetland meadow and 6 percent of basin shrubland could potentially be impacted (**Appendix F**, **Table F3.6-14**; **Figure F3.3.8A-17**, and **Figure 3.5-11**, Vegetation).

Full Build Out Plus 200 Years. Six valleys have one or more of the three groundwater dependent habitat types in areas that may be potentially impacted at the full build out plus 200 years time frame. Four valleys have streams in areas that could potentially be impacted, including Spring, Snake, Steptoe, and Lake valleys. The potentially impacted springs are found in 5 valleys, adding Cave, Lake, and Steptoe valleys to those named above. ET vegetation types are potentially impacted in one additional valley (Lake). The percent of ET wetland meadow and basin shrubland potentially impacted in Spring Valley increases to 22 percent and 53 percent, respectively, over the previous time frame. Hamlin and Lake valleys also show increases in the amount of ET vegetation types that may be impacted (**Appendix F**, **Table F3.6-14**; **Figure F3.3.8A-18**, and **Figure 3.5-11**, Vegetation).

Conclusion

- Alternative E pumping impacts to big game and other management concern species as well as special status species would be similar to those described in the Proposed Action, but the distribution of impacts on the landscape would vary given that pumping facilities would not be located in Snake Valley (**Appendix F**, **Figures F3.3.8A-16** through **F3.3.8A-18**). There are no important bird areas with springs or streams where impacts to flow could occur at any of the three model time frames.
- Based on groundwater flow model results, this alternative is not anticipated to impact Lower Meadow Valley Wash basin or perennial streams, which are important to southwestern willow flycatcher and yellow-billed cuckoo nor is it anticipated to impact Pahranagat Valley perennial streams or springs used by these two species.
- At the full build out time frame and within nesting brooding or summer range for greater sage-grouse, ET wetland/meadow and basin shrubland as well as springs and perennial streams are in areas that may be impacted by drawdown in Spring Valley. In the full build out plus 75 years time frame, two basins have ET vegetation types, springs or perennial stream segments in areas at potential risk within these two habitat ranges. By full build out plus 200 years, five basins contain these potentially affected habitats based on groundwater model results. Potential pumping impacts, when combined with potential groundwater development surface impacts, could result in the reduction or even loss of some local sage-grouse populations in Cave, Snake, and Spring valleys.

ACMs, recommended mitigation measures, and residual impacts would be the same as for the Proposed Action.

3.6.2.15 No Action

Groundwater Development

Under the No Action Alternative, the proposed groundwater development would not occur in the five pumping basins. Therefore, terrestrial wildlife resources would not be affected by surface disturbance or facility maintenance activities.

Groundwater Pumping

No Action pumping is limited to pumping activities that are already approved. This pumping could result in reductions in terrestrial wildlife habitat and affect terrestrial species.

Full Build Out. Six valleys have one or more of the three groundwater dependent habitat types (i.e. perennial streams, springs, or ET vegetation types) in areas that may be potentially impacted. There are three valleys with perennial

streams where impacts to flow could occur. Less than 1 percent of perennial stream miles in Clover Valley may potentially be impacted. Approximately 18 perennial stream miles in Spring Valley [201] are located within high or moderate risk areas where impacts could occur. Springs in six valleys occur in areas where impacts could occur during this time frame including Steptoe, Lake, Patterson, Panaca, Clover, and Lower Meadow Valley Wash. These potentially impacted springs make up less than 1 percent of springs in Steptoe Valley and up to 25 percent of the springs in Patterson Valley. No wetland meadow and a small percentage of basin shrubland (23 percent in Lake and 1 percent in Panaca) are potentially affected (**Appendix F**, **Table F3.6-15**; **Figure F3.3.8A-19**, and **Figure 3.5-12**, Vegetation).

Full Build Out Plus 75 Years. Ten valleys have one or more of the three groundwater dependent habitats in areas that may be potentially impacted at the full build out plus 75 years time frame. There are six valleys with perennial streams located in areas where impacts to flow could occur. Less than one percent of perennial stream miles in Spring [201] and Clover valleys, 35 percent in Panaca, 7 percent in Lower Meadow Valley Wash, 11 percent in White River, and 22 percent in Lake valleys could potentially be impacted. Springs in eight valleys could be impacted during this time frame including Lake, Patterson, Panaca, Clover, Lower Meadow Valley Wash, White River, Dry, and Spring [184]. These potentially impacted springs make up less than 1 percent of springs in Spring Valley [184] and up to 39 percent of the springs in Patterson Valley. ET vegetation types are potentially impacted in one additional valley (White River) as compared to the full build out time frame. Two percent ET wetland meadow and 3 percent of basin shrubland could potentially be impacted in White River Valley (**Appendix F**, **Table F3.6-15**; **Figure F3.3.8A-20**, and **Figure 3.5-12**, Vegetation).

Full Build Out Plus 200 Years. Twelve valleys have one or more of the three groundwater dependent habitat types in areas that may be potentially impacted at the full build out plus 200 years time frame. Seven valleys have streams located in areas where flows could potentially be affected including the six named above as well as Spring Valley [184]. Springs located in areas where impacts could occur are found in 12 valleys, adding Las Vegas, Spring [201], and Eagle valleys to those named above. ET vegetation types are potentially impacted in two additional valleys (Clover and Spring [184] valleys). The percent of basin shrubland potentially impacted in Spring Valley [184] increases to 1 percent over the previous time frame. Lake, White River, and Clover valleys also show increases in the amount of ET vegetation types that may be impacted (**Appendix F**, **Table F3.6-15**; **Figure F3.3.8A-21**, and **Figure 3.5-12**, Vegetation).

Conclusion

- No Action pumping impacts to big game and other management concern species as well as special status species would be similar to those described in the Proposed Action, but the distribution of impacts on the landscape would vary (**Appendix F**, **Figures F3.3.8A-19** through **F3.3.8A-21**). There is one important bird areas with springs or streams where impacts to flow could occur (Lower Meadow Valley Wash) at all three model time frames.
- Based on model results, No Action pumping could potentially impact perennial stream flow in Lower Meadow Valley Wash in the full build out plus 75 years and full build out plus 200 years model time frames potentially impacting historical habitat for southwestern willow flycatcher and foraging habitat for yellow billed cuckoo. Potential pumping impacts to perennial streams or springs are not anticipated in Pahranagat or Delamar valleys, so habitat impacts to these two bird species in these valleys are not anticipated.
- At the full build out time frame and within nesting brooding or summer range for greater sage-grouse, ET wetland/meadow and basin shrubland as well as springs and perennial streams are in areas that may be impacted by drawdown in two valleys (Steptoe and Lake). In the full build out plus 75 years and plus 200 years time frame, three basins (Lake, Spring [184], and White River) have ET vegetation types, springs or perennial stream segments at potential risk within these two habitat ranges.

3.6.3 Cumulative Impacts

3.6.3.1 Issues

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

- Short-term, long-term, and permanent changes in terrestrial wildlife habitat (loss or fragmentation) and species composition due to surface disturbance as a result of construction-related activities, and operational maintenance;
- Loss of individuals, or populations of federally listed, candidate, or special status terrestrial wildlife species due to surface disturbance, related potential impacts (e.g. accidental wildfires, invasive species) and indirect effects (displacement of individuals and loss of breeding success from exposure to construction movements, noise, and higher levels of human activity including traffic).
- Compliance with recovery plans, conservation agreements, and state wildlife action plans for special status species;
- Potential effects from collisions and electrocutions to raptors and other wildlife from power lines and power stations;
- Potential effects of additional infrastructure resulting in increased perches for raptors and corvids that may increase predation on other animals; and
- Potential effects on culturally significant terrestrial wildlife species traditionally used as food by regional Tribes.

Groundwater Pumping

- Short term, long term, and permanent loss of phreatophytic and riparian wildlife habitat and surface-water availability;
- Potential effects of groundwater drawdown on water resources and habitat that support migratory waterfowl, bats, and important bird areas;
- Potential effects of groundwater drawdown on wildlife associated with cave habitats; and
- Compliance with recovery plans, conservation agreements, and state wildlife action plans for special status species.

3.6.3.2 Assumptions

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

- Study Areas. The cumulative impact study areas for terrestrial wildlife species vary by species or species group based either on the basins impacted or by a recognized management unit for the species (e.g. big game management units, greater sage-grouse population management units). Given the large number of species, cumulative effects were evaluated for a selected set of species. The overall rationale for these various cumulative study areas is the need to evaluate the impacts of the various alternatives in concert with past and present actions and RFFA impacts on a scale that considers movement of the various species within their typical range, management units used by agencies (where established), or the basins crossed by the proposed Project.
- Time frames. The effects analysis included time frames that ranged from several days to 2 years for a short-term effect and greater than 5 years for a long-term effect.
- The past and present actions footprints are based on utility ROWs and other surface disturbance activities identified in the BLM and other data bases (Section 2.8, Past, Present, and Reasonably Foreseeable Future Actions).
- The reasonably foreseeable projects and activities are those outlined in **Table 2.8-1**, Section 2.8, Past, Present, and Reasonably Foreseeable Future Actions. No cumulative effects related to surface development activities are anticipated outside the selected species or species group cumulative study area.

Groundwater Pumping

- Wildlife habitats associated with water sources include perennial streams, springs, ET wetland meadows and ET basin shrubland phreatophytes, as described in Vegetation Resources.
- Assumptions made in the vegetation section also apply to wildlife with regard to vegetation communities, see Section 3.5.3, Vegetation.
- Assumptions made in the water section also apply to wildlife with regard to spring and perennial stream habitats, see Section 3.3.2, Water.
- Study area. The study area is the boundary for the groundwater model simulations (**Figure 1.1-1**).
- Time frames. The effects analysis included time frames from full build out of the entire project (approximately 2050) to full build out plus 200 years.

3.6.3.3 Methodology for Analysis

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

- The cumulative surface disturbance effects to terrestrial wildlife resources were estimated by overlaying the existing surface disturbances for past and present actions, RFFAs, and the ROW development areas for the project alternative being evaluated over the various species habitats within the cumulative impact study areas (**Appendix F**, **Figures F3.6-3** to **F3.6-12**). The estimated cumulative surface disturbance was then compared with the overall amount of habitat within the cumulative impact study area. Habitat for selected species are from the NDOW GIS layers for big game and greater sage-grouse, or SWreGAP animal habitat models for other species or groups of species, and for some species groups, the entire area within a cumulative impact study area was considered habitat.
- The cumulative surface disturbance effects to special status species were estimated from evaluating the cumulative surface disturbance footprint in relation to the habitat requirements of terrestrial wildlife species to provide a risk assessment for future effects on these species.

Groundwater Pumping

- The cumulative analysis focuses on those basins with groundwater dependent terrestrial wildlife habitats (i.e. springs, perennial streams, ET vegetation types [wetland meadow/basin shrubland]) predicted to be affected by each alternative. This represents the incremental effect of the alternative on groundwater dependent terrestrial wildlife habitat in combination with other cumulative pumping actions.
- Wetland meadow and basin shrubland (terrestrial wildlife habitat type at risk from pumping). The area enclosed by the maximum extent of the 10-foot drawdown contour was superimposed over the area of the primary ET units to calculate the area of vegetation that could experience reductions in soil moisture and long-term vegetation community composition changes caused by groundwater drawdown of 10 feet or more at different points in time (full build out, full build out plus 75 years, and full build out plus 200 years). Figures were generated to illustrate the expansion of the 10-foot and greater drawdown contours over time in relation to the vegetation communities within the hydrographic ET boundaries (see Section 3.5, Vegetation Resources).
- Springs and perennial streams (terrestrial wildlife habitat at risk from pumping). The 10-foot drawdown contour was applied to the springs and perennial stream reaches that were classified as being at risk from groundwater drawdown. The springs included for analysis were those rated as presenting a “high” or “moderate” risk of effects. The number of springs and miles of perennial stream reaches potentially affected were enumerated for each alternative over time from the modeling results (see Section 3.3, Water Resources).

General Discussion

The following cumulative impacts discussion is based on data presented in both Section 3.3, Water Resources and Section 3.5, Vegetation Resources. These sections present cumulative analysis for springs and perennial streams and impacts on ET wetland meadow and basin shrubland which are the habitat types used by terrestrial wildlife that are at risk of impacts by groundwater pumping. The wildlife pumping effects analysis builds on data presented in these two sections and their associated appendices.

3.6.3.4 No Action

Groundwater Development

Under the No Action Alternative, the proposed project would not be constructed or maintained. No project-related surface disturbance would occur. Terrestrial wildlife habitats would continue to be influenced by natural events such as drought, fire, and land use activities such as grazing and existing water diversions. Management activities on public lands will continue to be directed by the Ely and Las Vegas RMPs, which include measures to maintain habitats for terrestrial wildlife species. Management guidance for other public lands in close proximity to the project study area would be provided by Great Basin Park General Management Plan and the Forest Plan for the Humbolt-Toiyabe National Forest.

Groundwater Pumping

In general, groundwater pumping has the potential to impact important habitats for wildlife including perennial springs and streams, their associated vegetation communities (e.g. wetlands, riparian areas, wet meadows), and phreatophytic wetland/meadow and basin shrubland vegetation types in ET areas, see **Appendix F3.3.8**, **Figures F3.3.8B-19** through **B-21** for the potentially impacted perennial waters for the three pumping time frames. **Table F3.6-16** in **Appendix F** provides a summary of basins that have groundwater dependent habitat that is in areas potentially impacted by No Action cumulative drawdown in the three time frames. Perennial streams, springs, and ET wetland meadow and basin shrubland types are presented as a percent of the total available in the valley (e.g., potentially impacted springs as a percent of the total springs in the valley). The No Action cumulative scenario has 17 basins with potentially impacted perennial streams or springs by the full build out plus 200 years time frame including Pahranagat, Lower Moapa, Panaca, Clover, Lower Meadow Valley Wash, White River, Lake, Muddy River Springs Area, Spring [201 and 184], Steptoe, Patterson, Coyote Springs, Las Vegas, Eagle, Rose and Dry valleys. See **Appendix F**, **Table F3.6-1** for species that occur in these valleys. The degree of impacts to wildlife resources would depend on a number of variables, such as the existing habitat values and level of use, species' sensitivity (i.e. level of dependency on groundwater-dependent habitats), and the extent of the anticipated water and habitat reductions/shifts. Given the limited amount of these habitat types within the study area, it is assumed that species dependent on these areas currently are at carrying capacity. As a result, any individuals displaced as a result of reduction in amount or quality of these habitats could be lost, concentrating the remaining animals within smaller habitat areas. Species groups likely affected by reduction in groundwater dependent habitats would include: big game, small mammals, upland game birds, waterfowl, nongame birds (e.g. raptors and passerines), bats, reptiles, and invertebrates. Discussion of cumulative effects for species and species groups is addressed later in the section.

3.6.3.5 Proposed Action

Groundwater Development

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

Habitat Alteration and Direct/Indirect Effects on Terrestrial Wildlife Species

Past and present actions consist primarily of existing roads, energy utility corridors, mining districts, and recent wildfires (**Figures 2.8-1** and **2.8-2**). Other activities that have influenced terrestrial wildlife habitat and species include livestock grazing over the majority of public lands, the development of towns and rural communities (see Section 3.5.2.18, Vegetation Resources), and vegetation treatments conducted by various agencies. The primary future actions consist of construction of new utilities (pipelines, electrical distribution lines), roads and turbine pads for wind energy projects, which would be located in Spring, Pahranagat, Hidden Valley (north), Garnet, Dry Lake, Muleshoe, Lake, Delamar, and Coyote Springs valleys. The total estimated surface area disturbance for construction and maintenance of the main pipeline and ancillary facilities, plus the maximum anticipated groundwater development facilities, and RFFAs are displayed in **Table 2.8-1** for the Proposed Action. The reasonably foreseeable actions are described in **Table 2.8-1**.

Cumulative Effects. The areas where the GWD Project surface disturbance would potentially overlap with Past and Present Actions and RFFAs (**Figures 2.8-1** and **2.8-2** and **Table 2.8-1**) include existing road and highway crossings in all project hydrologic basins, the LCCRDA utility corridor that extends from southern Dry Lake Valley to the vicinity of Apex, and intersection with facilities associated with the ON Transmission Line and Eastern Nevada Transmission Project, and future wind energy projects in Spring and northern Lake valleys. The additive cumulative effects would result in additional habitat disturbance and fragmentation. Fragmentation would continue until restoration is complete, which could take from 5 to 200 years depending on the vegetation type. Some areas would be permanently converted

(e.g. new roads) to other uses. Habitat conversion or alteration would result in direct losses of smaller, less mobile species of wildlife such as small mammals and reptiles and displacement of more mobile species into adjacent habitats. Displacement would occur from various locations and would increase pressure on remaining habitats. This could result in some local reductions in wildlife populations, if adjacent habitats are at carrying capacity. Potential cumulative indirect impacts would include an incremental increase in noise, elevated human presence, dispersal of noxious and invasive weed species and dust deposition if projects occurred during the same time frame within wildlife habitat. Agency implemented vegetation treatments would improve habitats over time and would be a beneficial cumulative effect.

Groundwater Pumping

Past and present actions are represented by the No Action pumping operations described in Section 3.3, Water Resources. The reasonably foreseeable actions are described in **Table 2.8-4**. The following discussions are based on an interpretation of the groundwater model simulations that predict groundwater drawdown elevations that have the potential to impact three groundwater dependent habitats (perennial streams, springs, and ET vegetation types) that are used by terrestrial wildlife species. The degree of impacts to terrestrial wildlife resources would depend on a number of variables, such as the existing habitat values and level of use, species' sensitivity (i.e. level of dependency on groundwater-dependent habitats), and the extent of the anticipated water and habitat reductions/shifts. Given the limited amount of these habitat types within the study area, it is assumed that species dependent on these areas currently are at carrying capacity. As a result, any individuals displaced as a result of reduction in amount or quality of these habitats could be lost, concentrating the remaining animals within smaller habitat areas. Species groups likely affected by reduction in groundwater dependent habitats would include: big game, small mammals, upland game birds, waterfowl, nongame birds (e.g. raptors and passerines), bats, reptiles, and invertebrates. Discussion of cumulative effects for species and species groups is addressed later in the section.

There are 11 valleys that have at least one of the three groundwater dependent habitats incrementally impacted by Proposed Action cumulative (i.e., have impacts beyond those attributable to the No Action cumulative) in at least one of the three model time frames; these include Spring (184), Snake, Hamlin, Lake, Lower Meadow Valley Wash, Cave, Steptoe, Muddy River Springs Area, Panaca, Spring [201], and Eagle. **Table F3.6-17, Appendix F** provides a summary of basins that have groundwater dependent habitats that are in areas potentially impacted by Proposed Action cumulative drawdown in the three model time frames. **Table F3.6-1, Appendix F** provides a list of terrestrial wildlife species that occur in these valleys. Figures in Section 3.5.3.5, Vegetation display the incremental contribution of the Proposed Action cumulative to wetland/meadow and basin shrubland ET vegetation types as well as the number of springs and miles of perennial streams that are in areas potentially impacted by drawdown in selected valleys. Of these 11 valleys, 6 (Spring [184], Snake, Cave, Steptoe, Hamlin, Eagle) have all the potential incremental impacts of at least 1 groundwater dependent habitat coming entirely from the Proposed Action cumulative pumping. The other five valleys (Panaca, Lower Meadow Valley Wash, Spring [201], Muddy River Springs Area, and Pahranagat) show potential impacts based on the No Action cumulative model results to which the Proposed Action cumulative contributes incrementally. The location and risk to springs and perennial streams in relation to cumulative drawdown at the various model time frames are displayed in **Appendix F3.3.8**, **Figures F3.3.8B-01**through **F3.3.8B-03**.

Cumulative Effects of Groundwater Development and Pumping on Terrestrial Wildlife Species

Management Concern Species

Big Game: The cumulative impact study areas for big game species were developed from the hunt units and management subunit boundaries used by the States of Nevada and Utah to manage these species (**Appendix F**, **Figures F3.6-3** through **F3.6-7**). Most big game species require large areas to meet seasonal habitat requirements and move between these habitats. While the proposed project surface impacts may not impact a large percent of the overall available habitat for these species, when considered together with the past and present actions and RFFAs, impacts may be detrimental to local populations. The primary source of cumulative impacts to big game is the construction of roads and other infrastructure. These facilities reduce the quantity of available habitat both directly through habitat loss as well as indirectly through fragmentation and other fragmentation effects (e.g., increased noise, elevated human presence, dispersal of noxious and invasive weeds species, dust deposition). While research suggests that roadway impacts can have population-level effects on terrestrial species (Trombulak and Frissell 2000; Fahrig and Rytwinski 2009; Benitez-Lopez et al. 2010), the thresholds at which roads or other development features create movement barriers or population-level effects are rarely known (Frair et al. 2008) and can vary from species to species.

The future groundwater facilities development along with proposed wind power projects in Dry Lake and Spring valleys and the supporting facilities and roads would likely have cumulative effects particularly on pronghorn and mule deer winter range (NV Management units 11 and 22). By implementing ACMs, the proposed GWD Project would minimize impacts to big game species, but could not completely avoid contributing to incremental habitat fragmentation effects to these species in combination with other actions.

Groundwater pumping would be expected to change the distribution and movements of big game. As pumping would alter the availability of water and associated foraging habitat on the landscape, big game would make use of these high value habitats where they are found. Valleys where Proposed Action cumulative effects to at least one of the groundwater dependent habitats are likely to occur are listed above.

Other Terrestrial Species of Management Concern: The cumulative impact study area for other Terrestrial Species of Management Concern is the Project ROW cumulative impact study area (**Appendix F**, **Figure F3.6-8**). The study area considers all the basins that are crossed by the GWD Project facilities. Most small mammals and reptiles have relatively small home ranges and are not long distance migrants. As with big game, cumulative impacts associated with the construction of roads and other infrastructure temporarily disturb habitat, potentially create barriers to movement, increase potential for vehicle collisions, and also convert habitat and contribute to fragmentation and associated effects as discussed previously. Future groundwater facilities development along with proposed wind, and power line projects in valleys impacted by the proposed project have the potential to contribute cumulatively to local population effects on small mammals and reptiles.

For birds, cumulative impacts from various projects would increase direct and indirect habitat loss, increase vehicle presence, and result in some direct mortalities to raptors and other birds from power lines and wind projects. Given the location of other RFFAs within basins where sagebrush habitat is the majority of the vegetation cover, (e.g., Spring Valley), impacts to sagebrush obligate birds would lead to additional long-term loss of habitat and further indirect impacts through displacement and habitat fragmentation.

By implementing ACMs, the proposed GWD Project would minimize impacts to management concern species but could not completely avoid contributing to incremental habitat fragmentation effects to these species in combination with other actions.

The potential reduced availability of spring, perennial streams, and ET wetland/meadow and basin shrubland habitats due to cumulative groundwater pumping, could result in reductions or even loss of local populations of less mobile species in specific areas and displacement of mobile species like birds. For migratory birds, pumping impacts could decrease the amount of stopover habitat available on the landscape. Valleys where Proposed Action cumulative effects to at least one of the groundwater dependent habitats are likely to occur are listed above.

Special Status Species

Desert Tortoise and Gila Monster: The cumulative impact study area for desert tortoise includes the valleys crossed by the proposed Project facilities within desert tortoise range and also includes valleys that contain ACECs designated for desert tortoise protection (e.g. Kane Springs, Coyote Spring) crossed by the proposed Project (**Appendix F**, **Figure F3.6-11**). The cumulative impact study area for gila monster includes the basins crossed by the proposed project facilities within gila monster habitat (based on the SWReGap animal habitat model) (see **Appendix F**, **Figure F3.6-12**).

Past and present actions including roads, utility corridors, human development, and wildfires have impacted large portions of these species' habitats. The major additive cumulative effects within these species' cumulative impact study areas would be the expansion in the width of adjacent utility ROWs and new transmission ROWs which would convert and fragment habitat for desert tortoise, gila monster and other Mojave desert species habitat. Qualitatively, this would contribute to further fragmentation effects including isolating of populations, increasing potential for predation given additional above ground structures for perching and nesting of raptors and corvids, and increasing human-related disturbances (e.g., illegal collection, increased OHV use). By implementing ACMs, the proposed GWD Project would minimize direct take of desert tortoise and gila monsters and minimize impacts to habitat for these species once reclamation is complete. It would not completely avoid contributing to incremental habitat fragmentation effects to these species in combination with other actions.

The Proposed Action pumping could contribute cumulatively to potential groundwater dependent habitat impacts within the range of the gila monster (stream miles in Lower Meadow Valley Wash at the 75 and 200 years plus full build out time frames). Desert tortoise is not dependent on groundwater dependent habitats.

Southwestern Willow Flycatcher, Yellow-billed Cuckoo, and Yuma Clapper Rail: These bird species would not be directly impacted by the proposed Project facilities, so cumulative effects from surface impacts are not expected. For these species, the study area is water resources region of study. The southwestern willow flycatcher and yellow-billed cuckoo potentially could experience additional habitat impacts (forage and breeding), above those in the Cumulative No Action Alternative, under the cumulative Proposed Action pumping scenario by the full build out plus 200 years time frame or before. See **Table 3.6-17** for a summary of impacted habitat areas for these species by alternative. Note that groundwater dependent habitats in Las Vegas and streams in Muddy River Springs Area are impacted by the No Action Cumulative scenarios, but based on available data do not appear to interact cumulatively with the Proposed Action or other action alternatives. Lower Moapa valley model results show potential flow reductions at Overton which could potentially impact habitat for southwestern willow flycatcher and yellow-billed cuckoo. There are no recent records of occurrences for Yuma clapper rail in areas potentially impacted by drawdown.

Table 3.6-17 Potential for Cumulative Pumping Impacts to Springs or Perennial Streams in Valleys with Known Habitat for Southwestern Willow Flycatcher and Yellow-billed Cuckoo

	No Action	Proposed Action	A	B	C	D	E
Pahranagat (YBC, SWWF)	X	Y	X	Y	Y	X	X
Lower Meadow Valley Wash (YBC, historical habitat SWWF)	X	Y	Y	Y	Y	X	Y
Muddy River Springs (YBC)	X	Y	X	Y	X	X	X

N = no springs or perennial streams potentially impacted in the valley; X = no additional incremental effect on habitat and species from this alternative; Y = increases in impacts to springs or perennial streams above cumulative No Action pumping scenario.

SWWF = Southwestern Willow Flycatcher.

YBC = Yellow-billed Cuckoo.

Greater Sage-Grouse: The cumulative impact study area for greater sage-grouse was developed to include the NDOW population management units crossed by the GWD Project. Contiguous sage-grouse habitat areas across the Utah border were also included (**Appendix F**, **Figure F3.6-10**). While the GWD Project impacts less than 1 percent of the total habitat within the cumulative study area, when considered in context with the PPAs and RFFAs in the greater sage-grouse cumulative impact study area a large amount of sage-grouse habitat would be impacted because this species is a sagebrush obligate species sensitive to fragmentation effects. The major additive cumulative effects within these species' cumulative impact study areas would be the additional utility ROWs and wind power projects in Spring and Lake valleys. The increase in aboveground facilities including wind turbines and power lines would result in effects as described earlier in the section in ROW Areas and Groundwater Development Areas sections for this species. Cumulative effects within valleys could result in the reduction or loss of local populations. By implementing ACMs, the GWD Project would minimize impacts to habitat for greater sage-grouse species, but could not completely avoid contributing to incremental habitat fragmentation effects to this species in combination with other actions.

Proposed Action pumping would contribute incrementally to impacts to springs, perennial streams, and ET wetland/meadow and basin shrubland habitats, all important to greater sage-grouse. In valleys like Spring [184], Snake, Cave, and Hamlin, the Proposed Action would contribute all the impacts to at least one of the groundwater dependent habitats within the three model time frames, see **Table F3.6-17, Appendix F**. Cumulative pumping effects within valleys could result in the reduction or loss of local populations. Valleys where this species occurs that would have incremental contributions to groundwater dependent habitats from Proposed Action pumping include: Spring [184], Snake, Hamlin, Lake, Cave, Steptoe, Spring [201], and Eagle.

Additional Special Status Bird Species including Raptors and Important Bird Areas: For birds, cumulative impacts from various projects would increase direct and indirect habitat loss, increase vehicle presence, and could result in

some direct mortalities to raptors and other birds from power lines and wind projects. Given the location of other RFFAs within basins where sagebrush habitat is the majority of the vegetation cover, (e.g., Spring Valley), impacts to sagebrush obligate birds would lead to additional long-term loss of habitat and further indirect impacts through displacement and habitat fragmentation. These cumulative surface impacts could result in reductions in local populations in specific areas. By implementing ACMs, the proposed GWD Project would minimize impacts to special status bird species but could not completely avoid contributing to incremental habitat fragmentation effects to these species in combination with other actions.

Proposed Action pumping would contribute incrementally to impacts to reduced availability of spring, perennial streams, and ET wetland/meadow and basin shrubland habitats which also could result in reductions or even loss of local populations in specific areas for bird species dependent on these habitat types. For special status migratory birds, pumping impacts could decrease the amount of stopover habitat available on the landscape. The location and risk to springs and perennial streams in relation to cumulative drawdown at the various model time frames are displayed in **Appendix F3.3.8**, **Figures F3.3.8B-1** through **F3.3.8B-3.** Refer to **Table F3.6-17, Appendix F** for data on the percent of groundwater dependent habitats potentially impacted by the cumulative pumping scenarios within valleys potentially impacted by Proposed Action cumulative pumping; and Vegetation, Section 3.4 discusses the impacts to ET vegetation types from cumulative pumping and includes figures that include wetland meadow and basin shrubland information for cumulative with No Action, Proposed Action, and cumulative pumping with the Proposed Action as a way of identifying the incremental effects of the alternative.

Cumulative pumping also could potentially impact springs and perennial streams in important bird areas. **Table F3.6-17, Appendix F** includes a list and number of IBAs with either springs or perennial streams in areas potentially impacted by drawdown in the various model time frames. Because the No Action cumulative pumping scenario impacts Lower Meadow Valley Wash and the Pahranagat Valley Complex important bird areas at the full build out time frame, the Proposed Action also shows impacts to these two areas. The Proposed Action pumping increases the length of perennial stream miles in areas where impacts to flows could occur in the Lower Meadow Valley Wash important bird area during the full build out plus 75 years time frame. The Proposed Action has additional miles in areas potentially impacted by drawdown (approximately 24 miles) in the full build out plus 200 years time frame. The stream miles in Pahranagat Valley Complex remain the same when the No Action and Proposed Action are compared (approximately 0.5 mile) as do miles in the Muddy River Springs area (approximately 0.5 mile by the plus 200 years time frame). The other important bird areas impacted in later time frames include GBNP and D.E. Moore Bird and Wildlife Sanctuary. Perennial stream miles and springs within GBNP are also potentially impacted by Proposed Action cumulative pumping.

Pygmy Rabbit: The cumulative impact study area for pygmy rabbits was developed to include valleys crossed by the GWD Project within SWReGap modeled habitat (**Appendix F**, **Figure F3.6-9**). Habitat fragmentation is thought to limit pygmy rabbit dispersal capabilities given an apparent hesitancy to cross open habitats. Given their typical mode of escape (maneuvering into dense cover), pygmy rabbits are likely more vulnerable to predation in open habitats. RFFA projects within the pygmy rabbit cumulative impact study area would contribute to habitat loss and fragmentation effects to this species (e.g. Spring Valley). Overhead power lines also could contribute to potential predator perching sites, increasing predation potential on this species. By implementing ACMs, the proposed GWD Project would minimize impacts to pygmy rabbits; but could not completely avoid contributing to the long-term incremental sagebrush habitat fragmentation effects to this species in combination with other actions.

Valleys where this species occurs that would have incremental contributions to groundwater dependent habitats from Proposed Action pumping include: Spring [184], Snake, Hamlin, Lake, Cave, Steptoe, Spring [201], Panaca, and Eagle.

Bats: The cumulative impact study area for bat species is the project ROWs' cumulative impact study area (**Appendix F**, **Figure F3.6-8**). Types of projects that would most contribute to the additive cumulative effects to bat species would be the development of wind projects and utility corridors with overhead power lines as well as other projects that temporarily or permanently impact foraging habitat. Wind projects and projects that include overhead power lines would contribute to collision and electrocution potential of bat species, particularly if facilities are located within daily movement corridors (between roosting and foraging sites). By implementing the ACMs, the proposed GWD Project would minimize impacts to habitat for bat species, but could not completely avoid contributing to incremental foraging habitat and collision potential effects to these species in combination with other actions.

The most productive bat foraging habitat is the area around springs, perennial streams, and ET wetland/meadows as these areas typically support insects. Bats could be impacted by incremental Proposed Action cumulative drawdown in the valleys where any of these groundwater dependent habitats are impacted, refer to the groundwater pumping section above for the valleys likely impacted by Proposed Action cumulative pumping as well as **Table F3.6-1, Appendix F** for the species of bats that occur in those valleys.

Baking Powder Flat Blue Butterfly and White River Valley Skipper: The cumulative impacts study area for baking powder flat blue butterfly is the Baking Powder Flat ACEC as it contains all currently known records. As explained in the groundwater development – future facilities section, this species is found inside a proposed groundwater development area in Spring Valley. At this time, there are some water development projects within the ACEC. The Ely RMP designates this ACEC as an avoidance area and has it closed to locatable and leasable minerals, renewable energy, and does not allow any new roads (BLM 2008a). As described in the pumping effects section, the host plant for this species is an upland plant and not expected to be impacted by drawdown impacts. Cumulative impacts on this butterfly species from surface disturbance would be possible, but cumulative effects from pumping would be unlikely.

The cumulative impacts study area for White River valley skipper is White River, Lake and Spring valleys. White River valley skipper is not recorded within ROWs or groundwater development areas, so cumulative impacts from surface disturbance are not considered. This species, if present, may be impacted by drawdown in White River, Lake and Spring valleys as explained in the pumping effects section. The apparent host plant for this species is wetland dependent. Both Lake and Spring valleys would have additional incremental effects on the groundwater dependent habitats from all the Proposed Action cumulative pumping as compared to the No Action alternative.

Other Wildlife Species of Interest

Cave Species: The cumulative impacts study area for cave species were the known caves within the ROW CISA. Since proposed project facilities are unlikely to be located close to caves, cumulative effects from surface impacts are not expected.

As discussed in project specific pumping effects section, there are 6 caves in direct contact with the water table or surface water within susceptibility areas. They are all located in Snake Valley. If these caves have waters associated with them that are dependent on discharge from the regional groundwater flow system in Snake valley, habitat for cave obligate species may be impacted as a result of Proposed Action pumping which contributes almost all of the cumulative effects in this valley.

3.6.3.6 Alternative A

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

The effects of Alternative A surface disturbance resulting from ROWs and project facilities in combination with other cumulative actions on terrestrial wildlife resources would be the same as discussed for cumulative impacts with the Proposed Action. Maximum future groundwater development facility acreage would be less than under the Proposed Action, see **Table 3.6-18,** lowering the potential for cumulative effects with RFFAs.

Groundwater Pumping Effects

There are eight valleys that have at least one of the three groundwater dependent habitats incrementally impacted by Alternative A cumulative (i.e., have impacts beyond those attributable to the No Action cumulative) in at least one of the three model time frames; these include Spring [184], Snake, Hamlin, Steptoe, Lower Meadow Valley Wash, Cave, Spring [201], and Lake. **Table F3.6-18, Appendix F** provides a summary of basins that have groundwater dependent habitats that are in areas potentially impacted by Alternative A cumulative drawdown in the three model time frames. **Table F3.6-1, Appendix F** provides a list of terrestrial wildlife species that occur in these valleys. Figures in Section 3.5.3.6, Vegetation display the incremental contribution of the Alternative A cumulative to wetland/meadow and basin shrubland ET vegetation types as well as the number of springs and miles of perennial streams that are in areas potentially impacted by drawdown. Of these eight valleys, five (Spring, Snake, Cave, Steptoe, Hamlin) have all the potential incremental impacts of at least one groundwater dependent habitat coming entirely from the Proposed Action cumulative pumping. The other three valleys (Lake, Lower Meadow Valley Wash, and Spring [201]) show potential impacts based the No Action cumulative model results to which Alternative A cumulative contributes

incrementally. The location and risk to springs and perennial streams in relation to cumulative drawdown at the various model time frames are displayed in **Appendix F**, **Figures F3.3.8B-04** through **F3.3.8B-06**.

3.6.3.7 Alternative B

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

The effects of Alternative B surface disturbance resulting from ROWs and project facilities in combination with other cumulative actions on terrestrial wildlife resources would be the similar to impacts discussed for cumulative impacts with the Proposed Action. Maximum future groundwater development facility acreage would be less than under the Proposed Action, see **Table 3.6-18,** lowering the potential for cumulative effects with RFFAs.

Groundwater Pumping Effects

There are 12 valleys that have at least one of the three groundwater dependent habitats incrementally impacted by Alternative B cumulative (i.e., have impacts beyond those attributable to the No Action cumulative) in at least one of the three model time frames; these include Spring [184], Snake, Hamlin, Steptoe, Lower Meadow Valley Wash, Cave, Spring [201], Lake, White River, Panaca, Lower Moapa, and Eagle. **Table F3.6-19, Appendix F** provides a summary of basins that have groundwater dependent habitats that are in areas potentially impacted by Alternative B cumulative drawdown in the three model time frames. **Table F3.6-1, Appendix F** provides a list of terrestrial wildlife species that occur in these valleys. Figures in Section 3.5.3.7, Vegetation display the incremental contribution of Alternative B cumulative to wetland/meadow and basin shrubland ET vegetation types as well as the number of springs and miles of perennial streams that are in areas potentially impacted by drawdown. Of these 12 valleys, seven (Spring, Snake, Cave, Steptoe, Hamlin, Pahranagat, and Lower Meadow Valley Wash) have all the potential incremental impacts of at least one groundwater dependent habitat coming entirely from Alternative B cumulative pumping. The other five valleys (Panaca, Lake, Spring [201], Lower Moapa, and White River) show potential impacts based the No Action cumulative model results to which Alternative B cumulative contributes incrementally. The location and risk to springs and perennial streams in relation to cumulative drawdown at the various model time frames are displayed in **Appendix F3.3.8**, **Figures F3.3.8B-07** through **F3.3.8B-09**.

3.6.3.8 Alternative C

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

The effects of Alternative C surface disturbance resulting from ROWs and project facilities in combination with other cumulative actions on terrestrial wildlife resources would be the same as discussed for cumulative impacts with the Proposed Action. Maximum future groundwater development facility acreage would be less than under the Proposed Action, see **Table 3.6-18,** lowering the potential for cumulative effects with RFFAs.

Groundwater Pumping Effects

There are 7 valleys that have at least one of the three groundwater dependent habitats incrementally impacted by Alternative C cumulative (have impacts beyond those attributable to the No Action cumulative) in at least one of the three model time frames; these include Spring, Snake, Hamlin, Steptoe, Lower Meadow Valley Wash, Lake, and Cave. **Table F3.6-20, Appendix F** provides a summary of basins that have groundwater dependent habitats that are in areas potentially impacted by Alternative C cumulative drawdown in the three model time frames. **Table F3.6-1, Appendix F** provides a list of terrestrial wildlife species that occur in these valleys. Figures in Section 3.5.3.8, Vegetation display the incremental contribution of Alternative C cumulative to wetland/meadow and basin shrubland ET vegetation types as well as the number of springs and miles of perennial streams that are in areas potentially impacted by drawdown. Of these 7 valleys, five (Spring, Snake, Cave, Steptoe, Hamlin) have all the potential incremental impacts of at least one groundwater dependent habitat coming entirely from Alternative C cumulative pumping. The other 2 valleys (Lake and Lower Meadow Valley Wash) show potential impacts based the No Action cumulative model results to which Alternative C cumulative contributes incrementally. The location and risk to springs and perennial streams in relation to cumulative drawdown at the various model time frames are displayed in **Appendix F3.3.8**, **Figures F3.3.8B-10** through **F3.3.8B-12**.

3.6.3.9 Alternative D

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

Construction and facility maintenance in Snake Valley and White Pine County would be eliminated under Alternative D. As a result, construction of the remaining ROWs and project facilities in Lincoln and Clark County and the Lincoln County portion of Spring Valley would result in effects to terrestrial wildlife species and their habitats. This alternative would not interact with the Spring Valley Wind RFFA as that project occurs north of the county line in Spring Valley (**Figure 2.8-1**, Chapter 2). There would be no potential for cumulative impacts from surface impacts for Baking Powder Flat Blue butterfly as this species occurs north of the county line. Maximum future groundwater development facility acreage would be less than under the Proposed Action, see **Table 3.6-18,** lowering the potential for cumulative effects with RFFAs.

Groundwater Pumping Effects

There are seven valleys that have at least one of the three groundwater dependent habitats incrementally impacted by Alternative D cumulative (i.e., have impacts beyond those attributable to the No Action cumulative) in at least one of the three model time frames; these include Spring, Snake, Hamlin, Steptoe, Cave, Spring [201], and Lake. **Table F3.6-21, Appendix F** provides a summary of basins that have groundwater dependent habitats that are in areas potentially impacted by Alternative D cumulative drawdown in the three model time frames. **Table F3.6-1, Appendix F** provides a list of terrestrial wildlife species that occur in these valleys. Figures in Section 3.5.3.9, Vegetation display the incremental contribution of Alternative D cumulative to wetland/meadow and basin shrubland ET vegetation types as well as the number of springs and miles of perennial streams that are in areas potentially impacted by drawdown. Of these 7 valleys, six (Spring, Snake, Cave, Steptoe, Hamlin, and Spring [201]) have all the potential incremental impacts of at least one groundwater dependent habitat coming entirely from Alternative D cumulative pumping. The other valley (Lake) shows potential impacts based the No Action cumulative model results to which Alternative D cumulative contributes incrementally. The location and risk to springs and perennial streams in relation to cumulative drawdown at the various model time frames are displayed in **Appendix F3.3.8**, **Figures F3.3.8B-13** through **F3.3.8B-15**.

3.6.3.10 Alternative E

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

Under Alternative E, surface disturbance impacts would exclude Snake Valley. With this exception, the effects of Alternative E surface disturbance resulting from ROWs and project facilities in combination with other cumulative actions on terrestrial wildlife resources would be the same as discussed for cumulative impacts with the Proposed Action. Maximum future groundwater development facility acreage would be less than under the Proposed Action, see **Table 3.6-18,** lowering the potential for cumulative effects with RFFAs.

Groundwater Pumping Effects

There are nine valleys that have at least one of the three groundwater dependent habitats incrementally impacted by Alternative E cumulative (i.e., have impacts beyond those attributable to the No Action cumulative) in at least one of the three model time frames; these include Spring, Snake, Hamlin, Steptoe, Lower Meadow Valley Wash, Cave, Spring [201], White River, Rose and Eagle. **Table F3.6-22, Appendix F** provides a summary of basins that have groundwater dependent habitats that are in areas potentially impacted by Alternative E cumulative drawdown in the three model time frames. **Table F3.6-1, Appendix F** provides a list of terrestrial wildlife species that occur in these valleys. Figures in Section 3.5.3.10, Vegetation display the incremental contribution of Alternative E cumulative to wetland/meadow and basin shrubland ET vegetation types as well as the number of springs and miles of perennial streams that are in areas potentially impacted by drawdown. Of these 9 valleys, five (Spring, Snake, Cave, Steptoe, Hamlin) have all the potential incremental impacts of at least one groundwater dependent habitat coming entirely from Alternative E cumulative pumping. The other four valleys (Lake, Lower Meadow Valley Wash, White River and Spring [201]) show potential impacts based the No Action cumulative model results to which Alternative E cumulative contributes incrementally. The location and risk to springs and perennial streams in relation to cumulative drawdown at the various model time frames are displayed in **Appendix F3.3.8**, **Figures F3.3.8B-16** through **F3.3.8B-18**.

Table 3.6-18 Summary of Surface Disturbance by Alternative

Alternative	Groundwater Development Future Facilities Construction Disturbance (Acres)	Percent Difference between Proposed Action and other Alternative Groundwater Development Future Facility Construction Disturbance[1]	Maximum Total Project Construction Disturbance (Acres)	Percent Difference between Proposed Action Total Project Acres and other Alternatives	Number of Groundwater Development Basins within which the Alternative would construct Future Facilities
Proposed Action	3,530-8,265	NA	20,568	NA	5
Alternatives A and C	2,035-4,732	-43	17,035	-17	5
Alternative B	4,585	-45	16,888	-18	5
Alternative D	2,470-3,936	-52	12,776	-38	4
Alternative E	1,725-3,987	-52	14,687	-29	4

[1] Based on maximum acres.